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**NOT TO BE TAKEN FORWARD
OF
FIELD COMPANY HEADQUARTERS**

FRENCH EXPLOSIVES

FIELD ENGINEERING PAMPHLET

No. 4.

(Engineer-in-Chief's Technical Instruction No. 2)

1940

(Reprinted in Canada, May 1940, by permission of the
Controller, His Majesty's Stationery Office)

*Prepared under the direction of
The Chief of the Imperial General Staff*

THE WAR OFFICE,
February, 1940.

1M—6-40 (5651)
H.Q. 70-44-61

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FIELD ENGINEERING PAMPHLET

No. 4—1940

(Engineer-in-Chief's Technical Instruction, No. 2)

FRENCH EXPLOSIVES

INTRODUCTION

This instruction is issued in case engineer units have to deal with French demolition materials at any time.

SECTION I.—EXPLOSIVES

A. Melinite

(a) *Description and properties*

Melinite is obtainable as a powder, or in slab form. The powder consists of small straw-yellow crystals with a very bitter taste, while the slabs are yellow, grey or brown in colour. Both types are mainly used as "cutting" charges, but can also be used as mined charges.

Melinite is not sensible to shock, and will burn in free air without exploding.

(b) *Form of supply*

Figs. 1-4 show the shape, size and details of three types supplied, of which there are six.

				<i>Total weight.</i>	
Cylindrical cartridge containing	100 gr.	..	130 gr.	Fig. 1	
Rectangular petard	" 60 gr.	..	90 gr.	Fig. 3.	
" "	" 135 gr.	..	190 gr.	Fig. 2.	
" "	" 1 kg.	..	1 kg. 300 gr.		
" "	" 10 kg.	..	13 kg.		
" "	" 20 kg.	..	24 kg.	Fig. 4.	

Both cartridges and petards are supplied in sealed tins. The lids can be removed easily to get at the detonator socket.

Cartridges contain only powder melinite, but petards contain both powder and slab melinite, as shown in Fig. 2. The reason for this is that slab melinite is rather difficult to detonate by itself.

(c) *Precautions*

Melinite should not be exposed to moisture which reduces its chances of detonation. When moist it is a vivid yellow colour.

It should not be allowed to come into contact with alkalis or lead in any form.

The gases formed on detonation are very poisonous, and when mixed with air are highly inflammable.

(d) *Uses*

Its uses are similar to those of guncotton, with factors of 1·5 for cutting charges and 1·0 for mined charges (M.E., Vol. IV, Table B, p. 69).

Dry melinite powder can be detonated by the standard detonator or by F.I.D., provided that there is good contact, and Figs. 1-4 show the sockets provided to take either detonator or F.I.D.

It needs little or no tamping, when used as a cutting charge.

B. Cheddite

(a) *Description and properties*

The term cheddite covers many different explosives, either chlorates or perchlorates, having their own peculiarities. The basic substances are white in colour, but, as supplied, have a deeper tint owing to the coating of paraffin, vaseline, etc. Bad mixtures have a blotchy and stained appearance.

Cheddites, particularly perchlorates, are sensitive to shock, and will catch fire at temperatures above 250°F.

(b) *Form of supply*

It is supplied in cartridges and petards of similar shape to melinite, but can also be obtained in bulk in sacks and barrels. Sizes of cartridges, etc., are:—

	<i>Diam.</i>	<i>Length</i>	<i>Total weight.</i>
Cartridge containing 100 gr.	35 mm.	95 mm.	130 gr.
" " 135 gr.	35 mm.	115 mm.	160 gr.
Petard containing 1 kg. ..	100 mm.	100 mm.	Not known.
" " 10 kg. ..	170 × 170 mm.	220 mm.	Not known.

Both cartridges and petards are covered with paraffined paper.

(c) *Precautions*

Cheddites should not be exposed to moisture or high temperatures.

As supplied, it is perfectly safe to transport, although more susceptible to shock than melinite. Blotchy or stained explosive is more sensitive and should be destroyed.

Avoid spilling it on ground, clothes, etc. When used in buildings, etc., floors should be damped to reduce chances of accident.

Gases formed on complete detonation are not as poisonous as those formed by melinite. In cases of incomplete combustion, however, gases are poisonous.

(d) *Uses*

Its uses are similar to those of ammonal, i.e., for lifting rather than cutting.

It can however be used to make up the weight of a cutting charge where melinite is short. In such cases the melinite available should be laid in close contact with the girder, etc., while the cheddite is packed round it. The quantity of cheddite used should be more than the calculated figure. No factor is available, but double the amount for safety.

In mined charges, the effect is considerably increased by mixing melinite with the cheddite in a proportion of 1 : 9 by weight. Only two types of cheddite (O. No. 6B and O. No. 7B) can be fired by the standard detonator (1.5 gr. of fulminate). The others do not detonate so easily, requiring 3.5 gr. or more of fulminate.

It is better to use a small amount of melinite as a detonating agent with all charges.

No factors are available for M.E., Vol. IV, Table B, p. 69, but figures in French manuals lead one to suppose that the following factors for mined charges are suitable:—

In ordinary soil	..	..	1.0
In rocky soil	..	..	1.5
In concrete and rock	..	..	2.0

No mention is made in French manuals of any cheddites being supplied in plastic form, as mentioned in M.E., Vol. IV, p. 27.

Cheddites should always be well tamped, though tamping should not be rammed.

C. *Dynamite*

Full details are already available in M.E., Vol. IV.

SECTION II.—DEMOLITION AUXILIARIES

A. Meche lente

This corresponds to our safety fuze. Its rate of burning is 1.0 metres in 1½ minutes in free air, and a littler slower under compression.

Methods of junction and lighting are as for safety fuze.

B. Allumeurs

Several different types are in use for lighting *meche lente*. Their functions are obvious.

C. Amorce fulminante

There is a service detonator No. 1880 similar to ours, containing 1.5 gr. of fulminate of mercury, and a commercial detonator No. 7, containing a mixture of fulminate and powdered melinite. They have the same detonating power, but the commercial pattern is painted with green varnish at the explosive end, as opposed to black on the service detonator. There is also, now, a detonator with sockets at both ends, which is particularly useful for firing F.I.D. The central explosive part is painted black.

D. Cordeau detonant

This is similar to our F.I.D., but contains melinite. Its rate of burning is about 7,000 metres per second. It bends easily, but sharp kinks should be avoided. It should always be kept dry, with ends covered. Ends should be freshly cut before use. It is usually supplied in 50 metre lengths, with special obturators to cover the ends.

E. Amorce électrique

Commercial detonators are used most, the uses of which are obvious. They have a resistance of 1.35 ohms with a tolerance of .5 ohms plus or minus.

F. Insulated cable

Its resistance is 22 ohms per kilometre, and its weight is 16 gr. per metre. It is usually supplied on drums of 150-200 metres.

G. Exploders

These are electro-magnetic. No details of the new French exploder are available yet.

H. Chatterton mixture

This is supplied in stick form like sealing wax, and appears to be a bitumen mixture of sorts. When warmed the stick melts, and it is then rubbed all over a joint to make it waterproof. It is used for all joints under water, and for charges which are likely to be left on site for any length of time.

SECTION III.—METHODS OF FIRING CHARGES

A. Electrical

These are similar to our own methods, but are rarely used.

B. Using fuze

(a) For firing F.I.D., the French use either the double-socket detonator, the double-socket petard, or, where these are not available, join two detonators together with a clove hitch as shown in Fig. 5. The other end of the F.I.D. (with or without a detonator) is pushed firmly into the socket of a petard in the charge.

(b) For firing two pieces of F.I.D., a knot is used as shown in Fig. 6. The F.I.D. should be bent carefully, so that the outer skin is not broken.

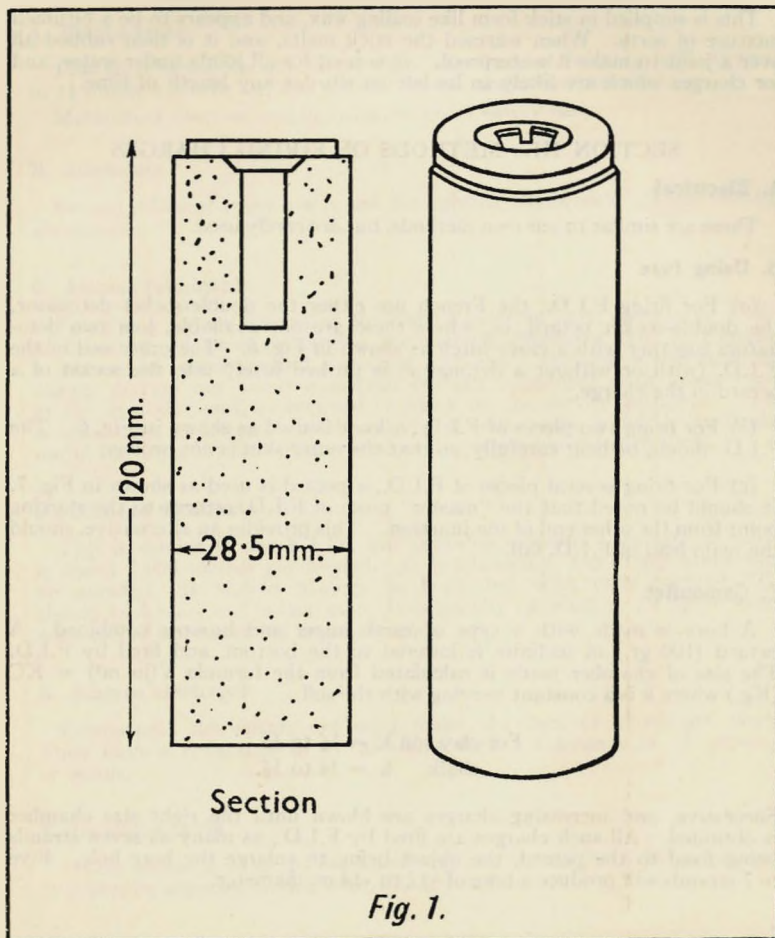
(c) For firing several pieces of F.I.D., a petard is used as shown in Fig. 7. It should be noted that the "master" piece of F.I.D. returns to the starting point from the other end of the junction. This provides an alternative, should the main lead of F.I.D. fail.

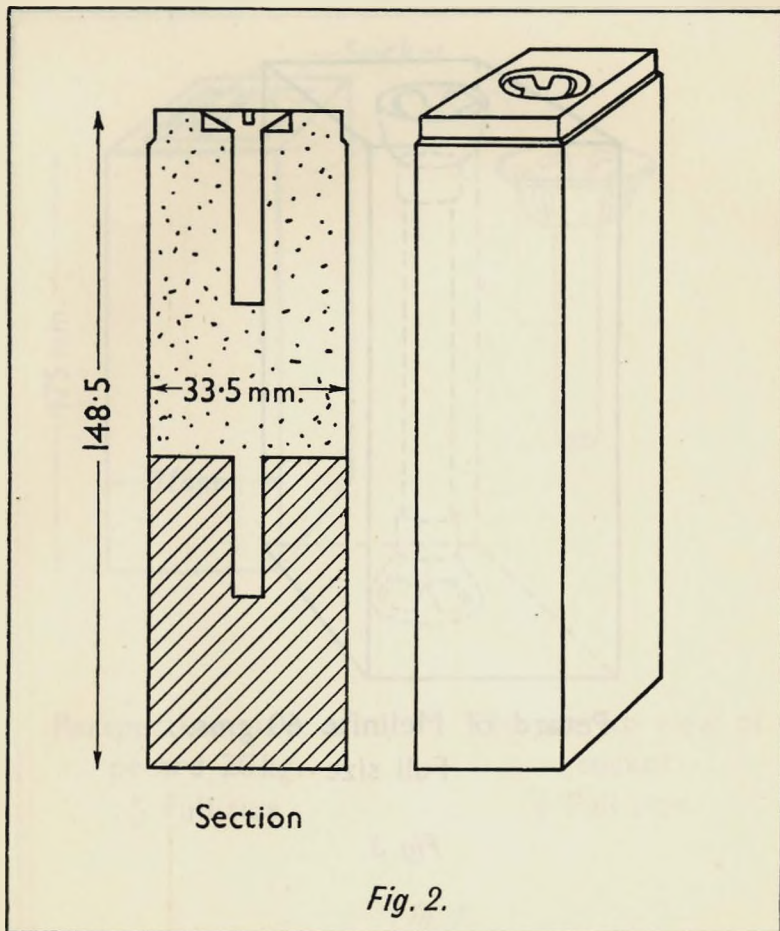
C. Camouflet

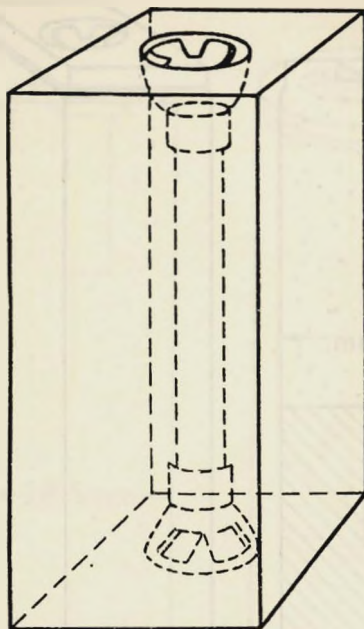
A bore is made with a type of earth auger and bumper combined. A petard (100 gr.) of melinite is lowered to the bottom, and fired by F.I.D. The size of chamber made is calculated from the formula $V(\text{in m}^3) = KC$ (Kg.) where k is a constant varying with the soil

$$\begin{array}{ll} \text{For clay soil } k = \frac{1}{4} \text{ to } \frac{1}{6} \\ \text{chalk } k = \frac{1}{8} \text{ to } \frac{1}{16}. \end{array}$$

Successive, and increasing charges are blown until the right size chamber is obtained. All such charges are fired by F.I.D., as many as seven strands being fixed to the petard, the object being to enlarge the bore hole. Five to 7 strands will produce a bore of .12 to .14 m. diameter.

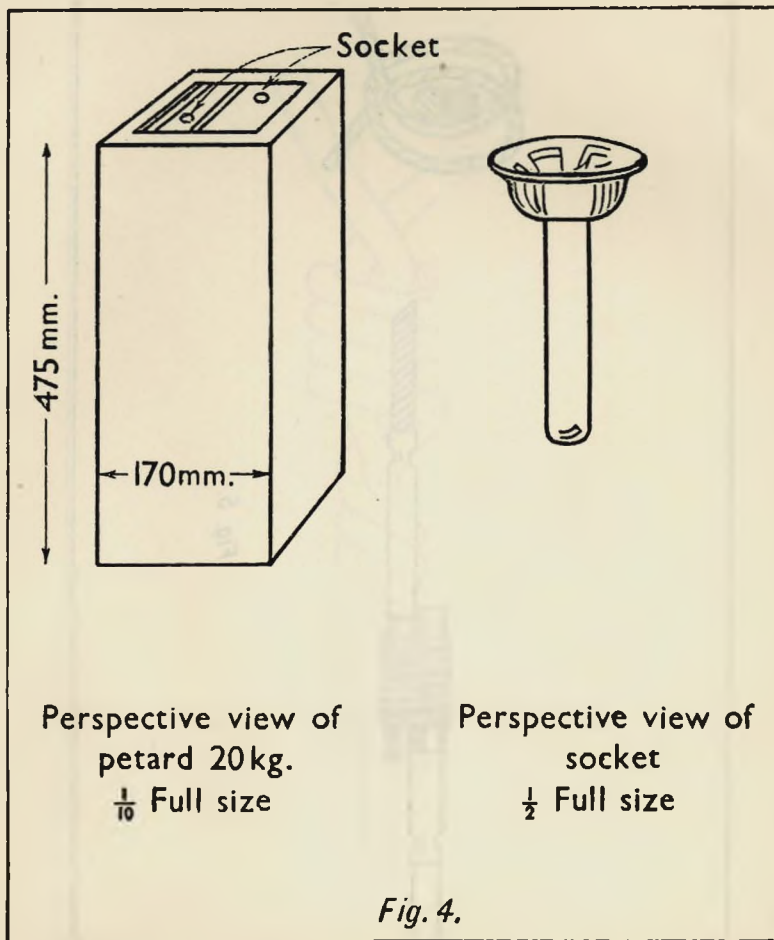


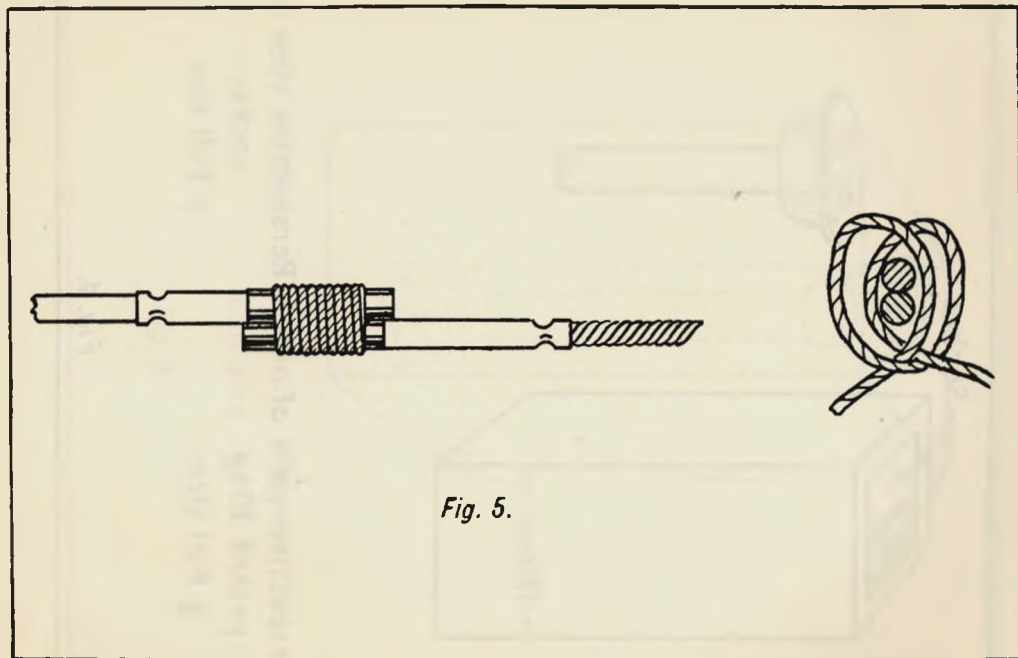




Petard of Melinite 60 gms.
Full size

Fig. 3.





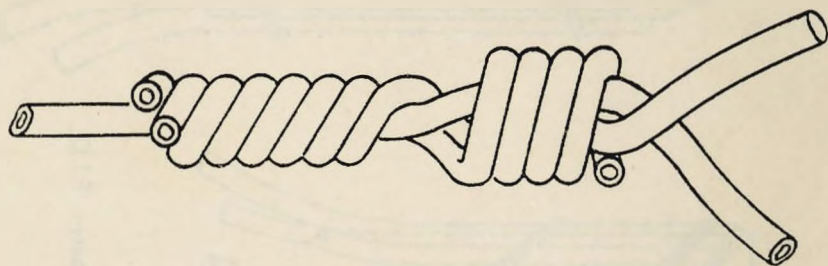


Fig. 6.

