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Italian Ammunition

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ITALIAN MARKINGS ON A.P., H.E., HOLLOW CHARGE AND SHRAPNEL SHELL (Fig. 1)

The following markings have been met with in the course of examining captured Italian shell of the above-mentioned types. The types bearing these markings are of recent manufacture. The markings of earlier types do not always conform to the system.

Basic Colours of Body

With each of the types the body of the shell is pale blue (almost a light grey) and the head (*i.e.*, from nose to just above the shoulder) is red. When a cap is fitted to the shell the cap is red. The 100/17hollow charge shell is an exception in that the cap is orange. Whether this is by design or is due to a variation in the shade of colour is not yet clear. These basic colours are normally applied by a process similar to sherardizing instead of by painting. The result is a flat finish and the absence of an obvious coating.

Bands

A green band immediately above the driving band is found on shell both of the piercing type and normal nose fuzed H.E. type when filled T.N.F. or matol.

A brown band immediately above the driving band is found on shrapnel siell.

A white band appears to be the distinguishing marking of shell designed for the attack of armour. With armour piercing shell the band is at the approximate centre between the shoulder and the driving band. With hollow charge shell the band is immediately above the driving band.

Stencilling

The following particulars regarding the shell are normally stencilled in black between the shoulder and the driving band:—

- (a) Weight of filled shell in kilograms.
- (b) Nature of bursting charge. Shell filled with cast T.N.T. either by the pouring process or in the form of blocks are stencilled "TRITOLO." Those filled cyclonite/T.N.T. are stencilled "TRITOLITE." Shell filled amatol are stencilled "Amatolo."
- (c) Letters indicating the filling factory followed by the last three figures of the year of filling.
- (d) The calibre of the equipment in millimetres followed by an oblique stroke and the length of the piece expressed in terms of calibres.

The marking "Migl" indicates a modified design.

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Italian D.A./Graze Fuze with Clockwork Safety Device

ITALIAN D.A./GRAZE FUZE WITH CLOCKWORK SAFETY

DEVICE (Figs. 2 and 3)

The fuze is of the floating needle type with a graze pellet carrying the detonator. The needle and detonator are held apart by a centrifugal safety bolt, the outward movement of which is controlled by a clockwork escapement. The design is similar in principle to the Model 16 described in Pamphlet No. 4, but differs in details.

The overall length of the fuze is 4 inches. When assembled in the shell the 3 inches which protrude consist of a brass tapering body with a red painted aluminium head. The head is tapered near its base to correspond with the shape of the body, but the taper is markedly increased further forward. The nose is flat and is fitted with a brass sealing disc.

The screw-threaded portion of the body for insertion in the shell is 1.76 inches in diameter and has a pitch of approximately 3 mm. The body is bored to accommodate the clockwork and graze mechanisms and is closed at the base by two aluminium screwed plugs which are drilled to provide a flash channel. The front end of the body is reduced in diameter and threaded for the assembly of the head. A lateral channel is formed for the safety bolt, and a recess, displaced from the centre, contains a detent and sleeve. A radial channel at right angles to the lateral channel is formed for the locking bolt.

The brass graze pellet carries a 2.2 grain igniferous detonator secured by a perforated brass plug and is designed with a necked portion which acts as a guide for the realle. A stee creep spring is held in compression between a shoulder on the pellet and the base of the brass cylinder containing the lockwork mechanism. The base of the cylinder is bored to fit over the neck of the graze pellet. The detonator filling consists of mercury fulminate 45.2 per cent., potassium chlorate 28.9 per cent. and antimony sulphide 25.9 per cent.

The brass detent is supported by a three-pronged form of stirrup spring which is attached to its base and rests on the shoulder formed in the brass sleeve. The stem of the detent enters a recess in the underside of the safety bolt and retains the bolt in the safe position until "set back" occurs.

The aluminium centrifugal safety bolt is forked at the inner end to provide two arms which pass under a flange formed on the needle and so prevent the needle moving towards the detonator. A recess to engage the detent is formed in the underside of the bolt and a hole is formed in the centre at one side to engage the stem of a spring-loaded centrifugal locking bolt. The opposite side of the safety bolt is in the form of a toothed rack which is enmeshed with the first spur of the clockwork escapement mechanism.

The clockwork arrangement is carried in a brass cylinder which is bored to accommodate the safety bolt and locking bolt. The escapement mechanism consists of a train of four wheels, each consisting of a spur and pinion, and a balance wheel oscillator. The first spur is enmeshed with the rack on the safety bolt. The fourth pinion is an escapement wheel and engages a recess formed in the eccentric projection on the balance wheel oscillator. The balance wheel oscillator is contained between the upper and lower motion plates which are suitably



Italian D.A./Graze Fuze. Arrangement of Mechanism

spaced by two brass washers. This assembly is secured by two screws to the brass cylinder containing the train of wheels and is surmounted by a spring washer compressed beneath the head of the fuze.

The aluminium head is drilled through the centre to take the stem of the hammer and the aluminium push rod and is recessed at the nose for the hammer head. The recess is closed against air pressure by a brass disc secured by a bush of the same material.

The hammer head has three holes for the escape of the air behind it when the hammer is driven in.

Action

On acceleration the detent sets back, forcing its spring past the shoulder in the sleeve and withdrawing its stem from the recess in the safety bolt. The prongs of the spring then engage the underside of the shoulder and prevent the detent moving forward.

During flight the locking bolt is moved outwards against its spring by centrifugal force and releases the safety bolt. The safety bolt then commences to move outwards, also under the impetus of centrifugal force. The outward movement of the safety bolt is transmitted by the toothed rack on the bolt to the train of wheels, and is controlled by the action of the balance wheel oscillator. The throw on the projection formed beneath the balance wheel oscillator, under the influence of centrifugal force, performs the normal function of the hair spring in a clock mechanism and, with the recess acting as a pallet, controls the rotation of the safety bolt has mored their of the needle and graze pellet, the needle is held off the detonator by the "ceep resulting from deceleration and the graze pellet is held by the ceep spring. On graze the needle is driven in by the hammer and push rod whilst

On graze the needle is driven in by the hammer and push-rod winst the graze pellet overcomes the creep spring and carries the detonator on to the needle. The flash passes through the flash channel in the base of the fuze.

ITALIAN TIME FUZE GRADUATED TO 13.2 (Fig. 4)

The fuze is used in the Q.F. 102 mm. 35 calibre anti-aircraft gun ammunition and is a tensioned fuze of the combustion type. The setting graduations extend from zero to 13.2. A fuze set to 13 gave a time of burning of 26.6 secs. at rest. The design includes a delay arrangement between the lower time ring and the magazine which ensures a minimum time of burning of .6 sec. and thus provides for safety against a "flash-over" in the bore or the results of a dangerously short setting. The screw-threaded portion of the fuze for insertion in the shell is 1.762 inches in diameter.

The exterior of the fuze, visible when assembled in the shell, is of aluminium or aluminium alloy. The tension cap and the upper ring are shaped to coincide and form an ogival head. The lower ring is cylindrical and the flange of the platform is tapered. The setting graduations may be marked on the lower ring or on the flange of the platform. A soldered alloy cover with tear-off wire and ring is sometimes fitted to the fuze. The cover is marked with a red arrow and the word "TIRARE," indicating the method of removal.



FIG. 4 Italian Time Fuze Graduated to 13.2