DEMOLITION MATERIALS
DEPARTMENT OF THE
ARMY AND THE AIR FORCE
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DESTRUCTION OF AMMUNITION TO PREVENT ENEMY USE

INDEX

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Paragraphs</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>GENERAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II.</td>
<td>Introduction</td>
<td>1, 2</td>
<td>2, 3</td>
</tr>
<tr>
<td></td>
<td>General discussion</td>
<td>3-14</td>
<td>3-13</td>
</tr>
<tr>
<td>2.</td>
<td>EXPLOSIVE CHARGES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II.</td>
<td>General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III.</td>
<td>Demolition charges</td>
<td>15, 16</td>
<td>14</td>
</tr>
<tr>
<td>IV.</td>
<td>Dynamites</td>
<td>17-20</td>
<td>16-26</td>
</tr>
<tr>
<td>3.</td>
<td>PRIMING AND INITIATING COMPONENTS ACCESSORIES AND TOOLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>23, 24</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25-28</td>
<td>32-36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29-31</td>
<td>41-44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32-35</td>
<td>45-46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>36-38</td>
<td>50-52</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39, 40</td>
<td>52-54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41-49</td>
<td>54-69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50-52</td>
<td>70-72</td>
</tr>
<tr>
<td>IX.</td>
<td>Miscellaneous accessories and tools</td>
<td>53-69</td>
<td>75-84</td>
</tr>
<tr>
<td>4.</td>
<td>DEMOLITION KITS</td>
<td>70-75</td>
<td>86-90</td>
</tr>
<tr>
<td>5.</td>
<td>MINE CLEARING DEVICES</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>76, 77</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td></td>
<td>78-86</td>
<td>97-116</td>
</tr>
<tr>
<td></td>
<td></td>
<td>87-94</td>
<td>117-126</td>
</tr>
<tr>
<td></td>
<td></td>
<td>95-99</td>
<td>127-128</td>
</tr>
<tr>
<td>6.</td>
<td>DESTRUCTION OF AMMUNITION TO PREVENT ENEMY USE</td>
<td>100-101</td>
<td>130</td>
</tr>
<tr>
<td>I.</td>
<td>COMPLETE ROUND TABLE</td>
<td>132</td>
<td></td>
</tr>
<tr>
<td>II.</td>
<td>REFERENCES</td>
<td>133</td>
<td></td>
</tr>
<tr>
<td>III.</td>
<td>INDEX OF FORMER NAMES</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>137</td>
<td></td>
</tr>
</tbody>
</table>

*This manual supersedes TM 9-1946, 29 November 1955, including C 3, 26 March 1959; C 4, 19 July 1960; C 5, 31 August 1960; C 7, 23 April 1962; TB 9-1375-200/1, 13 July 1960; TB 9-1375-200/2, 29 July 1960; and TB ORD 671, 18 February 1957.
CHAPTER 1
GENERAL

Section 1. INTRODUCTION

1. Scope

a. This manual provides information of a technical nature pertaining to the classification, identification, care, use, storage, packing and marking, and destruction to prevent enemy use, of demolition materials.

b. For principles, doctrines, and policies governing the tactical use of the demolition materials covered herein, and the training and field operating procedures incident thereto, see FM 5–25.

c. This manual differs from TM 9–1946, 29 November 1955 as indicated in (1) and (2) below:

(1) It adds additional information on packing, Concussion Detonator Kit, M1, dynamite and detonating cord. It also adds coverage on the following items not described in the previous edition:

- CAP, BLASTING: special, electric, M6
- CAP, BLASTING: special, nonelectric, M7
- CHARGE, DEMOLITION: block, M5 (2-1/2 lb, COMP C-3)
- CHARGE, DEMOLITION: block, 1/4 pound (TNT)
- CHARGE, DEMOLITION, INERT: block, M4 (1/2 lb, COMP C-3)
- CONTAINER, DEMOLITION CHARGE: MK1 mod 0
- CONTAINER, DEMOLITION CHARGE: MK3 mod 0
- CONTAINER, DEMOLITION CHARGE: MK7 mod 1
- CONTAINER, DEMOLITION CHARGE: MK7 mod 2
- CONTAINER, DEMOLITION CHARGE: MK7 mod 3
- CONTAINER, DEMOLITION CHARGE: MK7 mod 4
- CONTAINER, DEMOLITION CHARGE: MK7 mod 5
- CONTAINER, DEMOLITION CHARGE: MK7 mod 6
- CONTAINER, DEMOLITION CHARGE: MK7 mod 7
- CONTAINER, DEMOLITION CHARGE: MK7 mod 8
- CONTAINER, DEMOLITION CHARGE: MK8 mod 0
- DEMOLITION KIT, BLASTING: EXPLOSIVE INITIATING ELECTRIC AND NON-ELECTRIC
- DEMOLITION KIT, BLASTING: EXPLOSIVE INITIATING, NONELECTRIC
- DEMOLITION KIT, PROJECTED CHARGE: M3A1
- DEMOLITION KIT, PROJECTED CHARGE: M157
- DEMOLITION KIT, PROJECTED CHARGE M173
- AND DEMOLITION KIT, PROJECTED CHARGE, PRACTICE M174
- DESTRUCTOR, EXPLOSIVE: M19 (T15)
- DETONATOR, PERCUSSION: M1A2 (M1E1), 15-second delay
- DETONATOR, PERCUSSION: M2A1 (M2E1), 8-second delay
- IGNITER, TIME BLASTING FUSE: M60 (T2) weatherproof
- PRIMER, PERCUSSION: M27
- PRIMER, PERCUSSION: M39A1
- TAPE, COMPUTING: demolition charge

(2) It deletes reference to the following items:

- CHARGE, DEMOLITION: block, 1/2 pound, rectangular (nitro-starch)
- CHARGE, DEMOLITION: block,
1 pound, rectangular (nitro-starch)
CHARGE, DEMOLITION: block, (8 lb) (TNT)
CHARGE, DEMOLITION: chain
M1 (eight 2-1/2 lb 75-25 tetrytol charge strung on detonating cord)
DEMOLITION KIT, BLASTING:
set No. 1, engineer squad
DEMOLITION KIT, BLASTING:
set No. 2, engineer platoon
DEMOLITION KIT, BLASTING:
set No. 5, individual
DEMOLITION KIT, BLASTING:
set No. 7, electrical
DEMOLITION TRAINING KIT:
T38
DEMOLITION TRAINING KIT:
T39
DYNAMITE: military, M2
DYNAMITE: military, M3
FIRING DEVICE, DEMOLITION:
M2, pull friction type
RHEOSTAT: Blasting Machine,
testing 6-post
RHEOSTAT: Blasting Machine,
testing 9-post

2. Forms and Reports

a. Accidents. Responsibilities and procedures for preparation of reports of accidents, and recording and reporting requirements for Army accidents, are contained in AR 385-40.

b. Field Report of Accidents. If an accident or malfunction involving the use of ammunition, dynamite, blasting caps, detonating cord, shaped charges, and demolition charges of all types, occurs during training or combat, the occurrence will be reported immediately to the technical service representative under whose supervision the ammunition for the unit involved is maintained or issued. The report will be made by the officer in charge, by the senior noncommissioned officer or enlisted man of the unit involved. All available pertinent facts will be included in the report. It is the duty of the technical service representative to investigate thoroughly all cases of malfunction or accidents observed by him or reported to him and to report all cases, as outlined in AR 700-1300-8.

c. Fires. A fire report will be prepared in all cases of fire or explosion followed by fire that results in loss of life, or damage (if estimated at $50 or more) to Army equipment, materials, structures, plants, systems, timber or grasslands, or other property, (except motor vehicles or aircraft damaged while in use) at all Department of the Army installations. Reports of fire or explosion followed by fire involving ammunition or other explosives are in addition to reports specified in AR 385-40.

d. Report of Hazardous Conditions Involving Military Explosives or Ammunition. Commanding officers of Army installations and activities engaged in the development, testing, manufacture, maintenance, salvage, disposal, handling, transportation, or storage of explosives, or ammunition, will inform the head of the appropriate technical service of concentrations of explosives or ammunition, that are, or may become, hazards and of previously unrecognized hazards or conditions for which existing regulations and instructions appear to be inadequate, in order to permit review by the Armed Services Explosives Safety Board.

e. Equipment Improvement Recommendations or Improvement in Maintenance Procedures. Equipment improvement recommendation (EIR's) on equipment failures and defective new materiel received, or proposed improvements to materiel or maintenance procedures, will be reported on a separate Maintenance Request (DA Form 2407) as prescribed in TM 38-750, and submitted to the Ammunition Procurement and Supply Agency, Joliet, Illinois.

Section II. GENERAL DISCUSSION

3. Types of Demolition Materials

The demolition materials described in this manual (fig. 1) consist of the initiating, priming, and high explosive items comprising a demolition complete round (par. 4), together with the required nonexplo-
Figure 1. Representative types of demolition materials.
sive accessories and tools. Certain demolition materials are grouped into "kits" and "mine clearing devices" (chs. 4 and 5) for convenience in performing specific demolition operations.

4. Demolition Complete Round

a. Definition. A demolition complete round consists of all components of one system of explosives, ranging from the initiating element to the high-explosive element designed to accomplish the demolition, as well as any required nonexplosive elements. A complete round may be issued with all components in the same packing container, group of containers, or with components shipped separately for assembly in the field.

b. Explosive Train. The term explosive train refers to the initiating and explosive elements of a complete round. The components of an explosive train are arranged according to their sensitivity from the very sensitive initiating charge to the relatively insensitive main charge. A demolition complete round designed for cratering operations may serve as an example of a practical explosive train. This complete round might consist of a time blasting fuse igniter M60 (par. 35), a length of time blasting fuse M700 (par. 38), a nonelectric blasting cap M7 (par. 52) and a 40-pound ammonium nitrate cratering charge (par. 18f). The explosive train in this complete round has seven elements and functions in seven steps as follows:

Step 1 — The flash compound in the fuse igniter produces a small intense flame when the primer is struck by the firing pin.

Step 2 — The black powder in the time blasting fuse is ignited by the flame and transmits it to the blasting cap.

Step 3 — The ignition charge in the blasting cap is set off by the flame from the fuse.

Step 4 — The intermediate charge in the blasting cap is detonated by the ignition charge.

Step 5 — The base charge in the blasting cap is detonated by the intermediate charge.

Step 6 — The booster charge in the cratering charge container is detonated by the base charge.

Step 7 — The main charge of ammonium nitrate is detonated by the booster charge.

If any of these seven elements were omitted from this explosive train, it would not function with sufficient reliability for military demolition operations. For example, a blasting cap M7 is not sufficiently powerful to reliably set off an ammonium nitrate charge without a booster. An attempt to do so could result in a dangerous misfire (par. 10). To prevent this and assure reliable detonation, a booster charge of TNT is included in the central portion of the container opposite the priming tunnels.

5. Boobytraps

a. A boobytrap is a hidden explosive charge, having its firing mechanism so placed that it is detonated when an apparently harmless object is disturbed by an unsuspecting person. A boobytrap complete round usually consists of a firing device (pars. 41 to 49) with a nonelectric blasting cap (par. 52) attached, and an explosive charge. The explosive charge may be an artillery shell, a bomb, a land mine or one of the explosive charges described in chapter 2. Figures 2 and 29 illustrate typical boobytrap installations.

b. The initiating component of a boobytrap installation is normally a firing device equipped with safety pins, clips, forks, or keys, known as organic safeties (fig. 3). Figure 29 depicts typical initiating actions for boobytrap installations employing firing devices. The organic safeties of firing devices make them safe and easy to install, arm, and disarm. However, when firing devices are not available, improvised mechanical, chemical, or electrical firing means may be employed if appropriate safety precautions are taken. For detail information on tactical employment of boobytraps, see FM 5-31.

6. Classification

a. General. Demolition materials are classified according to use as service or
training, and according to composition as explosive or nonexplosive.

b. Service Demolition Materials. Service demolition materials may be explosive or nonexplosive. Nonexplosive service demolition materials consist of the accessories and tools (pars. 53-69) required in the installation and testing of demolition complete rounds.

c. Training Demolition Materials. Training demolition materials are inert loaded items which simulate explosive service items. They are used to instruct troops in the proper care, handling, installation, and arming of explosive materials. See paragraph 8b for information on the handling of inert demolition materials. Nonexplosive service demolition materials may be used for training purposes but explosive materials must never be substituted for inert materials in training operations.

7. Identification

a. General. Demolition materials, in common with other types of ammunition, are identified by the standard nomenclature and the lot number of the item. This identification is marked on all containers and on the item itself, unless the item is too small.

b. Standard Nomenclature. Standard nomenclature is established in order that each item supplied may be specifically identified by name. Standard nomenclature consists of the item name, a colon, model
number, and additional item identification established in accordance with Federal item identification guides. The use of standard nomenclature is mandatory for all purposes of record.

c. Ammunition Lot Number. When ammunition is manufactured, an ammunition lot number, which becomes an essential part of the marking, is assigned in accordance with pertinent specifications. The lot number consists, in general, of the loader's initials or symbol, the assigned interfix number, and the serial number of the lot. The parts of the lot number are separated by dashes. This lot number is stamped or marked on every item and on all packing containers. It is required for all purposes of record, including reports on condition, functioning, or accidents in which the ammunition may be involved. In any one lot of ammunition, similar components used in assemblies are manufactured under as nearly identical conditions as possible.

d. Model. To identify a particular design, a model designation is assigned at the time the model is classified as an adopted type. This model designation becomes an essential part of the nomenclature and is included in the marking of the item. The present system of model designation consists of the letter "M" followed by an Arabic numeral, for example, "M1." Modifications are indicated by adding the letter "A" and the appropriate Arabic number. Thus, "M1A1" indicates the first modification of an item for which the original model designation was "M1." Whenever a "B" suffix appears in a model designation it indicates an item of alternative (or substitute) design, material, or manufacture. Certain items standardized for use by both Army and Navy are designated by "AN" preceding the model number. Development items are indicated by the letters "XM" (or "T" for older items) plus an Arabic number and modifications by the addition of "E" and an Arabic numeral. Model designations of items of Navy design consist of "MK" signifying the work "Mark," followed by an Arabic numeral, together with a modification (Mod) number, for example, "MK6 mod 2."

e. Painting. Service demolition materials, except some plastic materials, are painted to prevent rust and in various colors to provide a means of identification. Service explosive demolition materials are lusterless olive drab with marking in yellow. Inert demolition materials, which are used in training, and nonexplosive demolition materials, except certain tools are painted black with marking in white. Some items of practice demolition are painted blue with marking in white.

f. Marking. Demolition materials are marked by stamping or stenciling with the type, size, model, and lot number.

g. Ammunition Data Card. The ammunition data card is a 5- by 8-inch card which is prepared for each lot of accepted ammunition and is furnished with the shipping ticket with each shipment of ammunition. This card contains data concerning the item and its components. Information on the data card includes lot number, date packed, identity of components, assembling and firing instructions, Federal stock number, Department of Defense ammunition code, and other data as required. It is the basic document in the surveillance and use of the item to which it pertains.

h. Federal Stock Number and Department of Defense (DOD) Ammunition Code. The Federal stock number (for example, 1375-028-5148) has replaced the ammunition identification code (AIC) and item stock number. There is a different Federal stock number for each item of supply as packed. The first four positions in a Federal stock number are always the class in which the item belongs. Demolition materials are included in the class number 1375. The next seven positions in a Federal stock number are called the Federal item identification number (FIIN). There is a different FIIN for each item in a supply manual. Thus, the Federal stock number is composed of the class (first four positions) and the FIIN (next seven positions). In connection with the Federal stock number, a Department of Defense ammunition code for interchangeability of ammunition and explosive supplies has been established. This code is composed of four characters consisting of a letter and three
digits (for example, "M038") which is the same for items that are completely interchangeable as to function and use. Hence, wherever the same second part of the code is used as a suffix to two or more Federal stock numbers, the items are interchangeable for issue.

8. Care, Handling, and Preservation—
General Precautions

a. Explosive demolition materials must be handled with appropriate care at all times. The explosive elements in primers, blasting caps, and fuzes are particularly sensitive to shock and high temperatures.

b. Personnel should be trained to handle all demolition items and components as potentially dangerous even though the items have been designated "INERT." The same basic safety rules should be followed when using inert training or lecture aids as prevails when the fully loaded items are being used; striking, dropping, or handling in other than the manner prescribed for explosive loaded (live) items should not be permitted. Personnel should be cautioned to treat all inert-loaded demolition materials and components of demolition materials as requiring the same degree of caution as their explosive-loaded (live) counterparts. In order to make inert items readily identifiable, several holes are drilled or cut in them where practicable. In addition, they are stamped and/or stencilled "EMPTY" if they have no filling and "INERT" if they have an inert filling. (For further information, see AR 385-65).

c. In order to keep explosive demolition materials in a serviceable condition and ready for immediate issue and use, due consideration must be given to the general rules in d through g below.

d. Store explosive demolition materials in the original containers in a dry, well-ventilated place protected from the direct rays of the sun and other sources of excessive heat. Keep sensitive initiators such as primers, blasting caps, fuzes, and igniters separate from other explosives.

e. Keep all demolition materials and containers clean, dry, and protected from possible damage.

f. Disassembly of explosive compo-

nents, without specific authorization, is strictly prohibited.

g. Do not open sealed containers or remove protective safety devices until just before use.

h. Return all demolition material prepared for firing, but not fired, to its original packing and mark it appropriately.

i. Observe all precautions listed throughout this manual. For more detailed information on care, handling, and preservation, and safety distance requirements for preparation of primers and demolition charges, refer to TM 9-1903 and FM 5-25.

9. Preparation for Firing—General
Precautions

a. General.

(1) Do not allow any instructions, or any set of rules, to take the place of care and thought when engaged in demolition work.

(2) Static electricity accumulates on many kinds of ungrounded objects. If allowed to accumulate to the extent that a spark could jump across an air gap in the presence of highly flammable material, a hazard exists. To eliminate this hazard, electrically continuous paths to the ground, called "grounds," must be provided so that static charges will be continuously dissipated. Therefore, all piles and stacks of explosive materials should be wired to grounded objects such as water pipes or metal rods driven into the ground.

(3) Blasting caps (pars. 50 to 52) should be crimped only with the cap crimper (par. 62) to insure a proper joint.

(4) Crimp nonelectric blasting caps 1/8 to 1/4 inch from open end.

(5) Blasting caps weaker than the one prescribed to detonate the explosive to be primed should not be used. Weaker caps may cause dangerous misfires. If only less powerful caps are available, test shots should be made to determine how many caps are required to insure high order detonation.
(6) Nonelectric blasting caps should not be used in underwater charges or charges placed in wet boreholes (par. 52).

(7) Primed explosive charges should not be forced into a borehole. Charges should be tamped with blunt wooden tamping sticks; no tamping should be done with steel bars or tools.

(8) In enlarging operations, do not reload a borehole immediately after exploding a charge in it. Wait until the hole is cool enough to prevent premature explosion of the second charge. Cool the hole with water if necessary.

(9) Dual firing systems should always be used where practicable, to reduce the possibility of misfires (par. 10). Instruction on installing dual firing systems should be included when training personnel in the use of demolition materials. Detailed information on the various types of firing systems may be found in FM 5–25.

(10) In training demonstrations or in testing, do not use larger charges, shorter lengths of fuse, or greater exposure of personnel than is necessary.

(11) To insure the success of nonelectric and electric firing systems, it is necessary to observe the precautions in b and c below.


(1) The burning rate of time blasting fuse should be tested prior to use.

(2) When cutting time blasting fuse, use a fuse cutter (par. 62) or a sharp knife and cut the end square.

(3) Time blasting fuse should not be cut too short. For training purposes, at least 36 inches of fuse should be used, except in training for combat where short lengths are required; in this case, token charges should be used.

(4) When time blasting fuse is to be used for a particular operation, the burning time of the length to be used must not be merely estimated, but determined by a trial with the same length of fuse, under the same conditions of altitude and confinement as expected for service use.

(5) When using time blasting fuse, do not bend or flatten the fuse allowing the powder to spill from the cord, as this may speed up the burning rate.

(6) Before crimping a nonelectric blasting cap to a length of time blasting fuse, examine the end of the cap for foreign substance. If any foreign substance is in the end of the cap, shake lightly, open end down. If this does not remove it, use another cap. Do not attempt to remove it with a nail or similar object.

(7) Do not force, bend, or twist the end of a length of time blasting fuse into a blasting cap.

(8) When using a length of time blasting fuse shorter than 1 foot, tape the connection between the blasting cap and fuse. The tape prevents the flash of a fuse igniter from spitting directly into the cap.

(9) Before igniting a time blasting fuse, make sure that no other explosive charges or blasting caps are close enough to allow the flame from the burning fuse to reach such explosives.

(10) When igniting a time blasting fuse, make certain that it is ignited properly before leaving it; this may be determined by the characteristic smoke and heat. In case of a misfire, where explosives are involved, personnel will not approach the area until a period of 30 minutes, plus burning time of fuse, has elapsed.

c. Electric Firing Systems.

(1) Electric blasting caps and electric blasting circuits may be energized to dangerous levels from outside sources, such as static electricity, stray currents, and currents induced by radio communication equipment and high tension wires. Safety precautions, therefore, will be taken to reduce the possibility
of a premature initiation of the electric blasting cap and explosive charges of which they form a part. Short wave radio must not be operated (either sending or receiving) within 1/4 mile of an electrical blasting or demolition operation and electric blasting caps must not be used within 1 mile of broadcasting or highpower short wave stations. These distances apply to all parts of the operation, including the lead wires of the cap and the firing wire circuit. Before connecting electric blasting caps to the firing wires, the blasting circuit, will be tested to determine if hazards from stray currents are present. A dummy test circuit, essentially the same as the actual blasting circuit, except that a No. 47 radio pilot lamp of known good quality, inserted in place of the blasting cap, should be used without applying electric current to the circuit. If any glow of the radio pilot lamp is observed when viewed in darkness, electric blasting caps must not be used and nonelectric caps and safety fuse substituted. Other suitable instruments, such as the DuPont "Detech-A-Meter," may be used to test the circuit for stray current in lieu of the method described above. If the instrument shows the presence of stray currents, electric blasting caps will not be used.

(2) Charges for electric firing should not be primed or connected during a thunderstorm, or if a thunderstorm is approaching.

(3) Use dual-firing systems (FM 5-25), if practicable, in order to increase the likelihood of a successful operation and to minimize the danger of unexploded charges being left hidden, tamped in the ground, or left unrecovered in shallow water.

(4) When more than one electric blasting cap is used in the same circuit, they must all be the product of the same manufacturer (par. 51).

(5) The short-circuiting tab on the lead wires of electric blasting caps must be removed prior to connecting the caps into a firing circuit.

(6) Lead wires (firing wires) of electric blasting caps should not be connected to a blasting machine until ready to fire the charge; they should not be left attached to a blasting machine after the charge is fired. Blasting machines should be operated vigorously.

10. Misfires and Hangfires

a. General. A misfire is a complete failure to function. A hangfire is the failure to function until an abnormal lag beyond the instant of initiation has occurred.

b. Causes of Misfires and Hangfires.

(1) Electric or nonelectric blasting caps too weak to detonate explosive.

(2) Deteriorated safety fuse or time blasting fuse, detonating cord, or explosive charge.

(3) Improper electric or nonelectric connections.

(4) Improper operations of blasting machine.

(5) Weakened blasting machines.

(6) Failure to make sure that the safety fuse or time blasting fuse has been ignited.

(7) Improperly made priming materials.

(8) Damaged electric or nonelectric firing circuits.

(9) Use of electric caps made by different manufacturers or of different size in the same circuit.

(10) Attempting to fire too many electric caps in same circuit.

c. Electric Misfires. Upon occurrence of a misfire, several successive attempts should be immediately made to fire the electric blasting caps. Should these attempts fail, the connections of the firing wires to the terminals of the blasting machine should be checked, then three more attempts to fire should be made. If the circuit still fails to fire, disconnect the blasting machine, twist the firing wire ends together, investigate the circuit for
shorts and breaks immediately, providing cap is not below ground. If cap is below ground, wait 30 minutes before investigating. If the fault is traced to a break or short circuit of wires below the tamping, for example, beneath the surface in a borehole, great care must be taken to avoid striking the electric blasting cap or the charge. If the fault is not located by removing the tamping to within 1 foot of the charge, place an auxiliary charge of 2 pounds of explosive with a new blasting cap at this point. Disconnect the wires of the original blasting cap from the circuit, connect the wires of the new blasting cap in their place, and replace the tamping. Detonation of the auxiliary charge should then detonate the original charge.

d. Nonelectric Misfires. The firing circuits in which nonelectric misfires occur may be divided into two types: those primed by a blasting cap initiated by time blasting fuse and those primed by detonating cord initiated by a blasting cap.

1. Charge primed with time blasting fuse and nonelectric cap.

(a) If a charger primed with time blasting fuse and nonelectric cap fails to fire, delay investigation until at least 30 minutes because it may be a hangfire. After the lapse of 30 minutes, it may reasonably be considered to be a misfire.

(b) If the misfired charge is not tamped, place a new primer next to the misfired charge. If it is tamped, remove the tamping to within about 1 foot of the charge, place an auxiliary charge of 2 pounds of explosive with a new blasting cap and time blasting fuse at this point, and replace the portion of the tamping that was removed.

(c) If practicable, place additional primed charges near enough to the misfired charge to detonate it rather than disturb the original time blasting fuse, because disturbing the fuse might cause a possible smoldering section in the fuse to resume normal burning.

(2) Charges primed with detonating cord.

(a) If a nonelectric blasting cap is used to fire a charge primed with a detonating cord, and the cap fails to detonate, delay investigation at least 30 minutes. After the lapse of 30 minutes, cut the detonating cord main line between cap and charge and fasten a new cap to the detonating cord.

(b) If an electric blasting cap is used to fire detonating cord and the cap fails to detonate, follow the procedure set forth in (c) above. If necessary, and practicable, fasten a new blasting cap on the detonating cord.

e. Prevention of Misfires and/or Hangfires. Care in placing charges, in making up and placing priming systems, and in connecting firing circuits will prevent many misfires and hangfires. In most cases, the use of dual firing systems (FM 5-25) will eliminate the possibility of misfires.

11. Storage of Demolition Materials

a. Temporary Magazine Locations.

(1) Accessibility, safety, dryness, and good drainage determine the magazine location. An isolated ravine is a good location if it is not subject to flash floods from heavy rains and cloudbursts. When single magazines are not isolated or where magazines are built in groups, each magazine should be surrounded with breastworks or baffle walls to minimize damage to adjacent structures in case of an explosion and to protect magazines from bomb and shell fragments.

(2) TM 9-1903 gives the distances at which magazines should be located from other magazines, buildings, and routes of communication.

b. Temporary Magazine Construction.

(1) Temporary magazines made of heavy, sheet-iron sections are the most satisfactory, but care must be taken to prevent them from becoming too hot if exposed to the sun,
particularly in hot climates. This may be done by using a double roof; the lower roof of lumber and the upper roof of metal, and a space for free circulation of air between the two. If a single roof of sheet iron is used, some protection against intense heat is gained by painting the outer surface with aluminum paint.

(2) The types of structures described in (a) through (d) below may be used for storage of moderate sized stocks of explosives.

(a) A chamber excavated in a dry bluff, timbered to prevent cave-ins.

(b) An isolated house or shed.

(c) A light wooden frame erected on the plan of a box house with a wedge roof and covered with lightweight corrugated iron.

(d) A light wooden frame as described in (c) above covered with a tent or with canvas tarpaulins.

c. Field Storage. In overseas commands and combat areas, the storage provisions of FM 9-5 should be observed.

d. Operation. Magazine operation should be based on the precautions in (1) through (12) below.

(1) Blasting caps will not be stored in the same magazine with other explosives. Primed demolition blocks or cartridges will not be kept in a magazine.

(2) Older explosives will be shipped first. Stocks should be arranged so that old stocks will be most readily accessible.

(3) Safety hand tools (nonsparking) must be used in buildings and at operations involving loose or bulk explosives, exposed explosives, and in the presence of hazardous concentrations of flammable gases and vapors.

(4) Matches, fire, nonsafety lamps, or spark-producing devices will not be allowed in a magazine.

(5) Cases of dynamite and any other nitroglycerin explosives will be stored right side up, not on sides or ends, so the sticks will lie horizontally.

(6) Miscellaneous material will not be stored in a magazine with explosives.

(7) The grounds around magazines should be kept free from brush, dry leaves, or grass. A fence, preferably of barbed wire, should be erected around a magazine area.

(8) Packages of explosives may not be opened at a distance of less than 100 feet from a magazine or dump.

(9) Only regulation safety shoes should be worn in magazines. Shoes having exposed nails, metal plates, or cleats are not permitted.

(10) Explosives should be stacked on planks or wooden mats for ventilation and protection against moisture. Explosives will not be stored in a damp place.

(11) Explosives will not be handled or stored in or near occupied buildings.

(12) Commercial dynamite should be turned periodically depending on temperature (see TM 9-1903 for detailed instructions).

12. Packing and Marking for Shipment

a. General. Packing data for demolition materials are given in SM 9-5-1375.

b. Packing. Moisture-resistant containers are used for most demolition explosives. These packing containers are marked to furnish all essential information.

c. Sealing. After the contents are packed properly, each container is sealed in a manner which will indicate whether the container has been tampered with. Seals are stamped with the letters "U.S."

d. Palletization. Palletization is employed to reduce handling time and save man-hours in storing and shipping certain types of ammunition.

e. Marking for Shipment.

(1) Packages are marked in accordance with user requirements, DOD and Army Regulations, Military Specifications, and Interstate
Commerce Commission (ICC) Regulations.

(2) Each package of supplies turned over for shipment on a government bill of lading is marked with the following:

(a) Name and address of destination or post office (or code marking) preceded by "To."

Note. This may be omitted on individual packages in carload shipments of packages of standard weights and dimensions containing standard quantities.

(b) Name and address of ultimate consignee preceded by word, "For." The exception noted in (a) above also applies here.

(c) Full, or abbreviated, description of contents.

(d) ICC shipping name and dangerous commodity designation.

(e) Federal stock number of class of Federal item identification number.

(f) Gross weight in pounds and displacement in cubic feet.

(g) The number of the package or shipping ticket. The exception noted in (a) above also applies here.

(h) The letters "U. S." in several conspicuous places.

(i) Order number of contract number.

(j) Ordnance insignia.

(k) Name or designation of consignor preceded by the word, "From." The exception noted in (a) above also applies here.

(l) Ammunition lot number.

(m) Month and year packed.

(n) Inspector's stamp.

(3) Wooden packing boxes are unpainted with marking in black.

13. Transportation

Transportation of explosives by rail or truck in the United States is regulated by Interstate Commerce Commission Regulations for Transportation of Explosives and other Dangerous Articles by Freight, published by the Bureau of Explosives.

14. Destruction of Unserviceable Demolition Materials

Demolition materials which are unfit for salvage or are unsafe to handle are disposed of by such methods as detonation, burning, or dumping at sea as described in TM 9-1903.
CHAPTER 2
EXPLOSIVE CHARGES

Section I. GENERAL

15. Uses

The items described in this chapter are the explosive charges used in military demolition operations which include both military explosives (pars. 17 through 20) and commercial dynamites (pars. 21 and 22). In addition to being used as the principal component of demolition charges, military explosives are also used in the initiating and priming components described in chapter 3 (pars. 23 through 52). Demolition explosives may be used for improvised land mines and boobytraps; and, when necessary, land mines, artillery projectiles, and bombs may be used for demolition operations. For tactical employment of the demolition materials described in this manual, see TM 5-220, FM 5-25, and FM 5-31.

16. Characteristics

a. The desirable properties of demolition charges for efficient and safe operation are:

   (1) Relative insensitivity to shock or friction including insensitivity to bullet impact.
   (2) Sufficient sensitivity to be positively detonated by simple initiators.
   (3) Proper detonating velocity for intended purposes.
   (4) High power per unit of weight consistent with required insensitivity.
   (5) Storage stability at temperatures between -80° F. and + 165° F. with sufficient stability to retain usefulness for a reasonable time in any climate.
   (6) Suitability for underwater use.
   (7) Convenient size and shape to facilitate packaging, logistics, and handling by troops.
   (8) High density (weight per unit of volume).

b. The principal types of explosives commonly used for demolition purposes are shown in table I. This table may be used to determine the appropriate explosive for a given operation. In using the table to determine the proper type of explosive to be employed for a specific purpose, the velocity of detonation should be considered. Explosives with a high velocity of detonation are best for cutting and breaching operations, while those with a lower velocity of detonation are best for cratering, ditching, and quarrying operations. For more detailed information on the characteristics of military explosives, see TM 9-1910.

Table I. Characteristics of Principal United States Explosives Used for Demolition

<table>
<thead>
<tr>
<th>Name</th>
<th>Principal use</th>
<th>Smallest cap* required for detonation</th>
<th>Velocity of detonation (meter/sec) (feet/sec)</th>
<th>Relative effectiveness as external charge (TNT=1.00)</th>
<th>Intensity of poisonous fumes</th>
<th>Water resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNT--------</td>
<td>Main charge, booster charge, cutting and breaching charge, general and military use in forward areas.</td>
<td>Special blasting cap.</td>
<td>6,900 mps., 23,000 fps.</td>
<td>1.00</td>
<td>Dangerous</td>
<td>Excellent</td>
</tr>
<tr>
<td>Tetrytol</td>
<td></td>
<td></td>
<td>7,000 mps., 23,000 fps.</td>
<td>1.20</td>
<td>Dangerous</td>
<td>Excellent</td>
</tr>
<tr>
<td>Composition C-3---</td>
<td></td>
<td></td>
<td>7,625 mps., 25,055 fps.</td>
<td>1.34</td>
<td>Dangerous</td>
<td>Good</td>
</tr>
<tr>
<td>Composition C-4---</td>
<td></td>
<td></td>
<td>8,040 mps., 26,481 fps.</td>
<td>1.34</td>
<td>Slight</td>
<td>Excellent</td>
</tr>
<tr>
<td>Name</td>
<td>Principal use</td>
<td>Smallest cap* required for detonation</td>
<td>Velocity of detonation (meter/sec) (feet/sec)</td>
<td>Relative effectiveness as external charge (TNT-1.00)</td>
<td>Intensity of poisonous fumes</td>
<td>Water resistance</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>----------------------------------------</td>
<td>--------------------------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------------------</td>
<td>-----------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Ammonium Nitrate—</td>
<td>Cratering and ditching.</td>
<td></td>
<td>3,400 mps. 11,000 fps.</td>
<td>0.42</td>
<td>Dangerous</td>
<td>Poor</td>
</tr>
<tr>
<td>Military Dynamite Ml.</td>
<td>Quarry and rock cuts.</td>
<td></td>
<td>6,100 mps. 20,000 fps.</td>
<td>0.92</td>
<td>Dangerous</td>
<td>Good</td>
</tr>
<tr>
<td>Straight Dynamite 40% (commercial) 50%</td>
<td>Land clearing, cratering, quarrying, and general use in rear areas.</td>
<td>No. 6 commercial cap.</td>
<td>4,600 mps. 15,000 fps. 5,500 mps. 18,000 fps. 5,800 mps. 19,000 fps.</td>
<td>0.65 0.79 0.83</td>
<td>Dangerous</td>
<td>Good (if fired within 24 hours).</td>
</tr>
<tr>
<td>Ammonia Dynamite 40% (commercial) 50% 60%</td>
<td>Land clearing, cratering, quarrying, and general use in rear areas.</td>
<td>No. 6 commercial cap.</td>
<td>2,700 mps. 11,000 fps. 3,400 mps. 11,000 fps. 3,700 mps. 12,000 fps.</td>
<td>0.41 0.46 0.53</td>
<td>Dangerous</td>
<td>Poor</td>
</tr>
<tr>
<td>Gelatin Dynamite 40% (commercial) 50% 60%</td>
<td>Land clearing, cratering, quarrying, and general use in rear areas.</td>
<td>No. 6 commercial cap.</td>
<td>2,400 mps. 7,900 fps. 2,700 mps. 8,900 fps. 4,900 mps. 16,000 fps.</td>
<td>0.42 0.47 0.76</td>
<td>Slight</td>
<td>Good</td>
</tr>
<tr>
<td>Ammonia Gelatin Dynamite (commercial) 60%</td>
<td>Land clearing, cratering, quarrying, and general use in rear areas.</td>
<td>No. 6 commercial cap.</td>
<td>4,900 mps. 5,700 mps.</td>
<td>0.50</td>
<td>Slight</td>
<td>Excellent</td>
</tr>
<tr>
<td>PETN ————</td>
<td>Detonating cord Blasting caps. Special blasting cap N/A</td>
<td></td>
<td>7,300 mps.</td>
<td>1.66</td>
<td>Slight</td>
<td>Good</td>
</tr>
<tr>
<td>TETRYL ————</td>
<td>Booster charge. Special blasting cap N/A</td>
<td></td>
<td>7,100 mps.</td>
<td>1.25</td>
<td>Dangerous</td>
<td>Excellent</td>
</tr>
<tr>
<td>Composition B ————</td>
<td>Shaped charges. Special blasting cap N/A</td>
<td></td>
<td>7,800 mps.</td>
<td>1.35</td>
<td>Dangerous</td>
<td>Excellent</td>
</tr>
<tr>
<td>Amatol 80/20—————</td>
<td>Bangalore torpedo Special blasting cap</td>
<td></td>
<td>4,900 mps.</td>
<td>1.17</td>
<td>Dangerous</td>
<td>Poor</td>
</tr>
<tr>
<td>Black Powder ————</td>
<td>Time blasting fuze. N/A</td>
<td></td>
<td>400 mps.</td>
<td>0.55</td>
<td>Dangerous</td>
<td>Poor</td>
</tr>
</tbody>
</table>

* Electric or nonelectric

**Abbreviations**

fps .... feet per second  No. .... number
mps .... meters per second sec .... second(s)
N/A .... not applicable
Section II. DEMOLITION CHARGES

17. General

Demolition charges include block charges and shaped charges. They are used for general demolition, cutting, breaching, cratering, and destruction of abandoned equipment and ammunition. Table II presents data on use and packing for various standard military demolition charges.

18. Block Demolition Charges

a. General. Block demolition charges are used in general demolition operations such as cutting, breaching, and cratering. They are composed of the high velocity explosives amatol, composition B, composition C series, tetrytol and TNT, and the low velocity explosive ammonium nitrate. With the exception of the 40-pound ammonium nitrate block demolition charge and the 1/4-pound TNT block demolition charge, which are made in cylindrical form, block charges are made in the form of rectangular blocks. The various block charges available are described in table II and b through g below.

b. Charge, Demolition: Block, M2 (2-1/2 Pound, 75-25 Tetrytol). The block demolition charge M2 (fig. 4) is a block of tetrytol (75% Tetryl and 25% TNT) with a tetryl booster pellet and threaded cap well cast in each end. The tetryl pellet is more sensitive than the tetrytol and gives the explosive force of the primer a "boost" to assure high order detonation of the tetrytol. The threaded cap well is designed to receive a detonator, a primed firing device, or a priming adapter with an electric or nonelectric blasting cap. Tetrytol is more powerful and more brisant than TNT (ebelow). For demolition work, it is effective as a cutting or breaching charge but is not desirable as a cratering charge. Tetrytol is only slightly soluble in water. It is brittle and breaks very easily when dropped. Each block is wrapped in olive-drab, asphalt-impregnated paper.

Table II. Demolition Charges and Containers

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Uses</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Description</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block M2 (2-1/2-lb., 75-25 tetrytol).</td>
<td>General demolitions cutting, breaching.</td>
<td>8/haversack, 2 haversack (16 chg)/wdn bx.</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block M3 (2-1/4-lb., comp C-2).</td>
<td>General demolitions cutting, breaching.</td>
<td>8/haversack, 2 haversack (16 chg)/wdn bx.</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block M3 (2-1/4-lb., comp C-3).</td>
<td>General demolitions cutting, breaching.</td>
<td>8/haversack, 2 haversack (16 chg)/wdn bx.</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block (1/4-lb., TNT).</td>
<td>General demolitions cutting, breaching.</td>
<td>200/wnbx, ------</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block (1/2-lb., TNT).</td>
<td>General demolitions cutting, breaching.</td>
<td>100/wnbx ------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>108/wnbx ------</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block (1-lb, TNT).</td>
<td>General demolitions cutting, breaching.</td>
<td>50/wnbx ------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>56/wnbx ------</td>
</tr>
<tr>
<td>Nomenclature</td>
<td>Uses</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block ammonium nitrate, 40-lb (cratering).</td>
<td>Ditching and cratering.</td>
<td>1/mtl cntr, 1 cntr (1 chc)/wdn bx.</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block ammonium nitrate, 40-lb (cratering).</td>
<td>Ditching and cratering.</td>
<td>1/wtrpf-papr bag/wdn bx.</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: linear (component of DEMOLITION KIT, PROJECTED CHARGE, M2).</td>
<td>Mine clearing breaching obstacles.</td>
<td>as required</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: linear (Component of DEMOLITION KIT, PROJECTED CHARGE, M2A1, M3).</td>
<td>Mine clearing breaching obstacles.</td>
<td>2/wdn bx</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: Springing charge----</td>
<td></td>
<td>20/wdn bx</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: Shaped 15-lb, M2A3.</td>
<td>penetrating steel plate, concrete, ice.</td>
<td>1/wtrprf-wrppd ctn, 2 ctn (2chgl/wdn bx, 3 chc/wdn bx</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: shaped 40-lb, M3.</td>
<td>penetrating steel plate, concrete, ice.</td>
<td>1 chc/wdn bx</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION, INERT: block, M4 (1/2-lb, Comp C-3).</td>
<td>Training</td>
<td>Packed as required</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION, INERT: block, 2-1/2-lb, M5 (T1).</td>
<td>Training</td>
<td>Packed as required</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION, INERT: block, 1-lb (TNT).</td>
<td>Training</td>
<td>Packed as required</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION, INERT: chain, M1 (eight 2-1/2-lb inert blocks).</td>
<td>Training</td>
<td>Packed as required</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION, INERT: shaped, 15-lb M2A3.</td>
<td>Training</td>
<td>Packed as required</td>
</tr>
<tr>
<td>CHARGE, DEMOLITION, INERT: shaped, 40-lb M3.</td>
<td>Training</td>
<td>Packed as required</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 1 mod O (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>Packed as required</td>
</tr>
</tbody>
</table>
### Table II. Demolition Charges and Containers—Continued

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Uses</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 2 mod 0 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>1. 50/wn box ------- 2. packed as required</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 3 mod 0 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>1. 50/egg cr. 2 cr (100 cntr) crdbd ctn. 2. packed as required</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 7 mod 1 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>50/egg cr, 2 cr (100 cntr)/frbd cntr.</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 7 mod 2 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>50/egg cr, 2 cr (100 cntr)/frbd cntr.</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 7 mod 3 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>50/egg cr, 2 cr (100 cntr)/frbd cntr.</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 7 mod 4 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>50/egg cr, 2 cr (100 cntr)/frbd cntr.</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 7 mod 5 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>packed as required---</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 7 mod 6 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>packed as required---</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 7 mod 7 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>packed as required---</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 7 mod 8 (for shaped charge).</td>
<td>Opening explosive filled ordnance.</td>
<td>packed as required---</td>
</tr>
<tr>
<td>CONTAINER, DEMOLITION CHARGE: MK 8 mod 1 (for shaped charge).</td>
<td>Opening explosive filled ordnance underwater.</td>
<td>100/wtrprfd wrpd frbd cntr, 1 cntr (100 cntr)/wn bx.</td>
</tr>
</tbody>
</table>

**Abbreviation:**
- bx .... box (es)
- chg .... charge
- cntr .... container
- cr .... crate
- ctn .... carton
- frbd .... fiberboard
- npr .... paper
- wtrf .... wooden
- wtrpf .... waterproof

### c. Charge, Demolition: Block, M3 (2-1/4 Pound, Composition C-2 or Composition C-3).

1. **General.** The block demolition charge M3 (fig. 5) is available in either explosive composition C2 or C3. These two explosives are similar and may be used interchange-
ably. They are pliable and may be molded at temperatures between -20° F. and +125° F. However, composition charges are not so easily molded at temperatures below freezing and, although body heat can keep the material pliable, emitted gases will cause sickening headaches. Composition C2 and composition C3 are more powerful than TNT (see below) and of about the same sensitivity. The plasticity of the material permits it to be molded by hand like putty and packed into intimate contact with irregular objects with resulting high demolition efficiency. Being insoluble in water, block demolition charges of composition C2 and C3 are suitable for underwater demolition. Initiation may be by detonating cord tied in a double knot, with the plastic explosive molded into a ball around the knot or by a special blasting cap inserted into the explosive with at least 1 inch of explosive over the explosive end of the cap and at least 1/2 inch around the sides and other end of the cap.

(2) Precautions.

(a) These compositions must not be exposed to open flame, as they ignite easily and burn with intense heat. If burned in large quantities, they may explode.

(b) They should not be stored below -20° F. because they become brittle, nor above +125° F. because they exude some of their oils. They may exude some oils at ordinary temperatures but this does not materially affect their sensitivity or other characteristics.

(c) They should not be used in closed spaces, because they produce poisonous gases when exploded.

d. Charge, Demolition: Block M5 (2-1/2 Pounds, Composition C3) and Block M5A1 (2-1/2 Pounds, Composition C4).

demolition charges M5 and M5A1 are similar in appearance and construction. They differ principally in length and type of explosive. The block demolition charge M5 is 12 inches long and is made of composition C3; while the block demolition charge M5A1 is 11-3/4 inches long and is made of composition C4. See b above for a description of composition C3 and the general properties of plastic explosives. Composition C4 has many advantages over composition C3; it is more powerful, it may be molded over a broader range of temperatures (-70° F to 170° F), it is more stable, it is less sticky and will not adhere to hands, and it is less subject to water erosion when used for underwater work. The explosive for both block demolition charges is packed in white plastic containers with a threaded cap well in each end. Bulk explosive is obtained by breaking open the plastic container. The block demolition charge M5A1 is a component of the demolition charge assembly M37 (par. 74), and the demolition kits described in paragraphs 71 and 72.

e. Charge, Demolition: Block (1/4-Pound, TNT), (1/2-Pound TNT), and (1-Pound, TNT).

(1) General. Trinitrotoluene (TNT) is one of the most important of military explosives. It has a high detonating velocity and is therefore used in general demolitions primarily for cutting and breaching. It can be burned in the open in small quantities without exploding. If an attempt is made to destroy it by burning when confined or in large quantities, it will explode. It is relatively insensitive to shock. Although it may not be exploded by the impact of a single rifle bullet, it would probably be exploded by concentrated rifle or machine gun fire. TNT is insoluble in water and can therefore be used in underwater charges. TNT block demolition charges (fig. 6) are available in three sizes, 1/4-pound, 1/2-pound and 1-pound. The 1/4-pound block demolition charge is issued in a cylindrical olive-drab plastic container; and the 1/2-pound and 1-pound block demolition charges are
issued in rectangular olive-drab plastic containers. All three have threaded cap wells at one end to receive detonators, primed firing devices, and priming adapters with electric or nonelectric special blasting caps.

(2) Special Precautions.

(a) TNT is not recommended for use in closed spaces, because its explosion produces poisonous gases.

(b) TNT should be detonated by special electric or nonelectric blasting caps, detonating cord, or any firing devices using special blasting caps.

f. Charge, Demolition: Block, Ammonium Nitrate, 40 Pound (Cratering).

(1) General. Ammonium nitrate is the least sensitive military explosive. In order to permit priming by ordinary means, the 40-pound ammonium nitrate block demolition charge (fig. 7) is provided with a TNT booster in the central portion opposite the priming tunnels. Ammonium nitrate has a very low detonating velocity and is therefore unsuitable for cutting and breaching operations. However, the low detonating velocity produces a pushing or heaving affect which makes it well suited for cratering and ditching operations. Ammonium nitrate readily absorbs moisture. The more moisture it absorbs the less sensitive to initiation and the less efficient it becomes. It is not possible to initiate wet ammonium nitrate.

(2) Description. In the 40-pound ammonium nitrate block demolition charge (fig. 7), the ammonium nitrate is packed in a watertight cylindrical metal container (fig. 7). Priming tunnels are attached to the outside of the container midway between the ends. One tunnel serves as a capwell for priming the block demolition charge with an electric or nonelectric special blasting cap. The other tunnel is for priming with detonating cord passed through the tunnel and knotted at the end. A cleat between the tunnels is provided for securing time blasting fuse, electrical firing wire or detonating cord in place. A metal ring is provided on the top of the container for lowering the charge into a hole.

g. Inert Block Demolition Charges.

(1) General. The block demolition M5 (above) and the 1-pound TNT block demolition charge (e above) are available in inert form for training purposes. Except for color, marking, and loading, these block demolition charges are identical to their service counterparts. See paragraphs 7 and 8 for information on color, marking, and handling of inert demolition materials. Table II lists two inert demolition charges which do not have service counterparts. These items are described in (2) and (3) below.

(2) Charge, Demolition, Inert: Block, M4 (1/2-lb, Composition C3). The inert block demolition charge M4 has no standard service counterpart. It is issued for use in training personnel in the handling and use of plastic explosives. It is issued in a black paperboard carton, perforated around the center perpendicular to the long axis, and imprinted in white. Its approximate dimensions are: length 7 inches, width 1 inch, and height 1-1/2 inches.

(3) Charge, Demolition, Inert: Chain, M1 (eight 2-1/2-Pound Inert Block Demolition Charges). ct demolition charge M1 has no standard service counterpart. It is issued for use in training personnel in the handling and use of cast block demolition charges. The chain inert demolition charge consists of eight inert blocks of tetrytol (similar to the block demolition charges described in a above) strung on a 16 foot length of inert
Figure 4. Charge, demolition: block, M2 (2-1/2-pounds, 75-25 tetrytol).

Figure 5. Plastic demolition charges.
detonating cord and packed in a haversack 8 inches wide, 4 inches deep, and 11 inches high.

19. Shaped Demolition Charges

a. General. Shaped demolition charges used in military demolition operations consist of cylindrical blocks of high explosive having a conical or hemispherical metal-lined cavity in one end and a conical shape with blasting cap well at the other end. Detonation of the charge starts at the cap well and travels to the cavity where the detonation wave is said to be "focussed" to produce a narrow concentrated detonation jet resulting in penetration that is greater than could be produced without the cavity.

With this effect, called "Munroe effect," boreholes can be blasted in steel, concrete, and similar material. Maximum penetration of a shaped demolition charge is obtained when it is exploded at an optimum distance, called "stand-off," from its target. This distance is provided for by a fiber sleeve or metal legs supporting the charge at the time of firing. Maximum effect is produced by a stand-off of one to one and a half times the diameter of the charge. A carrying strap is attached to the charge for suspending it in a horizontal position for firing against a vertical surface. Penetration data are given in table III. A more detailed description of the "Munroe effect" and the functioning of shaped charges may be found in TM 9-1910.
Figure 7. Charge, demolition: block, ammonium nitrate, 40-pound (cratering).
Table III. Penetration of Shaped Demolition Charges

<table>
<thead>
<tr>
<th>Model No. of shaped demolition charge</th>
<th>Reinforced concrete</th>
<th>Armor Plate</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Perforation(^1) (in.)</td>
<td>Perforation(^2) (in.)</td>
<td>Diameter of hole (in.)</td>
</tr>
<tr>
<td></td>
<td>Entrance</td>
<td>Average</td>
<td>Minimum</td>
</tr>
<tr>
<td>M2A3</td>
<td>36</td>
<td>30</td>
<td>3-1/2</td>
</tr>
<tr>
<td>M3</td>
<td>60</td>
<td>60</td>
<td>5</td>
</tr>
</tbody>
</table>

\(^1\) Thickness of wall that can be perforated with charge.

\(^2\) Depth of penetration when thickness is too great for perforation.

b. Special Precautions in Use. In using the shaped demolition charges, the precautions in (1) through (8) below should be observed.

(1) The charge should be centered over the point to be attacked.

(2) The axis of the charge should be in line with the direction of the hole desired. If the target is other than horizontal, the charge should be tied, taped, or propped in place.

(3) The proper stand-off can be obtained by using the legs or pedestal provided for the purpose.

(4) There should be no obstruction in the conical cavity or between the charge and target, as any obstruction will materially reduce penetration effect.

(5) Although the principal effect of a shaped demolition charge is in its piercing jet, considerable blast and fragmentation effect will be produced in all directions, especially directly opposite the direction of the jet. Personnel in the open should withdraw a minimum of 900 feet. If adequate cover is provided, 300 feet is sufficient.

(6) Since pentolite is somewhat more sensitive than TNT, shaped demolition charges containing pentolite should be handled with appropriate care.

(7) In using several charges at one time, 15-pound charges should not be placed closer than 5 feet from each other unless they can be fired simultaneously, that is, by exactly equal lengths of detonating cord detonated by a single cap or main cord. Similarly, 40-pound charges should not be placed closer than 8 feet apart.

(8) When shaped demolition charges are used to blast boreholes for two-stage demolitions, care should be taken to allow the hole to cool sufficiently before loading the second demolition charge over the hole.

c. Charge, Demolition: Shaped 15-Pound, M2A3. This charge (fig. 8) contains approximately 12 pounds of 50/50 pentolite, or composition B with a 50/50 pentolite booster, in a moisture-resisting molded fiber container. The charge may be used in wet locations without deformation of the case. The top of the charge has a threaded cap well for receiving a blasting cap and adapter or any standard firing device. A cylindrical fiber base slips on the end of the charge, to hold the charge at the proper stand-off distance. A
cone of glass is used as a cavity liner in this charge. This charge will pierce 36 inches of reinforced concrete (4,000 to 5,000 psi compressive strength) or, in a wall of greater thickness, will produce a hole 30 inches deep and 2 to 3-1/2 inches in diameter.

d. Charge, Demolition: Shaped, 40-Pound, M3. This charge (fig. 9) contains approximately 30 pounds of 50/50 pentolite, or composition B with a 50/50 pentolite booster, in a metal container. The cavity liner is made of metal. A threaded cap well is provided for receiving a blasting cap and adapter or any standard firing device. A metal tripod for gaging correct stand-off distance is shipped unassembled, but nested with the charge in the same container. This charge will penetrate 60 inches of reinforced concrete (4,000 to 5,000 psi compressive strength) with a hole tapering from 5 inches to 2-1/2 inches in diameter.

e. Shaped Demolition Charge Containers.

1) General. Shaped demolition charge containers (fig. 10) are designed for use in opening explosive-filled ordnance by initiating low-order detonation. When filled with composition C series plastic explosive, the liners mold the explosive to produce a shaped charge. Shaped demolition charge containers are available in several shapes and sizes designed for various types of operations. For additional information on the use of shaped demolition charge containers for explosive ordnance disposal, see TM 9-1984. The following special precautions must be observed in using shaped demolition charge containers.

(a) The plastic explosive must be carefully packed and tamped into the container to prevent formation of cavities or voids which would be detrimental to the high-speed jet formed when the charge is exploded.

(b) The charge should be primed with an electric or nonelectric special blasting cap inserted into the plastic explosive.

(c) In order to minimize the possibility of initiating high-order detonation, care should be taken to avoid "aiming" the shaped demolition charge at the booster in explosive-filled ordnance.

(d) The possibility of initiating high-order detonation should always be assumed and appropriate cover should be taken when using shaped demolition charge containers for opening explosive-filled ordnance.

2) Container, Demolition Charge: MK1 Mod 0 (for shaped demolition charge). This container (fig. 10) was developed for demolition purposes and for the disposal of explosive-filled projectiles. When used for demolition purposes, it will penetrate 3.2 inches of homogenous armor or 12 inches of reinforced concrete. The MK1 container has been used successfully to initiate high-order detonation of explosive-filled ordnance from a distance of 2 meters.

3) Container, Demolition Charge: MK2 Mod 0 (for demolition charge). When loaded with 0.6 ounce of plastic explosive, this container is intended to open thin-skinned, explosive-filled ammunition or charges by initiating low-order functioning. A stand-off distance of 8 inches is provided by three wire legs. This is considered the stand-off most likely to produce consistent low-order functioning of thin-skinned, explosive-filled demolition materials or ammunition. Due to a variation in optimum stand-off distance, the jet will not always penetrate the explosive covering. If the demolition materials or ammunition items fails to initiate "low order" after the first shot, a second shot may be made at a different spot, using the same stand-off distance. If this fails, the stand-off distance should be lessened by 2 inches on each successive shot until the item is opened. Successive shots should
always be made at different spots to minimize the possibility of initiating high-order detonation.

(4) Container, Demolition Charge: MK3 Mod 0 (for demolition charge). This container (fig. 10), when loaded with 1.3 ounces of plastic explosive, is used for disposal of explosive-filled ordnance buried in sand, mud, or earth. The stand-off distance of 6 inches, provided by the metal legs, is recommended as the one most likely to give consistent low-order detonation of explosive-filled ordnance buried under 1 foot of hard-packed earth. Due to a variation from the optimum stand-off distance, the jet will not always penetrate the explosive covering. If the material fails to initiate functioning low order after the first shot, follow the procedure described in (3) above.

(5) Container, Demolition Charge: MK7 series. The demolition charge container MK7 series consist of eight sizes of linear demolition charge containers designated mod 1 through mod 8. Figure 10 shows a typical container MK7. Each container is in the shape of a long narrow metal rectangle with a wedge-shaped cavity liner and metal legs. The wedge in the bottom of the rectangle provides the shape of the charge. Legs are supplied to provide the proper stand-off distance and clips are provided to attach equal-size containers together end to end. The linear container MK7 series is designed to open cases of explosive-filled ordnance such as mines or projectiles underwater. When loaded with composition C series plastic explosive and properly placed, it produces a straight linear cut. In priming, a special electric blasting cap is secured in the detonator holder with the end pressed against the explosive filler.

20. Linear Demolition Charges

a. General. The demolition charges described in this paragraph are all components of kits described in chapters 4 and 5; however, they may be ordered separately. They are referred to as linear demolition charges because their lengths are much greater than their other dimensions. Although these charges were all designed for specific operations, they may
be used in general demolition operations. Sometimes demolition problems arise when the rod-like shape of a linear charge would have distinct advantages, for example, in breaching barbed wire entanglements or tall fences.

b. Charge, Demolition: Linear (Component of Demolition Kit: Projected Charge, M2). This linear demolition charge is a component of Demolition Kit, Projected Charge, M2 (par. 78) but is not issued with the kit. It must be ordered separately. Each charge is a round tube 3-3/4 inches in diameter and 4 feet long with a threaded cap well in one end for use when it is used individually for general demolition work. It contains 20 pounds of explosives consisting principally of 80/20 amatol, with a 6-inch booster charge of crystalline TNT in each end.

c. Charge, Demolition: Linear (Component of Demolition Kits: Projected Charge, M2A1 and M3). This demolition linear charge is a component of Demolition Kits, Projected Charge, M2A1 and M3 (par. 79). The charge is usually issued with the kit but it may also be ordered separately. Each charge is an elliptical, aluminum tube, 5-3/8 inches wide, 3-3/4 inches high, and 5 feet long with a threaded cap well in one end for use when it is used individually for general demolition work. It contains 35 pounds of explosives consisting principally of 80/20 amatol, with a 6-inch booster charge of crystalline TNT in each end.

d. Charge, Demolition: Linear (Component of Explosive Kit, Earth Rod: Set No. 1). This linear demolition charge (W, fig. 61) is a component of Explosive Kit, Earth Rod: Set No. 1 (par. 73); however, it must be ordered separately. As a component of this kit, it is used to enlarge holes made with the earth rod. Each charge consists of two explosive-filled plastic tubes, 3/4-inch in diameter and 3 feet long, joined in the center by a sleeve to produce a charge 6

Figure 8. Charge, demolition: shaped, 16-pound, M2A3.

Figure 9. Charge, demolition: shaped, 40-pound, M3.
feet in length. Each 3-foot plastic tube contains 0.6 pound of composition B. An RDX booster charge surrounds a threaded cap well at one end. The 3-foot tubes may be used individually or joined with the connecting sleeve.

Section III. DYNAMITES

21. Description

a. General. Dynamites are low to medium velocity explosives used for excavation, cratering, and general demolition operations in rear areas. Dynamites of both commercial and military formulations are available. Technical data on the properties of dynamites may be found in table I. Table IV presents general data on use and packing of dynamite. Additional information on dynamites may be found in TM 9-1903, TM 9-1910, and FM 5-25.

b. Commercial Dynamites. Three types of commercial dynamites are available for use in military operations: ammonia dynamite, gelatin dynamite, and ammonia gelatin dynamite. Ammonia dynamite contains ammonium nitrate added to nitro-
glycerin as the explosive base and is not suitable for underwater use or use in extremely wet areas. Gelatin dynamite is a plastic dynamite that has an explosive base of nitrocotton dissolved in nitroglycerin and is relatively insoluble in water. Ammonia gelatin dynamite is a plastic dynamite that has an explosive base of nitrocotton dissolved in nitroglycerin with ammonium nitrate added. It is suitable for underwater use. The percentage designation of commercial dynamites is the percentage by weight of the nitroglycerin content. The use of commercial dynamites is restricted to noncombat areas due to its relatively high sensitivity to shock and friction. Commercial dynamites may be exploded when primed with No. 6 or larger commercial blasting caps or by special blasting caps (pars. 51 and 52). Commercial dynamites are issued in 1/2-pound paraffin-treated paper cartridges, 1-1/4 inches in diameter by 8 inches long (fig. 11).

**Table IV. Dynamites**

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Uses</th>
<th>Water resistance</th>
<th>Description</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DYNAMITE: military M1.</td>
<td>Quarry and rock cuts.</td>
<td>Good</td>
<td>1. Packed 50 stick/wtrprf bag, 2 bag (100 stick)/wdn bx.</td>
<td>19-7/8 11-7/8 11-1/8 62</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Packed 65 stick/ctn. 2 ctn (130 sticks, 50 lb)/wdn bx.</td>
<td>19-7/4 11-7/8 11-1/8 62</td>
</tr>
<tr>
<td>DYNAMITE: ammonia, 40%.</td>
<td>Land clearing. Quarrying</td>
<td>Poor</td>
<td>1. Packed 211 stick/wtrprf/ wdn bx.</td>
<td>17-3/4 10 11-1/2 57</td>
</tr>
<tr>
<td>DYNAMITE: ammonia gelatin, 40%, Type II, Class 1.</td>
<td>Cratering, and general use in rear areas.</td>
<td>Excellent</td>
<td>1. Packed 96 stick (50 lb)/ wdn bx.</td>
<td>17-3/4 12 8 57</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Packed 140 stick (50 lb)/ wdn bx.</td>
<td>19-1/4 8-1/2 13 59</td>
</tr>
<tr>
<td>DYNAMITE: ammonia gelatin, 60%.</td>
<td>&quot;</td>
<td>Excellent</td>
<td>1. Packed 165 stick (50 lb)/ wdn bx.</td>
<td>19-3/4 13 8-1/2 62</td>
</tr>
<tr>
<td>DYNAMITE: gelatin 40% (stick 1-1/8 in. dia, 8 in. long).</td>
<td>&quot;</td>
<td>Good</td>
<td>1. Packed 50 lb/ wdn bx.</td>
<td>17-3/4 11-1/2 7-1/2 59</td>
</tr>
<tr>
<td>DYNAMITE: gelatin 40% (stick 2-3/4 in. dia, 8 in. long).</td>
<td>&quot;</td>
<td>Good</td>
<td>1. Packed 10 stick (50 lb)/ crdbd bx.</td>
<td>17-1/4 12 8-3/4 54.2</td>
</tr>
<tr>
<td>DYNAMITE: gelatin, 60% Type III, Class 1.</td>
<td>&quot;</td>
<td>Good</td>
<td>1. Packed 103 stick (50 lb)/ wdn bx.</td>
<td>19-5/8 12-3/8 8-1/2 59.1</td>
</tr>
<tr>
<td>DYNAMITE: gelatin, 60%.</td>
<td>&quot;</td>
<td>Good</td>
<td>1. Packed 11 stick (50 lb)/ wdn bx.</td>
<td>21 12-1/4 8-3/8 57.4</td>
</tr>
<tr>
<td>DYNAMITE: gelatin, 75%.</td>
<td>&quot;</td>
<td>Good</td>
<td>1. Packed 50 lb/ wdn bx.</td>
<td>8-1/2 19-1/4 13 59.0</td>
</tr>
</tbody>
</table>

**Abbreviations:** bx ... box(es), crdbd ... cardboard, ctn ... carton, lb ... pound(s), wdn ... wooden, wtrprf ... waterproof

c. Dynamite: Military, M1. Dynamite M1 (fig. 12) is for general use as medium velocity blasting explosive to replace 60 percent commercial dynamites in military construction, quarrying, and service demolition work. Dynamite M1 is packaged in paraffin-coated cylindrical paper cartridges having a nominal diameter of 1-1/4 inches.
inches and nominal length of 8 inches. Dynamite M1, unlike commercial dynamite, contains no nitroglycerin and will not freeze in cold storage, nor exude in hot storage. The composition does not absorb or retain moisture. Shipping containers do not require turning in storage. Safety in transportation, storage, and handling is better than that of 60-percent nitroglycerin dynamite. Initiation is accomplished by the use of special blasting caps, electric or nonelectric (pars. 51 and 52), or by means of detonating cord.

22. Special Precautions

a. The general precautions in paragraphs 8 and 9 apply. In addition, the special precautions in b through e below must be observed.

b. Commercial dynamites must be handled with caution because they may be exploded by flame, sparks, friction, and sharp blows, including impact from bullets or projectile fragments. Military dynamites are relatively insensitive to friction, drop impact, and rifle-bullet impact. In tamping charges, do not use steel bars or tools; use only blunt wooden tamping sticks.

c. Explosion of some dynamites produces poisonous fumes (table I). These dynamites should not be used in enclosed spaces which will be entered by personnel after the explosion unless appropriate precautions are taken.

d. Dynamite that has deteriorated from age or other causes should not be used. Commercial dynamite that has deteriorated from age has a dark color and is soft and mushy. Their packing cases are often discolored by dark brown stains. Such dynamites are extremely sensitive and should not be used nor should the cases be opened.

e. Commercial dynamite that is frozen but otherwise serviceable will not be used until thawed. See FM 5-25 for thawing instructions.

f. Commercial dynamites must be inspected and turned periodically according to temperature. A representative sample will be selected and the containers examined for evidence of nitroglycerin exudation on the exterior of the cartridge. If exudation is found, the lot or lots involved will be reported on Ammunition Condition Report, DA Form 2415, with recommendation for destruction.
Figure 12. Dynamite: military, M1; dynamite, ammonia gelatin, type II, class I; and dynamite: gelatin, type III, class 2.
CHAPTER 3
PRIMING AND INITIATING COMPONENTS, ACCESSORIES, AND TOOLS

Section I. GENERAL

23. General

This chapter describes the initiating and priming components, accessories, and tools used in conjunction with the explosive charges described in chapter 2. The variety of initiating and priming components and accessories available permits considerable flexibility in the design of a demolition complete round (par. 4) so that specific demolition projects may be accomplished with the maximum efficiency and safety appropriate to the tactical situation. Many of these items are components of the sets and kits described in chapter 4. For information on the use of these materials for specific projects, see FM 5-25, FM 5-31, and TM 5-220.

24. Initiating and Priming

a. The initiating component of an explosive train (par. 4) is that component which receives the initiating action, such as a pull on a fuse igniter M60 (par. 35). Initiating components include fuse igniters (pars. 32-35), time blasting fuse (pars. 37-39), firing devices (pars. 41-49), and blasting machines (par. 57). Detonators (pars. 24-26) combine the functions of both initiating and priming components.

b. The priming component of an explosive train is that component which receives the action, such as a flame or an electric impulse, which was initiated by the initiating component. Priming components properly selected will produce high-order detonation in an explosive charge. Priming components include destructors (pars. 28-31), detonating cord (pars. 39 and 40) and blasting caps (pars. 50-52).

Section II. DETONATORS

25. General Description

Detonators are explosive devices, sensitive to mechanical initiation, and are used to detonate explosive charges. Detonators combine the functions of firing devices and blasting caps in a single unit. They may or may not incorporate a time-delay mechanism. Detonators used in demolition work are classified according to the initiating action as friction, percussion, and concussion. Table V presents a summary of data on detonators.

26. Delay Friction Detonators

a. General. Delay friction detonators are devices for detonating explosive charges after a definite period of delay. The initiating mechanism, delay system, and detonator are all integral parts of the unit. Table V gives the time delay for delay friction detonators that may be anticipated at a given temperature. These detonators are used to delay the firing of demolition charges, particularly during assault demolitions.

b. Detonator, Friction: M1 or M1A1, 15-Second Delay.

(1) Description. The 15-second delay friction detonator M1 or M1A1 (fig. 13) consists of a cylindrical-shaped, olive-drab plastic housing containing a pull wire coated with friction material. The pull wire is set in a flash compound. A tube set in the lower end of the housing
contains a 15-second time fuse and a blasting cap. The 15-second delay friction detonator may be distinguished from the 8-second delay friction detonator by the markings on the surfaces of the delay housings and the shapes of the pull rings. The 15-second delay friction detonator has a circular pull-ring and the 8-second delay friction detonator has a T-shaped pull-ring.

(2) Functioning.
(a) With safety pin removed, pulling on pull-ring draws coated wire through flash compound.
(b) Flash ignites powder-train delay.
(c) At the end of the delay period, the delay element explodes the attached blasting cap. Actual time delay varies with temperature (see table V).

### Table V. Detonators

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Initiating action</th>
<th>Operation</th>
<th>Delay data</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETONATOR, FRICTION: M1 or M1A1*, 15-sec delay.</td>
<td>Pulling friction material coated wire through flash compound.</td>
<td>1. Flash compound ignites delay fuse.</td>
<td>1. Temperature/Time delay 8-sec. delay det.</td>
<td>10 pkg, 5 pkg/inner pkg, 4 pkg (200 detonator)/wdn bx.</td>
</tr>
<tr>
<td>DETONATOR, FRICTION: M2, 8-sec delay.</td>
<td></td>
<td>2. Delay fuse fires blasting cap.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETONATOR, FRICTION: M1A1, 15-sec delay, inert.</td>
<td>See service counterpart above.</td>
<td>See service counterpart above.</td>
<td>Inert ------</td>
<td>1/mtl cntr.</td>
</tr>
<tr>
<td>DETONATOR, FRICTION: M2 8-sec delay, inert.</td>
<td>Removal of safeties releases firing pin.</td>
<td>1. Firing pin fires percussion primer.</td>
<td>1. 8-sec and 15-sec nominal delay.</td>
<td>25/ctn, 8 ctn (200 detonator)/wdn bx.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Width</td>
<td>Height</td>
</tr>
<tr>
<td>26-1/8</td>
<td>11-3/8</td>
<td>12</td>
</tr>
</tbody>
</table>
Table V. Detonators—Continued

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Initiating action</th>
<th>Operation</th>
<th>Delay data</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETONATOR, PERCUS-</td>
<td>2. Percussion</td>
<td>2. Above 60°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SION: M2A1</td>
<td>primer fires</td>
<td>actual delay will</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M2E1), 8-</td>
<td>delay fuse.</td>
<td>be less than</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sec delay.</td>
<td>3. Delay fuse</td>
<td>nominal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETONATOR</td>
<td>fires blasting cap.</td>
<td>3. Below 60°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KIT, CON-</td>
<td>1. Firing pin</td>
<td>actual delay will</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUSSION:</td>
<td>fires percussion</td>
<td>be greater than</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1.</td>
<td>primer.</td>
<td>nominal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETONATOR</td>
<td>See service</td>
<td>As required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KIT, CON-</td>
<td>counterpart</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUSSION:</td>
<td>See service</td>
<td>counterpart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>counterpart above.</td>
<td>above.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nert.</td>
<td>counterpart above.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Models M1 and M1A1 are identical in construction and use.

Abbreviations:

bx ... box(es)  lb ... pound(s)  pkg ... package(s)
cnr ... container(s)  min ... minute(s)  sec ... second
ctn ... carton(s)  mtl ... metal  wdn ... wooden
det ... detonator

3. Preparation for Use.

(a) Remove protector cap.
(b) Screw into threaded cap well in explosive.
(c) Place charge.
(d) Remove safety pin.
(e) Pull pull-ring vigorously to fire and leave area immediately. Do not stop to investigate installation.

Warning: Once safety pin is removed, any movement of pull-ring may ignite delay powder train and fire the detonator in prescribed time. There is little warning as the delay fuse gives off virtually no smoke and is almost noiseless in burning.

4) Neutralizing. The detonator cannot be neutralized after the ring has been pulled. If pull-ring has not been pulled, proceed as directed in (a) through (c) below.

(a) Reinsert safety pin.
(b) Unscrew the detonator from charge.
(c) Replace cap protector.

Note. After the pull-ring has been pulled, this delay friction detonator cannot be reused.

c. Detonator, Friction, M2, 8-Second Delay. Except for the delay period, the marking and the shape of the pull-ring, the 8-second delay friction detonator (fig. 14) is identical in construction, functioning, and use to the 15-second delay friction detonator described in b above. The 8-second delay friction detonator may be distinguished from the 15-second delay friction detonator by the markings on the surfaces of the delay housing and by the shapes of the pull-rings. The 8-second
delay friction detonator has a T-shaped pull-ring and the 15-second delay friction detonator has a circular pull-ring.

27. Delay Percussion Detonators

a. General. These delay percussion detonators were developed as improved replacements for the delay friction detonators described in paragraph 26. They may be used wherever the friction detonators are used, and are suitable for underwater use.


(1) Description. This delay percussion detonator (fig. 15) consists of a firing pin assembly joined to a delay housing and primer holder assembly, with a special blasting cap crimped to an integral coupling base on one end of the delay housing and primer holder assembly. The 15-second delay percussion detonator may be distinguished from the 8-second delay percussion detonator (c below) by the markings on the surfaces of the delay housings and by the shapes of the pull-rings. The 15-second delay percussion detonator has a circular pull-ring and the 8-second delay percussion detonator has a T-shaped pull-ring.

(2) Functioning.
(a) With the safety pin (small cotter pin) removed, a pull on the pull-ring releases the firing pin.
(b) The firing pin strikes the percussion primer.
(c) The flame from the percussion primer ignites the delay train.
(d) At the end of the delay period, the delay train fires the blasting cap.

(3) Preparation for Use.
(a) Remove cap protector.
(b) Screw into threaded cap well in explosive.
(c) Place charge.
(d) Remove safety pin.
(e) Pull pull-ring to fire and leave

Figure 13. Detonator, friction: M1 or M1A1, 15-second delay.
area immediately. Do not stop to investigate the installation.

**Warning:** Once pull-ring has been pulled it must be assumed that the delay fuse has been ignited because it gives little or no indication it is burning. Do not attempt to neutralize or reuse after pull-ring has been pulled.

(4) **Neutralizing.** If the pull-ring has not been pulled, proceed as directed in (a) through (c) below.

(a) Reinsert safety pin.

(b) Unscrew detonator from charge.

(c) Replace cap protector.

c. **Detonator, Percussion: M2A1(M2E1), 8-Second Delay.** Except for the delay period, marking, and the shape of the pull-ring, the 8-second delay percussion detonator (fig. 16) is identical in construction, functioning, and use to the 15-second delay percussion detonator described in b above. The 8-second delay percussion detonator may be distinguished from the 15-second delay percussion detonator by the markings on the surfaces of the delay housing and by the shapes of the pull-rings. The 8-second delay percussion detonator has a T-shaped pull-ring and the 15-second delay percussion detonator has a circular pull-ring.

28. **Detonator Kit, Concussion: M1**

a. **General.** The concussion detonator kit M1 is essentially a mechanical firing device with a blasting cap attached. It is actuated by a detonation wave from a high-explosive blast. A number of demolition charges fitted with this type of firing device, in water or air, can be fired simultaneously when within range of the blast from an initiating charge or within range of each other, without connecting the demolition charges by detonating cord or other firing arrangements.

b. **Description.** The kit (fig. 17) consists of a firing mechanism, base plug (shipping
plug), primed coupling base and blasting cap assembly, blue and yellow salt delay pellets, and pellet sleeve cover assembly.

(1) Firing mechanism. This mechanism consists of a circular body containing a bronze grill-protected, snap-type diaphragm which is in contact at its center with a spring-loaded firing pin which is housed in a cylindrical projection integral with the body. The bronze diaphragm is protected by a sheet rubber diaphragm. A pellet sleeve, which projects from one side of the device, contains a metal spacer, a space for a salt delay tablet, and a sleeve plug. Before installation, the firing pin is restrained in its unfired position by a steel safety ball which is held in place against the beveled shoulder of the firing pin by the metal spacer in the pellet sleeve; the spacer is in turn held in place by a safety cotter pin. After removal of the safety cotter pin (air installation), or after the removal of the safety cotter pin and partial dissolution of the installed salt delay pellet (water installation), the firing pin is restrained in its unfired position only by a split firing pin release spring which engages a groove in the diaphragm end of the firing pin.

(2) Base plug (shipping plug). The base plug is a metallic plug which is assembled to the firing mechanism during storage and shipment.

(3) Primed coupling base and blasting cap assembly. This assembly consists of the same type metal coupling base with assembled primer and nonelectric blasting cap as used with firing devices.

(4) Salt delay pellets. Two cylindrical compressed salt delay pellets, one
blue for 3-1/2 ± 1/2-minute delay and one yellow for 7 ± 1-minute delay, are packed with the kit.

(5) Pellet sleeve cover assembly. This assembly consists of a paper tube crimped to a chipboard sleeve cover with pull cord. It is assembled over the pellet sleeve covering the holes in the pellet sleeve in order to prevent the salt delay pellet from dissolving while the device is being installed under water. The cover should not be removed until the last possible moment before removing the safety cotter pin.

(6) Painting and marking. Firing mechanisms for use with the primed coupling base and blasting cap assembly are painted olive-drab with marking in yellow. Those for use with the inert coupling base and inert blasting cap for training painted black with marking in white.

c. Functioning.

(1) In water. After the device with the salt delay pellet of the desired delay has been installed in a demolition charge, and the pellet sleeve cover and safety pin removed (e (1) (b) 10 below), water flows through the holes in the pellet sleeve and starts to dissolve the salt delay pellet. As the pellet is dissolved, the steel safety ball is forced from its position by the beveled shoulder of the firing pin under the force of the firing pin spring. This allows the firing pin to move toward the coupling base about one-sixteenth of an inch and leaves the firing pin release spring as the only restraint to the firing pin, thus arming the device. A detonation wave from an underwater explosion of sufficient strength will snap the diaphragm against the top of the firing pin overcoming the restraint of the
firing pin release spring and driving the firing pin into the primer. The flame from the primer explodes the blasting cap which in turn explodes the demolition charge.

(2) *In air.* After the device has been installed (without salt delay pellet) in a demolition charge, and the pellet sleeve cover and safety cotter pin removed (e (2) (b) 6 below), the steel safety ball is forced against the pellet sleeve spacer, allowing the firing pin to move toward the coupling base about one-sixteenth of an inch, and leaving the firing pin release spring as the only restraint to the firing pin. In this armed condition, a detonation wave from an air explosion of sufficient strength will snap the diaphragm against the top of the firing pin and cause the explosion of the demolition charge as described in (1) above.

d. *Range.* Concussion detonator kits frequently function at ranges greater than those given in table VI, but their reliability at those greater ranges is not assured. The device should not be used under water at a greater depth than 15 feet. The snap diaphragm functions by hydrostatic pressure at a depth of 25 feet. All charges equipped with these devices should be placed reasonable equidistant and at distances indicated in table VI from the initiating charge. If placed too close to another charge in air, the concussion wave might cause the diaphragm to be impaled on the firing pin, resulting in a misfire.

e. *Preparation for Firing.*

(1) *In water.*

(a) *Salt delay pellet test.* Since surf conditions and water temperatures influence the dissolving time of salt pellets, it is advisable to expend one detonator to measure its arming time. The same device can be used to test either or both delay elements. This detonator, when equipped with the type of pellet that will be used, should be tested under conditions similar to those contemplated in the actual operation. Whenever possible, this test should be made by submerging the device in the proper depth under simulated operating conditions, with the base plug (shipping plug) in place and the cardboard protective cover and the safety pin removed, and observing the time required to perform the above test for all operating conditions, especially in various depths of water; therefore, alternate or expedient test methods should be used to simulate actual operating conditions. One expedient method will give an approximate arming time only and consideration should be given to this fact in the actual operation.

(b) *Installing.*

1. Remove a kit from its water-proof container.
2. Remove the pellet sleeve cover from a firing mechanism.
3. Unscrew the slotted sleeve plug from the pellet sleeve.
4. Depending on delay required, insert a blue or yellow salt delay pellet into the pellet sleeve, taking care that the spacer, safety cotter pin, and pellet sleeve cover are properly installed. Restore the sleeve plug and sleeve cover.
5. Remove the base plug (shipping plug) and carefully insert a coupling base and blasting cap assembly with its associated gasket into the firing mechanism to form a watertight joint.

<table>
<thead>
<tr>
<th>Weight of initiating charge (lbs)</th>
<th>In water</th>
<th>In air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth of water (ft)</td>
<td>Recommended range (ft)</td>
<td>*p = 99%</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>0.5</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>0.5</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>0.5</td>
<td>6</td>
<td>80</td>
</tr>
<tr>
<td>0.5</td>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td>2.5</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table VI. Operating Range of Concussion Detonator Kits
Table VI. Operating Range of Concussion Detonator Kits—Continued

<table>
<thead>
<tr>
<th>Weight of initiating charge (lbs)</th>
<th>In water</th>
<th>In air</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Depth of water (ft)</td>
<td>Recommended range (ft)</td>
</tr>
<tr>
<td>2.5</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>2.5</td>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>2.5</td>
<td>6</td>
<td>90</td>
</tr>
<tr>
<td>2.5</td>
<td>8</td>
<td>150</td>
</tr>
<tr>
<td>5</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>10</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>15</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>20</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>20</td>
<td>6</td>
<td>180</td>
</tr>
<tr>
<td>20</td>
<td>8</td>
<td>280</td>
</tr>
</tbody>
</table>

*p = Probability that detonator at indicated distance will be caused to function by initiating charge.

6. Screw the device, which includes the attached coupling base and blasting cap assembly, into the threaded cap well of each of the demolition charges used. An alternative method is to connect the blasting cap to the charge with a suitable length of detonating cord.

7. Wire or tie the device to the demolition charge and make sure that the diaphragm is free of obstructions and is clearly exposed.

8. Place all demolition charges in water, where required.

9. Remove the pellet sleeve covers from pellet sleeves.

10. Remove safety cotter pin.

11. Evacuate danger area within one-half of the arming time of the salt delay pellet in use as observed in the test ((a) above).

12. Wait full interval of arming time as observed in the test ((a) above) of the salt delay pellet before firing the initiating charge.

(2) In air.

(a) Firing pin release spring test. When the device is used in air, no salt delay pellet is used. In this case, when the safety cotter pin is pulled, the steel safety ball restraint on the firing pin is removed. Hence, the only restraint to the firing pin is that afforded by the firing pin release spring. Therefore, before fitting the coupling base and blasting cap assembly to the firing mechanism, test to make sure that the firing pin release spring restrains the firing pin when the safety cotter pin is withdrawn and that the spacer releases. When the safety cotter pin is withdrawn, the firing pin should move forward approximately 1/16 inch, but it should not fall or fly out of the barrel of the device. If the firing pin falls or flies out of the barrel, discard the mechanism.

(b) Installing.

1. If the firing pin release spring passes the test ((a) above), push the spacer against the safety steel ball, thus forcing the firing pin to its original position. Replace the safety cotter pin in its original position through the pellet sleeve and spacer.

2. Remove the base plug (shipping plug) and carefully insert coupling base and blasting cap assembly with its associated gasket firmly into the firing mechanism.

3. Screw the device with the attached coupling base and blasting cap assembly into threaded cap well of demolition charge or mine. An alternative method is to connect the blasting cap to the charge with the appropriate length of detonating cord.

4. Wire or tie the detonator to the demolition charge and make sure that the diaphragm is free of obstructions and is clearly exposed.

5. Place all demolition charges with the diaphragm of the device facing the initiating charge. Be sure this is done for all demolition charges.
6. Remove the pellet sleeve cover. Withdraw the safety cotter pin thus arming the device.
7. Evacuate the area immediately.
8. When personnel are clear of danger zone, fire the initiating charge.

f. Disarming. If it is necessary to disarm a device, remove the sleeve plug, insert a nail or stick into the pellet sleeve, and push the spacer against the safety ball forcing it against the beveled shoulder of the firing pin so that the firing pin returns to its original unfired position. Insert a tenpenny nail, or equivalent, through holes in the pellet sleeve. Unscrew the coupling base and blasting cap assembly from the firing mechanism and replace the base plug (shipping plug). Replace the safety pin and restore the kit to original condition and packing.

g. Precautions in Use.

(1) Arming time in water. Since the salt delay pellets become soft before they are completely dissolved, the device is dangerous after half the arming time as determined by the test \( (e(1)(a) \text{ above}) \) elapses. Therefore, personnel should be clear of the danger area within half the arming time so determined. This is because a nearby concussion from enemy bombs, projectiles, or other causes could fire the device after the salt delay pellet has softened. The initiating charge should not be fired until the full dissolving time of the salt delay pellet has elapsed.

(2) Arming time in air. The device in an air installation becomes fully armed as soon as the safety cotter pin is removed, hence, personnel should be clear of the danger zone immediately upon removal of the safety cotter pin.

(3) Pellet sleeve cover. This cover fits over the pellet sleeve and completely protects a salt delay pellet from dissolving during the placing of an underwater installation. The cover should not be removed until the last possible moment before pulling the safety cotter pin.

Section III. EXPLOSIVE DESTRUCTORS

29. General

Explosive destructors are used to adapt ammunition and other explosive material, which cannot be reliably detonated by special blasting caps, for use in demolition work, boobytraps, and improvised mines. Explosive destructors are also used to destroy deteriorated or abandoned ammunition. Table VII gives a tabulation of the destructors used in demolition work, with packing data.

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Description</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Length</td>
<td>Width</td>
</tr>
<tr>
<td>DESTRUCTOR, EXPLOSIVE, Universal, M10.</td>
<td>1. fbr cntr. 50 cntr (50 destructor)/wdn bx.</td>
<td>16-3/4</td>
<td>15-1/8</td>
</tr>
<tr>
<td>DESTRUCTOR, EXPLOSIVE, M19 (T15).</td>
<td>1. fbr cntr, 6 cntr (6 destructor)/wdn bx.</td>
<td>20-3/4</td>
<td>8-3/4</td>
</tr>
</tbody>
</table>

Abbreviations:
bx... box(es)  lb... pound(s)
cntr... container(s)  wdn... wooden
fbr... fiber
30. Destructor, Explosive, Universal, M10

a. General. This destructor (fig. 18) is essentially a high explosive adapter-booster which is used in preparing loaded projectiles and bombs as improvised demolition charges. It is also used to destroy deteriorated or abandoned ammunition. See FM 5-25 and FM 5-31 for additional information on tactical uses.

b. Description. The destructor is a tubular sheet-steel roll-threaded assembly consisting of:

1. Closing plug or cork gasket. The plastic closing plug and cork gasket is used to keep the destructor sealed during shipment, storage, and handling preparatory to use.

2. Blasting cap bushing. This bushing is threaded to receive any issue firing device.

3. Activator bushing with felt washer. This bushing is threaded to receive activator M1. (See TM 9-1940 for a description of this item.)

4. Booster assembly. This assembly consists of two identical externally and internally threaded booster cups screwed together. The cup to which the activator bushing is attached contains cylindrical tetryl pellets with central holes which allow for the insertion, without interference, of either a blasting cap or an activator. The other cup contains cylindrical tetryl pellets (without central holes) and a felt pad.

5. Ammunition bushing. This bushing is a hexagonal-edged steel collar with two different size external threads and an internal thread. The internal thread of 1-1/2-inch diameter fits the external thread of the booster cups and adapts the destructor for use with any ammunition having 1.7-inch or 2-inch diameter right-hand-threaded fuze cavities.

c. Initiation and Adaptation. This destructor is designed for initiation by a firing device and blasting cap, or by a firing device and activator M1 (activator, practice, M1, cannot be used with this destructor). The destructor assembly has three external threads of different diameter available for attachment to ammunition items having three corresponding fuze well sizes. These three available threads are the 2-inch external thread on the ammunition bushing, the 1.7-inch external thread on the ammunition bushing, and the 1.5-inch external thread of the booster cup. Thus, there is a proper size external thread available for attachment of the destructor to artillery projectiles, bombs, and rockets having corresponding size fuze wells.

d. Functioning.

1. The blasting cap (or mine activator) is exploded by appropriate means.

2. Explosion of the blasting cap (or mine activator) explodes the tetryl pellets in the booster cups.

3. Explosion of the tetryl pellets explodes the main charge.

e. Installing and Arming.

1. Initiation by firing device and blasting cap.

a. Unscrew closing plug and cork gasket from blasting cap bushing.

b. Inspect opening in blasting cap bushing to see that there is no foreign material in the well.

c. Crimp a nonelectric blasting cap to a firing device.

d. Screw this assembly (firing device and blasting cap), which now becomes a fuze, into the blasting cap bushing, using the cork gasket removed in (1) above.

e. Screw the destroyer thus fuzed into the fuze well of the ammunition item to be exploded, matching the size of the ammunition fuze well to the appropriate size thread on the ammunition bushing of the destructor.

f. If the ammunition items involved (such as mines) do not have fuze wells in which the destructor will fit, attach the destructor to the ammunition or explosive charges to be exploded, using detonating cord. For information
Figure 17. Detonator Kit, concussion: M1.
on the priming of explosive items, refer to FM 5-25.

(g) Attach pull wires to firing device as required.

(h) Arm the firing device.

(2) Initiation by firing device and activator.

(a) Unscrew the blasting cap bushing from the activator bushing of the destructor.

(b) Unscrew the closing plug from an activator M1.

(c) Screw a firing device into the activator.

(d) Screw this assembly (firing device and activator), which now becomes a fuze, into the activator bushing, handtight.

(e) Same as e(1)(e) above.

(f) Same as e(1)(f) above.

(3) Initiation by blasting cap, electric or nonelectric.

(a) If using an electric blasting cap, thread the lead wires through a priming adapter of the M1 series. If using a nonelectric blasting cap, crimp the cap to a suitable length of time blasting fuse and thread the fuse through the adapter.

(b) Screw the primed adapter assembly into the blasting cap bushing.

(c) Same as e(1)(e) above.

(d) Same as e(1)(f) above.

(e) If using an electric blasting cap, initiate the cap through a suitable blasting circuit. If using a nonelectric blasting cap, initiate the cap and time blasting fuse by means of a fuse igniter (FM 5-25).

31. Destructor, Explosive: M19 (T15)

a. General. The explosive destructor M19 (fig. 19) consists of an explosive-filled, cylindrical body with a removable ogive. The ogive may be removed and discarded if not needed for a particular operation. This destructor is primed with a delay detonator, a delay firing device with a special blasting cap, a nonelectric special
blasting cap initiated with time blasting fuse or detonating cord, or an electric special blasting cap. The cap well, on each end of the body, is threaded to accept firing device coupling bases or priming adapters.

b. Preparation for Use.

(1) Remove shipping plug and gasket from end of body.
(2) Insert detonator or special blasting cap with firing device or priming adapter into cap well.
(3) Tighten detonator, firing device coupling base, or priming adapter handtight in threads of fuze well.

(4) Place primed destructor and initiate.

Note. If the ogive is not needed in placing the primed destructor, a dual firing system (FM 5-25) would be desirable. The second firing circuit for a dual system may be installed by removing the ogive from the other end of the destructor and proceeding as described in (1) through (4) above.

c. Disarming and Removal.

(1) Disarm and unscrew detonator, firing device, or priming adapter with blasting cap and remove from destructor.
(2) Replace shipping plug and gasket (and ogive if removed) and restore to original packing.

Section IV. TIME BLASTING FUSE IGNITERS

32. General

Time blasting fuse igniters are initiating components which are used in place of matches to light time blasting fuse. Fuse igniters are usually more reliable than matches and their use is almost mandatory in rainy and windy weather. Table VIII presents data on fuse igniters.

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Initiating action</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGNITER, TIME BLASTING FUSE: M1, friction.</td>
<td>Pulling handle to draw coated wire through friction powder.</td>
<td>Description: 10/wxd crdbrd cntr., 250 cntr. (2,500 igniter)/wdn bx.</td>
</tr>
</tbody>
</table>

Figure 19. Destructor, explosive: M19 (T15).
Table VIII. Time Blasting Fuse Igniters—Continued

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Initiating action</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGNITER, TIME BLASTING FUSE: M2, weatherproof.</td>
<td>Pulling release pin ring releases firing pin which strikes percussion primer.</td>
</tr>
<tr>
<td>IGNITER, TIME BLASTING FUSE: M60 (T2), weatherproof.</td>
<td>Pulling pull ring releases firing pin which strikes percussion primer.</td>
</tr>
<tr>
<td>IGNITER, TIME BLASTING FUSE: M2, weatherproof, inert.</td>
<td>Pulling release pin ring releases firing pin which strikes dummy primer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 5/wtrprf ctn. 30 ctn (150 igniter)/wdb bx.</td>
<td>17-1/2 9-1/8 7-1/4</td>
<td>28.6</td>
</tr>
<tr>
<td>2. 5/set up bx, 5 bx/ wtrprf frdb ctn, 10 ctn(250 igniter)/wdb bx.</td>
<td>22-1/2 12-1/2 8</td>
<td>46.9</td>
</tr>
<tr>
<td>5/wtrprf wrppd ctn, 60 ctn (300 igniter)/ wdb bx.</td>
<td>21-5/8 11-7/8 13-1/8</td>
<td>56.3</td>
</tr>
</tbody>
</table>

| Abbreviations: | | |
| bx . . . . box(es) | ctn . . . . container(s) | wrppd . . . wrapped |
| flrbd . . . fiberboard | lb . . . . pound(s) | wdb . . . wooden |
| wrprf . . . waterproof | wxd . . . waxed |

33. Igniter, Time Blasting Fuse: M1, Friction

This igniter (fig. 20) consists of a paper tube containing friction powder, which is mechanically ignited. The open end, when placed over the end of a length of time blasting fuse, is held in place by a pronged insert inside the fuse igniter. The prongs are inclined so they permit the fuse to enter, but prevent its removal except by force. A pull on the loop, or handle at the closed end, ignites the friction powder which, in turn, fires the powder train in the fuse. To prevent pulling the fuse igniter from the fuse, which will cause an air gap between the fuse end and the igniter, hold the body of the igniter in one hand and pull the igniter wire with the other. If any doubt exists as to whether the fuse is burning and the length of fuse will permit time, pull the fuse igniter off the fuse by force immediately after pulling the igniter wire.

34. Igniter, Time Blasting Fuse: M2, Weatherproof

This igniter (fig. 21) consists of a barrel that holds the firing mechanism and a base that contains a percussion cap and a pronged fuse retainer. The barrel contains the striker spring and striker, held locked in one end by a release pin. The other end is threaded to fit over the base. Plastic sealing material (included with the igniter) is used to waterproof the joint of time blasting fuse and fuse igniter. When the release pin is pulled, the striker strikes the percussion cap which, in turn, ignites the fuse. The igniter will ignite the fuse under all weather conditions, even under water.

Caution: To prevent breakage of the pull-ring, press the spread ends of the release pin together prior to use, then pull with a twisting motion on the pull-ring. If the igniter is not used, spread the ends of the release pin to their original position.

35. Igniter, Time Blasting Fuse: M60 (T2), Weatherproof

a. General. The weatherproof time blasting fuse igniter M60 (T2) (fig. 22) is a pull-type assembly and is used to initiate time blasting fuse M700 (par. 38). A cross-sectional view of the complete igniter is shown in figure 23. The major parts are the firing assembly, fuse holder assembly, and primer base assembly.

b. Firing Assembly. The firing assembly consists of a housing with a threaded top cap on one end. A striker assembly
(firing pin), pull rod, release washer, and firing pin spring are situated inside the housing. One end of the pull rod protrudes through the top cap and accepts the pulling ring and safety pin. The pull rod has a venting passage which allows the blasting fuse gases to be released to the atmosphere after functioning. The venting passage is open to the atmosphere only when the rod is in the "fired" position and therefore does not affect the weatherproof feature of the igniter. A rubber friction seal washer, located between the top cap and the housing, provides sealing at the pull end of the unit.

c. Fuse Holder Assembly. The fuse
holder assembly is located at the end of the housing opposite the pull ring. This assembly consists of a threaded fuse holder cap with a split tapered collet located inside of it. A tapered grommet, assembled between the small washer and the large washer, is located just inside the housing. The shipping plug goes through the fuse holder cap and is held in place by the grommet and the collet. The rubber grommet provides a seal for the fuse end of the igniter.

d. Primer Base Assembly. The primer base assembly is located inside the housing, next to the small washer, and consists of the primer base with a percussion primer M39A1 (fig. 24).

e. Functioning. In use, the shipping plug is removed from the igniter and is replaced with time blasting fuse. The safety pin is then removed by a pull of approximately 10 to 30 pounds on the safety pin cord. The pull-ring is then pulled outward with a force of approximately 5 to 15 pounds. This carries the pull rod and firing pin back against increasing spring compression until the split cylinder of the striker assembly slips over the release washer. The release washer forces open the split cylinder and disengages the striker assembly from the pull rod. This permits the compressed spring to drive the striker assembly against the primer. This action initiates the primer and the resultant spit of flame ignites the time blasting fuse. The gases resulting from the burning fuse are emitted through the venting passage in the pull rod to the atmosphere.

f. Preparation for Use.

1. Unscrew the fuse holder cap two or three turns. (Care must be taken not to unscrew the cap completely since this may cause the split collet to become disarranged.)

2. Push the shipping plug in and then work the plug from side to side while withdrawing it from the igniter. Retain the shipping plug and all moving parts in case the igniter is not used.

3. Insert a freshly square-cut end of time blasting fuse into the igniter as far as possible. In so doing, a fair amount of resistance is offered
when the fuse passes through the rubber grommet. Hand tighten the fuse holder cap sufficiently to ensure proper holding and sealing.

(4) Hold the igniter firmly with one hand. With the other hand, remove the safety pin by pulling the safety pin cord. The igniter is now fully armed.

(5) To fire, pull outward on the pull-ring.

Note. Some gas will escape through the venting passage of the pull rod but this gas is cool and will not affect the user.

g. Precautions in Use.

Warning: In case of failure to fire, the provisions of TM 9-1903 and AR 385-63 will be observed.

(1) The igniter should never be lifted or handled by the pull-ring or safety pin cord.

(2) The safety pin should not be removed until after the time blasting fuse has been inserted and just prior to use.

(3) Defective igniters are never repaired.

Section V. TIME BLASTING FUSE

36. General

a. Description. Time blasting fuse is used to transmit a flame from a match or igniter to a nonelectric blasting cap (par. 52) or other explosive charge and to provide a time delay during which personnel may retire to a safe distance. Table IX presents data on time blasting fuses.

Table IX. Time Blasting Fuse

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Means of initiation</th>
<th>Uses</th>
<th>Description</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUSE, BLASTING, TIME: safety fuse.</td>
<td>Match; fuse igniter.</td>
<td>Fire blasting caps, fire black blasting or pellet powder.</td>
<td>1. 50 ft/coil, 2 coil/pk, 30 pkg (3,000 ft)/wdn bx.</td>
<td>24-3/4 15-3/4 12-1/2</td>
<td>71.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. 50 ft/coil, 2 coil/pk, 5 pkg/sealed mtl can, 8 can (4,000 ft)/wdn bx.</td>
<td>30 14-5/8 14-5/8</td>
<td>93.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. 50 ft/coil, 2 coil/pk, 60 pkg (6,000 ft)/wdn bx.</td>
<td>29 22 17</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Packed as required.</td>
<td>----- ----- -----</td>
<td>----</td>
</tr>
<tr>
<td>FUSE, BLASTING, TIME: inert safety fuse.</td>
<td>Non-initiable</td>
<td>Training in use of time blasting fuse.</td>
<td>----- ----- -----</td>
<td>----</td>
<td></td>
</tr>
</tbody>
</table>

36. General

a. Description. Time blasting fuse is used to transmit a flame from a match or igniter to a nonelectric blasting cap (par. 52) or other explosive charge and to provide a time delay during which personnel may retire to a safe distance. Table IX presents data on time blasting fuses.

Table IX. Time Blasting Fuse

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Means of initiation</th>
<th>Uses</th>
<th>Description</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUSE, BLASTING, TIME: safety fuse.</td>
<td>Match; fuse igniter.</td>
<td>Fire blasting caps, fire black blasting or pellet powder.</td>
<td>1. 50 ft/coil, 2 coil/pk, 30 pkg (3,000 ft)/wdn bx.</td>
<td>24-3/4 15-3/4 12-1/2</td>
<td>71.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. 50 ft/coil, 2 coil/pk, 5 pkg/sealed mtl can, 8 can (4,000 ft)/wdn bx.</td>
<td>30 14-5/8 14-5/8</td>
<td>93.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. 50 ft/coil, 2 coil/pk, 60 pkg (6,000 ft)/wdn bx.</td>
<td>29 22 17</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Packed as required.</td>
<td>----- ----- -----</td>
<td>----</td>
</tr>
<tr>
<td>FUSE, BLASTING, TIME: inert safety fuse.</td>
<td>Non-initiable</td>
<td>Training in use of time blasting fuse.</td>
<td>----- ----- -----</td>
<td>----</td>
<td></td>
</tr>
</tbody>
</table>
### Table IX. Time Blasting Fuse—Continued

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Means of initiation</th>
<th>Uses</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FUSE, BLASTING, TIME: M700</strong></td>
<td>Match; fuse igniter.</td>
<td>Fire blasting caps, fire black blasting or pellet powder.</td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Dimensions (inches)</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Length</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50 ft/coil, 2 coil/pkg, 5 pkg/sealed container, 8 container (4,000)ft/wdn bx</td>
</tr>
</tbody>
</table>

**Abbreviations:**
- bx . . . . . . box (es)
- ft . . . . . . foot (feet)
- lb . . . . . . pound (s)
- mtl . . . . . . metal
- pkg . . . . . . package (s)
- wdn . . . . . . wooden

### 37. Fuse, Blasting, Time: (Safety Fuse)

The fuse (fig. 25) is limited standard for use in general demolitions, and is authorized for use only in the continental United States. It is in the form of a cord approximately 0.20 inch in diameter and has a black powder core covered with several layers of fiber and waterproof material. It may be identified by its corrugated surface.

**Warning 1:** Each roll of fuse must be tested shortly before use. The rate of burning will vary for the same or different rolls under different atmospheric and/or climatic condition, from a burning time of 30 seconds or less per foot to 45 seconds or more per foot.

**Warning 2:** Particular precautions must be taken when used under water as the rate of burning is increased significantly.

**Warning 3:** The only positive means of timing is by testing a 1-foot length by burning.

![Fuse, blasting, time: (safety fuse)](image)

![Fuse, blasting, time: M700](image)
38. Fuse, Blasting, Time: M700

This fuse (fig. 26) is for general use in military demolitions. It is in the form of a cord, 0.20 inch in diameter. It is marked with single painted bands at 1-foot or 18-inch intervals and double painted bands at 5-foot or 90-inch intervals depending on whether of old or new manufacture. These markings are used to estimate the approximate lengths of fuse required for tactical situations. When ignited by an ordinary match or fuse igniter, it transmits a flame to a nonelectric blasting cap which may be installed in a high-explosive charge either on land or under water. The fuse, which has a black powder core, burns at a uniform rate of approximately 40 seconds per foot, which permits the firer to gage required time to retire to a safe place before the charge explodes.

Warning 1: Each roll of fuse must be tested, shortly before use. The rate of burning will vary for the same or different rolls under different atmospheric and/or climatic conditions, from a burning time of 30 seconds or less per foot to 45 seconds or more per foot.

Warning 2: Particular precautions must be taken when used under water as the rate of burning is increased significantly.

Section VI. DETONATING CORD

39. General

a. Use. Detonating cord (figs. 27 and 28) may be used as a detonating agent, a priming agent, or alone as an explosive charge. It may be used for detonating single or multiple charges. It will transmit a detonation wave from one point to another at a rate of at least 5,900 meters per second.

b. Description. Detonating cord consists of a core of PETN in a textile tube coated with a layer of asphalt. The asphalt layer has an outer textile cover which is finished with a wax gum composition or a plastic coating. Table X presents data on the various detonating cords available.

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Nom. dia. (in.)</th>
<th>Covering</th>
<th>Loading</th>
<th>Description</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORD, DETONATING: fuse, primacord (PETN) Type I*</td>
<td>0.210</td>
<td>Cotton with wax gum composition finish</td>
<td>50 grn PETN/ft.</td>
<td>1. 1,000 ft/spool, 1 spool (1,000 ft)/wdn bx.</td>
<td>10-1/8 10 10</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. 100 ft/spool, 25 spool (2,500 ft)/wdn bx.</td>
<td>19-3/4 18-1/2 8-1/2</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. 500 ft/spool, 1 spool/sealed can. 8 can (4,000 ft)/wdn bx.</td>
<td>30 15 14-5/8</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. 500 ft/spool, 8 spool (4,000 ft)/wdn bx.</td>
<td>----- ----- -----</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. 50 ft/spool, 100 spool (5,000 ft)/wdn bx.</td>
<td>24 17 12</td>
<td>94</td>
</tr>
<tr>
<td>CORD, DETONATING: fuse, primacord (PETN) Type II*</td>
<td>0.216</td>
<td>Double cotton with wax gum composition finish</td>
<td>50 grn PETN/ft.</td>
<td>100 ft/spool, 50 spool (5,000 ft)/wdn bx.</td>
<td>21 14-3/4 18-3/8</td>
<td>111</td>
</tr>
<tr>
<td>CORD, DETONATING: fuse, primacord (PETN) (50-ft spool (spliced))</td>
<td>0.210</td>
<td>Cotton with wax gum composition finish</td>
<td>50 grn PETN/ft.</td>
<td>Packed as required.</td>
<td>----- ----- -----</td>
<td>----</td>
</tr>
</tbody>
</table>

Table X. Detonating Cord
<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Nom. dia. (in.)</th>
<th>Covering</th>
<th>Loading</th>
<th>Description</th>
<th>Packing</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORD, DETONATING: fuse, primacord (PETN) inert.</td>
<td>0.210</td>
<td>Cotton with wax gum composition finish.</td>
<td>Inert</td>
<td>Packed as required.</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>CORD, DETONATING: reinforced, pliofilm-wrapped, waterproof, Type IV**.</td>
<td>0.235</td>
<td>Textile with plastic coating.</td>
<td>60 grn PETN/ft.</td>
<td>1. 1,000 ft/spool, 1 spool/crdbd bx., 3 bx/wtrprf. lead foil env., 1 env. (3,000 ft)/wdn bx.</td>
<td>33-3/8</td>
<td>11-3/4</td>
<td>11-1/4</td>
</tr>
<tr>
<td>CORD, DETONATING: reinforced, pliofilm-wrapped, waterproof, Type IV**.</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>2. 500 ft/spool, 1 spool sealed can 8 can (4,000 ft)/wdn bx.</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>CORD, DETONATING: reinforced, dummy.</td>
<td>0.235</td>
<td>Textile with plastic coating.</td>
<td>Inert</td>
<td>Packed as required.</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>CORD, DETONATING: waterproof, plastic outer covering (8-ft length) Type IV**.</td>
<td>0.235</td>
<td>Textile with plastic coating.</td>
<td>60 grn PETN/ft.</td>
<td>200 length (1,600 ft)/wdn bx.</td>
<td>26-1/2</td>
<td>18</td>
<td>11</td>
</tr>
</tbody>
</table>

* Type designation in accordance with PA-PD-417, 7 May 1954.
** Type designation in accordance with MIL-C-17124A, 11 June 1959.

Abbreviations:
- bx... box(es)
- crdbd... cardboard
- dia... diameter
- env... envelope
- ft... foot (feet)
- grn... grain(s)
- lb... pound(s)
- nom... nominal
- wdn... wooden
- wtrprf... waterproof

Figure 27. Cord, detonating: reinforced, pliofilm wrapped, waterproof.
c. **Functioning.** A blasting cap, electric or nonelectric, should be used to initiate detonating cord. When properly initiated, detonating cord will explode through its entire length and detonate any properly connected demolition charge. For firing multiple charges, all branch lines of detonating cord must be properly connected to the main or trunk line. A branch line of detonating cord should be fastened to a main line by use of a detonating cord clip Ml (par. 60), by a girth hitch, or by three round turns and a half hitch. The angle formed by the branch line and the blasting cap end of the main line should be particularly noted. The angle should not be less than 90 degrees from the direction from which the initiation is coming. With the angle less than 90 degrees, it is possible for the branch line to be blown off the main line without being detonated. At least 6 inches of detonating cord should be left free on both sides of a connecting knot. Knotted or spliced connections may not function properly if used in a hole. Detonating cord will detonate when the core is water-soaked, provided the detonation is started from a dry end. For complete details on priming and detonating demolition charges, refer to FM 5–25.

d. **Handling and Storage.** Detonating cord, while possessing a high velocity of detonation, is relatively insensitive to friction and ordinary shock. The cord is relatively safe to store and handle but due to the explosive core, it is stored and handled in the same manner as other explosives. For information on compatibility groupings, hazard classifications, and quantity-distance requirements, see TM 9–1903.

40. **Precautions in Use**

Safety precautions to be observed in handling and using all types of detonating cord are as follows:

a. Avoid kinks and sharp bends.

b. Always make a firm, close connection between branch and main lines. Pull the connection up tight.

c. **Handle** with special care in cold weather to avoid breaking either the covering or explosive train. In rainy weather, or if conditions are wet, keep the connections dry and protected.

d. Lay out detonating cord lines as straight as possible but do not stretch them. Detonating cord tends to form a spiral as it is unwound from the spool. To avoid misfire, it must be carefully straightened before firing.

e. Do not remove any part of the detonating cord covering.

f. Do not use knotted or spliced connections of detonating cord in a wet hole or under water unless the charge is to be fired immediately.

g. If necessary to connect two or more lengths of detonating cord in the main line, join the ends by tying them together with a square knot pulled up tight.

h. Inspect all connections just before firing. Do not use or permit makeshift methods.

i. Seal the end of the detonating cord with a waterproof sealing compound (1375–212–4603) to keep out moisture when using the cord in underwater charges, or in charges to be left in place several hours before firing. A 6-inch free end will protect the remainder of the line from moisture for 24 hours.

![Figure 28. Cord, detonating: reinforced, ploifilm wrapped, waterproof on spool with plastic handle.](RA PD 212806)
blasting cap or activator. It is a separate item of issue and is packed in its own packing box. Firing devices (table XI) are of two general types, the tubular type and the box type. The tubular-type firing devices, consisting of head, case, and coupling base, are arranged for actuation by pressure, pull, or release of pull according to the design of the particular model. The box-type firing devices consisting of a rectangular steel body and coupling base are arranged for release of pressure. The coupling base, fitted to all types, contains a percussion primer.

Table XI. Firing Devices and Components

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Initiating action</th>
<th>Uses</th>
<th>Description</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Length</td>
<td>Width</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1, 10-min. delay, black.</td>
<td>Finger pinch</td>
<td>To provide delay action firing of mines, demolition blocks and other explosive charges.</td>
<td>1. 10/paprbd bx, 10 bx (100 device) wdn bx.</td>
<td>17-3/8</td>
<td>6-3/8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. 10/paprbd bx, 32 bx (320 device)/wdn bx.</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. 10/paprbd bx, 10 bx/fbrbd, 5 bx (500 device) wdn bx.</td>
<td>21-3/4</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1, 15-min delay, red.</td>
<td>Finger pinch</td>
<td>To provide delay action firing of mines, demolition blocks and other explosive charges.</td>
<td>10/ctn, 12 ctn (120 device) wrprf wdn bx, M12.</td>
<td>14-1/4</td>
<td>10-1/8</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1, 1 hour delay, white.</td>
<td>Finger pinch</td>
<td>To provide delay action firing of mines, demolition blocks and other explosive charges.</td>
<td>1 set/paprbd bx, 10 bx/fbrbd bx, 5 lbs (50 set)/wdn bx.</td>
<td>21-3/4</td>
<td>12-7/8</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1, 2-1/2 hour delay, green.</td>
<td>Finger pinch</td>
<td>To provide delay action firing of mines, demolition blocks and other explosive charges.</td>
<td>10/ctn, 12 ctn (120 device) wrprf wdn bx, M12.</td>
<td>14-1/4</td>
<td>10-1/8</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1, 5-1/2 hour delay, yellow.</td>
<td>Finger pinch</td>
<td>To provide delay action firing of mines, demolition blocks and other explosive charges.</td>
<td>10/ctn, 12 ctn (120 device) wrprf wdn bx, M12.</td>
<td>14-1/4</td>
<td>10-1/8</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1, 11-1/2 hour delay, blue.</td>
<td>Finger pinch</td>
<td>To provide delay action firing of mines, demolition blocks and other explosive charges.</td>
<td>10/ctn, 12 ctn (120 device) wrprf wdn bx, M12.</td>
<td>14-1/4</td>
<td>10-1/8</td>
</tr>
<tr>
<td>FIRING DEVICE SET, DEMOLITION: M1 delay type.</td>
<td>Finger pinch</td>
<td>To provide delay action firing of mines, demolition blocks and other explosive charges.</td>
<td>10/ctn, 12 ctn (120 device) wrprf wdn bx, M12.</td>
<td>14-1/4</td>
<td>10-1/8</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1, pressure type.</td>
<td>20-lb press</td>
<td>Mines and boobytraps.</td>
<td>5/crdbd bx, 30 bx/wtprf-wxd cloth-paper (150 device)/wdn bx.</td>
<td>40-3/4</td>
<td>10-1/2</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1A1, pressure type.</td>
<td>20-lb press</td>
<td>Mines and boobytraps.</td>
<td>1. 5/bx, 50 bx (250 device) wdn bx.</td>
<td>27-1/4</td>
<td>12-3/4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Packed as req'd.</td>
<td>---</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1A1, pressure type, inert.</td>
<td>Inert, non-initiable.</td>
<td>Training</td>
<td>Packed as req'd</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M5, pressure release type.</td>
<td>Removal of restraining load.</td>
<td>Antitank mines and boobytraps.</td>
<td>1. 4/paprbd bx, 5 bx/fbrbd bx, 10 bx (200 device)/wdn bx.</td>
<td>19-7/8</td>
<td>11-7/8</td>
</tr>
<tr>
<td>Nomenclature</td>
<td>Initiating action</td>
<td>Uses</td>
<td>Description</td>
<td>Dimensions (inches)</td>
<td>Weight (lbs)</td>
</tr>
<tr>
<td>--------------</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Length</td>
<td>Width</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M5, pressure release type, inert.</td>
<td>2. Packed as req'd.</td>
<td>Training ------</td>
<td>As required ------</td>
<td>13-1/2</td>
<td>10</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1, pull type.</td>
<td>Inert, non-initiable.</td>
<td>3-pound pull</td>
<td>Anti-personnel mine M3 anti-tank mines, as improvised mines, and boobytraps.</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M2, pull friction type, inert (w/trip wire).</td>
<td>Inert, non-initiable.</td>
<td>Training ------</td>
<td>As required ------</td>
<td>15-3/8</td>
<td>11-3/8</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M3, pull-release type.</td>
<td>Release or 6-lb pull.</td>
<td>Antipersonnel mine M3 improvised mines and boobytraps.</td>
<td>1. 5 (w/2 spool of trip wire)/chipbd bx, 30 bx (150 device and 60 spool wire)/wtn bx. 2. 5, 2/w spool of trip wire/chipbd bx, 1 chipbd bx/leadfoil env. 40 env (200 device w/80 spool wire)/wtn bx. 3. Packed 250/wtn bx. 4. Packed as req'd.</td>
<td>15-1/2</td>
<td>10</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M3, pull-release type, inert.</td>
<td>Inert, non-initiable.</td>
<td>Training ------</td>
<td>Packed as required</td>
<td>26-1/4</td>
<td>10-1/2</td>
</tr>
<tr>
<td>FIRING DEVICE, DEMOLITION: M1, release type.</td>
<td>Removal of restraining load.</td>
<td>Boobytraps------</td>
<td>4/chipbd bx, 20 bx (80 device)/wtn bx.</td>
<td>15-1/2</td>
<td>13-3/4</td>
</tr>
<tr>
<td>BASE, COUPLING, FIRING DEVICE: (w/primer percussion, M27).</td>
<td>Component for demolition firing devices.</td>
<td>50/wtrprf ctn, 10 ctn (500 base)/wtn bx.</td>
<td>15-1/2</td>
<td>13-1/4</td>
<td>10</td>
</tr>
<tr>
<td>PRIMER, PERCUSSION: CAP, M2.</td>
<td>Release of firing pin.</td>
<td>For coupling of demolition firing device.</td>
<td>1. 2,500/wtn bx. 2. 100/crdbd bx, 50 bx (5,000 primers)/crdbd bx (w/excelsior inside)/wtn bx.</td>
<td>15-1/8</td>
<td>13-1/4</td>
</tr>
<tr>
<td>PRIMER, PERCUSSION</td>
<td>Release fir-</td>
<td>For coupling</td>
<td>1. 100/ctn, 50 ctn</td>
<td>19</td>
<td>10</td>
</tr>
</tbody>
</table>
Table XI. Firing Devices and Components—Continued

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Initiating action</th>
<th>Uses</th>
<th>Description</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>SION: CAP, Improved No. 3 (or equal)</td>
<td>ing pin.</td>
<td>base of demolition firing.</td>
<td>(5,000 primers) wdn bx.</td>
<td>Length Width Height Weight (lbs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. 10,000 wdn bx.</td>
<td>14-1/4 10-1/8 7-7/8 39.0</td>
</tr>
</tbody>
</table>

**Abbreviations:**
- bx = box(es)
- chipbd = chipboard
cardb = cardboard
- ctn = carton(s)
env = envelope
- forb = fiberboard
- lb = pound(s)
papbd = paperboard
- pkg = package(s)
- req'd = required
- w/ = with
- wdn = wooden
- wtrpf = waterproof

---

b. All firing devices are physically interchangeable, as coupling bases have the same thread (nine-sixteenths of an inch) for attachment to mines or explosive charges. The coupling bases of the pull friction type and the delay type firing devices are not removable. The coupling base of all other type firing devices are removable. Firing devices may be reprimed where appropriate (par. 49) and their firing mechanism recocked such as when used repeatedly in training.

c. Firing devices may be used with demolition charges (fig. 29) with heavy antitank mines if fitted to activators, with light antitank mines, or destructors. When a firing device is used with a service activator or a practice activator (TM 9-1940), a blasting cap cannot be used. When used with light antitank service mines, with demolition charges, or with universal destructor M10 (par. 30), the firing device requires a crimped-on blasting cap.

d. Inert firing devices, which contain an inert percussion primer, are provided for training. Inert firing devices used for training purposes are to be employed in exactly the same manner and with the same care and precautions as are the explosive items comprising the firing devices simulated; hence, it is essential that personnel in training be fully conversant with all procedures and instructions given in this manual pertaining to the explosive firing devices.

e. Primed coupling bases (par. 48) are issued separately as replacement parts for firing devices.

42. Firing Device, Demolition: Delay Type, M1

a. General. This is a chemical device (fig. 30) used for delay action firing of mines or demolition charges.

b. Description. The device consists of a two-part case or tube, the parts being joined near the center by a coupling. The tube is about 3/8 inch in diameter and the device is 6-1/4 inches long including a primed coupling base, which is not removable, but has the same size thread and nipple as on all firing devices. The half of the case attached to the coupling base is brass and the other half is thin copper, capable of being crushed between thumb and finger. The copper half contains a sealed glass ampoule of corrosive chemical and the brass half houses a firing pin and spring. An identification and safety strip, colored according to the length of delay (table XII) in which the device functions, extends through slots opposite an inspection hole near the primer of the coupling base. Devices with black, red, white, green, yellow, and blue strips are packed separately, according to color. A restraining wire, extends from the end of the device where it is held by a screw, along the ampoule, through a firing pin spring, and to the firing pin to which it is attached.

c. Functioning. When the glass ampoule is crushed (fig. 31), the corrosive liquid is released. The liquid then eats through the restraining wire releasing the firing pin. The firing pin, driven by a spring, fires the primer in the coupling base. A temperature correction table (one in each box) shows the delay of a device having a strip of particular color at various temperatures as shown in table XII.
Table XII. Effect of Temperature on Delays of Firing Device, Delay Type, M1

<table>
<thead>
<tr>
<th>Temp. (deg. F)</th>
<th>Black OM ST</th>
<th>Black OM ST</th>
<th>White OM ST</th>
<th>Green OM ST</th>
<th>Yellow OM ST</th>
<th>Blue OM ST</th>
</tr>
</thead>
<tbody>
<tr>
<td>-25</td>
<td>-----</td>
<td>-----</td>
<td>8.5 hr</td>
<td>3.3 hr</td>
<td>3 day</td>
<td>1.3 day</td>
</tr>
<tr>
<td>0</td>
<td>8 hr</td>
<td>2.5 hr</td>
<td>45 min</td>
<td>20 min</td>
<td>17.5 hr</td>
<td>8 hr</td>
</tr>
<tr>
<td>+25</td>
<td>36 min</td>
<td>16 min</td>
<td>25 min</td>
<td>11 min</td>
<td>5.5 hr</td>
<td>2.5 hr</td>
</tr>
<tr>
<td>50</td>
<td>15 min</td>
<td>7 min</td>
<td>17 min</td>
<td>8 min</td>
<td>2 hr</td>
<td>55 min</td>
</tr>
<tr>
<td>75</td>
<td>9 min</td>
<td>4 min</td>
<td>15 min</td>
<td>7 min</td>
<td>1 hr</td>
<td>27 min</td>
</tr>
<tr>
<td>100</td>
<td>5 min</td>
<td>2.0 min</td>
<td>8 min</td>
<td>3.5 min</td>
<td>32 min</td>
<td>14 min</td>
</tr>
<tr>
<td>125</td>
<td>4 min</td>
<td>1.5 min</td>
<td>5 min</td>
<td>2 min</td>
<td>20 min</td>
<td>9 min</td>
</tr>
<tr>
<td>150</td>
<td>3 min</td>
<td>1 min</td>
<td>4 min</td>
<td>1.5 min</td>
<td>15 min</td>
<td>6 min</td>
</tr>
</tbody>
</table>

d. Preparation for Use.
(1) The card found in each box of devices indicates the color for the required delay at the prevailing temperature (table XII).
(2) Select a device with identification strip of this color.
(3) Look in or insert a nail or wire into the inspection hole to make sure that the firing pin has not been released. Examine the copper half of the tube of the device (this half contains the glass ampoule of corrosive chemical), to see that it is not dented and that there is no evidence that the ampoule has been crushed.
(4) Remove the celluloid protective shipping cap from the coupling base and crimp on a nonelectric blasting cap.
(5) Insert the blasting cap into the cap well of the demolition charge or mine, as the case may be, and screw the device into the threads of the well.
(6) If detonating cord is used, tape one end of the cord to the blasting cap on the delay firing device, then extend the other end of the cord to the charge, or mine, where it must be fitted with another blasting cap for insertion or tapping.
(7) Crush ampoule between thumb and fingers.
(8) Look through inspection hole to see whether the firing pin has been released.
(9) If the firing pin rests on the identification and safety strip, remove the device and discard.
(10) If the firing pin has not been released, withdraw the strip.

e. Neutralizing. There is no safe way to neutralize this firing device. If an extreme necessity arises to neutralize the device before the period of delay expires, a cotter pin or wire should be inserted very gently through the inspection holes. The device should then be removed from the charge and discarded, because, once actuated, no attempt must be made to reuse it.

f. Precautions in Use.
(1) When screwing this device into an explosive item, it should be held with the thumb and fingers gripping the coupling that joins the two halves (copper and brass) of the tube.
(2) The time delay starts when the ampoule is crushed—not when the colored identification and safety strip is withdrawn. Calculations must be made accordingly.
(3) Areas where explosives fuzed with this type of device have been installed and actuated should be especially so marked and recorded. Troops must not approach installed charges employing this type of delay firing device.

43. Firing Device, Demolition: M1, Pressure Type, and M1A1, Pressure Type

a. General. These firing devices (figs. 32 and 33) are similar in functioning and appearance. They are designed for actu-
UP APPARENTLY LOST

PULL ON TAUT TRIP WIRE INITIATING PULL-RELEASE FIRING DEVICE FITTED TO DEMOLITION CHARGE

PULL ON TRIP WIRE INITIATING PULL FIRING DEVICE FITTED TO DEMOLITION CHARGE

PICKING UP APPARENTLY LOST PACKAGE WEIGHING OVER FIVE-POUNDS THUS INITIATING PRESSURE-RELEASE FIRING DEVICE FITTED TO A HAND GRENADE

PRESSURE ANYWHERE ON BOARD INITIATING PRESSURE TYPE FIRING DEVICE FITTED TO DEMOLITION CHARGE

PRESSURE ON BOARD AT P LIFTING ROCK HEAVIER THAN 3-POUNDS—THUS INITIATING RELEASE FIRING DEVICE

ORD D336A
ation by pressure and intended for use in mines and boobytraps. The information in b through e below applies to both models of the pressure type firing device.

b. Description. The firing device consists of a head, case, and coupling base. The case that contains the firing mechanism has three lugs, each with a hole for use in anchoring the device. The firing mechanism consists of a spring-loaded firing pin held in the "cocked" position by a firing pin release pin, which is attached to the pressure cap. This is accomplished by a keyhole-shaped opening in the trigger pin. The smaller part of this opening fits into a groove in the firing pin (cocked position); the larger part of the opening permits the free movement of the firing pin upon release. The head, an integral part of the case, contains the firing pin release pin mechanism, which terminates in a pressure cap. A tapped hole in the center of the pressure cap is provided for use of an extension. The coupling base, which screws into the case, contains the primer. A removable fork, located under the pressure cap, prevents movement of the firing pin release pin. The safety pin, which passes through a hole in the case between the firing pin and the primer of the coupling base, prevents the firing pin from striking the primer should the firing pin be accidentally released.

c. Functioning. A pressure of 20 pounds on the pressure cap compresses the firing pin release pin spring and pushes the release pin inward. When the enlarged portion of the keyhole-shaped opening in the release pin is in line with the spindle, the firing pin is released. The spring-loaded firing pin then fires the primer.

d. Preparation for Use.

(1) Inspection before use. Check the firing mechanism as directed in (a) through (f) below.

(a) Unscrew the coupling base from
the firing mechanism and inspect the primer. Invert the coupling base and hold it against the firing mechanism, with the nipple extending into the threaded end of the firing mechanism.

(b) Holding the coupling base firmly against the case, remove safety fork and safety pin. Depress the pressure cap. The firing pin should strike the nipple end of the coupling base sharply, indicating proper functioning of the firing mechanism.

(c) Recock the firing mechanism by pushing firing pin inward with unsharpened end of a pencil or a small blunt rod and, at the same time, pressing downward on the pressure cap, so that the end of firing pin can pass through the enlarged portion of the keyhole in the firing pin release pin.

(d) Release pressure on pressure cap to allow the narrow part of the keyhole to engage the groove on the spindle.

(e) Replace safety pin and safety fork. The safety pin and the safety fork should be free enough for easy removal after the firing device has been installed.

(f) Screw the coupling base into the firing mechanism handtight. This restores firing device to original condition.

(2) Installation and arming.

(a) Remove protector tube from nipple, crimp a nonelectric blasting cap on the nipple, and then screw firing device, with safety fork and safety pin in place, into a mine or other explosive charge.

(b) Bury and anchor the assembled mine and firing device on a firm flat foundation.

(c) Place or arrange some suitable object such as a pressure board in contact with, but not bearing
on, the pressure cap. If the particular object does not touch the pressure cap, screw extension rod into pressure cap and adjust by unscrewing the rod up snugly against object, then backing the rod away one quarter turn to relieve any pressure on pressure cap. If the tri-pronged pressure head is to be used, screw it into the pressure cap and adjust in the same manner. The extension rod and the tri-pronged pressure head are illustrated in the insert in figure 32.

(d) Remove the safety fork. It should pull off easily. A sudden jerk may cause firing device to function. If the safety fork does not pull off easily, check the installation to make sure there is no pressure on pressure cap.

(e) Using the attached cord, pull out safety pin slowly and carefully. If the safety pin resists a gentle pull, the firing pin may have been released and is pressing against it. In such a case, replace the safety fork, remove the installation, and remove firing device from mine. Unscrew coupling base and check firing mechanism. If the firing mechanism is defective, replace it.

(f) Retain safety fork and safety pin for subsequent use in disarming.

e. Neutralizing.

(1) Carefully insert the safety pin into the case of the firing device, then install safety fork.
(2) Take up assembled firing device and mine or demolition charge.
(3) Remove firing device from mine or demolition charge.
(4) Restore firing mechanism and coupling base to original condition and packing.

44. Firing Device, Demolition: M5, Pressure Release Type

a. Description. This device (fig. 34) consists of a rectangular pressed-steel case containing a spring-loaded striker. The striker is restrained by a release plate, which is held in place by a safety pin. A coupling base fits into the threaded hole in the bottom of the case. This device is used to activate antitank mines equipped with supplementary fuze wells (cap wells) and for general boobytrap installations with charges having a threaded well.

b. Functioning.

(1) When the restraining load of at least 5 pounds is removed and the release plate moves more than 5/8 inch, the firing pin is released.
(2) The firing pin, impelled by the spring, fires the percussion cap.

c. Installing and Arming.

(1) Inspect the device to make sure that there are no obvious defects, that firing pin is cocked, and that the safety pin is in proper position.
(2) Remove small cotter pin.
(3) Slip a nail (common – 6, 8, or 10 penny) or a length of 10 gauge wire through interceptor holes.
(4) Remove the coupling base.
(5) Remove the celluloid shipping cap.
from the coupling base and crimp on a nonelectric cap.

(6) Screw the coupling base into the firing mechanism.

(7) Screw the device into the threaded fuze well (cap well) of charge or mine.

(8) Install so that the release plate is held closed by weight of a mine, a charge, or a boobytrap bait, or by wedging against some stable object. If the device is in the ground, use the small board issued with the device to provide solid foundation. See that the safety pin is in proper position and adjust the installation so that the safety pin will slip out easily.

(9) Remove the safety pin gently by pulling attached cord. If striker falls, it can be felt striking the interceptor hole nail or wire. (If this happens, remove the restraining load and check device. If device is defective, discard it.) Recock device and repeat process.

(10) If no clicking sound is heard, pull out wire or nail from interceptor hole. It should come out easily.

d. Neutralizing.

(1) Insert wire or nail through interceptor holes.

(2) Insert safety pin.

(3) Remove restraining load.

(4) Insert cotter pin.

(5) Remove the device from mine or charge.

(6) Unscrew coupling base and destroy or store in a safe place. Protector cap from used 15-second delay detonator may be used.

Warning: Do not attempt to remove blasting cap from the coupling base.

e. Reuse. If the primer (percussion cap) in the standard coupling base has been fired in training or if there is no blasting cap attached to the base, the base may be reused by removing the fired primer and pressing a primer M2 (or M3) firmly into place. To recock, proceed as directed in (1) through (6) below.

(1) Remove the coupling base.

(2) Hold the firing mechanism with release plate up, hinge of release plate toward you.

(3) With nail held in right hand perpendicular to long axis of firing mechanism, force the firing pin back to cocked position.

(4) Hold down release plate and withdraw nail.

(5) Insert safety pin.

(6) With release plate held down firmly, withdraw safety pin to see that it slides out easily; replace safety pin.

Note. Other methods of recocking may be used if found satisfactory.

45. Firing Device, Demolition: M1A1, Pull Type

a. General. This firing device (fig. 35) is designed for actuation only by a pull on a trip wire and is intended for use with
improvised antipersonnel mines, for boobytrapping antitank mines, and for setting up boobytraps.

b. Description.

(1) This firing device consists of a cylindrical case (body), head, and coupling base. The head, which is permanently joined to the case, contains a release pin, release pin ring, a loading spring, and a safety pin. The case, which contains the firing mechanism consisting of the firing pin and compression spring, also contains a positive safety pin. The coupling base, which screws into the case, contains the primer. The outer end of the coupling base is threaded to fit activators and firing device wells (cap wells). It has a nipple to which a blasting cap may be assembled.

(2) The pull-ring end of the firing pin, which is slotted axially to form four jaws, passes through a cylindrical opening in the case. The end of the release pin, fitting into an axial hole in the slotted end of the firing pin, causes it to engage on the upper surface of the opening, thereby restraining downward movement of the firing pin.

(3) The safety pin, which passes through a hole in the head and a hole in the release pin, prevents accidental movement of the release pin during shipment and handling. The positive safety pin, which passes through a hole in the case between firing pin and primer, prevents the firing pin from striking the primer.
should the firing pin be accidentally released. An anchor cord, on the case, is used to anchor the firing device firmly during installation.

c. Functioning. A direct pull of 3 to 5 pounds on the trip wire causes the release pin to be pulled outward, overcoming the resistance of the loaded release pin spring. The slotted end of the firing pin, being no longer restrained by the cylindrical opening, passes through the opening. The released firing pin, driven by the compression spring then fires the percussion cap.

d. Preparation for Use.

(1) Inspection before use. Check firing device as directed in (a) through (d) below.

(a) Unscrew the primed coupling base and inspect primer. Invert coupling base and hold it so that the nipple end is inside the case.

(b) Holding coupling base firmly against the case, remove the positive safety pin and head safety pin. Pull outward on the pull-rings. Firing pin should strike the end of the nipple sharply, indicating proper functioning of assembly.

(c) Recock firing device by pushing firing pin inward with unsharpened pencil or blunt rod until release pin slips into place, thus expanding slotted head of firing pin.

(d) Insert positive safety pin and head safety pin, then screw the primed coupling base into the case, primer end inward. Safety pins should be free enough for easy removal after the firing device has been installed.

(2) Installation and arming.

(a) Remove the primed coupling base.

(b) Remove the protector cap from the nipple and crimp on a non-electric blasting cap. Screw primed coupling base into the case (body).

(c) Screw the firing device, with safety pins in place, into a mine or demolition charge.

(d) Install loose trip wire, attaching anchor end first. Unspool the trip wire to the mine. Before connecting trip wire to the firing device, step off to the side and inspect for detectability of trip wire and mine. If necessary, rearrange the installation to obtain adequate concealment.

(e) Attach free end of wire to pull-ring, drawing up excess wire through pull-ring just taut but without strain.

(f) Remove the head safety pin. If it does not pull out easily, trip wire may be too tight. Adjust trip wire if necessary. If head safety pin still binds, remove the coupling base and check mechanism. If defective, replace faulty firing device with a serviceable one.

(g) Using the attached cord, pull out the positive safety pin slowly and carefully. If it resists a gentle pull, the firing pin may have been released and is pressing against it or spread of legs of the positive safety pin is excessive. If spread of legs is not excessive but the pin still resists gentle pull, install head safety pin, unscrew coupling base, and check mechanism. If defective, replace faulty firing device with a serviceable one.

(h) Retain safety pins for future use in disarming the firing device.

(3) Disarming and removal.

(a) Carefully insert the positive safety pin first, then the head safety pin into the firing device. After insertion, spread legs of safety pins just enough to prevent accidental loss of pins during handling and shipment.

(b) Disconnect trip wire from the pull-ring.

(c) Unscrew firing device from mine or charge.

(d) Restore firing device to original condition and packing.
46. Firing Device, Demolition: M3, Pull Release Type

a. General. This firing device (fig. 36) is a mechanical device containing a percussion cap. It is designed for actuation by either an increase (pull) or decrease (release) of the tension in a taut trip wire and is intended for use with antipersonnel mine M3, improvised antipersonnel mines, or in setting up boobytraps.

b. Description.

(1) The firing device consists of a head, body, coupling base, firing pin, release pin, safety pin, and winch assembly. The head, which is crimped to the body, acts as a guide for the release pin. The body contains a spring-loaded firing pin, in which the knob end of the release pin is installed. The coupling base, which screws into the body, contains the primer. The outer end of the coupling base is threaded to fit activators and firing device wells (cap wells) and has a nipple, to which a blasting cap may be assembled.

(2) The outer end of the firing pin is slotted longitudinally to form four jaws, and grooved internally to receive a knob on the inner end of the release pin. The slotted end of the firing pin passes through a cylindrical opening in the body, in which position it is held by the knob of the release pin when the release pin is in its normal axial position and the safety pin in place. The safety pin passes through an elongated opening in the head and a hole in the release pin. A small cotter pin, which passes through a hole in the end of the safety pin, prevents accidental movement of the safety pin during shipment. The safety pin, when in position, prevents forward or rearward movement of the release pin (beyond the slight movement permitted by the elongated slot in the head), thus preventing release of the firing pin. The winch, consisting essentially of a bracket, spool with a knurled knob, and a pawl, is attached to the outer end of the release pin.

(3) A positive safety pin, one leg of which passes through a hole in the body between the firing pin and the primer, prevents the firing pin from striking the primer should the firing pin be accidentally released. The other leg of the safety pin is bent around the body, to keep it in place during shipment and handling. An anchor cord (12 inches long), attached to the eyelet on the body, is used to anchor the firing device firmly during installation.

c. Functioning.

(1) Pull operation. A direct pull of 6 to 10 pounds on the trip wire causes the release pin and firing pin to be pulled outward until the jaw end of the firing pin passes beyond the constricted opening in the body. In this position, the jaws spread, thereby releasing the firing pin from the knob of the release pin. The jaws then close, releasing the firing pin which, driven by its spring, fires the primer.

(2) Tension-release operation. Release of tension, such as cutting or detaching trip wire, permits the release pin and spring-loaded firing pin to move inward. When the end of the firing pin clears the constricted opening in the body, the jaws spread, thereby freeing the firing pin from the release pin. The released firing pin, driven by its spring, fires the primer.

d. Preparation for Use.

(1) Inspection before use. Check firing device as directed in (a) through (c) below.

(a) Unscrew the primed coupling base from the firing mechanism and inspect the primer.

(b) Inspect the positive safety pin and the safety pin, to see that they are in place, yet free enough for easy removal after the firing device has been installed.

(c) Leaving the positive safety pin and safety pin in position, pull the
winch assembly out with the finger until it is stopped by the safety pin, then release; repeat two or three times. The winch assembly should move smoothly approximately 1/4 inch and should require a force of 6 to 10 pounds. If the assembly hangs or moves jerkily or too easily, examine the firing device. If fault cannot be corrected, use another firing device.

(2) Installation and arming.
(a) Remove the protector cap from the nipple of the primed coupling base and crimp on a blasting cap.
(b) Screw the firing mechanism to the primed coupling base (fig. 37).
(c) Screw the firing device, with positive safety pin and safety pin in place, into a mine or demolition charge.
(d) Secure the trip wire at the anchor end, making certain that this tie will not slip. Unspool the trip wire to the mine or charge. Before connecting the trip wire to the firing device, step off to the side and inspect for detectability of the trip wire and mine. If necessary, rearrange the installation to obtain adequate concealment.
(e) Attach loose end of trip wire to the winch by threading it through the hole in the winch spindle.

Note. The wire must be threaded through the hole in the winch spindle, to prevent slippage and accidental functioning.

(f) Draw up excess wire through hole in winch spindle. Take up the remaining slack by turning the knurled knob until the safety pin is pulled exactly into the middle position (wide portion) of its elongated hole in the head.
(g) Remove small cotter pin from safety pin and then gently remove the safety pin. If safety pin does not slide out easily, adjust the winch winding until the safety pin is loose enough to be withdrawn easily.

(h) Using the attached cord, pull out the safety pin slowly and carefully. It should come out easily. If it resists a gentle pull, install the safety pin and remove trip wire from winch by depressing knurled knob and stripping off the wire. Remove the coupling base and check the mechanism. If defective, replace the whole firing device.

Warning: When finally removing safety devices, remove them from a safe distance, using a string or length of wire for the purpose.

(i) Retain safety devices for subsequent use in disarming.

e. Neutralizing.
(1) Carefully insert the positive safety pin into the body. The pin should enter freely.
(2) Insert the safety pin and install cotter pin.
(3) Release tension on trip wire by depressing knurled knob and stripping off wire.
(4) Remove firing device with blasting cap attached from the explosive charge or mine.
(5) Unscrew the primed coupling base from the firing mechanism. Do not attempt to remove the blasting cap from the primed coupling base; either destroy it or store it in a safe position.
(6) Restore firing mechanism to original condition and packing.

47. Firing Device, Demolition: M1, Release Type

a. General. This firing device (fig. 38) is designed to be actuated when a restraining weight is removed from it and is intended for use in setting up booby-traps. The restraining weight is applied at the time of installation. The firing device is restrained from firing as long as there is a load greater than 3 pounds on the top face of latch.
b. Description. The firing mechanism of this device is cube-shaped, approximately 2 inches square by 3 inches long. It is fitted with a cover at one end and a threaded hole to receive a primed coupling base at the opposite end. The body houses a spring lever, a spring, and a firing pin. One end of a steel latch engages a lip on the lever, the remaining portion of the latch rests on top of the device and, as issued, is held in place by a safety pin. This arrangement holds the lever in the set position. Two 3/16-inch holes are provided in the sides of the body, to permit the insertion of a nail or heavy gage wire to act as an additional safety device by intercepting the lever and preventing it from striking the firing pin should premature functioning occur during installation. A strip of metal 3/4-inch wide and 4 inches long spot-welded to the base of the body serves as a nailing bracket.

c. Functioning. Upon removal of restraining weight from the firing device, the lever is unlatched and is driven through an arc of approximately 75 degrees to strike the firing pin, which explodes the primer contained in the coupling base.

d. Preparation for Use.
(1) Inspection before use. Check firing device for any obvious defects and to make sure that the safety pin is properly installed and that the lever is latched in the set position.
(2) Installation and arming.
   (a) Remove the cotter pin in the end of the safety pin.
   (b) Slip a nail or stout wire through the interceptor holes.
   (c) Remove coupling base. Remove its protector cap and crimp on a nonelectric blasting cap.
   (d) Screw the coupling base into the firing mechanism.
   (e) Screw the firing device thus assembled into fuze well (cap well) of the mine or charge.
   (f) Provide a level surface at the base of the hole in which the mine or charge with firing device assembled is to be planted. A board may be used for this purpose.
   (g) Place the assembled mine (or charge) and firing device in the hole, with the latch on the firing device uppermost.
   (h) Place the restraining weight on the exposed surface of the latch.

   Warning: The weight placed on the latch must be greater than 3 pounds to prevent firing device from functioning when safety devices are withdrawn.

   (i) Make sure that the safety pin cord and interceptor wire are at ground level in position convenient for removal.
   (j) Conceal the installation.
   (k) Gently withdraw the safety pin by pulling on its cord. If it does not come out easily, the load on the mine is too light or improperly placed on the latch. If resistance is met, uncover and check the installation.
   (l) Withdraw the interceptor wire; it also should come out easily.

   e. Neutralizing.
      (1) Carefully uncover installation.
      (2) Insert a nail or wire through interceptor holes.
      (3) Insert safety pin.
      (4) Remove restraining weight.
      (5) Insert cotter pin.
      (6) Remove mine (or charge) with its assembled firing device. Unscrew the firing device (firing mechanism and coupling base) from the mine or charge.

   (7) Unscrew the coupling base from the firing mechanism.
   (8) Destroy the coupling base with blasting cap attached or store in a safe place.

   Warning: Do not attempt to remove the blasting cap from the coupling base.
   (9) Restore firing mechanism to original condition and packing.

48. Base, Coupling, Firing Device

This is a metal coupling (see firing device illustrations, figs. 30-38) containing a percussion primer and having a nipple to which a blasting cap may be attached. The coupling base is threaded at one end to screw into a standard firing mechanism and at the other end to screw into a cap well of a block demolition charge or certain types of mines. The following firing devices and detonators are issued with removable coupling bases:

   Coupling bases are also issued individually with percussion primer M27 (fig. 39) for use as replacements in firing devices fired for training and test purposes. A coupling base may be used for several firings before replacement is necessary. The originally installed percussion primer M27 is replaced by a percussion primer M2 or improved No. 3 (par. 49).

   Warning: Do not attempt to remove an unfired primer from a coupling base.

49. Primer, Percussion: Cap, M2 and Improved No. 3

Percussion primer M2 (fig. 40) and Improved No. 3 are essentially the same. When struck by a firing pin, a percussion primer emits a small but intense flame through its open end which will initiate a blasting cap. Demolition firing devices and firing device coupling bases are issued with percussion primers already installed.

   Percussion primer M2 and Improved No. 3 are issued separately for repriming firing devices used with regular practice mines or with improvised practice mines or boobytraps. A fired primer may be
punched out of a coupling base from the nipple end by a suitable rod. Separately issued primers are used for retriming fired firing devices used in training activities. A new primer may be inserted in place of the fired primer provided it fits snugly enough to be held tightly in place.

Warning: Do not attempt to remove an unfired primer from a coupling base.

Section VIII. BLASTING CAPS

50. General

Blasting caps (fig. 41) are used for initiating high explosives (the types of caps required for positive detonation of various explosives are shown in table I, par. 14), and are designed to be inserted in cap wells. They are also the detonating element in certain land mine fuzes. They are classified according to the means of initiation as electric (par. 51) and nonelectric (par. 52). Special blasting caps are used to detonate less sensitive explosives such as
TNT, military dynamite, or ammonium nitrate. Blasting caps No. 8 and No. 6 are used to detonate more sensitive explosives such as tetryl, or commercial dynamite. The cap No. 8 is more powerful than the No. 6, hence the cap No. 8 may be used to detonate a less sensitive explosive than one which can be detonated by a cap No. 6. See FM 5–25 for firing systems and priming.

Warning: Blasting caps are extremely sensitive and may explode unless handled carefully. They must be protected from shock and extreme heat and must not be tampered with. They are never to be stored with any other explosives. Caps and explosives must not be carried on the same truck except in an emergency.

51. Electric Blasting Caps

Electric blasting caps (figs. 42, 43, and 44) are used when a source of electricity such as a blasting machine or battery is available. They should always be used for underwater demolitions or where a waterproof installation is desired, except when this is impossible. Table XIII presents a tabulation of data on electric blasting caps.

Table XIII. Electric Blasting Caps.

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Lead wire characteristics</th>
<th>Description</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAP, BLASTING: commercial, electric, No. 6, instantaneous.</td>
<td>Short lead, 4 ft through 10 ft.</td>
<td>500/wdn bx ---------</td>
<td>18 13-3/8 12</td>
<td>48.6</td>
</tr>
<tr>
<td>CAP, BLASTING: commercial, electric, No. 6, instantaneous.</td>
<td>Medium lead, 12 ft through 40 ft.</td>
<td>As required -----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>CAP, BLASTING: commercial, electric, No. 6, instantaneous.</td>
<td>Long lead, 50 ft through 100 ft.</td>
<td>As required -----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>CAP, BLASTING: commercial, electric, No. 6, instantaneous.</td>
<td>Short lead, 4 ft through 10 ft.</td>
<td>1. 70/ctn, 5 ctn (350 cap)/wdn bx.</td>
<td>15 12-1/2 6-1/2</td>
<td>222</td>
</tr>
<tr>
<td>CAP, BLASTING: commercial, electric, No. 8, instantaneous.</td>
<td>Medium lead, 12 ft through 40 ft.</td>
<td>As required -----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>CAP, BLASTING: commercial, electric, No. 8, instantaneous.</td>
<td>Long lead, 50 ft through 100 ft.</td>
<td>As required -----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>CAP, BLASTING: electric No. 8, strength.</td>
<td>Lead 6 ft long, copper tinned.</td>
<td>50/ctn --------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>CAP, BLASTING: electric, No. 8, strength.</td>
<td>Lead 6 ft long -------</td>
<td>70/ctn --------</td>
<td>13-3/4 7-1/4 4-3/4</td>
<td>8</td>
</tr>
<tr>
<td>CAP, BLASTING: electric, No. 8, strength.</td>
<td>Lead 30 ft long, copper tinned.</td>
<td>25/ctn --------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>CAP, BLASTING: electric, No. 8, 1st delay</td>
<td>Lead 12 ft long -------</td>
<td>500/wdn bx --------</td>
<td>19-1/2 13-1/2 9-1/4</td>
<td>30</td>
</tr>
</tbody>
</table>
### Table XIII. Electric Blasting Caps—Continued

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Lead wire characteristics</th>
<th>Description</th>
<th>Dimensions (inches)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAP, BLASTING: electric, No. 8, 2nd delay (approx. 1.18 sec.)</td>
<td>Lead 12 ft long ----</td>
<td>500/wdn bx</td>
<td>19-1/2 13-1/2 9-1/4</td>
<td>30</td>
</tr>
<tr>
<td>CAP, BLASTING: electric, No. 8, 3rd delay (approx. 1.35 sec.)</td>
<td>Lead 12 ft long ----</td>
<td>500/wdn bx</td>
<td>19-1/2 13-1/2 9-1/4</td>
<td>30.5</td>
</tr>
<tr>
<td>CAP, BLASTING: electric, No. 8, 4th delay (approx. 1.53 sec.)</td>
<td>Lead 12 ft long ----</td>
<td>500/wdn bx</td>
<td>19-1/2 13-1/2 9-1/4</td>
<td>30.0</td>
</tr>
<tr>
<td>CAP, BLASTING: electric, high strength.</td>
<td>Lead 6 ft long, copper tinned.</td>
<td>1. 50/ctn</td>
<td>9 4-1/8 3</td>
<td>2.34</td>
</tr>
<tr>
<td>CAP, BLASTING: electric, high strength.</td>
<td>Lead 9 ft long, copper tinned.</td>
<td>50/ctn</td>
<td>7-1/4 4-3/8 3-1/4</td>
<td>4.0</td>
</tr>
<tr>
<td>CAP, BLASTING: electric, low strength.</td>
<td>Lead 6 ft long, copper tinned.</td>
<td>50/ctn</td>
<td>6-1/2 6 2-7/8</td>
<td>2.0</td>
</tr>
<tr>
<td>CAP, BLASTING: electric, inert.</td>
<td>Various long lead wires.</td>
<td>As required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAP, BLASTING: special, electric.</td>
<td>Lead 12 ft long ----</td>
<td>1. 1/chipbd pkg. 50 pkg/fbrbd bx, 10 bx (500 cap)/wdn bx, 2. As required</td>
<td>28-1/4 15-1/4 11-3/4 76.5</td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviations:**
- bg ...... bag(s)
- bx ...... box(es)
- chipbd ...... chipboard
- ctn ...... carton(s)
- crdbd ...... cardboard
- fbrbd ...... fiberboard
- ft ...... foot (feet)
- lb ...... pound(s)

**b.** When two or more electric caps (except the cap M6) are connected in the same circuit, they must be the product of the same manufacturer. This is essential to prevent misfires because caps of different manufacturers do not have the same electrical characteristics. The electrical characteristics of the cap M6 is closely controlled and caps of this model from different manufacturers may be mixed in a firing circuit. A current of at least 0.5 ampere is required to insure detonation of electric blasting caps. First, second, third, and fourth delay blasting caps No. 8 are used to detonate charges of commercial dynamite (or lengths of detonating cord) in a sequence, especially in quarrying or tunnel-driving operations.

**c.** Issue electric caps have lead wires of various lengths for connecting them to the circuit. The most commonly used caps have 12-foot lead wires. A short-circuiting tab or shunt fastens the loose ends of the wires together (fig. 44). This shunt prevents accidental electric firing of the cap and must be removed before the cap is connected in a firing circuit.

### 52. Nonelectric Blasting Caps

Nonelectric blasting caps (fig. 45 and 46) may be initiated by time blasting fuse, firing devices, or detonating cord. Because nonelectric caps are extremely difficult to waterproof, their use should be avoided in priming charges placed under water or in wet boreholes. Such charges, if they are to be fired nonelectrically, should be...
Figure 42. Cap, blasting: special, electric, M6 with cast sulphur and rubber plug assembly (top) and rubber plug assembly (bottom).

Figure 43. Cap, blasting: special, electric, M6 on cardboard shipping spool.

primed with the nonelectric blasting cap crimped to the detonating cord, which should be kept above the water or ground level. If it becomes necessary to use nonelectric caps in damp boreholes, they should be moisture-proofed with waterproof blasting cap sealing compound (par. 68) and fired immediately after placing. Table XIV presents data on nonelectric blasting caps.
### Table XIV. Nonelectric Blasting Caps

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Description</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dimensions (inches)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length</td>
</tr>
<tr>
<td>CAP, BLASTING: nonelectric, No. 6, instantaneous.</td>
<td>1. 5,000/wdn bx</td>
<td>20-1/8</td>
</tr>
<tr>
<td></td>
<td>2. 100/ctn, 10 ctn/fbrbd bx, 1 bx/wtrprf bag, 5 bag (5,000 cap)/wdn bx.</td>
<td></td>
</tr>
<tr>
<td>CAP, BLASTING: nonelectric, No. 8 instantaneous.</td>
<td>1. 100/ctn, 50 ctn (5,000 cap)/wdn bx.</td>
<td>18-1/2</td>
</tr>
<tr>
<td></td>
<td>2. As required</td>
<td></td>
</tr>
<tr>
<td>CAP, BLASTING: special, nonelectric (Type I(J-1)) (PETN or RDX).</td>
<td>1. 50/mtl can, 20 can/fbrbd, ctn, 5 ctn (5,000 cap)/wdn bx.</td>
<td>24-3/4</td>
</tr>
<tr>
<td></td>
<td>2. 100/ctn, 10 ctn/crdbd bx, 10 bx (10,000 cap)/inner wtrprf pkg. 1 inner pkg in sawdust/outer wtrprf pkg/wdn bx.</td>
<td>22-3/4</td>
</tr>
<tr>
<td></td>
<td>3. As required</td>
<td></td>
</tr>
<tr>
<td>CAP, BLASTING: special nonelectric, M7.</td>
<td>6/pprbd ctn, 1 ctn/wtrprf bag, 50 bag/fbrbd bx, 12 bx (3,600 cap)/wdn bx.</td>
<td></td>
</tr>
<tr>
<td>CAP, BLASTING: tetryl, nonelectric, type A.</td>
<td>100/ctn, 50 ctn (5,000 cap)/wdn bx.</td>
<td>19</td>
</tr>
<tr>
<td>CAP, BLASTING: nonelectric, inert.</td>
<td>As required</td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviations:**
- bx: box(es)
- ctn: carton
- crdbd: cardboard
- fbrbd: fiberboard
- mtl: metal
- pkg: package(s)
- pprbd: paperboard
- wdn: wooden
- wtrprf: waterproof

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**Figure 44. Caps, blasting: electric—commercial.**
Section IX. MISCELLANEOUS ACCESSORIES AND TOOLS

53. General

This section describes nonexplosive accessories and tools used in demolition operations. Most of the items described are components of one or more of the demolition kits described in chapter 4. However, all items may be ordered individually on a unit basis.

54. Adapter, Priming: Explosive, M1A4

a. General. The priming adapter is a plastic hexagonal-shaped device, approximately 1.1 inches long, 0.63 inch across the flat portion, and hexagonal-shaped for 0.85 inch of its total length, the balance of its length being threaded to fit female threads of threaded cap wells and the de-
structor M10 (par. 30). A shoulder inside one end is large enough to permit time fuse or detonating cord to pass through but too small for an Army special blasting cap. The adapter is slotted longitudinally, so the wires of an electric blasting cap can be inserted easily and quickly. The priming adapter M1A4 replaces the M1A2 and M1A3 models which are similar to the M1A4 but have cylindrical bodies. The hexagon-shaped M1A4 model can be more readily handled, using arctic mittens. This item simplifies the priming of military demolition explosives having threaded cap wells and utilizing Army special blasting caps, both electric and nonelectric. The priming adapter is used as indicated in b below.

b. Methods of Use.

(1) With electric blasting cap (A, fig. 47).
(a) Pass cap wires of the electric cap through slot of priming adapter.
(b) Pull cap into adapter.
(c) Insert cap into fuze well (cap well) of explosive.
(d) Screw the adapter into the well.

(2) With nonelectric blasting cap and time blasting fuse M700 (B, fig. 47).
(a) Pass the end of the fuse through the adapter.
(b) Crimp the nonelectric blasting cap to the fuse.
(c) Pull the cap into the adapter.
(d) Insert cap into cap well of explosive and screw adapter into place.

(3) With detonating cord.
(a) Cut off and discard 6 inches from the end of the detonating cord.
(b) Use same method as for nonelectric cap and time blasting fuse.

Note. Detonating cord alone in the cap well of a TNT block is not sufficiently powerful to detonate it.

55. Adhesive: Paste for Demolition Charges, One-Half Pound Can, M1

a. The adhesive is a sticky, putty-like substance for attaching charges to vertical surfaces or to overhead flat surfaces. It is useful in holding charges while tying them in place, or under some conditions, holding charges without tying. Charges are held in place from several minutes to several days depending on the size and shape of charge and the surface to which it is attached.

b. The adhesive will hold a single thickness of block demolition charges to dry, clean wood, steel, or concrete for several days.

c. The adhesive will not adhere satisfactorily to dirty, wet, or oily surfaces.

d. The compound becomes stiff and hard at subzero temperatures and loses its adhesive quality.

e. The adhesive is softened by water and becomes useless if wet.

f. The adhesive is a component of the blasting demolition kits described in paragraphs 71 and 72.

56. Bag, Canvas, Carrying: Demolition Kit

This carrying bag (fig. 48) is used for carrying selected demolition material for specific operations. It consists of a rectangular canvas receptacle with web shoulder and adjusting straps. It is issued as a basic component of the blasting demolition kits described in paragraphs 71 and 72.

57. Blasting Machines

a. General. Blasting machines are small electric generators that produce current for firing electric blasting caps. There are two types in Army use, the 10-cap twisting type and the 50- and 100-cap push-down-handle (rack bar) type.

Note. Blasting machines are not suitable for firing parallel-connected firing circuits.

See FM 5-25 for detailed information on electric firing systems.

The 10-cap blasting machine (A, fig. 49) is a component of blasting demolition kit described in paragraph 71. If operated correctly, it will fire 10 electric blasting caps properly connected in series. It weighs 5 pounds. When using this machine, proceed as indicated in (1) through (3) below.
Figure 47. Use of explosive priming adapter M1A4 with electric and nonelectric blasting caps.
the blasting machine is satisfactory for use.

f. Care and Preservation.

(1) Blasting machines are of rugged construction but they house a delicate, electrical mechanism, hence the machine should be treated with care.

(2) No attempt will be made to disassemble or repair a blasting machine.

(3) Cleaning and oiling will be done only by authorized personnel.

(4) When not in use, machines will be stored in a clean, dry, and relatively cool place.

(5) Directions for care and use on metal plates attached to each machine should be followed carefully.

58. Boxes for Blasting Caps

a. General. Specially designed empty boxes of various capacities are provided for blasting demolition kits and earth rod explosive kits. These boxes consist of rectangular wooden blocks with telescoping covers. Holes in the block-like interior of the box are receptacles for non-electric blasting caps. The boxes are filled with blasting caps when preparing the sets for use. The available blasting cap boxes are described in b and c below.

b. Box, Cap: 10-Cap Capacity, Infantry. This box (fig. 50) is a component of the blasting demolition kit described in paragraphs 71 and 72 and the Explosive Kit, Earth Rod, Set No. 1 (par. 73).

c. Box, Cap: 50-Cap Capacity, Engineer. This box (Q, fig. 63) is similar except for size and capacity to the 10-cap box. It is a component of Explosive Kit, Earth Rod: Set No. 1 (par. 73).

59. Electrical Wire and Cable

a. Stranded two conductor vinyl polymer insulated firing electrical power cable No. 18 AWG is used in making connections between electrically primed demolition charges and a source of power such as blasting machine or battery. It is issued in 500 foot coils and is carried on the reels described in paragraph 67.
A—TEN-CAP BLASTING MACHINE

B—FIFTY-CAP BLASTING MACHINE

C—METHOD OF USING 10-CAP BLASTING MACHINES

Figure 49. Blasting machines: 10-cap and 50-cap capacities.
are components of the blasting demolition kit described in paragraph 71. See FM 5-25 for detailed information on electrical firing systems.

60. Clip, Cord: M1, Detonating

The detonating cord clip M1 (fig. 51) is a steel device used in making parallel and 90-degree detonating cord connections and also in priming detonating cord with blasting caps. It is a component of the blasting demolition kits described in paragraphs 71 and 72 and of the priming assembly M15 which is part of the demolition charge assembly M37 (par. 74). See FM 5-25 for detailed instructions on the use of detonating cord clips.

Note. Detonating cord clips do not fit reinforced detonating cord because of its larger diameter.

61. Chest, Demolition: Engineer Platoon, M1931

This chest (fig. 52) is issued as a basic component of the blasting demolition kit...
described in paragraph 71. It is used for storage and to facilitate handling of the kit. The dimensions of the chest are 32-3/4 x 17-3/4 x 12-3/4 inches. Partitions are arranged specially for keeping components of the kit in order.

62. Crimper, Cap: M2, With Fuse Cutter

a. This crimper (fig. 53) is designed to squeeze the shell of the nonelectric cap tightly enough around safety fuse or time blasting fuse or detonating cord to prevent it from being pulled off easily and still not interfere with the burning of the powder train in the fuse. The lower portion of the jaws of the crimper are shaped and sharpened for cutting fuse or detonating cord. One leg of the handle is pointed for punching holes for caps on dynamite sticks. The other leg has a screwdriver end.

b. The cutting jaws must be kept clean and must be used only for cutting fuse or detonating cord. The cap crimper must not be used as pliers.

c. The crimper M2 has a narrow jaw that crimps a water-resistant groove completely around the cap. Earlier model cap crimpers have wider crimping jaws, which form a sleeve at the open end of the cap. Both crimper are constructed so the jaws cannot be closed tightly enough to injure the cap or fuse.

d. This crimper is issued as a basic component of the blasting demolition kits described in paragraphs 71 and 72 and earth rod explosive kit set No. 1 (par. 73).

63. Galvanometer, Blasting: With Leather Case and Carrying Strap

a. This galvanometer (fig. 54) is used to test electrical firing circuits. It contains an electromagnet, a small special silver chloride dry-cell battery (d below), and a division scale with indicator needle. Some galvanometers also contain an ohms scale. When the two external terminals are joined by a closed circuit, the flow of current from the special silver chloride dry-cell battery causes the needle to move across the scale. The amount of deflection depends upon the amount of resistance in the closed circuit and on the strength of the dry-cell battery.

b. The galvanometer is issued with a leather case and carrying strap. Lifting the top of the case exposes the terminals and scale which permits use of the galvanometer without removing it from the case. The case and carrying strap may be requisitioned separately for replacement purposes.

c. The galvanometer must be handled with care and kept dry. Before using, it is tested by holding a piece of metal across its two terminals. If this does not cause a deflection of 23 to 25 units (25 units is full
scale) of the needle, the special silver chloride dry-cell battery is weak and must be replaced.

d. The dry cell battery authorized for use with this galvanometer down to 0° F, is:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BATTERY. Special Silver Chloride Dry Cell:</td>
<td>BA275-245</td>
<td>6135-128-1632</td>
</tr>
<tr>
<td>1.09 v total voltage, cylin-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>drical shape, 2 terminal, stud</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and nut type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 4-inc. dia., 2-15 32-in. dia.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Warning:** Only the authorized special silver chloride dry-cell battery specified above is safe for service in this instrument. Dry-cell batteries of the conventional type (flashlight or other) create an extreme hazard when substituted for the special silver chloride dry-cell battery in blasting operations since the ordinary dry-cell battery furnishes sufficient current to detonate an electric blasting cap. This dry-cell battery will freeze and cease to function below 0° F. When using the galvanometer in cold climates, protect it from freezing by placing it under the clothing near the body. The special silver chloride dry-cell battery must be connected with proper polarity to obtain correct operation of the galvanometer. Connect the instrument leads to the terminals of the battery and check to assure that the meter shows a deflection of 23 to 25 units of the scale when a conductor is placed across the terminals of the instrument. If the meter shows reversed deflection of the needle, the dry-cell battery connections must be reversed.

**Caution:** This special silver chloride dry-cell battery is subject to corrosion when stored within the galvanometer. The special silver chloride dry-cell battery should be removed from the galvanometer when it is not to be used for extended periods.

64. Twine and Electrical Insulation Tape

Eight-ounce balls of number 18 hemp twine and 82.5-inch rolls of 3/4-inch wide rubber-coated and impregnated black adhesive cotton electrical insulation tape are components of the blasting demolition kits described in paragraphs 71, 72, and 73 to fasten caps to detonating cord, insulate electrical connections, fasten charges in place, tie or tape block demolition charges together into a compact package, and miscellaneous uses.

65. Knife, Pocket

This knife (fig. 55) consists of a 1-3/4-inch long cutting blade, a can opener, a punch, a combination bottle opener and screwdriver, and is equipped with a clevis on one end. It is issued as a basic component of the blasting demolition kits described in paragraphs 71 and 72.

66. Pliers: Lineman's

The pliers (fig. 56), equipped with a side cutter, is 8 inches long. It is a component of the blasting demolition kit described in paragraph 71.

67. Reels

a. Reel, Wire: Firing, 500-foot, RL-39A, With Two Carrying Straps, With Winding Device, Without Wire. This firing wire reel (fig. 57) consists of a spool, a handle assembly, and a crank axle. Two carrying straps are used to carry the reel
(fig. 58). This reel is issued as a basic component of the blasting demolition kit described in paragraph 71.

1. The spool is 9 inches in diameter and about 8 inches wide. It has a capacity of 500 feet of 18-gage firing wire. The fixed end of the wire is brought from the spool through a hole in the side of the drum and fastened to brass thumb nut terminals.

2. Two U-shaped steel rods form the handles. A loop at each end encircles a bearing assembly, consisting of a brass housing that contains a steel center to receive the axle.

3. The axle is a square 5/16-inch shaft. A crank is riveted to one end and a hole near the other end receives a cotter pin, which holds the axle in place.

b. Reel, Wire: Firing, 500-foot, With Two Detachable D-shaped Handles. This firing wire reel (fig. 59) is a metal drum mounted on an axle, to which two detachable D-shaped handles are fastened. The arm with knob on the side of the drum is used to crank it.

c. Reel, Wire: Firing, 1,000-foot, Empty. This item is similar to the item described in b above, except that it is empty and has a capacity of 1,000 feet of firing wire.

68. Sealing Compound: Blasting Cap, Waterproof, 1/2-Pint Can

This compound is used to waterproof the connection between the time blasting fuse and a nonelectric blasting cap and to moisture-proof dynamite primers. It does not make a permanent waterproof seal and must not be submerged in water unless the charge is to be fired immediately. It is a component of the blasting demolition kits described in paragraphs 71 and 72.
69. Tape, Computing: Demolition Charge

a. The demolition charge computing tape (fig. 60) is designed to provide a rapid method of calculating the weight of TNT (in pounds) required to accomplish specific demolition projects. The tape assembly consists of two 6-foot, flexible steel, spring retractable tapes in metal housings which are joined by metal bars.

The tape assembly has five special-purpose computing scales as follows:

(1) For breaching concrete, masonry, timber, or earthen walls.
(2) For breaching concrete beams, roadways, and bridge spans.
For cutting steel and timber construction members.
(4) For calculating cross-sectional area of steel members.
(5) For calculating requirements for cutting rods and bars.

b. This computing tape is issued as a basic component of the blasting demolition kits described in paragraphs 71 and 72. For a more detailed description of demolition charge computing tapes, see FM 5-25.
CHAPTER 4
DESTRUCTION KITS

70. General

The destruction kits described in this chapter are made up of destruction explosive items, accessories, and tools selected from those described in paragraphs 15 through 69 and other specialized components, with specially designed containers and carrying attachments. Demolition Kit, Blasting: Explosive Initiating, Electric, and Nonelectric, and Demolition Kit Blasting: Explosive Initiating, Non-electric, replace the following old sets: Demolition Kit, Blasting: set No. 1, En-

Engineer Squad; Demolition Kit Blasting: set No. 2, Engineer Platoon; Demolition Kit, Blasting: set No. 5, Individual; and Demolition Kit, Blasting: set No. 7, Elec-

trical.

71. Demolition Kit, Blasting: Explosive Initiating, Electric and Nonelectric

a. Components Issued as Basic Kit. The basic kit consists of the items listed below. These items may also be requisitioned separately for replacement purposes. These items are described and illustrated in chapter 3, section IX.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>BAG, CANVAS, CARRYING: demolition kit</td>
</tr>
<tr>
<td>1</td>
<td>BLASTING MACHINE: Ten-cap capacity</td>
</tr>
<tr>
<td>5</td>
<td>BOX, CAP: ten-cap capacity, infantry</td>
</tr>
<tr>
<td>1</td>
<td>CHEST, DEMOLITION: engineer platoon, M1931.</td>
</tr>
<tr>
<td>2</td>
<td>CRIMPER, CAP: M2 (w/fuse cutter)</td>
</tr>
<tr>
<td>1</td>
<td>GALVANOMETER, BLASTING: (w/leather case and carrying strap)</td>
</tr>
<tr>
<td>2</td>
<td>KNIFE, POCKET</td>
</tr>
<tr>
<td>2</td>
<td>PLIERS: lineman's (w/side cutter), length 8 in.</td>
</tr>
<tr>
<td>1</td>
<td>REEL, WIRE: firing, 500 ft, RL-39A, (w/carrying straps, w/winding device, w/spool, w/o wire).</td>
</tr>
<tr>
<td>2</td>
<td>TAPE, COMPUTING: demolition charge</td>
</tr>
</tbody>
</table>

b. Components Issued Separately. The following items are required to complete the kit and should be on hand at all times. These items are not supplied with the kit, and must be requisitioned separately. These items are described in chapters 2 and 3.

<table>
<thead>
<tr>
<th>(1) Nonexplosive components.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>60</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

(2) Explosive components.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>CAP, BLASTING: special, electric (type II (J-2 PETN)).</td>
</tr>
<tr>
<td>50</td>
<td>CAP, BLASTING: special, nonelectric (type I (J-1 PETN)).</td>
</tr>
<tr>
<td>40</td>
<td>CHARGE, DEMOLITION: block, M5A1, 2-1/2-lb. Comp. C-4.</td>
</tr>
<tr>
<td>50</td>
<td>CHARGE, DEMOLITION: block, 1-lb. (TNT).</td>
</tr>
<tr>
<td>5</td>
<td>CORD, DETONATING: fuse, primacord 100-ft. spool.</td>
</tr>
<tr>
<td>5</td>
<td>DESTRUCTOR, EXPLOSIVE: universal, M10.</td>
</tr>
<tr>
<td>2</td>
<td>FUSE, BLASTING, TIME: 50-ft. coils</td>
</tr>
<tr>
<td>50</td>
<td>IGNITER, BLASTING FUSE: M2, weatherproof.</td>
</tr>
</tbody>
</table>

72. Demolition Kit, Blasting: Explosive Initiating, Nonelectric

a. Components Issued as a Basic Kit. The basic kit consists of the items listed below. These items may also be requisitioned separately for replacement purposes. These items are described and illustrated in chapter 3, section IX.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>BAG, CANVAS, CARRYING: demolition kit</td>
</tr>
<tr>
<td>2</td>
<td>BOX, CAP: 10-cap capacity, infantry</td>
</tr>
<tr>
<td>2</td>
<td>CRIMPER, CAP: M2 (w/fuse cutter)</td>
</tr>
<tr>
<td>2</td>
<td>KNIFE, POCKET</td>
</tr>
<tr>
<td>2</td>
<td>TAPE, COMPUTING: demolition charge</td>
</tr>
</tbody>
</table>

b. Components Issued Separately. The following items are required to complete the kit and should be on hand at all times. These items are not supplied with the kit,
and are to be requisitioned separately. These items are described in chapters 2 and 3.

(1) Nonexplosive components.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>ADAPTER, PRIMING: M1A4</td>
</tr>
<tr>
<td>2</td>
<td>ADHESIVE: paste, for demolition charges, 1/2 lb can, M1.</td>
</tr>
<tr>
<td>50</td>
<td>CLIP, CORD: M1, detonating</td>
</tr>
</tbody>
</table>
| 2        | INSULATION TAPE, ELECTRICAL: black adhesive, 3/4 in.
| 1        | SEALING COMPOUND: blasting cap, waterproof, 1/2 pt can. |

(2) Explosive components.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>CAP, BLASTING: special, nonelectric (Type I (J-1 PETN)).</td>
</tr>
<tr>
<td>40</td>
<td>CHARGE, DEMOLITION: block, M5A1, 2-1/2 lb Comp C-4.</td>
</tr>
<tr>
<td>200</td>
<td>CORD, DETONATING: fuze, primacord, 100 ft spool.</td>
</tr>
<tr>
<td>2</td>
<td>DESTRUCTOR, EXPLOSIVE: universal, M10.</td>
</tr>
<tr>
<td>100</td>
<td>FUSE, BLASTING, TIME: 50-ft coils</td>
</tr>
<tr>
<td>50</td>
<td>IGNITER, BLASTING FUSE: M2, weatherproof</td>
</tr>
</tbody>
</table>

73. Explosive Kit, Earth Rod: set No. 1

a. General. This kit (fig. 61), is used for making holes for demolition or constructional purposes as deep as 6 feet and as large in diameter as several inches in earth and soft shale. It is not usable in rock or other hard material.

b. Description. The kit consists of the nonexplosive and explosive items as listed in A(1) below. The main rod is of steel, 6 feet in length and 1-1/4 inches in diameter. The point, which is 1-1/2 inches in diameter, fits the lower end of the rod and a cylindrical firing chamber, 15 inches long and 4-9/16 inches od, screws on the upper end of the rod. The rod is driven into the earth by the propelling charge M12 exploded in the firing chamber. The propelling charge is exploded by primer M44 which is initiated by time blasting fuse ignited with the time blasting fuse igniter. A removable handle (extractor rod), which fits through holes in the walls of the firing chamber, and is used for gripping and lifting the rod, and an extension which is for lengthening the rod, are used to pull the rod from the earth. The tripod furnished with the kit consists of a 4-3/4 inch ring supported on three adjustable legs. In order to hold the assembled rod steady for firing, the firing chamber is held within the ring of the tripod, which is centered over the point where the hole is to be made. A linear charge is furnished with the kit for enlarging the diameter of the hole made by the main rod and point. A forked inserting rod is furnished for inserting an improvised linear charge (made up of a bundle of detonating cords) into the hole made by the main rod and point. Such improvised charges may be used as an expedient for enlarging holes to various diameters (depending on the number of detonating cords used in the bundle) when a standard linear charge is not available. The blasting caps and time blasting fuse furnished with the kit are used for detonating either the standard linear charge, or an improvised linear charge.

c. Components.

Note. The item letters in (1) and (2) below are keyed to figure 61.

(1) Nonexplosive items.

<table>
<thead>
<tr>
<th>Item</th>
<th>Letter</th>
<th>Quantity</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>CHEST</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>CHAMBER: firing</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>PLATE: base, extractor, assy.</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>ROD: extension</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>EXTRACTOR: rod</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>1</td>
<td>ROD: handles and starting</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>1</td>
<td>ROD: inserting</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>2</td>
<td>ROD: intermediate</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>2</td>
<td>ROD: main, long</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>100</td>
<td>ADAPTER, PRIMING: explosive, M1A3 or M1A4.</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>1</td>
<td>CRIMPER, CAP: M2 (w/fuse cutter)</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1</td>
<td>BOX, CAP: 10-cap capacity, infantry</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2</td>
<td>INSULATION TAPE, ELECTRICAL: black adhesive cotton, 3/4-inch wide</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>100</td>
<td>POINT</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>2</td>
<td>BOX, CAP: 50-cap capacity, engineer</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>1</td>
<td>TRIPOD</td>
<td></td>
</tr>
</tbody>
</table>

(2) Explosive items.

<table>
<thead>
<tr>
<th>Item</th>
<th>Letter</th>
<th>Quantity</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>100</td>
<td>CHARGE, PROPPELLING, EARTH ROD: M12 (w/primer, M44).</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>100</td>
<td>CAP, BLASTING: special, nonelectric (type I (J-1 PETN)).</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>2</td>
<td>FUSE, BLASTING, TIME: 50-ft coils</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>200</td>
<td>IGNITER, TIME BLASTING FUSE: M2, weatherproof</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>100</td>
<td>CHARGE, DEMOLITION: linear (two 3-ft. sections and one connecting sleeve)</td>
<td></td>
</tr>
</tbody>
</table>
d. Preparation for Use.

(1) Prepare a conical depression about 8 inches deep and 30 inches in diameter at place where hole is desired. Insert the end of the 1-1/4 inch handle and starting rod into one of the points and drive it about 8 inches vertically into the center of the depression. Remove the handle, leaving the point at the bottom of the hole. Fit a main rod into the point, tamping around rod to hold it erect. Set the tripod so that its collar is in position to hold the firing chamber and rod steady in a vertical position.

Caution: The ring of the tripod must not be positioned over the holes in the upper portion of the firing chamber. If a demolition charge is fired with the ring of the tripod positioned over these holes, the collar may be broken by the pressure in the firing chamber transmitted through these holes to the ring.

(2) The propelling charge (M12) is highly flammable. No smoking should be permitted while handling it. Unscrew the small metal cap from a can containing a propelling charge and punch a hole through the cap. Insert primer M44, attached to a length (at least 12 inches) of time blasting fuse into the propelling charge, which consists of loose smokeless powder M2. Next, slip the cap of the can over the fuze, and screw the cap to the can.

(3) Place the propelling charge in the bottom of the firing chamber and tamp the charge with earth or sand.

Caution: The space at the bottom of the firing chamber below level of the shoulder should be empty and free from tamping material or water before placing the propelling charge in place. The firmness of tamping required depends on the character of the soil into which the rod is to be driven. Never use a charge other than propelling charge M12, with primer M44, with this kit. Test shots are necessary to determine the tamping required. Screw the firing chamber tightly to the top of the rod, adjusting the tripod, if necessary, in order to hold the firing chamber firmly in position. Attach weatherproof igniter M2 (par. 34) to the length of time blasting fuse. Operate the igniter and take cover or retire at least 25 meters until the charge fires.

(4) To remove the rod from the ground, fit the gripper of the rod extractor around the rod and lift it from the hole. The base plate is placed on the ground beneath the purchase ( pry) leg of the extractor for support, with the bolt of the base plate passing between the branches of the purchase leg. If the rod is buried too deep to be reached with the extractor, remove the firing chamber and place an extension on the end of the rod. The point is expendable and need not be recovered.

(5) To enlarge the hole, using the linear charge, lower or gently push one or more charges, as required, into the hole made by the rod. The charges are in cylindrical containers about 1 inch in diameter. A blasting cap, crimped to a length (at least 12 inches) of time blasting fuse should be inserted in the cap well of the uppermost charge in the hole. Attach the fuse igniter to the length of time blasting fuse. Operate the igniter and take cover or retire a distance of at least 25 meters until the charge fires. Additional charges may be fired in the same hole to increase the diameter of the hole as desired.

Caution: Wait 1/2 hour between any successive firings in the same hole, so that it may cool to a safe temperature. Water may be poured into the hole to speed the cooling if desired.

(6) To enlarge the hole with an im-
provised linear charge, cut several lengths of detonating cord (not furnished with the kit) and tape them together tightly at the center and both ends, thus making a detonating cord charge (several strands bound together). The number of strands of detonating cord used depends on the desired diameter of the hole and their length depends on its depth. Fifteen strands of detonating cord usually will produce a 12-inch hole in average ground. If a larger hole is required, first use one or two stands to widen the small hole, then use a greater number of strands for a second shot. Using the inserting rod, place the stands in the hole. Prime the detonating cord charge with a blasting cap and fuse igniter. Operate fuse igniter and take cover or retire to a distance of at least 25 meters until the charge is fired. Repeated firings may be made as in (5) above, observing the same precautions.

(7) If it is desired to make a spherical enlargement at the bottom of the hole, use one linear charge at the bottom of the hole and prime as in (5) above. Repeated firings may be made as in (5) above, observing the same precautions.

e. Packing. The kit is packed in a plywood box. The dimensions of the box are 73-3/16 x 11-3/16 x 5-5/8 inches, the cover being chained to bottom of box. The chain is long enough to allow the cover to go 20 degrees past vertical open position.

74. Charge Assembly, Demolition: M37

a. Description. This demolition charge assembly (fig. 62) consists of eight block demolition charges M5A1, eight block demolition charge hook assemblies, and two demolition priming assemblies M15. The block demolition charge M5A1 (fig. 5), which is composed of composition C4, is described in paragraph 18. The priming assembly M15 (fig. 63) consists of approximately 5 feet of detonating cord, to each end of which is attached a priming adapter M4A1 and a booster. The priming assembly also includes two detonating cord clips. The adapter is threaded to fit the con-
ventional size cap well of block demolition charges and light antitank mines. The booster, which is about 1/4 inch in diameter and 2 inches in length, contains a charge of 13.5 grains of RDX. The booster is crimped, one to each end of the 5-foot detonating cord, and is cemented in place. The clips, which are in place on the cord about 20 inches from either end of the assembly, are for forming junctions (fig. 51) on main lines of detonating cord in a demolition system. The main lines, with their initiators, and the priming assembly M15 together comprise the firing circuit for one or more block demolition charges M5A1.

b. Packing. The block demolition charges M5A1 are packed four in block demolition charge bag M5. Two bags (eight charges) and two priming assemblies M15 are packed in carrying case M85. Two complete assemblies are packed in a wood box 17-1/8 inches long, 11-1/2 inches wide and 12-1/2 inches high. The gross weight of the two assemblies and packing box is 57 pounds.

75. Demolition Kit, Bangalore Torpedo: M1A1

a. General. This kit (fig. 64) consists of a group of 10 loading assemblies (steel tubes filled with high explosive), which are used singly or in series with nose sleeve and connecting sleeves, for blasting a path through barbed-wire entanglements or other obstructions, or used in bundles as substitute explosive charges in the anti-tank mine-clearing projected charge demolition kits (pars. 77 through 86).
b. Description and Functioning. The loading assemblies (tubes) are 5 feet in length and 2-1/8 inches in diameter, grooved, and capped at each end. The explosive in the tubes is amatol, with a 4-inch booster of TNT at each end. The total weight of explosive in each tube is about 9 pounds. Each end of the loading assembly (tube) contains a threaded cap well, to accommodate any issue firing device with a blasting cap crimped thereto. The nose sleeve has a rounded point at each end, for ease in pushing the tube or tubes through obstacles, and a single clip, which holds the nose sleeve in place at the end of a tube. The connecting sleeve is a short cylindrical coupling, into which the ends of two tubes can fit and be used or any number of loading assemblies may be used as required. In assembling two or more tubes, a nose sleeve is pressed onto one end of one tube, then the other end of this tube is connected to a second tube by a connecting sleeve, and so on until the desired number of tubes are connected. Detonation of a charge in a tube or all charges in a series of tubes may be accomplished by a firing device with blasting cap screwed into the cap well of the tail end of a tube or the tail end of the last tube in a series. Detonation may also be accomplished by an electric blasting cap with the leads connected to a source of electric current, or by a nonelectric blasting cap attached to time blasting fuse and fuse igniter. An alternate method of detonation may be by wrapping a minimum of four turns of detonating cord around the tube in a one-tube assembly, or around any tube in a multiple-tube assembly, and detonating the detonating cord with a delay detonator or with an appropriately arranged blasting cap primed by a time blasting fuze and fuze igniter.

c. Packing. Demolition Kit, Bangalore Torpedo: M1A1, is packed in a wooden box, which contains ten 5-foot assemblies (tubes), 10 connecting sleeves, and 1 nose sleeve. The dimensions of the box are 64-1/8 inches long, 13-3/8 inches wide, and 7-1/8 inches high. The gross weight of the kit as packed is 176 pounds.
CHAPTER 5
MINE-CLEARING DEVICES

Section I. DEMOLITION KITS, PROJECTED CHARGE: M1 AND M1E1
          (ANTIPERSONNEL MINE-CLEARING DEVICES)

76. General

These kits consist of a flexible linear charge together with other components required to carry and lay the charge in position. It is used to clear narrow lanes through antipersonnel mine fields (fig. 65). The projected charge demolition kit M1E1 (fig. 66) is described in this section. This kit is identical to the kit M1 in all respects except for the delay detonators and time blasting fuse igniters issued with them. The 15-second delay percussion detonator M1A2 (par. 27) and weatherproof time blasting fuse igniter M60 (par. 35) are issued with the kit M1E1. The 15-second delay friction detonator M1 or M1A1 (par. 26) and the weatherproof time blasting fuse igniter M2 (par. 34) are issued with the kit M1.

77. Demolition Kit, Projected Charge: M1E1

a. Description.
   (1) Detonating Cable.
      (a) The nylon-covered detonating cable is 170 feet long and about 1 inch in diameter, weighs 63 pounds, and contains 46 pounds of oil-soaked PETN. This charge consists of 19 strands of special detonating cord, each strand containing approximately 100 grains of PETN per foot. This contrasts with the 50-60 grains per foot contained in regular detonating cord, which should not be used as a substitute.
      (b) The cable is coiled around a cone in a carrying case. The cone is removed from the case before the unit is fired. One end of the cable is anchored to the ground and has a sleeve containing a booster charge and a threaded cap well for inserting a 15-second delay detonator. This end also has a braided wire cable grip with two 8-inch wire loops for anchoring the cable to a 13-inch oak tent stake driven into the ground (fig. 67).

   (2) Launcher. The launcher is a folding stand made of small aluminum angles. When set up on level ground with the propulsion unit (rocket motor) on the launcher, the angle of elevation is 38 degrees (fig. 67).

   (3) Other equipment. A weatherproof time blasting fuse igniter M60 (fig. 24) is provided for igniting the propulsion unit, a 15-second delay percussion detonator M1A2 (fig. 15) for exploding the cable, and a 13-inch oak tent stake for anchoring one end of the cable.

   (4) Carrying case. The entire assembly is contained in a cylindrical aluminum can (fig. 68), 16-1/2 inches in diameter, 20 inches long, and weighing 92 pounds. Both ends of the can have removable lids with carrying handles. The joints between the lids and the case are waterproofed. The loaded case is designed for transportation to the firing point by two men.

b. Functioning. The cable is projected across the mine field by the propulsion unit (rocket motor) from a launcher, where it is exploded by a 15-second delay detonator. Grass, leaves, other light vegetation, and some soil are blown aside in a lane about 8 feet wide. More soil is blasted aside when the ground is moist and soft than when dry and hard. Camouflaged antipersonnel mines and those near the surface in the 8-foot lane normally are exposed.
Figure 65. Demolition kit, projected charge: M1E1, laying cable over antipersonnel mine fields.

(1) **Mines.** If the cable is less than 6 inches off the ground, pressure-type antipersonnel mines with the pressure surface directly under the cable are detonated or destroyed. **Pressure-type mines** within 5 feet of the cable may or may not be fired, depending on the particular mine installation.

**Caution:** Mines not exploded by the cable may become extremely sensitive.

(2) **Trip wires.** The detonation of the cable across trip wires either cuts the wires or detonates the mines to which they are connected.

c. **Preparation for Use.** The loaded case is designed for transportation to the firing point by two men. About 100 feet from the firing point or edge of the mine field, a location should be selected where each of the two men may take cover in a prone position when the cable is detonated. Procedure for setting up and firing the cable is as directed in table XV. Before
operating this kit, personnel should be trained in the functioning and preparation for use of the percussion detonator M1A2 (par. 27) and the fuse igniter M60 (par. 35) (or the friction detonator M1 or M1A1 (par. 26) and the fuse igniter M2 (par. 24) if the kit M1 is to be used).

d. Packing. The item is issued complete with detonating cable, the rocket motor M4 propulsion unit, launcher, and firing equipment in a waterproof aluminum carrying case painted olive drab. Both ends of the case have removable lids with carrying handles. Each case is packed in a wooden box 25-1/2 inches long, 18-3/8 inches wide, and 19-1/4 inches high. The gross weight of the kit and box is 142 pounds.

Table XV. Procedure for Setting Up and Firing Demolition Kit Projected Charge M1E1 (Antipersonnel Mine-Clearing Device)

<table>
<thead>
<tr>
<th>Step</th>
<th>First man</th>
<th>Second man</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Remove top lid (fig. 69).</td>
<td>Remove bottom lid (fig. 70).</td>
<td></td>
</tr>
<tr>
<td>2. Unbuckle strap holding plywood retainer in place, and remove retainer.</td>
<td>Unscrew wing nut holding cone in case.</td>
<td></td>
</tr>
<tr>
<td>3. Remove the propulsion unit and folded launcher from cone.</td>
<td>Place cone in upright position (top lid end up).</td>
<td></td>
</tr>
<tr>
<td>4. Set up launcher on level ground about 5 feet ahead of case.</td>
<td>Carefully lift cone from case, with the handles, and replace case on its side. Arrangement of components in case is shown in figure 66.</td>
<td></td>
</tr>
<tr>
<td>5. Place jet propulsion unit on launcher, so rear (nozzle) end rests against bottom crossbar of launcher (fig. 67).</td>
<td>Remove wood stake from case, and drive stake into ground about 6 inches behind case (fig. 67).</td>
<td></td>
</tr>
</tbody>
</table>
Table XV. Procedure for Setting Up and Firing Demolition Kit Projected Charge M1E1 (Antipersonnel Mine-Clearing Device—Continued)

<table>
<thead>
<tr>
<th>First man</th>
<th>Second man</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Pull about six coils of cable out of case</td>
<td>Place both cable-wire loops over stake.</td>
</tr>
<tr>
<td>7. Remove time blasting fuse igniter M60 from cone</td>
<td>Remove cap protector from 15-second delay detonator M1A2.</td>
</tr>
<tr>
<td>8. Remove shipping plug from end of fuse igniter</td>
<td>Screw detonator into cap well (fig. 67) in rear end of cable.</td>
</tr>
<tr>
<td>9. Cut about 4 inches from end of waterproof tubing around fuse projecting from nozzle to expose powder train.</td>
<td>Take cover in prone position at a prede-termined location about 100 feet to rear.</td>
</tr>
<tr>
<td>10. Push end of fuse into fuse igniter as far as possible. Cable is now ready for firing (fig. 67).</td>
<td></td>
</tr>
<tr>
<td>11. Remove fuse igniter safety pin by pulling safety pin cord. Igniter is now armed.</td>
<td></td>
</tr>
<tr>
<td>12. Pull outward on pull ring to fire igniter, 4 to 7 seconds later pull detonator safety pin, then pull ring on rear end of detonator. Note: This delay is necessary, since firing-time delay of both the propulsion unit fuse and delay detonator is 15 seconds.</td>
<td>Aid other man in finding covered position by signalling.</td>
</tr>
<tr>
<td>13. Take cover in prone position</td>
<td></td>
</tr>
</tbody>
</table>

Warning: Since the carrying case may be broken and thrown about 40 feet into the air, personnel must take care to avoid being hit by fragments when cable explodes.

![Diagram of demolition kit](https://via.placeholder.com/150)

Figure 67. Demolition kit, projected charge: M1E1, ready for firing.
Section II. DEMOLITION KIT, PROJECTED CHARGE, M2, M2A1, M3, and M3A1 (ANTITANK MINE-CLEARING DEVICES)

78. General

a. These kits consist of semirigid projected charges approximately 400 feet long, together with the accessories and tools required to assemble the charges and attach them to a light or medium tank. An assembled projected charge may weigh as much as 7-1/2 tons and must be pulled or pushed into place by a tank or other suitable vehicle (fig. 71). These projected charges are used to clear wide paths through antitank mine fields.

b. The projected charge demolition kit M3A1 described in this section is similar to the M3 in appearance, construction, and functioning, differing principally in the explosive filler. Refer to table XVI for differences among demolition kits M2, M2A1, M3, and M3A1. In describing the functioning and use, the tanks M4 and M24 series are used. These kits with modifications may also be used with the tanks M41, M47, M48, and M60 series. Tactical uses of projected charges and their effects on minefields and other obstacles are described in FM 5-25, TM 5-220, and FM 20-32.
79. Demolition Kit, Projected Charge: M3A1—Description

a. Projected Charge Components. This projected charge consists of two parallel linear explosive charges encased between corrugated aluminum plates bolted together to form a rigid assembly, which can be towed or pushed by a light or medium tank. It is flexible in vertical plane to permit it to pass over rough ground and rigid enough in horizontal plane so it will maintain a relatively true course when being pushed. The assembled projected charge, shown in cross-section in figure 72, is 14 inches wide, 5 inches high, and 400 feet long. It weighs approximately 9,000 pounds, including 4,500 pounds of explosives. For information pertaining to training of crews for assembly of projected charges, see FM 20-32 and TM 5-220. A list of parts which comprise the projected M3A1 charge is given in table XVII.

<table>
<thead>
<tr>
<th>Table XVI. Comparison of Projected Charge Demolition Kit Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Principal differences between Demolition Kit, Projected Charge M2, M2A1, M3, and M3A1 are tabulated below:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>M2</th>
<th>M2A1</th>
<th>M3 and M3A1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total net weight</td>
<td>12,500 lb.</td>
<td>15,000 lb.</td>
<td>9,000 lb.</td>
</tr>
<tr>
<td>Corrugated plates</td>
<td>Steel, 53 lb, 164 --</td>
<td>Steel, 53 lb, 172 ------</td>
<td>Aluminum, 16 lb, 200</td>
</tr>
<tr>
<td>Washers</td>
<td>1 per bolt, 2 in. long</td>
<td>1 per bolt, 2 in. long ------</td>
<td>2 per bolt, 4 in. long</td>
</tr>
<tr>
<td>Tamping bags</td>
<td>Paper ------</td>
<td>Paper ------</td>
<td>Cloth or paper</td>
</tr>
<tr>
<td>Pushing attachment</td>
<td>Wire rope ---</td>
<td>Steel chain ---</td>
<td>Steel chain</td>
</tr>
<tr>
<td>Total explosive</td>
<td>3,200 lb.</td>
<td>4,500 lb.</td>
<td>4,500 lb.</td>
</tr>
<tr>
<td>Fuze and shield</td>
<td>1 of each</td>
<td>2 of each</td>
<td>2 of each</td>
</tr>
<tr>
<td>Towing assembly rigging</td>
<td>Rope on towing yoke raised by hand.</td>
<td>M2 fittings and rigging improved and strengthened. Cable on towing yoke raised by winch on periscope fitting.</td>
<td>M2 fittings and rigging improved and strengthened. Cable on towing yoke raised by winch on periscope fitting.</td>
</tr>
</tbody>
</table>
Table XVI. Comparison of Projected Charge Demolition Kit Models—Continued
b. Assembly procedure for the projected charge demolition kits M2 and M2A1 is similar to that for the kits M3 and M3A1, except that lapping of the steel plates differs from that prescribed for aluminum plates.

c. With projected charges M2 and M2A1, an expedient nose can be used in place of the standard pear-shaped nose and adapter. It is built from steel body plates and is fastened to the two foremost bolt holes of the assembled projected charge. This nose is better adapted for pushing projected charges over obstacles presenting a vertical face of limited height.

Table XVII. Components of 400-Foot Projected Charge M3A1

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonexplosive components:</td>
<td></td>
</tr>
<tr>
<td>Corrugated aluminum body plate</td>
<td>200</td>
</tr>
<tr>
<td>11/16-in. bolt, 3 in. long</td>
<td>210</td>
</tr>
<tr>
<td>Special washer</td>
<td>420</td>
</tr>
<tr>
<td>11/16-in. square nut</td>
<td>210</td>
</tr>
<tr>
<td>Nose</td>
<td>1</td>
</tr>
<tr>
<td>Nose adapter and towing hook</td>
<td>1</td>
</tr>
<tr>
<td>Nose retainer</td>
<td>1</td>
</tr>
<tr>
<td>Tamping bag</td>
<td>40</td>
</tr>
<tr>
<td>Pushing hook</td>
<td>1</td>
</tr>
<tr>
<td>Fuze shield</td>
<td>2</td>
</tr>
<tr>
<td>Tail ramp</td>
<td>1</td>
</tr>
<tr>
<td>Explosive components:</td>
<td></td>
</tr>
<tr>
<td>Linear demolition charge for projected</td>
<td>128</td>
</tr>
<tr>
<td>charge M3A1</td>
<td></td>
</tr>
<tr>
<td>Bullet impact fuze M1A1</td>
<td>2</td>
</tr>
</tbody>
</table>

(1) Body plates. The corrugated aluminum plates (fig. 73) form the body of the projected charge. Top and bottom plates are identical. Each plate is 9 feet long and 14 inches wide, about 1/8 inch thick, and weighs 16 pounds. Five holes are spaced 2 feet apart along the center of the plate, starting 6 inches from either end. The plates are painted olive drab, with a patch of white paint around each bolt hole for ease in locating holes in night assembly.

(2) Bolts, washers, and nuts (fig. 74). Eleven-sixteenth-inch diameter by three inches long steel bolts, washers, and nuts are used to fasten the corrugated plates together. The washers are specially shaped to assure a uniform bearing surface. Nut and bolt heads are 1 inch square.

(3) Nose adapter and towing hook (fig. 75). The nose adapter connects the projected charge to the nose. It is fitted between the body plates at the forward end of the projected charge and is secured by two bolts, which fasten the plates together. The towing hook is an integral part of the adapter, being welded to its upper side as shown. A bumper ring around the adapter just forward of the towing hook prevents the nose from sliding too far back over the adapter.

(4) Nose and nose retainer (fig. 76). The hollow pear-shaped aluminum nose fits over the nose adapter. It is lashed to the adapter with the 1/8-inch aircraft cable. This cable, which is looped through the slot in the towing hook, is passed through the 3-inch hole in the tapered part of the nose, then through the loop in the nose retainer, and the ends of the cable joined with a wire clip. The nose is free to swivel slightly in any direction and aids in guiding the forward end of the projected charge over or around obstructions, such as trees or boulders.

(5) Pushing hook (fig. 77). The pushing hook assembly consists of a hook welded to a steel bar, which has four bolt holes for attachment to the projected charge. A flat steel plate welded on the top of the hook bears against the belly of the tank during pushing operations. The assembly is bolted to the projected charge's rearmost plate, starting with the second bolt hole from the rear end.

(6) Bullet impact fuze M1 and M1A1 and fuze shield.

(a) Fuze. The bullet impact fuze M1A1 (fig. 78) is issued with the
projected charge demolition kits M2, M2A1, M3, and M3A1. It consists of a target plate of 3/8-inch steel, spring mounted on three studs, and a body, which contains a detonator and two shaped-charge boosters. The target plate bears a firing pin, which is restrained by a shear pin and safety fork. The safety fork must be removed before the fuze can be operated. In placing the fuze, care must be exercised to have the semicircular end up, since the effect of the two shaped boosters is directly downward, perpendicular to the two flat edges. Two of these fuzes are furnished with each projected charge demolition kit M2A1, M3, and M3A1. The fuze M1 (fig. 79) is similar to the M1A1, except for minor constructional differences. The fuzes are packed one per hermetically-sealed, metal-lines wooden box.

(b) **Fuze shield.** The fuze shield (figs. 80 and 81) serves as a bracket for mounting the fuze and protects it from view and from premature detonation or damage by frontal small-arms fire. A cotter pin chained to the shield is inserted in a hole in the shield to hold the fuze in position. In bolting the shield to the projected charge, it is necessary that the ends of the linear charges be centered directly below the body of the fuze; otherwise, the composition of the charge may not detonate.

(7) **Explosive charges.**

(a) **Linear charges.** Elliptical (in cross-section) linear charges (figs. 82 and 83) are issued with the projected charge demolition kit M3A1. They are 5-3/8 inches wide, 3-3/4 inches high, and 5 feet long, and weigh 40 pounds, each including approximately 35 pounds of explosive. The bulk of the explosive is composition B, with a 6-inch booster charge of Comp A-3 in each end. One end contains a cap well to receive a blasting cap for use when the charges are used individually for general demolition work. One hundred and twenty-eight charges are loaded in 320 feet of a 400-foot projected charge giving an explosive weight of 14 pounds per foot.

(b) **Bangalore torpedoes.** Bangalore torpedoes (par. 75) may be used as alternate explosive charges when projected charge explosive charges are not available or when stubs of exploded projected charges are salvaged to build new projected charges. A bundle of four bangalore torpedoes (fig. 84) is loaded in each corrugation of the projected charge. The eight bangalore charges give an explosive weight of 14.4 pounds per foot.

(8) **Tail ramp (fig. 85).** The tail ramp is a small, hinged, steel skid, which fastens to the rearmost bolt of the projected charge. The hinged bar extends beyond the last corrugated plate and drags on the ground to prevent the pushing chain from fouling on the end of the projected charge when engaging the pushing hook.

(9) **Tamping bags (fig. 86).** Forty light cloth or paper bags, 4 inches in diameter and 24 inches long, are furnished with each projected charge for use as tamping bags to prevent the charges from shifting. They are filled with dirt to within 3 inches of the top, the end is folded over, and the bags are placed in both ends of the projected charge. When available, 75-mm ammunition containers filled with dirt are satisfactory for tamping.

**b. Tank Accessories (fig. 87).**

(1) **Pushing and towing assemblies** (table XVIII).
Table XVIII. Tank Accessories and Tools for Construction of 400-Foot Projected Charge M3A1

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank accessories:</td>
<td></td>
</tr>
<tr>
<td>Pulley support post with pulley</td>
<td>5</td>
</tr>
<tr>
<td>Rope guide ring with pulley</td>
<td>2</td>
</tr>
<tr>
<td>Rope guide ring</td>
<td>1</td>
</tr>
<tr>
<td>3/8-in. sash cord (ft.)</td>
<td>15</td>
</tr>
<tr>
<td>1/8-in. aircraft cable (ft.)</td>
<td>33</td>
</tr>
<tr>
<td>Cable clamp</td>
<td>1</td>
</tr>
<tr>
<td>Periscope fitting (for medium tank)</td>
<td>1</td>
</tr>
<tr>
<td>Direct-vision port fitting (for light tank)</td>
<td>1</td>
</tr>
<tr>
<td>Crank</td>
<td>1</td>
</tr>
<tr>
<td>Towing yoke assembly</td>
<td>1</td>
</tr>
<tr>
<td>5/8-in. pushing chain, 5-1/2 ft long</td>
<td>1</td>
</tr>
<tr>
<td>Tools:</td>
<td></td>
</tr>
<tr>
<td>Structural wrench</td>
<td>6</td>
</tr>
<tr>
<td>Socket-wrench assembly</td>
<td>2</td>
</tr>
</tbody>
</table>

(a) Pushing chain (A, fig. 87). A 5-1/2-foot length of 5/8-inch chain fastened to the tank's front towing clevises, is used to push the projected charge. A length of sash cord (B, fig. 87) tied to the chain leads into the tank for raising and lowering the chain.

(b) Towing yoke assembly. The towing yoke assembly is used to tow the projected charge behind a tank. It consists of two 1-inch square bars (C, fig. 87) pinned to the rear towing lugs of the tank, a semicircular yoke (D, fig. 87) pinned to the outer ends of the bars, which catches the towing hook, a lifting bail bolted to the yoke for lifting the assembly, and a coil spring (E, fig. 87) shackled to the lifting bail to act as a shock absorber while maneuvering the tank with the yoke disengaged from the projected charge.

(c) Pulleys and cable. A length of 1/8-inch cable (F, fig. 87) clamped to the coil spring runs along the top right side of the tank, through a series of pulleys (G, fig. 87) welded to the tank hull and enters the tank at the bow gunner's seat. It is used to raise and lower the towing yoke assembly.

(d) Periscope and port fittings. The periscope fitting (H, fig. 87) is placed in the bow gunner's forward periscope slot in the medium tank. The sash cord tied to the pushing chain and the 1/8-inch cable from the towing yoke assembly enter the tank through holes in the fitting. The direct vision port fitting is used on the light tank M24 instead of the periscope fitting. It fits in the bow gunner's direct vision port and operates the same as the periscope fitting.

(2) Wrenches (fig. 88). Two double socket wrenches and six end wrenches are supplied for assembling the projected charge. The tapered ends are used as drift pins to align the plates during assembly.

(c. Additional Equipment Needed. The following equipment is not issued with the kit, but is required for its construction:

- 2 heavy wrecking bars, to assist in moving or lifting corrugated plate sections.
- 4 mallets and ledges, to open explosive packing boxes.
- 1 shovel, to fill tamping bags.
- One 2-1/2 ton or larger truck with winch, half truck with winch, or tank, to tow projected charge backward as it is assembled.
- 30 drift pins, 1/2, 5/8, or 3/4 inch diameter, to align bolt holes during assembly.

80. Assembly of Projected Charge

a. Training of Personnel. Personnel must be thoroughly trained to assemble the projected charge efficiently and to eliminate the undue fear of handling large explosive charges. Personnel should realize that only an almost direct hit with artillery projectiles will detonate the projected charge. The 105-mm high-explosive projectiles must land within 1 meter of the projected charge to detonate it. The projected charge should be assembled several times during both day and night until the crew is entirely familiar with the parts and their assembly before attempting to use it in military operations. A practice detonation is desirable for the benefit of both assembly and operating personnel.

b. Selection of Site. A level assembly
site is desirable, but any fairly smooth area may be used. The surrounding terrain must permit towing the projected charge backward as increments are added and towing it forward when it is completed. The site should be as near as possible to the point of anticipated detonation, preferably with 1 mile and concealed from enemy fire and observation.

c. Preparation.

(1) Before starting assembly, the appropriate alinement of the projected charge is determined and the site prepared. Either of the methods in (a) or (b) below can be used.

(a) Place expedient supports, such as short logs at least 5 inches in diameter, at 5-foot intervals along the line on which the projected charge is to be assembled. The logs elevate the plates, so bolts can be easily inserted from the bottom. Drive stakes at the ends of the logs to keep them in position when towing the projected charge.

(b) Dig a trench 3 feet wide by 6 inches deep and 45 feet long to permit insertion of bolts from the bottom. Place eight plates with edges down across it at 5-foot intervals for support during assembly. Five-foot lengths of 3-inch pipe or 4-inch logs may be used instead of the plates. Pile earth from the trench on the ends of the supporting plates to prevent their displacement when towing the projected charge.

(2) The top of the projected charge is divided into sections A, B, and C and the bottom into sections D, E, and F. The assembly diagram shown in figure 89 lists the number of plates in each section and indicates the lapping of plates within sections. Assembly is facilitated if bottom plates are placed on one side of the assembly line and top plates on the other. Plates should be stacked in piles containing the proper number of plates for
Figure 76. Nose and nose retainer for projected charge M3A1.
each section. Explosives are placed on the same side as the bottom plates. Since plates within each section have the same overlap, assembly crews can tell when a change in lapping is required by watching the stacks.

d. General Assembly Procedure. The general assembly procedure is as indicated in (1) and (2) below.

(1) Place bottom plates with center ridge up and aline bolt holes. Place cartridges and tamping bags in the corrugations. Place cover plates with center ridge down and aline bolt holes. Bolt top and bottom plates together. Tow completed portion to rear and retighten all bolts.

(2) To facilitate feathering of plates, assemble the projected charge from rear to front. Build it in about 40-foot increments and tow it to the rear after each increment is added to minimize carrying of parts. Towing shakes the parts into better alignment, permitting bolts to be retightened, thus increasing structural stability.

e. Detailed Assembly.

(1) Rear 40 feet.

(a) To assemble the rear 40 feet of the projected charge, underlap each successive underplate (sec. D, fig. 89), then overlap each successive cover plate (sec. A, fig. 89). The bottom plate-carrying detail carries plates from the proper stack and places them with the correct lapping. After lapping is checked by the non-commissioned officer in charge, aliners, working on the opposite side of the projected charge, aline the bolt holes with drift pins or ends of assembly wrenches. Pins are left in place until they interfere with placing of top plates. This rearmost 40-foot section contains no explosive but, when time permits, is completely filled with tamping for additional stability.

(b) Aliners remove interfering drift pins from bolt holes. Top plates are placed from the proper stack with the correct overlap and pins are reinserted for realinement. When the plates are placed and properly alined, the bolt carrier distributes one bolt, two washers, and one nut at each bolt hole along the plates. The tail ramp is fastened with the rearmost bolt and hinged forward to prevent its being damaged during assembly. The pushing hook is fastened with four bolts immediately ahead of the rear bolt (fig. 90). The bolting detail removes the drift pins from each bolt hole, thrusts the bolt (w/washer) through the hole from the bottom, and places the top washer and hand tightens the nut. Wrench handlers then finish tightening the nuts with wrenches.

(2) Central portion of projected charge.

(a) After the first 40 feet are towed to the rear, place the next 40 feet of bottom plates. The lapping of plate changes from three bolt holes per plate in section D to two holes per plate in section E, 60 feet from the rear end. Use all bottom plates from the first stack, then take plates from the next stack. At this stage, determine the locations of the fuze shields (fig. 81). The open end of the first fuze shield will be bolted to the projected charge at the thirty-third bolt from the rear end. The open end of the other shield will be bolted to the projected charge 10 bolt holes (20 feet) forward of the open end of
Figure 78. Fuze, bullet impact: M1A1-cutaway and rear view.
from beneath the fuzes. This should be checked by the noncommissioned officer in charge.

(c) After the explosive charges are properly placed, assemble the cover plates, paying particular attention to the change in lapping between sections A and B. During the bolting of this portion, mount the fuze shields on the cover plates at the predetermined locations. Do not place the fuzes in the shields until the assembly is complete and the projected charge is ready for use. Assemble successive portions similarly. Note the change in lapping of underplates, 348 feet from the rear end.

(3) Front portion of projected charge.

(a) Assemble the front portion of the projected charge in the same way. Lap one of the top plates in forward section C over four bolt holes instead of three, so the under and cover plates terminate at the same point. This four-hole lap is made most easily with the last plate.

(b) Place explosive charges to within 20 feet of the front end of the projected charge, then add 10 feet of tamping bags to prevent them from moving.

(c) Fasten the nose adapter between the under and cover plates at the forward end by the two foremost bolts. Slip the nose over the adapter until it is snug against the bumper ring. Pass one end of the nose retainer wire rope loop through the hole in the towing hook. Pass the retainer bar through the loop on the opposite side of the hook, through the hole in the nose, and position it inside the nose with the bar across the opening (figs. 76 and 91).

(d) Position the remaining cover plates and bolt them in place. When the assembly is completed, it is checked by the junior noncommissioned officer, all bolts

the first shield. Place the first pair of linear charges or bangalore torpedo bundles with the forward ends 6 inches in front of the hole to which the open end of the shield will be fastened. This places the open end of the rear shield 64 feet from the tail and insures that 12 inches of composition A-3 (6 inches in each of the butted charges) is beneath the body of the fuze.

(b) Tightly pack earth-filled tamping bags (fig. 86) for 20 feet in back of rearmost explosive charges without disturbing their position. The explosive detail places additional charges forward of the two already placed. The charges or bangalore torpedoes must fit tightly end-to-end, to prevent the booster portions from shifting

Figure 79. Fuze, bullet impact: M1.
Figure 80. Longitudinal section of projected charge M3A1 at fuze.

Figure 81. Fuze shield for projected charge M3A1.

Figure 82. Linear demolition charge for projected charge M3A1.

are retightened, and the tail ramp is hinged to the rear.

(e) Arm the projected charge by re-

moving the safety forks and inserting the fuzes within the shields. The fuze must be seated well forward against the vertical stop plate inside the shield. Fasten it in place with the key chained to the shield.
81. Assembly of Towing and Pushing Assemblies

a. Towing Assembly. Bolt the towing rods and lifting bail (fig. 87) to the towing yoke. Pin the front ends of the rods to the rear towing lugs of the tank and shackle the coil spring to the lifting bail (fig. 92). The towing assembly is raised in medium and light tanks as shown in figures 93 and 94.

b. Pushing Chain. Fasten the pushing chain to the front clevises of the tank (fig. 95).

c. Rigging Fixtures.

(1) Pulleys and mounting posts. Five pulley support posts with pulleys, two rope guide rings with pulleys, and one rope guide ring are furnished with each demolition kit. They are used in raising the towing yoke and pushing chain and are welded on the tank hull. Location of the pulleys depends on the tank model. Figure 96 shows location of the fittings on several typical tanks. Posts and guide rings must be installed so that tank gun clears them when the turret is traversed and the gun is at its lowest elevation.

(2) Periscope fitting. The periscope fitting, through which the towing yoke cable and the pushing chain rope enter the tank, fits in the periscope slot on medium tanks. The bow gunner in most tanks of the M4 series has two periscopes; one in the hatch door and one in the hull just forward of the hatch door. The periscope fitting is inserted in the bow gunner's hull periscope slot. On some early production models of tank M4 series, the bow gunner has a periscope in the hatch cover and the direct-vision slot in the hull. When these tanks are used, the periscope fitting is inserted in the periscope slot in the bow gunner's hatch cover. In this case, the bow gunner's view is obstructed and he cannot use his machinegun and the coaxially mounted machinegun must be used to detonate the projected charge. As an alternate method, a cover plate for the radio antenna hole on the right of the bow gunner may be improvised and the direct-vision port fitting mounted on the plate.

(3) Direct-vision port fitting. This fitting may be used in place of the periscope fitting. The cover plate over the bow gunner's direct-
Figure 87. Tank accessories for projected charge demolition kit M3A1.
vision port is removed and the fitting is inserted in the port and fastened in place.

(4) **Rigging.** Tie the sash cord securely to the pushing chain, thread it through the front pulley, and take it into the tank through the larger hole in the periscope or direct-vision port fitting. Fasten one end of the 1/8-inch cable to the coil spring on the lifting bail, using the special cable clamp. Then, thread the cable through the pulleys and into the tank through the smaller hole in the periscope or direct-vision port fitting. Wind the end of the cable on the reel in the fitting. The pushing chain is raised and lowered by hand with the sash cord. The towing yoke is raised by winding the reel on the periscope or direct-vision port fitting. A wrench is provided for winding the reel (fig. 93). However, the yoke can be raised much faster using a ratchet wrench (fig. 94) and a 1-inch socket. To drop the yoke, the ratchet bar on the reel is pushed to the right.

### 82. Night Assembly

_a._ Night assembly procedure is the same as during the day, but requires more practice and normally requires two to three times as long as day assembly. Parts must be laid out where they are easily accessible and can be readily found.
Close supervision is important to insure proper assembly. Drift pins and wrenches are less easily lost if painted white.

b. Even though the fuze faces are coated with luminous paint, they often cannot be seen from the inside of the tank at night. Therefore, when firing the projected charge at night, a standard flashlight should be wired securely to the bolt nearest the fuze, with the beam directed on the fuze (fig. 97). An alternate method is to place a piece of white paper under the flashlight lens to diffuse the beam and point the flashlight toward the tank.

83. Safety Precautions

When a projected charge is detonated, the blast pressure is at a minimum toward the rear and is greatest on the flanks. Blast pressure from the detonation causes the tank crew no discomfort. If the projected charge is fired immediately after it is released by the tank, flame from the explosion may enter the tank if any ports are open. However, there will be no damage to the tank or injuries to personnel if safety precautions listed in a through c below are observed. Detonation may throw fragments as far as 1,000 meters laterally or 300 meters to the rear, but most of the fragments are thrown at right angles to the line of the projected charge. The precautions in a through c below must be taken when handling the projected charge.

a. Towing and Pushing Tank.
   (1) All loose oil and fuel drippings must be removed from inside the tank.
   (2) Tank fire extinguishers must be in good working condition and ready for use.
   (3) Pistol port must be locked securely.
   (4) All direct-vision slots must be closed.
   (5) Fuel tank filler covers must be properly fastened.
   (6) Gaskets and latches on all hatch covers must be in good condition.
   (7) Hatch doors must be securely latched. Detonation of a projected charge will blow open improperly latched hatch covers.
   (8) Periscopes must be fitted in all periscope holders.
   (9) Smoke mortar, turret machine guns, and bow machine guns must be in place or wooden plugs wedged in openings.
   (10) Canvas or asbestos should be stuffed around hull and turret ventilators to minimize dirt blowing into tank.
   (11) Canvas or asbestos should be stuffed in gun shield opening behind rotor shield, to prevent flame from explosion from entering tank.

b. Tanks Close to Tank Pushing or Firing Projected Charge.
   (1) The minimum safe lateral distance for tanks is 100 meters.
   (2) Tanks within 500 meters should have all ports and slits closed and all hatch doors securely latched.

c. Personnel Outside of Tanks
   (1) No personnel must be within 250 meters of the projected charge in firing position or armed projected charges being towed or pushed.
   (2) Personnel must take cover when 250 to 800 meters away laterally or 250 to 300 meters to the rear of armed projected charge.

84. Towing and Pushing

The average tank driver requires 1 week
Figure 92. Towing assembly of projected charge demolition kit M3A1 mounted on tank.
gunner releases the cable holding the towing yoke and the yoke falls into the projected charge behind the towing hook. The tank then moves forward slowly until the yoke engages the hook. Towing assembly is shown in figure 92.

(2) When towing a projected charge, it is important that changes in direction and speed be made gradually and without jerking.

(3) Tow the projected charge as close as possible to the obstacle. The last 100 meters of the tow must be a straight course when pushed into the obstacle. When the projected charge is to be dropped, stop the towing tank and back it about 2 feet to disengage the yoke from the towing hook. Raise the yoke by cranking up the cable on the periscope fitting. The yoke is raised much faster using a ratchet wrench and a 1-inch socket rather than the wrench furnished with the projected charge. Then move the tank forward far enough to clear the nose of the projected charge before turning.

b. Pushing.

(1) Aline ment. To push a projected charge, approach the tail of the projected charge and align the tank astride the projected charge. Practice is required to align the center of the tank with the projected charge because the driver is seated off center and his view is restricted. Pronounced misalignment may cause the projected charge to buckle during pushing.

(2) Engaging pushing hook. Before reaching the tail ramp, the bow gunner releases the pushing chain (fig. 95). The tank then advances slowly until the chain engages the pushing hook and the hook is picked up and held against the belly of the tank.

(3) Starting push. After picking up the hook, the tank starts forward in lowest gear and slowly accelerates until it is running in second or
Figure 95. Pushing assembly of projected charge demolition kit M3A1 mounted on tank.
Figure 96. Location of rigging fixtures on tank hulls.
third gear. Alignment of the center of the tank over the center of the projected charge must be preserved and the driver must follow the projected charge carefully, making no attempt to guide it. Attempts at guiding usually cause structural failure of the plates immediately in front of the tank.

(4) Observation by tank driver. The driver must frequently manipulate the periscope to observe the terrain ahead, the behavior of the nose, the relative alignment of the tank with the projected charge, and the condition of the projected charge near the tank. The entire length of a 400-foot projected charge is seldom completely within the limited field of vision of the periscope.

(5) Releasing the projected charge. To release the projected charge, back the tank up far enough to clear the chain from the hook. The chain is pulled up by hauling in on the control rope.

85. Detonation

The flash of flame produced by detonation of the projected charge M3A1 (aluminum plates) is greater than that produced by detonation of the M2 and M2A1 models (steel plates). It may extend back to the tail of the projected charge, and, if the projected charge is detonated immediately after the tank disengages from the pushing hook, the tank may be partially enveloped in flame for an instant. A number of projected charges have been fired with the tank in this position without injuries or damage. All precautions listed in paragraph 83 were taken. It is preferable, after dropping the projected charge, to back the tank up about 40 feet before detonation. However, the projected charge can be fired while pushing without stopping to unhook or back up, and the tank can immediately advance through the cloud of smoke and dust raised by the explosion, the driver feeling his way through the crater.

a. Bullet-Impact Fuze. The projected charge is normally detonated by firing at one of the fuzes mounted on the projected charge with either machinegun mounted on the tank. Two fuzes are provided, because the position of the projected charge may place one of the fuzes where it is difficult to see or hit. The coaxially mounted machinegun is generally the better gun to use because it is mounted higher in the tank. In medium tanks where the periscope fitting is inserted in the hatch cover, the bow gunner’s view is obstructed; hence the coaxial gun must be used. Tracer ammunition must be used when firing at night with the fuzes illuminated (fig. 97).

b. Detonating Projected Charge With Tank Gun. If neither fuze can be hit by machinegun fire, the projected charge is detonated by a direct hit from the tank gun (37 mm and over), using a high-explosive projectile with superquick fuze. The projected charge will explode when any loaded section is hit. Fire should not be directed at the rear 60 feet of the projected charge which contains no explosive.

86. Effectiveness of Projected Charges

a. Most Suitable Terrain. These demolition items are most effective in flat or moderately rolling, open, or lightly wooded terrain. Such terrain, moreover, is suitable for maneuvering tanks.

b. Crater. The size of the crater blasted
by a projected charge depends on the type of soil and its moisture content. In most soils, the crater will be about 100 meters long, 5 meters wide, and 2 meters deep. The crater provides a well-marked route for tanks.

c. Breaching Obstacles.

(1) The principal use of projected charge demolition kits is breaching mine fields. However, they may also be used to breach bands of log posts, steel rails, antitank ditches, barbed wire, concertina, and some small concrete obstacles. Effectiveness depends on type, shape, height, weight, spacing, and emplacement depth of the individual obstacles, and ground characteristics. The projected charge is either pushed through or over the obstacles. The length of projected charge used depends on the depth of the obstacle. When fired, the section of projected charge loaded with explosives must be over or adjacent to the obstacle. When the projected charge is detonated, a crater is blasted and the obstacles in the crater are generally shattered or blown out of the crater, depending on the characteristics of the obstacles.

(2) Against reinforced concrete obstacles interconnected by ground sills and against large reinforced concrete blocks, detonation of a single projected charge may not produce an adequate breach because of the weight and strength of the blocks and because good contact of explosives with surface of concrete is not obtained.

(3) Success in breaching antitank ditches depends on the depth, width, and revetting of the ditch and whether the nose of the projected charge clears the far side of the ditch. Detonation of a projected charge breaks down the sides of the ditch. In average unrevetted ditches 5 feet deep, a single projected charge will blast a gap passable by tanks. Deeper ditches may require the detonation of a second projected charge in the crater of the first. It is generally not practicable to breach ditches deeper than 8 feet.

Section III. DEMOLITION KIT, PROJECTED CHARGE M157
(ANTITANK MINE-CLEARING DEVICE)

87. General

a. The demolition kit M157 (fig. 98) is an antitank, minefield-clearing device which is designed to be towed (dragged) and pushed for emplacement by a medium tank (M48 or the M60 series) with accessories. This demolition kit is utilized to clear a path large enough for tanks, vehicles, and personnel to travel through minefields planted with single-pulse, pressure-type mines. This demolition kit is flexible enough in the vertical plane to permit it to pass over rough terrain and rigid enough in the horizontal plane so that it will maintain a relatively true course when being pushed. The flexibility and rigidity is accomplished by use of a joint system and a series of pushing bars running through rectangular enclosures or tunnels in section assembly.

b. For a complete physical description, assembly procedure, operational description, and maintenance instructions of the projected charge demolition kit M157, refer to TM 9-1375-204-10.

88. Demolition Kit, Projected Charge: M157—Description

a. Projected Charge Demolition Kit Components. This projected charge demolition kit consists of 79 irregular hexagonal tubes (section assemblies) which, when assembled (fig. 99), are approximately 12 inches wide, 7 inches high, 400 feet in length, and weigh approximately
Figure 98. Medium tank pushing the Demolition Kit M157.
11,000 pounds, including approximately 2,880 pounds of composition B and approximately 320 pounds of composition C4. The section assemblies are as follows: nose section, 13 body sections, 62 center-loading sections, 2 impact-fuze sections, and tail section. Each of the 62 center-loading section assemblies and the two fuze section assemblies are loaded with 50 pounds of explosive material. A list of parts which comprise the projected charge demolition kit M157 is given in Table XIX.

**Table XIX. Components of 400-Foot Projected Charge Demolition Kit M157**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nose section assembly</td>
<td>1</td>
</tr>
<tr>
<td>Body section assembly</td>
<td>13</td>
</tr>
<tr>
<td>Center loading section assembly</td>
<td>62</td>
</tr>
<tr>
<td>Impact fuze section assembly</td>
<td>2</td>
</tr>
<tr>
<td>Tail section assembly</td>
<td>1</td>
</tr>
<tr>
<td>Fuzing</td>
<td></td>
</tr>
<tr>
<td>Fuze, mine, M603</td>
<td>2</td>
</tr>
<tr>
<td>Fuze explosive container loading assembly</td>
<td>2</td>
</tr>
</tbody>
</table>

**Table XX. Tank Accessories and Tools for Construction of 400-Foot Projected Charge Demolition Kit M157**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable No. 1</td>
<td>1</td>
</tr>
<tr>
<td>Cable No. 2</td>
<td>1</td>
</tr>
<tr>
<td>Chain assembly No. 1</td>
<td>1</td>
</tr>
<tr>
<td>Chain assembly No. 2</td>
<td>1</td>
</tr>
<tr>
<td>Clevis pin assembly</td>
<td>2</td>
</tr>
<tr>
<td>Drag plate assembly</td>
<td>1</td>
</tr>
<tr>
<td>Extension bar assembly</td>
<td>2</td>
</tr>
<tr>
<td>Gear box assembly</td>
<td>1</td>
</tr>
<tr>
<td>Multiple sheave assembly</td>
<td>1</td>
</tr>
<tr>
<td>Pulley support post assembly</td>
<td>1</td>
</tr>
<tr>
<td>Safety snap hook</td>
<td>2</td>
</tr>
<tr>
<td>Shoulder screw</td>
<td>2</td>
</tr>
<tr>
<td>Single sheave assembly</td>
<td>1</td>
</tr>
<tr>
<td>Spring assembly</td>
<td>1</td>
</tr>
<tr>
<td>Tools</td>
<td></td>
</tr>
<tr>
<td>Hammer (rawhide or rubber)</td>
<td>2</td>
</tr>
<tr>
<td>Screwdriver</td>
<td>4</td>
</tr>
<tr>
<td>Double-socket wrench</td>
<td>2</td>
</tr>
<tr>
<td>Structural wrench</td>
<td>2</td>
</tr>
</tbody>
</table>

**b. Tank Accessories.** See Table XX for a list of the tank accessories and tools. Also refer to TM 9-1375-204-10 for installation and operation instructions for the projected charge demolition kit, M157, tank accessories, and tools. Figure 100 is an illustration of the provided tank accessories.

c. Assembly Tools. Two rawhide or rubber hammers, four screwdrivers, two double-socket wrenches, and two structural wrenches are supplied for assembling the projected charge demolition kit and for assembling the tank accessories to the tank.

d. Functional Description. The force of the bullet (cal. .30 or .50, ball) striking the impact plate of the bullet impact fuze assembly drives the impact plate forward, which in turn, strikes and detonates the impact fuze M603 and booster M120. The detonation of the booster, in turn, detonates the composition B of the fuze explosive container loading assembly. The container shatters downward in a manner which produces a narrow, concentrated detonating jet. This jet stream has the force necessary to penetrate the insert tube walls of the impact fuze section assembly, thereby assuring detonation of the composition B and composition C-4 contained within. Detonation of either of the explosive fuze container loading assemblies will initiate detonation of the other loaded sections (center loading and impact fuze) of the demolition kit.

**Note.** The bullets fired must strike one of the impact plates in order for the demolition kit to be detonated.

e. Effectiveness.

1. **Most suitable terrain.** Projected charge demolition kit M157 is more effective in flat or moderately rolling, open, or lightly wooded terrain. This type of terrain, moreover, is suitable for maneuvering tanks.

2. **Crater.** The size of the crater blasted by the projected charge demolition kit depends on the type of soil and its moisture content. In most soils, the crater will be approximately 320 feet long, 12 to 16 feet wide, with the maximum depth of 3 to 5 feet. The crater provides a well-marked path for tanks, vehicles, and personnel.

3. **Breaching Obstacles.**

(a) Though the principal use of the
projected charge demolition kit is to breach minefields, the kit can also be used to breach bands of log posts, steel rails, antitank ditches, and some small concrete obstacles. Effectiveness of the kit depends upon type, shape, height, weight, spacing, and emplacement depth of the individual obstacles, and the ground characteristics. The kit is either pushed through or over the obstacle. Length of the kit used depends on the length of the obstacle. When fired, the sections of the kit loaded with explosives must be over or adjacent to the obstacle. When the kit is detonated, a crater is blasted and the obstacles in the crater are generally shattered or blown out of the crater, depending on the characteristics of the obstacles.

(b) Against reinforced-concrete obstacles interconnected by ground sills and against large reinforced-concrete blocks, detonation of a single demolition kit may not produce an adequate breach because of the weight and strength of the blocks and because good contact of explosives with surface of concrete is not obtained.

(c) Success in breaching antitank ditches depends on the depth, width, and revetting of the ditch and whether the nose of the demolition kit clears the far side of the ditch. Detonation of a demolition kit breaks down on the sides of the ditch. In an average unrevetted ditch 5 feet deep, a single kit will blast a gap passable by tanks. Deeper ditches may require the detonation of a second kit in the crater of the first. It is generally not practicable to breach ditches deeper than 8 feet.

89. Assembly Procedure for Projected Charge Demolition Kit M157

a. Uncrating. Unpack the sections from the packing boxes and crates, and after reading the instruction plate on the nose or tail section, proceed to assemble the demolition kit as illustrated in figure 99.

b. Selection of Site. Choose a flat area (rear area) large enough to contain the assembled kit when possible. When assembly space is limited, assemble the sections at selected location, and have assembled sections towed away. The site should be as near as possible to the point of anticipated detonation, preferably within 1 mile and defiladed from enemy fire and observation.

Note. Use plank decking where possible when assembling the demolition kit on muddy or wet terrain.

c. Preparation. Lay all sections on the ground in the following order: 1 nose section, 3 body sections, 60 center loading sections, 1 fuze impact section, 2 center loading sections, 1 fuze impact section, 10 body sections, and 1 tail section.

Note 1. Point the nose section in the direction of the minefield.

Note 2. A body section assembled between any of the center loading sections will interrupt the detonation propagation of the charge.

Note 3. The male connecting lugs of the sections should always point toward the nose section.

Warning: The center loading and impact fuze sections contain high explosives and must be handled in accordance with applicable safety regulations (refer to TM 9-1903 and AR 385-63).

d. Assembly of Sections of Projected Charge Demolition Kit.

(1) Remove the side joint pins using a rawhide or rubber hammer, and retain the pins for future use.

(2) Bring the sections together, mating the male and female connecting lugs. Using the rawhide or rubber hammer, drive the side joint pins
Figure 99. Assembly of sections of demolition kit M157.
in the holes of the connection lugs.
(3) Place the pushing bar in the rear of the first body section and push it against the pushing bar of this section until its front end makes contact with the pushing bar stop in the nose section. Remove the pushing bar inserted in the body section.

(4) Unscrew and remove the top joint stud. Remove the top bearing bar of the body section and pull the links over the joint.

(5) Check the notch position of the bearing bar removed in (4) above, then insert the bar in the top supports and through the links. The notch position is used when adjusting the top joint for the required slack adjustments.

(6) Inspect for presence of the pushing bar with the screwdriver, then inspect the general condition of the joint system.

(7) Check the notch position of the top bearing bar of the nose section for correct slack adjustment position. If slack adjustment is required, refer to instructions in paragraph 92b.

(8) Join all sections using the instructions provided in (1) through (7) above.

Note 1. Leave the pushing bar inserted in the rear of the last body section.

Note 2. The time required to assemble the demolition kit is approximately 6 man-hours.

e. Assembly of Fuze. Fuzing procedures for the demolition kit are as follows:

(1) Remove fuze M603 and fuze explosive container loading assembly containing booster M120 from packing box, and inspect for presence of dirt and/or moisture. Remove dirt or moisture when possible. Replace unserviceable fuze explosive container or fuze.

(2) Unlatch and open impact fuze housing door.

(3) Remove bullet-impact assembly and dummy container from fuze housing assembly.

(4) Unscrew knurled fuze cap from fuze cup of fuze explosive container, and retain for future use.

Note 1. When removing knurled fuze cap, check to assure fuze cap travels over full length of threads on fuze cap without binding.

Note 2. Booster M120 is contained in the fuze cup of the fuze explosive container. Check for presence of booster by noting that the booster retainer is approximately 1 inch from the top of the fuze cup. If booster is missing, fuze cup depth is approximately 1-1/2 inches.

(5) Insert explosive fuze container into fuze housing assembly.

Warning: Exercise care when handling the explosive fuze container.

(6) Remove safety clip (fork) from fuze and place fuze in fuze cup with detonator (green) downward and fuze pressure plate upward.

Warning: Exercise extreme caution not to exert any pressure on the fuze pressure plate.

(7) Replace and secure the knurled fuze cap to the fuze cup.

(8) Assemble the bullet-impact spring and plate into the fuze housing with the flat side of the impact fuze plate outward.

(9) Check position of fuze explosive container assembly and bullet impact fuze assembly to assure they are seated properly in the fuze housing. Make corrections, if necessary.

(10) Secure the fuze housing door assembly to the fuze housing assembly.

90. Assembly of Tank Accessories

The following are the procedures for assembling the tank accessories (fig. 100) for assembly of the projected charge demolition kit M157 to the tank.

a. Bolt the front portion (shackle No. 1) of the extension bar assemblies and chain assembly No. 2 to the drag plate assembly using the shoulder screws.

b. Place the rear portion (shackle No. 2) of each extension bar assembly over the rear towing lug of the tank and secure with a clevis pin assembly.
c. Secure the spring assembly to chain assembly No. 2, using the ring of the chain assembly.

d. Install the safety hook on cable No. 2 and fasten the free end of the spring assembly to cable No. 2.

e. Remove pins from round shackle pins of chain assembly No. 1, and retain pins and cotter pins for future use.

f. Aline the holes of the round shackle pins of chain assembly No. 1 with the holes of the front towing lugs of the tank.

g. Insert the pins removed in e above and secure with the cotter pins.

h. Install safety snap hook on cable No. 1 and fasten cable No. 1 to chain assembly No. 1 using the hook. Locate this hook approximately at the midpoint of the chain assembly.

i. Insert and secure the gear box assembly in the port periscope fitting.

Note. The center periscope may be removed in place of port periscope.

j. Remove required screws from the tank for placement of sheave and support assemblies and retain screws for future use.

Note. The location of the pulley of the multiple sheave assembly will be altered when this assembly is assembled to tank M48A2.

k. Place the single and multiple sheave assemblies in locations (required) and secure them to the tank with the screws removed in j above.

l. Place the pulley support assembly on the tank and fasten down.

m. Thread the free end of cable No. 1 through the pulley assembly of the gear box assembly and the cam cleats of the gear box assembly.

n. Thread the free end of cable No. 2 through the pulley support post, the multiple sheave, and the single sheave assemblies.

o. Push the free end of cable No. 2 in the opening of the gear box assembly and secure the cable to the gear spool assembly of the gear box assembly.

p. Wind cable No. 2 on the gear spool assembly using the wrench assembly of the gear box assembly.

Note. The gear spool assembly operates by moving the wrench assembly of the gear box assembly from left to right.

91. Safety Precautions

When the projected charge demolition kit is detonated, the blast pressure is minimum toward the rear and maximum on the sides of the kit. Blast pressure from the detonation causes the tank crew a minimum of discomfort. If the kit is detonated immediately after it is released by the tank, flames from the explosion may enter the tank if any ports are open. However, there will be no damage to the tank or injuries to personnel if the safety precautions listed in a through c below are observed. Detonation will throw fragments as far as 740 meters laterally or 460 meters to the rear, but most of the fragments are thrown at right angles to the line of the kit. It should be remembered that fragments may occasionally be thrown as far as 1,000 meters. The precautions in a through c below must be taken when handling this projected charge demolition kit.

a. Towing and Pushing.

(1) All loose oil and fuel drippings must be removed from inside the tank.

(2) Tank fire extinguishers must be in good working condition and ready to use.

(3) All direct-vision slots must be closed.

(4) Fuel-tank filler covers must be properly fastened.

(5) Gaskets and latches on all latch covers must be in good condition.

(6) Hatch doors must be securely latched. Detonation of the demolition kit will blow open improperly latched doors.

(7) Periscopes must be fitted in all periscope holders.

(8) The turret machine guns must be in place or wooden plugs wedged in the openings.

(9) Canvas or asbestos should be stuffed around hull and turret ventilators to minimize dirt blowing into tank.

(10) Canvas or asbestos should be stuffed in gun-shield opening behind rotor shield to prevent flame from explosion entering tank.
Figure 100. Tank accessories.
b. Tanks Close to Tank Pushing or Firing Demolition Kit.
   (1) The minimum safety lateral distance for tanks or vehicles is 100 meters.
   (2) Tanks within 460 meters should have all ports and slits closed and all hatch doors securely latched.

c. Personnel Outside of Tanks.
   (1) Only those personnel who are involved with the assembly of the demolition kit should be in the immediate area.
   (2) No personnel must be within 300 meters of kits in firing position or armed kits being towed or pushed.
   (3) Personnel within 275 to 740 meters to the sides of armed kit or 275 to 460 meters to the rear of the armed kit must take cover at all times.
   (4) All personnel within the limits specified in (3) above must be notified prior to detonation of the demolition kit.
   (5) All personnel should be equipped with steel helmets and positioned to the rear of the demolition kit, if possible, rather than to the sides.
   Warning: Personnel should take advantage of available cover.
   (6) A 1-minute fall-out period should be allowed for falling fragments prior to the advancement of tanks, vehicles, or troops through the cleared area.

92. Emplacement Procedures

Warning: Before a live demolition kit is towed or pushed, the safety precautions listed in paragraph 91 should be taken.

   a. Inspection. Before towing the demolition kit to the desired mine area, the assembled demolition kit and its component parts should also be inspected to assure that:
      (1) All demolition kit sections are arranged correctly.
      (2) All side joints pins and pushing bars are in place.
      (3) All links are securely held up by the top bearing bars.
      (4) The two fuze impact sections are in the correct location.
      (5) Each of the fuze impact sections are fuzed.
      (6) The impact fuze housing door is held securely with the latch.
      (7) The slack has been adjusted for all joints, in accordance with b below.

Caution: The above inspections are necessary to prevent damage to the demolition kit when it is towed or pushed.

b. Adjustment. The slack adjustment procedures are as follows:
   (1) Check the top bearing bar notches for the correct slack adjustment.
   (2) If slack adjustment is needed, remove the top joint stud, slide the top bearing bar through the top joint supports and links, and position correctly.
   (3) Secure the top bearing bar with the
top joint stud once the correct slack adjustment has been made.

c. Towing.

(1) Aline the rear of the tank with the nose section of the kit and then back the tank until the drag plate assembly is behind the nose hook assembly.

(2) Using the wrench assembly of the gear box assembly, release cable No. 2 holding the drag plate assembly, allowing it to settle behind the nose hook assembly.

(3) When the drag plate assembly falls behind the nose hook assembly, move the tank forward slowly until the drag plate assembly engages the nose hook assembly.

Caution 1: Do not back the tank over the nose section and crush it.

Caution 2: When towing a demolition kit, it is important that changes in direction and speed be made gradually and without jerking.

(4) Tow the demolition kit as close as possible to the edge of the minefield.

Caution: The final towing (approximately 150 meters) of the demolition kit should be as straight as possible so as to straighten the demolition kit for easier pushing and to minimize the chances of damaging the demolition kit.

(5) Stop the tank and back it about 1 meter to disengage the drag plate assembly from the nose hook assembly.

(6) Using the wrench assembly of the gear box assembly, shorten cable No. 2 holding the drag plate assembly until this assembly is clear of the nose section hook.

(7) Once the drag plate assembly has cleared the nose hook assembly, move the tank forward a sufficient distance to clear the nose section before turning.

d. Pushing.

(1) Approach the tail section of the kit and aline the center of the tank over the center of the kit.

(2) Before reaching the tail section, release cable No. 1 holding chain assembly No. 1.

(3) Advance the tank slowly until chain assembly No. 1 engages the rear portion of the rear hook assembly, and the rear hook plate rests against the tank hull.

Caution: The rear hook plate should rest securely against the bottom of the tank hull when the demolition kit is being pushed.

(4) Push the demolition kit into the desired mine area.

Caution: Do not attempt to straighten the kit by force. Steer the tank so as to minimize any bending of the kit. Keep the last 35 meters of the kit as straight as possible.

93. Misalinement Correction Procedures When Pushing Projected Charge Demolition Kit

a. Back the tank at least 2 meters from the tail section. Raise the chain assembly No. 1.

b. Move the tank forward slowly until chain assembly No. 1 engages the front portion of the rear hook assembly of the tail section. Lower chain assembly No. 1.

c. Back the tank for a sufficient distance to realine or straighten the demolition kit.

b. Disengage chain assembly No. 1 and follow the procedures outlined in paragraph 92a (1) through (4) above.

94. Detonation Procedures

Warning: Before a demolition kit is detonated, precautions listed in paragraph 91 should be taken.

a. Back tank approximately 25 meters to avoid damaging the lights and/or other accessories.

Note. Raise chain assembly No. 1 clear of the ground.

b. Fire a bullet from one of the machine-guns into either bullet impact fuze plate.

Note 1. The gunner should aim the gun at the center of the white cross painted on the fuze housing door.

Note 2. The thin aluminum fuze housing door offers minimum resistance to the bullet.
Section IV. DEMOLITION KIT, PROJECTED CHARGE M173 AND DEMOLITION KIT, PROJECTED CHARGE, PRACTICE, M174

95. General

a. Projected Charge Demolition Kit M173. The projected charge demolition kit M173 (fig. 101) is an antitank mine field-clearing device which is designed to be towed (dragged) by a vehicle to the edge of a mine field. It is utilized to clear a path in those antitank mine fields planted with single impulse pressure-type mines and it may be towed over land or water by an adequately sized land or amphibious vehicle containing a suitable 24-volt direct current bayonet-type receptacle. Firing of the kit is accomplished by means of a firing control switch.

b. Practice Projected Charge Demolition Kit M174. The practice projected charge demolition kit M174 (fig. 101) differs from the projected charge demolition kit M173 (a above) in that it is painted blue rather than olive drab and it contains an inert linear demolition charge and inert fuze rather than a live linear demolition charge and live fuze. This demolition kit is used for antitank mine field-clearing, troop-training purposes only.

96. Demolition Kit, Projected Charge: M173 and M174—Description

a. Physical Description. Each demolition kit (fig. 102) is fundamentally composed of a waterproof skid M3, a linear charge propulsion system, a linear demolition charge, and the necessary accessories to tow and fire the kit. For a complete physical description, assembly procedure, operational description, and maintenance instructions of the projected charge demolition kit M173 and M174, refer to TM 9-1375-202-10.

b. Functional Description.

(1) The demolition kit is initially connected to the tow vehicle by means of mechanical and electrical couplings. At time of use, the kit is electrically released from its mechanical coupling by means of the firing control switch operated from within the vehicle, after it has been towed to the desired area. After movement of the vehicle to a safe distance from the kit, removal of the main cover is accomplished by means of the propellant actuated thruster XM24 electrically initiated from within the vehicle by means of the same switch. Automatic elevation of the launcher tube occurs as the cover slides from the kit.

(2) Rotation of the firing control switch handle to its third position then causes ignition of the rocket motor M95. When sufficient thrust is built up by the rocket motor, it breaks its restraining screw and carries the connected linear demolition charge M96 or inert linear demolition charge M97 across the mine field. After coming to rest, rotation of the firing control switch handle to its fourth position provides a closed circuit through which the electrical current flows to initiate fuze M1134, or simulate initiation of inert fuze T1302E1.

(3) Although demolition kit M173 is an expendable (nonrecoverable) item, practice demolition kit M174, designed for troop-training purposes, is not expendable. Thus, demolition kit M174, including the inert linear demolition charge M97, inert fuze T1302E1, propellant actuated thruster XM24, and rocket motor M95 is to be recovered after use and returned to the supporting ordnance ammunition personnel for the required service.

c. Tabulated Data.
Complete assembly:
Length ---------------------- 145 in.
Height ---------------------- 24 in.
Width ---------------------- 56.5 in.
Weight (approximately) ------ 3,030 lbs
Launcher tube elevation adjustment:
Full adjustment possible ------ 20 to 80 deg
Normal setting ------------- 55 deg
Cable lengths:

- Arresting cable: 100 ft
- Electrical cable: 250 ft
- Pickup cable: 9.5 ft
- Tow cable: 15 ft

Linear demolition charge M96 and inert linear demolition charge M97:

- Length: 300 ft
- Weight (total): 1,720 lbs
- Weight of comp. C4 explosive (M96) and simulated explosive (M97): 1,500 lbs
- Number of explosive (or simulated explosive) charges on line: 800 (400 pairs)
- Electric power supply: 24 v dc

97. Preparation for Towing

Preparations for towing, as described in TM 9-1375-202-10, are broken down into two categories, namely, "preparation for towing when immediate firing is not to be accomplished," and "preparation for towing prior to immediate firing." These categories are further broken down into towing instructions and rigging for one demolition kit only, two demolition kits in tandem, and two demolition kits in parallel. Further instructions are given for attachment of tow vehicle accessories, coupling of the demolition kit to the tow vehicle, fuzing instructions, and connection of the propellant actuated thruster.

98. Towing

Drive the vehicle to which the demolition kit(s) had been connected to tow the kit(s) to the desired receiving or combat area, or to the edge of the mine field through which a path is to be cleared. If one kit M173 is connected to the tow vehicle to clear a path in a mine field or if one kit M174 is connected for training in this operation, select the stopping point of the vehicle as described in paragraph 99a. In all cases, however, observe the following precautions when towing in order to prevent upset or other damage to the kit(s).

Caution 1: Never tow in excess of 20 miles per hour.

Caution 2: Negotiate all ditches and obstructions with extreme care.

99. Firing of Demolition Kit

a. Tow the demolition kit as described in paragraph 98 to the edge of the mine field so the longitudinal line of the kit, when extended beyond its bow, will track the path that is to be cleared through the field. Stop the tow vehicle with the kit "aimed" in this direction so the kit lies approximately 125 feet from the edge of the mine field upon a site preselected for its cross-levelness. The degree of cant of the kit will determine the amount of firing error. Make certain the stopping point of the kit is as level from front to back as possible, but in no case will it be elevated or depressed more than 20 degrees.

b. Fire the kit as follows:

1. Unlatch the trunk latch on the firing control switch and open the handle extension to its extended position.

2. Rotate the handle counterclockwise by means of the extension to its stop position. Reverse the direction of rotation and rotate until the handle stops at the "TOW 1" position. Indexing this position detonates the explosive bellows motors.
T5E1 in the tow cable release, thus disconnecting the tow cable from the tow vehicle.

(3) To avoid exposing the rear of the tank to enemy fire, back the tank around the kit to a position not less than 120 feet nor more than 150 feet to the rear of the kit.

**Caution:** Prevent cutting or fouling the 250-foot electrical cable by avoiding sharp turns or excessive speed when backing away from the kit.

(4) Rotate the switch handle fully counterclockwise, then clockwise until it stops at the "LID 2" position. Indexing this position actuates the propellant actuated thruster XM24 on the main cover, thus removing the cover and automatically raising the launcher tube in the front hull compartment. Visually determine that the rocket motor has raised to preset elevation.

**Warning:** All personnel must remain under cover during firing of the propellant actuated thruster XM24, projection of the rocket motor M95, and linear demolition charge (5 below), and detonation of the charge (6 below).

(5) Rotate the switch handle fully counterclockwise, then clockwise until it stops at the "JATO 3" position.

Indexing this position actuates the rocket motor M95 which then carries attached linear demolition charge M96 (M173) or inert linear demolition charge M97 (M174) over the mine field along the target path and arms the attached fuze.

**Warning:** All personnel must remain under cover during firing of the propellant actuated thruster XM24 (4 above), projection of the rocket motor M95, and linear demolition charge, and during detonation of the charge (6 below).

(6) Rotate the switch handle fully counterclockwise, then clockwise until it stops at the "CHARGE 4" position. Indexing this position detonates fuze M1134 (M173) or simulates detonation of inert fuze T1302E1 (M174). This detonation actuates linear demolition charge M96 (M173) or inert linear demolition charge M97 (M174) to clear or simulate clearing of the desired path in the mine field.

**Warning:** All personnel must remain under cover during firing of the propellant actuated thruster XM24 (4 above), projection of the rocket motor M95, and linear demolition charge (5 above), and during subsequent detonation (and simulated detonation) of the charge.
CHAPTER 6
DESTRUCTION OF AMMUNITION TO PREVENT ENEMY USE

100. General

a. Destruction of demolition materials, when subject to capture or abandonment, will be undertaken by the using arm only when, in the judgment of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by, the Army commander.

b. This information is for guidance only. The conditions under which destruction will be effected are command decisions and may vary in each case, dependent upon a number of factors such as the tactical situation, security classification of the demolition materials, their quantity and location, facilities for accomplishing destruction, and time. In general, demolition materials can be accomplished most effectively by burning or detonation, or a combination of these. However, selection of the particular method of destruction requires imagination and resourcefulness in the utilization of the facilities at hand under the existing conditions. Time is usually critical.

c. If destruction to prevent enemy use is resorted to, explosive and nonexplosive demolition materials must be so completely destroyed that they cannot be restored to usable condition in the combat zone. Equally important, the same essential components of sets and kits must be destroyed so that the enemy cannot assemble complete ones from undamaged components by cannibalization.

d. If destruction of demolition materials is directed, due consideration should be given to (1) and (2) below.

(1) Selection of a site (place for the destruction operation) that will cause greatest obstruction to enemy movement and also prevent hazard to friendly troops from fragments and blast which will occur incidental to the destruction.

(2) Observance of appropriate safety precautions.

101. Methods

Demolition material can be most quickly destroyed by burning or detonation. The methods in a and b below, in order of preference, are considered the most satisfactory for destruction of demolition materials to prevent enemy use.

a. Method No. 1 — By Burning.

(1) General. Packed and unpacked high-explosive items such as linear demolition charges, shaped demolition charges, block demolition charges, dynamite sticks, detonating cord, firing devices, time blasting fuse, and similar items may be destroyed quickly and effectively by burning. Blasting caps set aside for destruction by burning must be stacked in separate piles and not with other explosives.

(2) Method of destruction.

(a) The explosives should be stacked in a pile if possible (not over 2,000 pounds to a pile).

(b) Pour fuel oil over the entire pile.

(c) Ignite the pile by means of a combustible train (excelsior or slow-burning propellant) of suitable length and take cover immediately. The danger area for piles being burned in the open is 400 meters.

Warning: Cover must be taken without delay, since an early explosion of the explosive materials may be caused by the fire.

b. Method No. 2 — By Detonation.

(1) General. Packed and unpacked high-explosive items such as linear demolition charges, shaped demolition charges, block demolition charges, dynamite sticks, det-
onating cord, blasting caps, firing devices, time blasting fuse, and similar items may be destroyed by placing them in piles and detonating them with initiating charges having TNT, or composition C series, or other explosives of equivalent potential.

(2) **Method of destruction.**

(a) The explosives should be stacked in piles if possible (not over 2,000 pounds to a pile).

(b) Each 100 pounds of packed explosives (mines, blocks, etc.), require a 2-pound (min) explosive charge to insure complete detonation of the pile. For unpacked explosives, a 1-pound (min) explosive charge for each 100 pounds is sufficient.

(c) Provide for dual priming as explained in FM 5-25 to minimize the possibility of a misfire. For priming, either a nonelectric blasting cap crimped to at least 5 feet of time blasting fuse or an electric blasting cap and firing wire may be used.

**Warning 1:** Each roll of fuse must be tested shortly before use. The rate of burning will vary for the same or different rolls under different atmospheric and/or climatic conditions from a burning time of 30 seconds or less per foot to 45 seconds or more per foot.

**Warning 2:** Particular precautions must be taken when used under water as the rate of burning is increased significantly. Time blasting fuse, which contains black powder, and blasting caps must be protected from moisture at all times. Time blasting fuse may be ignited by a time blasting fuse igniter or an ordinary match; the electric blasting cap requires a blasting machine or equivalent source of electricity.

**Warning:** Blasting caps and time blasting fuses must be kept separated from the charges until required for use.

*Note.* For the successful execution of methods of destruction involving the use of demolition materials, all personnel concerned will be thoroughly familiar with the provisions of FM 5-25. Training and careful planning are essential.

(d) Detonate the charges. If primed with nonelectric blasting cap and safety fuse or time blasting fuse, ignite and take cover; if primed with electric blasting cap, take cover before firing the charges. The danger area for piles detonated in the open is a circular area of a radius which varies according to the quantity of explosive items to be destroyed. Quantity-distance data for inhabited buildings as given in TM 9-1903 may be used as an approximate guide for such operations as are contemplated in this chapter.
## APPENDIX I

### COMPLETE ROUND CHART

**Demolition Material**

<table>
<thead>
<tr>
<th>Demolition explosive</th>
<th>Priming means</th>
<th>Initiating means</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CORD, DETONATION</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DYNAMITE: ammonia, straight, 40%.</td>
<td></td>
<td>ELECTRIC CURRENT</td>
</tr>
<tr>
<td>DYNAMITE: gelatin, 40%, 60%, 75%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DYNAMITE: military, M1, M1A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: chain, M1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block, M2&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block, M3 (COMP C-2).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block, M3 (COMP C-3).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block, M5 (COMP C-3).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block, M5A1, (COMP C-4).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block, TNT&lt;sup&gt;1&lt;/sup&gt;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARGE, DEMOLITION: block, 40 lb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORD, DETONATING: fuse, priming.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORD, DETONATING: fuse, priming M1A4 or ADAPTER, priming M1A2 or M1A3, may be used with electric blasting caps, which have lead wires, or with safety fuse or detonating cord with nonelectric blasting caps, and is intended for use with demolition items having firing device wells which have 9/16-inch threads.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEMOLITION KIT, BANGALORE TORPEDO: M1A1.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> ADAPTER, priming M1A4 or ADAPTER, priming M1A2 or M1A3, may be used with electric blasting caps, which have lead wires, or with safety fuse or detonating cord with nonelectric blasting caps, and is intended for use with demolition items having firing device wells which have 9/16-inch threads.

<sup>2</sup> CORD, DETONATING, may be used with adapters M1A4, M1A3 or M1A2 and a nonelectric blasting cap, or may be wrapped around a demolition charge (except shaped charges).
APPENDIX II
REFERENCES

1. Publication Indexes

The following indexes should be consulted frequently for latest changes or revision of references given in this appendix and for new publications relating to material covered in this technical manual.

Indexes of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.

Military Publications:
- Index of Administrative Publications ................................................ DA Pam 310-1
- Index of Blank Forms ........................................................................... DA Pam 310-2
- Index of Graphic Training Aids and Devices ........................................ DA Pam 310-5
- Index of Supply Manuals; Ordnance Corps ........................................ DA Pam 310-29
- Index of Tables of Organization and Equipment, Type Tables of Distribution, and Tables of Allowances.
- Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders...
- Index of Training Publications ............................................................ DA Pam 310-3

2. Supply Manuals and Publications

a. Ammunition.

Ammunition and Explosives: (Class 1375 Explosives, Solid Propellants, and Explosive Devices).

b. Maintenance and Repair.

Tool Kit, Explosive Disposal: Field Maintenance Disposal (5180-754-0644).

c. Training Aids.

Supply Control: Distribution of Ammunition for Training...................... AR 710-1300-1
Transportation and Travel: Transportation by Water of Explosives and Hazardous Cargo.

d. Camouflage.

Camouflage, Basic Principles and Field Camouflage ............................. FM 5-20

e. Decontamination.

Chemical, Biological, and Radiological (CBR) Decontamination ........... TM 3-220
Small Unit Procedures in Nuclear, Biological, and Chemical Warfare.

f. General.

Ammunition: Supply within the Continental United States .................... SB 9-AMM6
Explosives and Demolitions ................................................................. FM 5-25
Inspection of Ordnance Materiel in the Hands of Troops ..................... TM 9-1100
Administration ................................................................................... AR 210-10
Malfunctions Involving Ammunition and Explosives ............................ AR 700-1300-8
Unsatisfactory Equipment Report ......................................................... AR 700-38
Military Chemistry and Chemical Agents ............................................ TM 3-215
Military Symbols ......................................................................................... FM 21-30
Land Mine Warfare ..................................................................................... FM 20-32
Military Terms, Abbreviations, and Symbols:
  Authorized Abbreviations and Brevity Codes ........................................ AR 320-50
  Dictionary of United States Army Terms ............................................ AR 320-5
Military Training ......................................................................................... FM 21-5
Ordnance Ammunition Company .............................................................. FM 9-17
Ordnance Ammunition Service ................................................................. FM 9-5
Ordnance Major Items and Major Combinations and Pertinent SB 9-1
  Publications.
Ordnance Service in the Field ................................................................. FM 9-1
Safety:
  Accident Reporting and Records ......................................................... AR 385-40
  Fire Report ............................................................................................ AR 385-12
Supply and Service Installations and Activities:
  Organization and Command Relationship ............................................ AR 780-10
  Chemical, Biological, and Radiological (CBR) Operations ................ FM 3-5
Targets, Target Material, and Training Course Lay Outs ........................ TM 9-855
Techniques of Military Instructions ......................................................... FM 21-6
Transportation and Travel: Military Traffic Management .................... AR 55-355
Regulation.
Use and Installation of Boobytraps .......................................................... FM 5-31
g. Maintenance and Repair.
Ordnance Maintenance: Materials Used for Cleaning, Preserving,
  Abrading, and Cementing Ordnance Material, and Related
  Materials Including Chemicals. .............................................................. TM 9-247
h. Shipment and Limited Storage.
General Packaging Instructions for Ordnance General Supplies .............. TM 9-200
Logistics (General): Report of Damaged or Improper Shipment .............. AR 700-58
Demolition Equipment Set, Explosive Initiating Electric and
  Nonelectric. ........................................................................................... SM 9-4-1375-R03
Demolition Equipment Set, Explosive Initiating, Nonelectric ................. SM 9-4-1375-R04

3. Forms

The following forms pertain to the material covered in this manual:

DA Form 468, Unsatisfactory Equipment Report
DA Form 2028, Recommended Changes to DA Technical Manuals,
  Parts Lists, or Supply Manuals 7, 8, or 9.
DA Form 2407, Maintenance Request.
DD Form 6, Report of Damaged or Improper Shipment.
DA Form 2415, Ammunition Condition Report.

4. Other Publications

  a. Ammunition.

  Ammunition, General ............................................................................. TM 9-1900/
  ................................................................. TO 11A-1-20
  Ammunition, Restricted or Suspended ............................................. TB 9-AMM2/
  ................................................................. TO39B-1-1
  Ammunition for Training ................................................................. TA 23-100
  Ammunition Renovation ..................................................................... TM 9-1905
Care, Handling, Preservation, and Destruction of Ammunition  TM 9-1903/TO 11A-1-37
Disposal of Supplies and Equipment Ammunition .......... SR 755-140-1
Explosive Ordnance Disposal Tools and Methods (C) TM 9-1984
(Land Type) (U).
Land Mines ............................................. TM 9-1940
Military Explosives .................................... TM 9-1910/TO 11A-1-34
Qualification in Arms: Qualification and Familiarization ... AR 370-5
Safety:
  Coordination with Armed Services Explosive Safety Board AR 385-60/AFR 14-12
  Identification of Inert Ammunition and Ammunition Components.
  Regulations for Firing Ammunition for Training, Target Practice, and Combat.
  AR 385-63/AFR 50-13
b. Technical Manuals.
Operators Manual, Demolition Kit, Projected Charge, M157.. TM 9-1375-204-10
Passage of Obstacles Other Than Minefields ............... TM 5-220
# APPENDIX III
## INDEX OF FORMER NAMES

<table>
<thead>
<tr>
<th>Former item name</th>
<th>Federal item name</th>
<th>Former item name</th>
<th>Federal item name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACHINE, blasting</td>
<td>BLASTING MACHINE</td>
<td>SNAKE, demolition</td>
<td>DEMOLITION KIT, PROJECTED CHARGE.</td>
</tr>
<tr>
<td>BOX, cap</td>
<td>BOX, CAP</td>
<td>DEMOLITION EQUIPMENT</td>
<td>DEMOLITION SET</td>
</tr>
<tr>
<td>CAP, blasting</td>
<td>CAP, BLASTING</td>
<td>DESTRUCTOR</td>
<td>DESTRUCTOR, EXPLOSIVE.</td>
</tr>
<tr>
<td>BLOCK, demolition</td>
<td>CHARGE, DEMOLITION: block</td>
<td>DETONATOR</td>
<td>DETONATOR, FRICTION, or DETONATOR, PERCUSSION.</td>
</tr>
<tr>
<td>CHARGE, cratering</td>
<td>CHARGE, DEMOLITION: block, ammonium nitrate.</td>
<td>DETONATOR</td>
<td>DETONATOR KIT, CONCUSSION.</td>
</tr>
<tr>
<td>CHARGE, for snake, demolition.</td>
<td>CHARGE, DEMOLITION: linear, block, ammonium nitrate.</td>
<td>DETONATOR, concussion type.</td>
<td>EXPLOSIVE KIT, EARTH ROD.</td>
</tr>
<tr>
<td>CHARGE, springing, for rod, earth, blast driven.</td>
<td>CHARGE, DEMOLITION: linear</td>
<td>ROD, earth, blast-driven.</td>
<td>FIRING DEVICE, DEMOLITION.</td>
</tr>
<tr>
<td>CHARGE, propelling, M12.</td>
<td>CHARGE, PROPELLING, EARTH ROD.</td>
<td>FIRING DEVICE, delay type M1.</td>
<td>FIRING DEVICE, DEMOLITION SET.</td>
</tr>
<tr>
<td>KIT, demolition</td>
<td>CHARGE ASSEMBLY, DEMOLITION.</td>
<td>FUZE, blasting time</td>
<td>FUZE, BLASTING, TIME PECUSSION.</td>
</tr>
<tr>
<td>CONTAINER, cavity charge.</td>
<td>CONTAINER, DEMOLITION CHARGE.</td>
<td>FUZE, bullet impact</td>
<td>FUZE, BULLET IMPACT.</td>
</tr>
<tr>
<td>CORD, detonating</td>
<td>CORD, DETONATING</td>
<td>HANDLE</td>
<td>HANDLE, REEL</td>
</tr>
<tr>
<td>TORPEDO, bangalore</td>
<td>DEMOLITION KIT, BANGALORE TORPEDO.</td>
<td>IGNITER, TIME BLASTING FUSE.</td>
<td>IGNITER, TIME BLASTING FUSE.</td>
</tr>
<tr>
<td>DEMOLITION EQUIPMENT sets.</td>
<td>DEMOLITION KIT, BLASTING.</td>
<td>PRIMER, percussion cap</td>
<td>PRIMER, PERCUSSION</td>
</tr>
<tr>
<td>CABLE, detonating, mine clearing, anti-personnel.</td>
<td>DEMOLITION KIT, PROJECTED CHARGE.</td>
<td>REEL, wire</td>
<td>REEL, WIRE</td>
</tr>
</tbody>
</table>
INDEX

Accessories and tools -------------------------- 53-69 75-84
Accidents, field report of --------------------- 2 3
Adapter, priming, explosive, M4A1 -- 54 75
Adhesive, paste, for demolition charges, 1/2-pound can, M1 ------ 55 76
Ammunition:
  Data card----------------------------- 7g 7
  Destruction to prevent enemy use 100,101 130
Lot number ------------------ 7c 7
Annunciator wire. (See Wire.)
Bag, canvas, carrying, demolition equipment --------- 56 76
Bags, tamping------------------------ 79a 98
Bangalore torpedo. (See Torpedo, bangalore.)
Base, coupling. (See Coupling base.)
Blasting cap crimer ---------------------- 62 81
Blasting:
  Caps: -------------------------------- 58 78
  Boxes for ----------------------------- 59 78
  Caps for positive detonation
  Description:------------------------- 51 71
  Electric caps------------------------ 50 70
  General----------------------------- 51 72
  Nonelectric caps--------------------- 9c 9
  Precautions for electric caps
  and circuits------------------------- 9 8
  Preparation for firing
  ----------------------------------- 68 83
  Sealing compound
  ------------------------------------
Fuse. (See Fuse, blasting, time,)
Galvanometer (See Galvanometer, blasting.)
Machine:
  Description------------------------ 57 76
  Rheostats ------------------------ 2 3
Block, demolition (See Charge, demolition: block)
  Packing -------------------------- 12 12
  Bodytraps ------------------------ 5 5
Box, cap:
  10-cap capacity, infantry---------- 58b 78
  50-cap capacity, engineer--------- 58c 78
Cable, detonating, mine-clearing, antipersonnel (See Demolition Kit, Projected Charge)
Canvas carrying bag (demolition kit) -- 56 76
Cap, blasting. (See Blasting caps.)
Cap, crimer -------------------------- 62 81
Care, handling, and preservation------- 8 8
Case, leather, for galvanometer ------- 8 8
Cavity charge container (See Container, demolition charge)
  Characteristics of principal U. S.
  explosives used for demolition (table
  I) -------------------------------- 16 14
Charge assembly, demolition: M37 ---- 74 89
Charge, demolition:
  Blocks:
    Ammonium nitrate, 40-pound
    (cratering)--------------------- 18f 20
    Inert -------------------------- 18g 20
    M1(2-1/2-pound, chain)------- 18g 20
    M2(2-1/2-pound, 75-25
    tetraytol)---------------------- 18b 16
  M3(2-1/4-pound, composition
  C-2 or C-3)--------------------- 18c 18
  M4(1/2-pound, composition
  C-3)--------------------------- 18g 20
  M5(2-1/2-pound, composition
  C-3)--------------------------- 18d 19
  M5A1(2-1/2-pound, composition
  C-4)--------------------------- 18d,74 19,89
  TNT-1/4-pound, 1/2-pound and
  1-pound ----------------------- 18e 19
Linear:
  Component of demolition kit,
  projected charge: M2 ------- 20b 27
  Component of demolition kit,
  projected charge: M2A1 or
  M3--------------------------- 20c 27
  Component of explosive kit,
  earth rod: set No. 1--------- 20d 27
Shaped:
  Containers for shaped charges-- 19e 25
  M2A3, 15-pound --------------- 19c 24
  M3, 40-pound --------------- 19d 25
  Penetration of shaped charges
  (table III)------------------ 19a 22
  Precautions------------------- 19b 24
  Chest, demolition---------------- 61 80
  Classification of demolition materials 6 5
  Clip, cord, detonating, M1 ------- 59 78
  Complete round (demolition):
    Description--------------------- 4 4
    Table -------------------------- App. I 132
  Computing tape (See Tape, computing, . .)
  Compound, sealing, blasting cap,
  waterproof---------------------- 19e 25
  Container, demolition charge------ 19e 25
  Cord, detonating:
    Clip for ---------------------- 60 80
    Description--------------------- 39 52
    Precautions--------------------- 40 54
    Table X------------------------ 39 52
  Coupling base, firing device------ 48 69
  Cratering charge. (See charge,
  demolition: block, ammonium nitrate
  40-pound (cratering))
Crimper:
  Blasting cap --------------------- 62 81
  Cap (w/fuze cutter) M2------------- 62 81
  Cap (w/fuze cutter) M3------------ 62 81
Demolition:
  Blocks (See charge, demolition,
  block)
  Charges (See charge, demolition)
  Charges and containers (table II)--- 17 16
  Chest------------------------- 61 80
  Complete round. (See Complete
  round (demolition).)
  Kit carrying bag---------------- 56 76
  Kits:
    Bangalore Torpedo, M1A1 ------ 75 90
    Projected charge: M1 and M1E1
    ----------------------------- 76,77 93
    Projected charge: M2, M2A1,
    M3, M3A1:
    Assembly--------------------- 80 101
    Assembly of pushing and
towing assemblies--------  81  108
Assembly, night--------  82  110
Comparison of models
(table XVI)----------  78  97
Components of 400-foot
projected charge M3A1
(table XVII)--------  79  98
Description--------  79  98
Detonation----------  85  116
Effectiveness--------  86  116
Safety Precautions--------  85  111
Tank accessories and tools
(table XVIII)--------  79  95
Towing and pushing--------  84  111
Projected charge: M157--------  87,93 117,126
Projected charge: M173 and
M174--------  95,99 127,128

Kit, Blasting:
Explosive initiating, electric
and nonelectric--------  71  86
Explosive initiating, non-
electric--------  72  86

Department of Defense ammunition
code------------------  7h  7

Description:
Ammunition to prevent enemy use
Unserviceable demolition materials------------------  100,101 130

Destructors, explosive:

General------------------  29  41
M19 (T15)------------------  31  44
Table VII------------------  29  41
Universal, M10------------------  30  42

Detonating:
Cable. (See Demolition Kit, projected charge, M1 and M1E1)
Cord. (See Cord, detonating.)

Detonator:
Friction------------------  26  32
Kit, Concussion------------------  28  36
Perusion------------------  27  35
Table V------------------  25  32

Devices:
Firing. (See Firing devices.)
Mine-clearing. (See Demolition Kit, projected charge)

Dynamites:
Commercial------------------  21b  28
Military------------------  21c  29
Special precautions------------------  22  30
Table IV------------------  21  28

Electrical wire and cable------------------  59  78
Electricity, static and induced------------------  9c  9

Explosive:
Charges, characteristics (table I)
(See Destructor, explosive, explosive . . .)
Kit, earth-rod set No. 1------------------  73  87
Train------------------  4b  5

Federal item identification number------------------  7h  7
Federal stock number------------------  7h  7

Fires, reports------------------  2c  3

Firing device, demolition:
Base, coupling------------------  48  69
Delay type, M1------------------  42  57
Delay type, M1, delay data (table XII)------------------  42  57
Pressure-release type, e, M5------------------  44  62
Pressure type, M1A1 and M1------------------  43  58
Pull-release type, M3------------------  46  66
Pull type, M1------------------  45  63
Release type, M1------------------  47  67

Firing devices and components:
Data (table XI)------------------  41  54
Description------------------  41  54
Firing mechanism, tri-pronged------------------  43d  60
Firing, preparation------------------  9  8
Firing wire. (See Wire.)
Former names------------------  App. III 136

Fusion tape (See Tape, electrical insulation)

Fuse, blasting, time:
Igniter (See Igniter, time blasting fuse)
M700------------------  38  52
Safety fuse------------------  37  51
Table------------------  36  50
Precautions------------------  9b  9
Fuse cutter------------------  62  81

Fuze, bullet impact, M1 and M1A1
(for Demolition Kit, projected charge)------------------  79a  98

Galvanometer:
Battery------------------  63d  82
Blasting------------------  63  81
Case------------------  63b  81

Handling:
Inert demolition material------------------  8b  8
Precautions------------------  8  8

Identification of demolition materials------------------  7  6

Igniter, time blasting fuze:
Friction, M1------------------  33  46
Table VII------------------  32  45
Weatherproof, M2------------------  34  46
Weatherproof, M60 (T2)------------------  35  46

Inert demolition material, handling------------------  8b  8
Initiating and priming------------------  24  32

Knife, pocket------------------  65  82

Lighter (See Igniter, time blasting fuse)
Lineman's pliers------------------  36  82
Lot number, ammunition------------------  7c  7

Machine, blasting. (See Blasting machine.)

Magazines, temporary:
Construction------------------  11b  11
Location------------------  11a  11
Operation------------------  11d  12

Marking------------------  7f  7

Mine-clearing devices------------------  76-86 93-116

Misfires:
Caus es and preventions------------------  10b,e 10,11
Electric------------------  10c  10
Nonelectric------------------  10d  11

Model designation------------------  7d  7

Nomenclature------------------  7b  5

Packing and marking for shipment------------------  12  12

Painting------------------  7e  7

Percussion primer. (See Primer, percussion, cap.)
Pliers, lineman's side-cutting------------------  66  82
Pocket knife ——
Precautions: (See also specific items)
Blasting caps ——
Care, handling, and preservation
Dynamites ——
Electrical misfires ——
Nonelectric misfires ——
Preparation for firing:
   Electric firing systems ——
   General ——
   Nonelectric firing systems ——
Projected charge (antitank mine clearing) ——
Shaped charges ——
Storage ——
Preparation for firing ——
Preservation ——
Primer, percussion, cap:
   Improved No. 3 ——
   M2 ——
   M27 ——
   M39A1 ——
Priming:
   Adapter. (See Adapter, priming . . .)
   Description ——
   Materials ——
Properties of military explosives ——
Reels, wire ——
Reports:
   Accidents ——
   Fires ——
   Hazardous conditions ——
Rod, earth, blast-driven, set No. 1
   (See Explosive Kit, earth rod set No. 1)
Round, complete. (See Complete round (demolition).)
Safety fuse. (See Fuse, blasting, time)
Scope ——
Sealing compound, blasting cap ——
Shaped charges ——
Shaped charge containers ——
Shipments, packing and marking for ——
Snake, demolition (See Demolition Kit, projected charge)
Spools. (See Reels)
Static electricity and stray currents ——
Storage ——

Tables:
Characteristics of principal United States explosives use for demolition (table I) ——
Comparison of projected charge demolition kit models (table XVI) ——
Complete round table ——
Components of 400-foot projected charge M3A1 (table XVII) ——
Demolition charges and containers (table II) ——
Detonating cord (table X) ——
Detonators (table V) ——
Dynamites (table IV) ——
Effect of temperature on delays of firing device, delay type, M1 (table XII) ——
Electric blasting caps (table XIII) ——
Explosive destructors (table VII) ——
Firing devices and components (table XI) ——
Nonelectric blasting caps (table XIV) ——
Operating range of concussion detonators (table VI) ——
Penetration of shaped charges (table III) ——
Procedure for setting up and firing demolition kit projected charge MLE1 (antipersonnel) mine-clearing device (table XV) ——
Tank accessories and tools for construction of 400-foot projected charge M3A1 (table XVIII) ——
Time blasting fuse (table IX) ——
Time blasting fuse igniters (table VIII) ——
Tape, computing, demolition charge ——
Tape, electrical insulation ——
Temporary magazine. (See Magazines, temporary)
Time blasting fuse ——
TNT. (See Charge, demolition: block . . .)
Tools. (See Accessories and tools.)
Torpedo, bangalore. (See Demolition Kit, torpedo bangalore)
Transportation ——
Twine ——
Types of demolition materials ——
Wire (annunciator and firing) ——
By Order of Secretary of the Army:

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)
DCSLOG (1)
CNGB (1)
CofEngrs (2)
CofT (1)
USCONARC (3)
USAMC (2)
USAWECCOM (2)
USAMUCOM (2)
USASMCOM (2)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (2) except
USAREUR (5)
OS Base Comd (2)
USACDC (2)
USAARMCDCA (2)
USAADCDA (2)
USAARTYCDCA (2)
USAAVNCDCA (1)
USACBRCDA (2)
USACARMSCDA (2)
USACECDA (1)
USAECDA (2)
USAICDA (2)
USAINTCDA (1)
USAMPDCDA (1)
USAOCDA (2)
USAQMCDA (1)
USASWCDA (2)
LOGCOMD (2)

MDW (1)
Armies (3)
Corps (2)
USA Corps (2)
Div (2)
Instl (2)
Army Dep (2)
GENDEP (2)
Ord Sec, GENDEP (5)
Ord Depots (OS) (5)
PG (1)
Ord Arsenals (2) except
Picatinny (35)
Proc Dist (3) except
Chicago (none)
Svc Colleges (2)
Br Svc Sch (2)
OASMS (2)
USA Ammo Proc & Sup Agcy (1)
PMS Sr Div Ord Units (1)
Fld Comd, DASA (1)
USA Tml Comd (2)
POE (2)
USAOSA (2)
Mil Msn (1)
MAAG (2)
JBUSMC (2)
JUSMAGG (2)
Units org under fol TOE:
9-500 (Tms BB, IA, KA, KB, KC) (1)

*NG*: State AG (3); Units – Same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used see AR 320-50.