No. 1745

HANDBOOK

OF THE

6-INCH TRENCH MORTAR

MARK I

(SIX PLATES)

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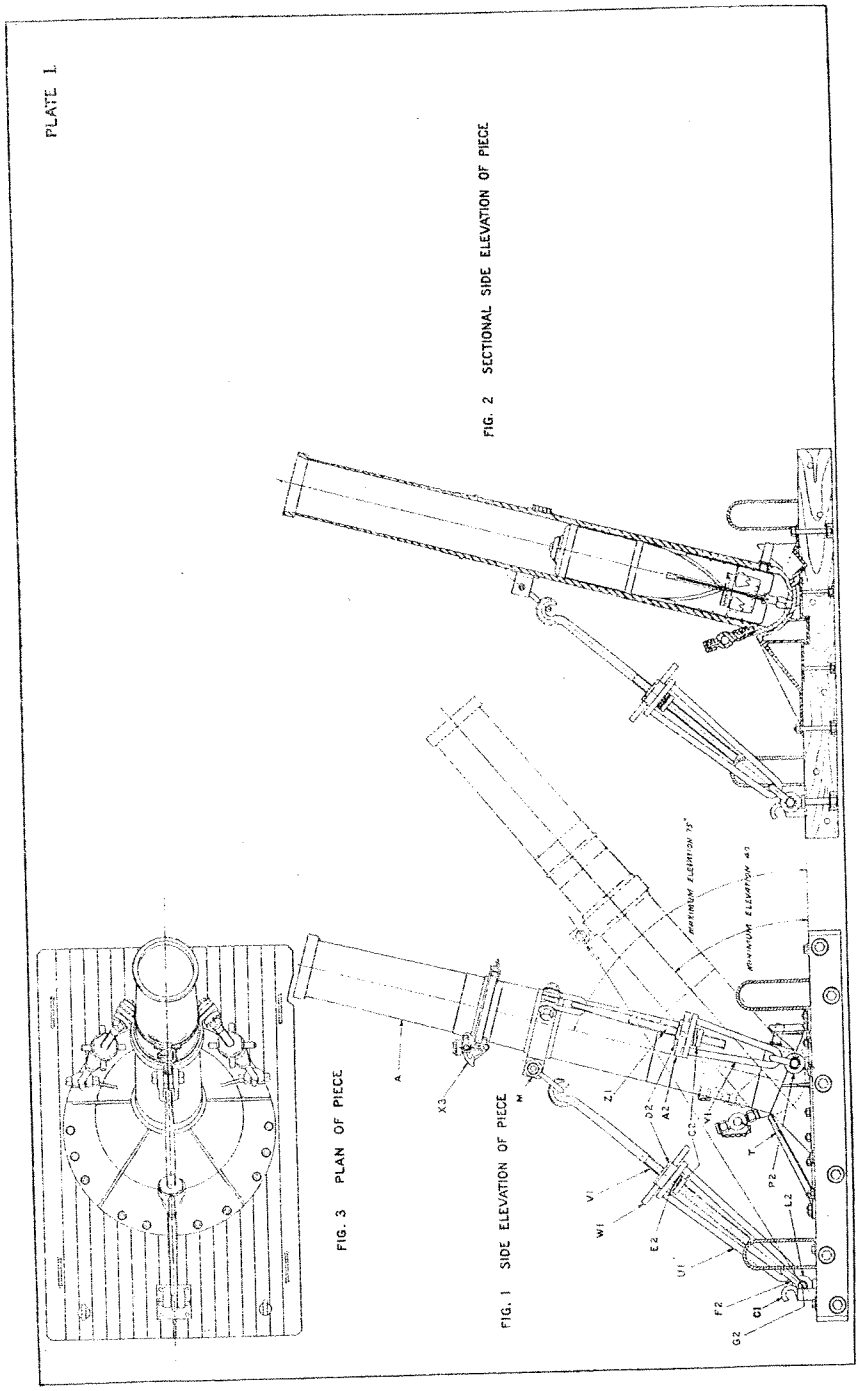
PLATE I



6-INCH TRENCH MORTAR, MARK I.

GENERAL DESCRIPTION.

The 6-Inch Trench Mortar, Mark I, is a short-range gun for high-angle fire and of a type developed in the operations of trench warfare. Simplicity of design and lightness characterize the components of the piece, and no part is of greater weight than will permit its removal by the gun crew without special appliances. It is very effective against wire entanglements, machine-gun shelters, strong points, and other similar objectives.

The mortar, mounted in firing position, with a projectile in the barrel, is shown in the exterior and sectional view of figures 1, 2, and 3. The piece consists of:

1. The barrel, with clinometer.
2. The platform, base, guys, and fittings.
3. The subbase.

The gun is muzzle-loading and has a smooth bore. The breech is closed. The breech rests in a hemispherical socket supported upon a stationary platform to which the barrel is stayed by three adjustable guys (Z1 and V1). The elevation may be varied from a maximum value of 75° to a minimum of 40°, and lateral deviation made as required by altering the lengths of the guys (Z1 and V1), which are adjustable by means of handwheels (W1 and A2). These adjustments are determined by the setting of the clinometer attached to the barrel. The range can be varied by changing either the elevation of the gun or the weight of the propelling charge.

The projectile is a cast-iron fragmentation shell with vanes, weighing approximately 42 pounds unloaded, and containing a bursting charge of approximately 11 pounds of high explosive. The propelling charge consists of 9 ounces of sporting ballistite and is held in place between the vanes by means of a propelling bag holder.

BARREL ASSEMBLY.

BARREL.

(Figs. 1, 2 and 3.)

diameter of 6.01 inches and flared slightly at the muzzle for the easy insertion of the projectile. The breech end, which is hemisperical is machined to fit a socket in the base (T) and the firing plug or anvil (B, fig. 4) is screwed into the breech from the inside.

Near the middle of the barrel two rings are turned on the exterior which form shoulders approximately 2 inches apart, and between which is placed the barrel band (M). In the lower ring three equidistant notches are cut, and these engage three lugs formed on the barrel band.

At a point approximately 5⅝ inches from the upper ring mentioned in the above paragraph and toward the muzzle another ring ⅜ inch wide and approximately 7 3/16 inches in diameter is turned. This ring fits the groove in the quadrant (X3) and is the guide for the lateral adjustment of the clinometer. Adjacent to the clinometer ring, graduations are engraved on the barrel on the right and left of a zero line and are used for the traverse setting of the clinometer. A longitudinal notch on the muzzle is in prolongation with the zero line and is used as a quick method of sighting.

A guide stud (D, Fig. A) diametrically opposite the zero line of the graduations, with its axis at right angles to the axis of the barrel, mentioned above, and passing through the center of the hemispherical breech, projects from the barrel and moves between the parallel faces of the two vertical lugs in the base (T). Upon this guide stud and the center of the hemispherical breech depends the motion of the gun.

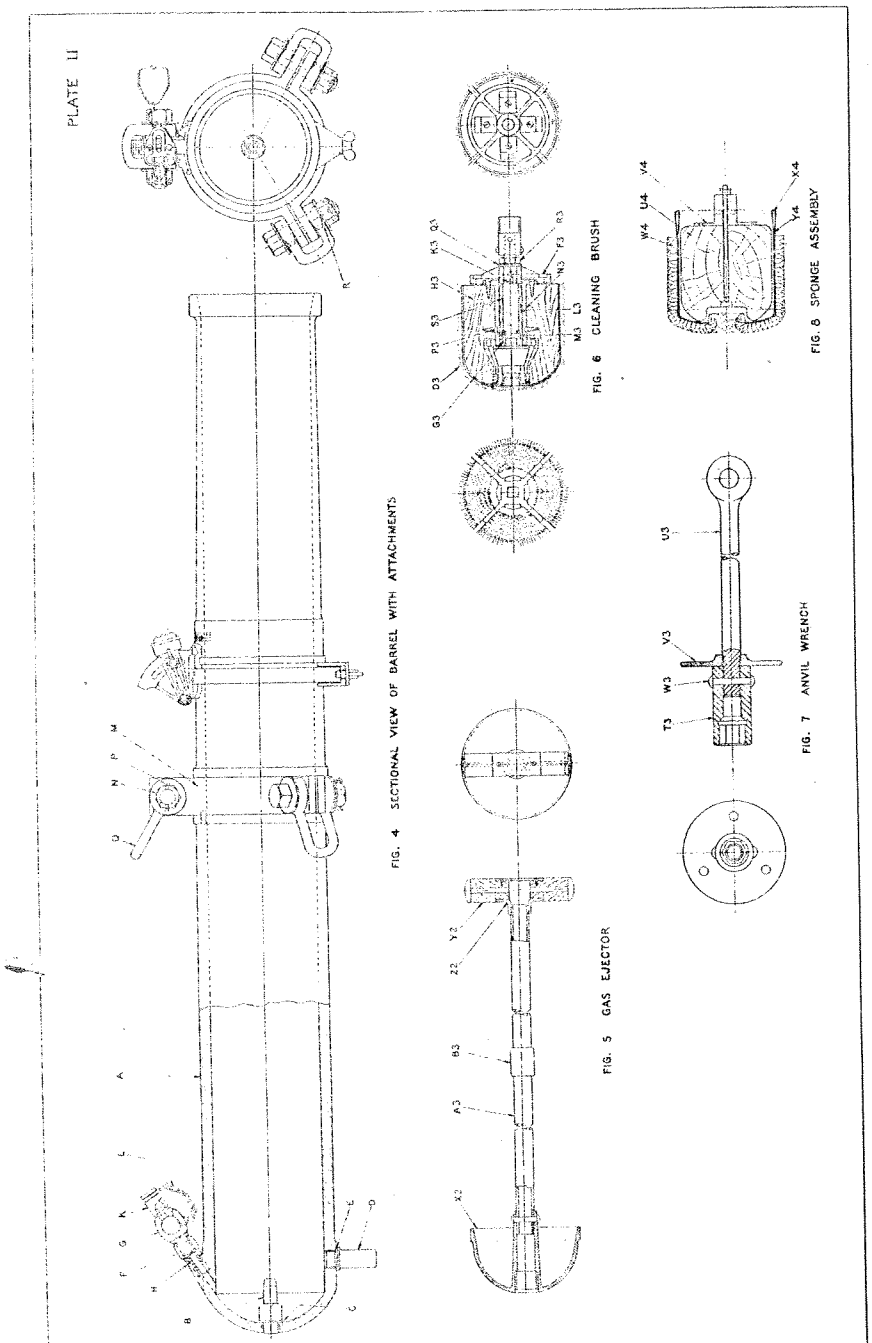
Diametrically opposite the guide stud (D) an inclined boss is made by building up the metal by welding. A hole is drilled through this boss and the barrel at approximately 34 degrees with the barrel axis. The boss is then counterbored and tapped to fit the misfire plug adapter (F, fig. 4).

GUYS.

(Figs. 1, 2, and 3.)

The *elevating guy* consists of a hairpin link, the end of which is closed by a plate containing the elevating nut (C2). A handwheel is fastened integrally with the nut. A hook screw, the shank of which has been threaded to fit the nut, is screwed into the nut and the hook is attached to a clevis on the barrel band. The lower part of the hairpin is attached to the eye bolt (L2) mentioned above.

The *traversing guys* are constructed similar to, but shorter than, the elevating guy, and are attached to eye bolts (P2), which pass through the cast-steel base.



BARREL BAND.

(Fig. 4.)

The *barrel band* (M) is used for attaching the three guys (Z1 and V1) to support the barrel (A). It consists of three drop forgings which are machined to fit the barrel diameter between the two rings mentioned above. A small lug is swaged out on each of these segments and engages one of the notches cut in the ring on the barrel. This lug prevents the band from sliding around on the barrel. The segments are clamped together and to the barrel by means of bolts, washers, and spacing bushings. These spacing bushings allow the segments to be drawn up without binding the clevices to which the guys are attached.

ANVIL.

(Fig. 4.)

The *anvil* (B) is a case-hardened steel pin which is screwed into the breech at the center and projects into the interior of the barrel. A copper washer between the shoulder of this pin and a spot face in the breech forms a gas tight seal. By means of the hexagonal section which fits the anvil wrench (T3, fig. 7) the pin is screwed into place and tightened.

GUIDE STUD.

(Fig. 4.)

The *guide stud* (L) is also case hardened and is fitted with a copper washer to form a gas tight seal. A small hole is drilled at right angles to the axis and near the end of the stud which allows the tommy bar to be inserted for tightening the stud in the barrel.

MISFIRE PLUG.

(Fig. 4.)

The *misfire plug* (G) is a steel forging, having two cylindrical ends joined by a ring section. The ends are threaded to fit the adapter (F). One end is drilled axially for the insertion of the misfire fuze, and the other is left solid. The solid end is the one ordinarily used when firing the gun. The *adapter* (F) is made of hexagonal cold-rolled steel turned down and threaded at one end, counterbored and threaded at the other and drilled axially. The adapter, fitted with a lock washer, is screwed into the boss on the barrel and once screwed in is never removed except for replacement, if damaged.

The *cap* (K) is made of hexagonal steel, bored and threaded to fit the threaded ends of the misfire plug (G). This cap is used to close the hole and also to protect the threads of the end of the misfire plug. It is attached to the misfire plug by means of rings and a

ACCESSORIES.

GAS EJECTOR, CLEANING BRUSH, AND SPONGE.

(Figs. 5, 6, and 8.)

The *gas ejector* (fig. 5) consists of a cast aluminum head fixed to a stem made of wrought-iron pipe to the end of which is screwed a gas pipe T and two wooden plugs forming a handle. The head has a hole through it concentric with the hole in the pipe. The gas ejector is pushed down the barrel and forces the burnt gases up through the handle and out of the gun. When the gas ejector is removed cold air is sucked through the handle and into the gun.

The head (X2) is cast in the shape of a hollow hemisphere, having a band approximately three-quarters of an inch wide at its maximum diameter, and with a hollow tubular shank projecting inward toward the center. The band is machined to a diameter slightly below the minimum diameter of the barrel. The stem is screwed into the shank and fastened permanently with a rivet. The stem is in two sections (A3) connected together by a common pipe coupling (B3) and the two wooden handles (Y2) which screw into the gas pipe T at right angles to the end of the stem opposite the head are fastened with screws.

The *cleaning brush* (fig. 6) is made up of four wooden segments covered with card wire and fastened to a spindle by means of two guide plates. Four springs also fastened to the spindle and working against the inner surfaces of the wooden segments make the outside diameter of the brush adjustable. This takes care of the wearing down of the card wire. The spindle is fitted with a bushing which is screwed into the opening in the gas ejector head whenever the brush is to be used. This bushing is hollow and has four holes drilled into it at right angles to the longitudinal axis. These holes and hollow bushing take care of compression that would exist when the hole in the gas ejector head is closed by the brush. In action, the brush is pushed down the barrel of the gun, rotated and pulled back, and this action is repeated until any substance which may have been burned fast to the inside of the barrel is removed.

A *sponge* (fig. 8) made with a head of hardwood and a sheepskin covering, lined with canvas, is also used as a cleaning agent for the barrel. This sponge is screwed into the opening of the gas ejector head in place of the wire brush whenever it is desirable to sponge out the barrel.

ANVIL WRENCH.

(Fig. 7.)

The *anvil wrench* is a long socket wrench which fits the hexagonal base of the anvil (B) and is used for screwing the anvil into place. A

PLATE III

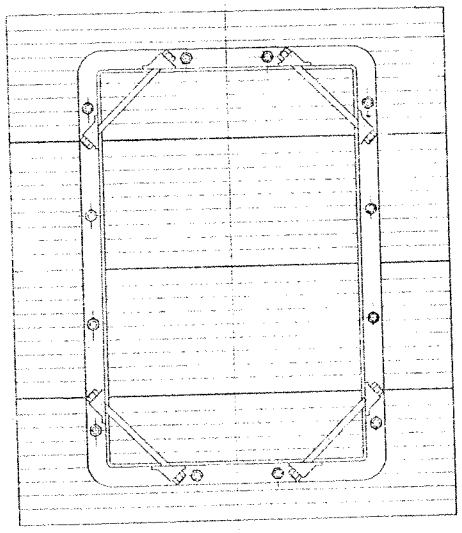


FIG. 12 PLAN OF SUB-BASE

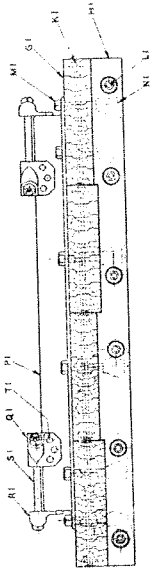
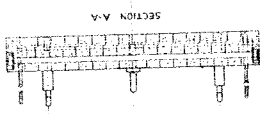


FIG. 11 ELEVATION OF SUB-BASE



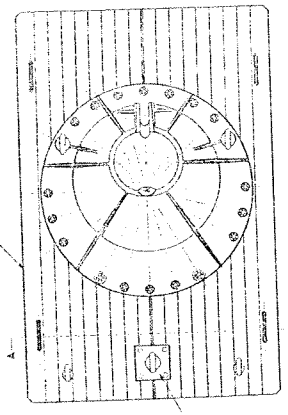


FIG. 10 PLAN AND END ELEVATION OF PLATFORM AND BASE

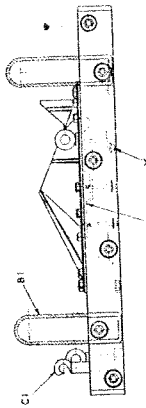


FIG. 9 ELEVATION OF PLATFORM AND BASE

BASE, PLATFORM AND SUB-BASE

place. The main component parts of the wrench are the hexagonal socket, guide, and shank. The wrench is seldom used in the field and is carried in the platoon box from which it may be obtained when necessity requires the removal of the anvil.

BASE.

(Figs. 9 and 10.)

The *base* (T) is a steel casting having a machined hemispherical socket connected to a supporting flange by a hollow truncated cone. The hollow cone is reinforced by ribs. The hemispherical socket is also supported by two hollow cylinders, the shorter one resting on a plate in the platform and the longer one machined to fit a shoulder which is turned out on the plate (X). This longer hollow cylinder helps to take up the recoil of the gun. The flange is fitted with bolt holes, through which bolts are passed fastening it to the platform, as shown on figures 9 and 10).

Two guides are cast integrally with the base between which the guide stud moves. The surfaces upon which the guide stud moves are machined.

PLATFORM.

(Figs. 9 and 10.)

The *platform* (W), rectangular in shape, is made by joining with cabinet joints thin strips of oak and bolting them together. The grain of the oak runs lengthwise, giving it maximum strength. A circle of bolt holes, in which bolts are placed, fasten the cast-steel base to the platform. Centrally with this circle, the steel plate (X) is set into the platform and bolted to it with eight carriage bolts. This platform plate engages the longer hollow cylinder of the cast-steel base and helps to take up the recoil.

Four wire-rope handles are passed through the platform and fastened on the underside. These handles are used for carrying the platform. Special hook bolts provide a method of fastening the guys during the transportation of the platform and base. An eyebolt (L2, fig 1), with plate (Z) sunk into the platform, forms the anchorage for the elevating guy, and two similar eyebolts, passed through the flange of the base and this platform, form the anchorage for the traversing guys.

SUBBASE.

(Figs. 11 and 12.)

The *subbase*, rectangular in shape, is made up of eight timbers (G1 and H1). Four of these timbers (H1) are fitted with socket nuts (N1), and form the lower layer of the subbase. The other four

through corresponding to the location of the socket nuts. An angle iron frame (P1), rectangular in shape, has holes corresponding to the holes in the upper layer of timbers and bolts (M1) are passed through these holes and those in the upper timbers, and are screwed into the socket nuts of the lower timbers, thus fastening the subbase together. The timbers themselves are made up by joining with cabinet joints narrow pieces of oak and bolting through in a manner similar to that used in constructing the platform. Rectangular sections are cut out of the adjacent surfaces of the two layers so that a system of interlocking is accomplished. This interlocking helps to take up the shock and also facilities putting the platform together. The angle iron frame (P1), mentioned above, forms a pocket into which the platform (W) is fitted. Near the corners forged steel brackets (Q1) are riveted to the angle iron frame. Through these brackets and just high enough to clear the platform when it is placed inside of the frame, four retaining bolts (S1) are passed. These retaining bolts prevent the platform from jumping out of the frame during firing.

CLINOMETER.

(Figs. 13, 14, and 15.)

The *clinometer* is the main sighting instrument of the gun. Its action depends upon the leveling of a pair of cross bubbles in a manner somewhat similar to leveling the bubbles on the upper plate of a transit. It is used for elevating and traversing the gun in the manner described in a succeeding paragraph. The main component parts of the clinometer are, the quadrant (X3), clamping bands (M4), bubble carrier (Y3), bubbles (Z3), bubble cover (C4), and cover cap (F4). The quadrant and bubble carrier are bronze castings so designed as to give the maximum air space and circulation between the barrel of the gun and the bubbles. The clamping bands, made of steel strips suitably punched, are riveted at one end to the quadrant. The opposite end of one is permanently fastened to the clamping nut (V4). The loose end of the other can be attached to or detached from the clamping nut so that the clinometer can be attached to or removed from the barrel. The bubbles are ordinary curved spirit bubbles incased in a rubber tube, which has a section cut out in order to show the air bubble. The bubbles also have two luminous bands painted equidistant from the leveling center. The bubble cover consists of a piece of sheet brass pressed into shape. It is used to hold the bubbles in place and is connected to the top of the bubble carrier by means of two screws. The cap is also pressed out of sheet brass, and is attached to the bubble carrier by means of a chain (G4).

PLATE IV

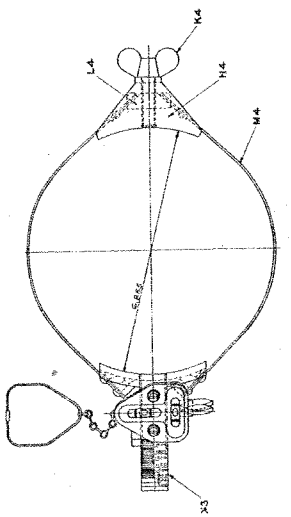


FIG. 15 PLAN OF CLINOMETER

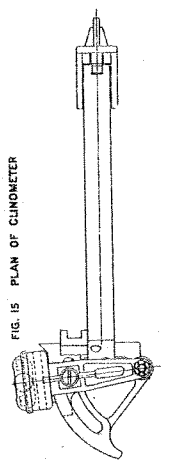


FIG. 13 SIDE ELEVATION OF CLINOMETER

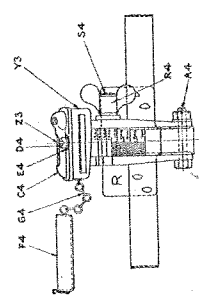
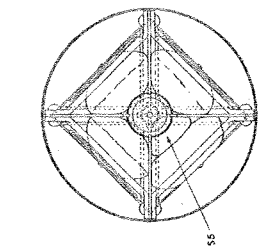


FIG. 14 END ELEVATION OF CLINOMETER

PLATE XI



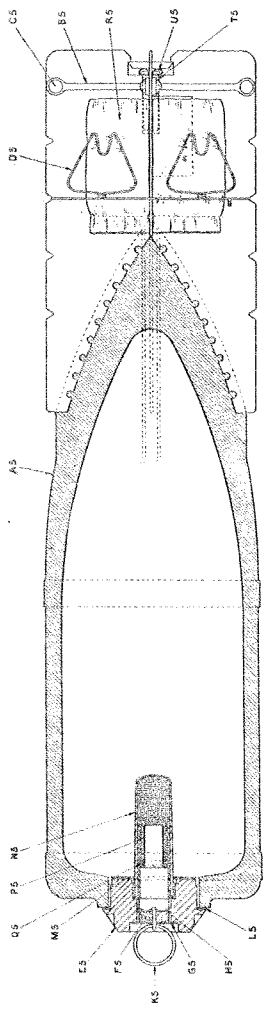


FIG. 22 SHELL ASSEMBLY AND PROPELLING CHARGE

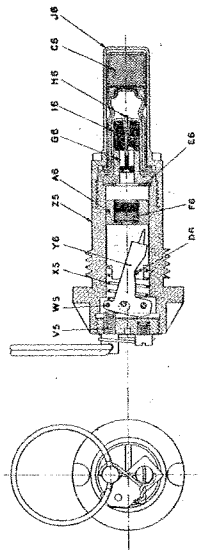


FIG. 24 DELAY FUZE, MARK XXII

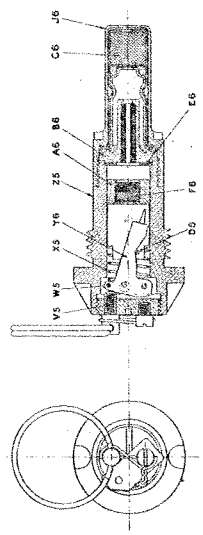


FIG. 23 NON-DELAY FUZE, MARK XXII

of the bubble carrier and through a boss on the quadrant. After the quadrant is graduated, the bubble carrier is attached, bubbles adjusted, and the indicating arrow scribed on the projecting tongue of the bubble carrier.

GRADUATIONS.

The first lot of 500 mortars with their clinometers was graduated in degrees. All other mortars and clinometers are to be graduated in mils in conformity with the American Artillery Practice.

A true mil is the angle subtended by an arc equal in length to 0.001 of the radius describing it, or 1/6238 of the circumference. The mil actually used is taken at the rounded-off value 1/6400 of the circumference.

FUNCTIONING.

The clinometer is attached to the barrel by means of clamping nuts and bands. The arrow on the quadrant is set to coincide with the desired mils traverse, and the indicator on the bubble carrier is also set coincident with the desired elevation. The guys are then adjusted so that both bubbles are exactly level. The barrel of the gun then points in the desired direction. This operation requires several slight adjustments of the guys in order to bring both bubbles central.

AMMUNITION.

SHELL.

(Fig. 22.)

The body of the shell is made of gray cast iron having two bourrelets which are machined. Two vanes, made from sheet steel with holes and sections properly punched, are cast integrally with the pointed end of the body. These vanes are reinforced at the extreme ends by four steel braces, which are riveted together and to the vanes. The nose or flat end of the shell has a boss central with the axis of the shell. This boss is machined and threaded to receive the steel adapter (E5) which carries the fuze or adapter plug and the booster casing.

The rear end of the vanes are so punched as to receive the ignition cartridge (T5) and clip assembly (U5). The outer edges of the vanes are notched to hold the propelling bag holder (D5). The sections of the vanes embedded in the shell body are also punched with small holes to form an anchorage between the shell body and the vanes.

The shell machined but unloaded, and unfitted with fuze and adapter, weighs approximately 42 pounds.

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BURSTING AND PROPELLING CHARGES.

The bursting charge is 11 pounds of high explosive and is detonated by means of the fuze and booster described in the succeeding paragraphs.

The propelling charge consists of sporting ballistite contained in silk bags of 1 and 2 ounce capacity. With these two sizes of bags a number of combinations can be obtained and the range can be varied according to these combinations. The maximum charge is 9 ounces and the minimum, 3 ounces. The bags containing the propelling charge are tucked under and held close to the vanes by the propelling bag holder (D5).

The ignition cartridge is made by cutting a standard rifle cartridge body to approximately $1\frac{5}{8}$ inches length and filling to its maximum capacity with grade A1 black powder and sealing with a paper seal. The primer used is a standard rifle cartridge primer.

FUZES.

(Figures 23 and 24.)

The detonation of the 6-inch trench mortar shell originates with the functioning of the trench mortar fuze, Mark XVI, either the delay or the nondelay type, shown on Plate VI, figures 23 and 24. The delay type of fuze is used whenever the shell is to be employed for demolition purposes. The nondelay type is used when it is desired to employ the shell for fragmentation purposes as used in destroying barbed wire entanglements, etc. The mechanical features of the two types of fuzes are identical—the only difference being in the loading—the nondelay type having a retard carrier which in the delay type is substituted by a delay carrier and a relay cup. This fuze, while nondelay in action, nevertheless is not instantaneous, for its functioning depends upon a retardation of the velocity of the shell, while to be instantaneous it would be necessary to employ the principle of retardation of the velocity of a striker or pellet without affecting the velocity of the shell.

For safety in transportation the fuzes are shipped with a safety screw inserted, which causes the striker to be deflected to one side and out of alignment with the primer.

Referring to figures 23 and 24, the use and functioning of the fuze is as follows: After being inserted in the adapter of the shell and before entering the shell in the mortar, it is necessary to remove the safety screw (V5). By taking hold of the key ring and giving the screw a partial turn, the sealing wire is very easily broken and removal of the safety screw can be accomplished. The safety screw closing disk is then moved to the central position of the head so as

is necessary in order to eliminate the possibility of dirt entering the fuze at impact and causing failure. With the ignition of the propelling charge and the resulting acceleration of the shell, the percussion pellet (A6) moves to the rear relative to the shell. At the same time the striker (Y6) moves to the central position of the fuze. This is actuated by the pin (D6) in the percussion pellet bearing against the cam side of the striker. The percussion pellet (A6) is retained in its rear position of the fuze body by the action of the creep spring (X5). A soft lead washer (E6) is inserted at the lower end of the fuze body so as to absorb the shock of the percussion pellet and to eliminate any rebound action. The fuze is now in the armed condition which it retains during the course of flight. At impact with the ground, the velocity of the shell being retarded, the percussion pellet (A6) moves forward, compressing the creep spring (X5), causing the striker (Y6) to pierce the fulminate primer (F6), thus starting the ignition. When the striker (Y6) is moved to the central position of the fuze, due to the initial acceleration of the shell, the aluminum shear wire (W5) is thus bent and this aluminum wire is of such a temper as to retain the striker (Y6) in its central position when the percussion pellet (A6) moves forward at impact.

If the nondelay type fuze is in use, the ignition of the primer (F6) ignites the black powder in the retard carrier (B6) which in turn communicates the flame and gives a spit of fire sufficient to ignite the detonator (C6). If the delay type fuze is in use, the ignition of the primer (F6) is communicated to the delay carrier (G6) which is loaded with compressed fine black powder, and the burning of this powder pellet then occupies a time of approximately 0.20 seconds. It is the slow burning of this powder pellet which gives the delay action of the fuze. From there the flame is communicated to the relay cup (I6) loaded with coarse black powder, which in turn ignites the detonator (C6). The insertion of quick match (H6) threaded through the central hole of the relay cup (I6) gives an added intensity or assurance of burning of the powder pellet in the relay cup.

The firing of the detonator (C6) in the detonator socket (J6) causes the detonation of the high explosive filling in the booster which surrounds the detonator socket and this in turn causes the detonation of the bursting charge in the shell.

INSTALLATION.

A careful installation of the gun in its emplacement will go a long way toward preventing accidents and insuring steady flight of the projectile. In hard ground a layer of earth free from rock and gravel should be interposed between the sub-base and the ground. In swampy ground a large platform made of timbers and sand bags

The minimum elevation at which the shell will pass over the parapet must be ascertained, and care taken that no trees or other obstacles are in the path of the projectile. It is important that the emplacement be well drained.

LAYING THE MORTAR BED.

The following methods of laying the mortar bed have been copied from the preliminary notes on the 6-Inch Newton Trench Mortar which were received from England. The nature of the terrain and conditions under which the mortar is fired will govern the method employed in laying the bed.

Method 1—Figure 16.—When this method of laying the bed is employed, six pickets must be used, two being driven into the earth at the rear of the platform (W) and two on each side. The rear pickets must be supported by a solid backing, as shown in the diagram, so as to prevent any movement of the bed to the rear when the mortar is fired.

Method 2—Figure 17.—In the second method of laying, the platform (W) is supported by the sub-base. A 3-inch plank, approximately 9 inches wide and 5 feet long, is placed broad face against the rear edge of the sub-base, so as to increase the bearing area over which the backward thrust of the piece is distributed.

Method 3—Figure 18.—With this method of laying the mortar platform the sub-base is also used, and is laid at the bottom of a recess and supported all around by 3-foot lengths of 3-inch timbers. The sub-base is held in place by two sets of wedges which are driven between the front edge and the 3-inch timbers.

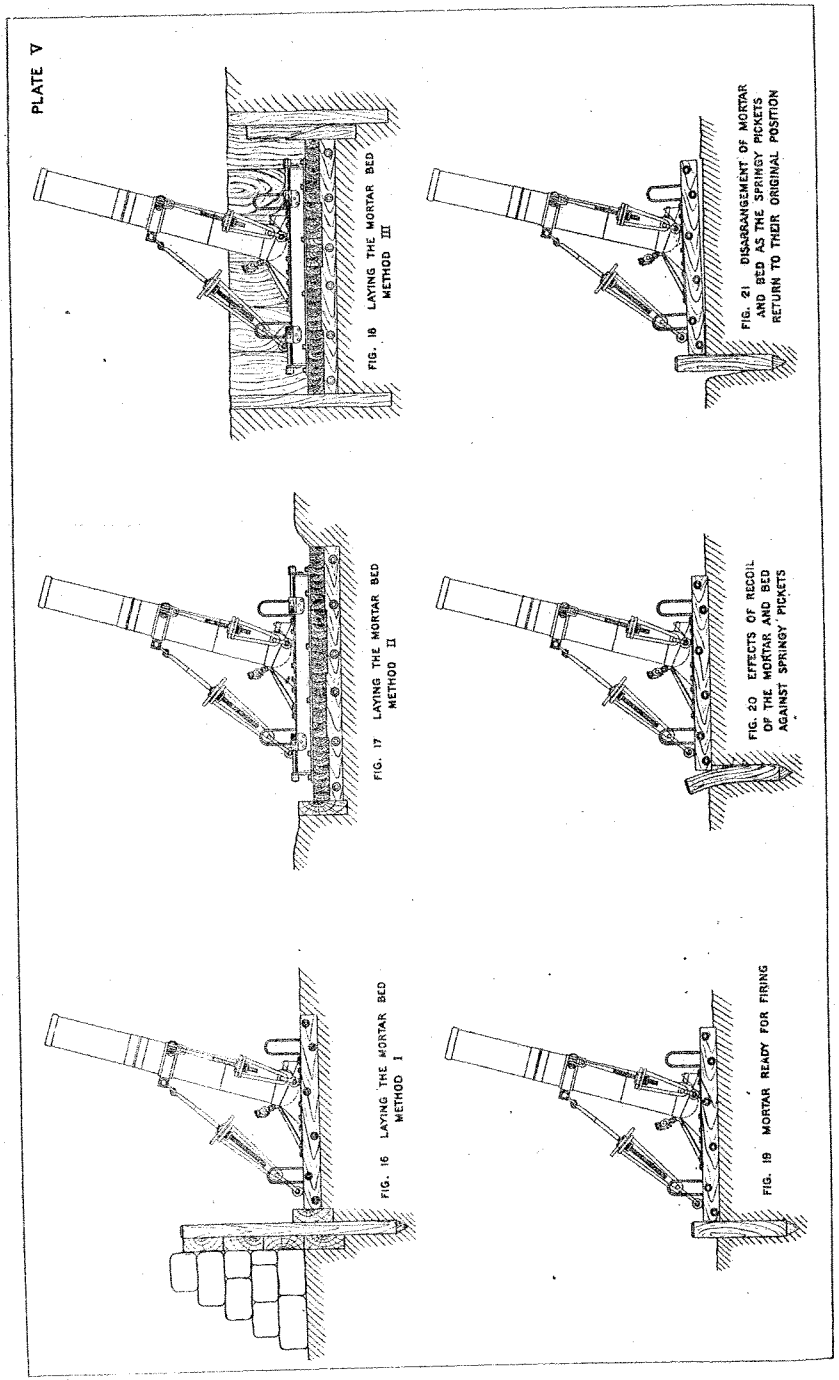
In any of the above methods of laying the mortar bed the mortar platform will be further secured by sandbag weighting, as many filled sandbags as it is practicable to place on the platform being used; but care must be taken that the sandbag weighting is kept clear of the elevating and traversing guys, so as not to impede the working of the mortar.

Extreme care must be taken that a solid backing is provided for the mortar platform, but more particularly so when the first method is employed, as, especially on sandy soil and when long pickets are used, considerable movement, due to springiness of the pickets, is likely to occur, with consequent irregular shooting of the mortar.

For ranges greater than 500 yards the sub-base must be used with the platform, or an equivalent arrangement, to make a 6-inch thickness of supporting timbers. Figures 18, 19, and 20 show the action of the mortar and bed when not solidly supported.

ASSEMBLING.

PLATE V



ing bolts. The rounded end of the barrel is placed in the socket of the base (T) with the guide stud between the vertical guides. The muzzle is then raised sufficiently to engage the elevating hook with its proper clevis on the barrel band. The two traversing guys are then attached to their clevises, the clinometer set as above, the guys adjusted and tightened. Care must be used to have the guys as tight as possible, to prevent any hammering action between the barrel and the base.

DEMOUNTING.

To demount the gun, the clinometer is first removed, the traversing guys unscrewed, and the hooks disengaged from their clevises. The muzzle is then elevated and the hook of the elevating guy disengaged from its clevis. The muzzle cap is placed upon the muzzle of the gun and strapped, the clinometer placed in the tool and spare-parts box the free ends of the guys attached to the hooks, the platform removed from the sub-base, and the sub-base disassembled. The mortar is then ready for transportation.

FIRING.

Before firing, the shells are equipped with the propelling charge, ignition cartridge, and clip. The adapter plug is removed and the fuze screwed in, but the safety screw is not withdrawn. The mortar is set up as described on page — of this pamphlet, and elevated and traversed to give the range and direction desired. Just before firing, the safety screws on the fuzes are removed. The shell is then placed vane end first in the muzzle of the gun and allowed to drop of its own weight. As it nears the bottom of the barrel, the ignition clip strikes on the anvil, and sets off the ignition cartridge. This in turn ignites the propelling charge which throws the shell from the gun. Should the ignition cartridge fail to function, the misfire plug is unscrewed from the barrel and the misfire charge, consisting of a slow burning blasting fuze, to the end of which is fastened a small of bag black powder, is inserted into the barrel of the gun, bag end first. A short section of the blasting fuze is left projecting from the barrel and is threaded through the opening in one end of the misfire plug. The misfire plug is then screwed into place and the fuze lighted with a special lighter which is attached to each misfire charge. The flash from the bag of powder on the end of the blasting fuze ignites the propelling charge and the shell is thrown from the gun.

Several precautions noted here should be observed. Owing to a possible chance of premature the man firing the piece should be protected by placing a pile of sandbags between himself and the mortar, and as soon as the shell is dropped into the muzzle of the gun, he

The man firing does not get burned by trying to shoot the piece too rapidly. Great care should be taken not to remove the safety screw from the fuzes too long before firing takes place.

After firing several shots, the clinometer should be observed, and, if necessary, the adjustments made to obtain the desired elevation and traverse.

CARE AND PRESERVATION.

GENERAL DIRECTIONS.

The barrel must always be kept clean and free from rust and débris, and the bore slightly greased. If the mortar is not to be used for some time, the interior of the barrel should be cleaned with kerosene and then coated with a light oil. Thick lubricating oil should not be used for this purpose, as it chars and tends to clog the barrel.

The anvil should be examined from time to time, and if found worn so as to be likely to cause misfires, it should be replaced, care being taken that the new anvil is tightly screwed home.

The guide stud at the exterior of the barrel should occasionally be examined and, if found loosened by vibration, tightened to insure against gas leakage.

The guide stud groove on the base should be kept free from earth, which may cause the guide stud to be broken off.

After firing, the bore should be cleaned and dried carefully, a light coat of grease applied, and the muzzle cap put on.

Special attention should be given to the elevating and traversing gears. Care should be taken that they do not become bent during transportation. They should be kept clean and greased at all times.

The other parts of the material should be kept clean and in good condition.

The base should be frequently inspected for cracks and the platform always kept free from earth.

In mounting and dismounting care should be taken not to injure the projecting misfire plug.

Weights.

	Pounds.
Barrel	162
Base	75
Platform	160
Subbase	530
Shell, loaded	53
Barrel band	25
Anvil wrench	45
Gas detector	25
Elevating gear	10
Muzzle cap	8
Clinometer	8
Shell box	10
Propelling charge, (Box and contents)	

6-inch trench mortar, Mark I.

NOMENCLATURE.

Symbol.	Quantity.	Nomenclature.	Material.	Location and purpose.
A	1	Barrel	Gun steel	On base (T).
B	1	Anvil	Steel (case hardened)	Inside barrel (A) at bottom; fires ignition cartridge (M5).
C	1	Anvil washer	Copper	Between anvil (B) and barrel (A); form gas-tight joint.
D	1	Guide stud	Steel (casehardened)	On outside of barrel (A); guides lateral motion of barrel.
E	1	Guide stud washer	Copper	Between guide stud (D) and barrel (A); forms gas-tight joint.
F	1	Misfire plug adapter	Steel (copper plated)	Screws into barrel (A); receives misfire plug (G).
G	1	Misfire plug	Steel	Screws into adapter (F); contains misfire fuze.
H	1	Lock washer	do	Between barrel (A) and adapter (F); holds adapter in place.
K	1	Misfire plug cap	do	Protects fuze end of misfire plug (G).
L	1	Misfire plug cap chain	Steel (rust proofed)	From cap (K) to misfire plug (G); prevents loss of cap (K).
M	1	Barrel band	Steel forgings	Around barrel (A); filled with 3 clevises (Q) for engaging with supporting guys (Z1 & V1).
N	3	Barrel band bolts with nuts and washers.	Steel	Through barrel band (M); secures band to barrel (A) and supports clevises (Q).
P	3	Split pin	do	Fits in end of barrel band bolts (N), locking nuts (N).
Q	3	Clevis	do	On barrel band (M); engages guy (Z1 & V1).
R	6	Bushing	do	In barrel band (M); engages clevis (Q).
S	1	Muzzle cap (complete)	Duck	

BASE.

T	1	Base	Cast steel	On platform (W); seat for barrel (A).
U	17	Bolt, nut and washer		
V	17	Split pin		

PLATFORM.

W	1	Platform	Oak (built up)	On subbase; carries base (T).
X	1	Platform plate	Mild steel	On platform (W); under base.
Y	8	Carriage bolts, nuts, and washers.	Steel	Through platform plate (X) and platform (W); holds plate in place.
Z	1	Eyebolt plate	do	Distributes pressure of eyebolt on platform timber (W).
A1	4	Wood screws	do	In plate (Z).
B1	4	Wire-rope handle	Steel	At corners of platform (W); to facilitate transportation.
C1	1	Hook bolt, nut, and washer	do	Secures guy when mortar is in transportation.
D1	3	Guy, eyebolt, nut, and washer.	do	Right, left, and rear of platform (W); to secure guy to platform (W).
F1	6	Bolt, nut, and washer	do	Through platform battens; hold battens together.

SUBBASE.

G1	4	Subbase timber (upper)	Oak	Upper timbers of platform.
H1	4	Subbase timber (lower)	do	Lower timber of platform.
K1	20	Top sub-base bolt, nut, and washers.	Steel	Clamps battens forming upper subbase timber (G1).
L1	24	Bottom subbase bolt, nut, and washers.	do	Clamps battens forming upper subbase timber (H1).
M1	12	Angle-iron frame bolt	do	

6-inch trench mortar, Mark I—Continued.

AMMUNITION—Continued.

Symbol.	Quantity.	Nomenclature.	Material.	Location and purpose.
H5	1	Adapter plug washer (inside).	Copper	Below adapter plug (F5).
K5	1	Ring and link	Steel	In adapter plug (Z4) (F5) to remove plug.
L5	1	Washer	Lead	Around adapter (Y4) (E5); forms gas-tight joint.
M5	1	.....do.....	Felt	On lower surface of adapter (Y4) (E5) to prevent contact between adapter and explosive.
N5	1	Booster casing	Steel	Attached to adapter (Y4) (E5); holds fuze socket (G5 P5) and booster charge.
P5	1	Fuze socket	Brass (or other metal)	Inside booster casing (F5 N5); provides space for fuze.
Q5	1	Washer	Felt	In booster casing (F5 N5), around fuze socket (G5 P5); holds booster charge in place.
R5	4	2-ounce powder bag		For propelling charge.
S5	1	1-ounce powder bag		Do.
T5	1	Ignition cartridge		Ignites propelling charge (S5 and K5 65).
U5	1	Ignition cartridge clip		Holds ignition cartridge (M5 U5) in shell vanes (U4 B5).

FUZE.

V5	1	Safety screw	Steel	In head of fuze. Prevents premature detonation during transportation.
W5	1	Shear pin	Soft aluminum	Passes through striker and closing cap; retains striker in central position after arming.
X5	1	Creep spring	Steel	In body of fuze. Retains percussion pellet in rear of body after arming.
Y5	1	Firing-pin or striker	.....do.....	In body of fuze. Used to fire primer.
Z5	1	Body	Brass	Upper half of fuze. Incloses the mechanical parts.
A6	1	Percussion pellet	.....do.....	In body of fuze; used to arm striker and contains the primer.
B6	1	Relay carrier	.....do.....	In detonator socket; relays flame from primer to detonator.
C6	1	Detonator	Copper casing and fulminate of mercury.	In detonator socket; used to burst detonator socket and detonate booster.
D6	1	Pin	Steel	In percussion pellet; used to move striker from safe position to armed position.
E6	1	Pellet stop washer	Soft lead	Lower end of body; used to prevent rebound of percussion pellet at set-back.
F6	1	Primer	Copper shell and high explosive.	In percussion pellet; starts firing of fuze at impact.
G6	1	Retard carrier	Brass	In detonator socket; gives delay due to slow burning of powder.
H6	1	Quick match	Cotton yarn covered with powder.	In relay cup; gives added intensity to relay pellet.
I6	1	Relay cup	Brass	In detonator socket; relays flame from retard carrier to detonator.
J6	1	Detonator socket	.....do.....	Lower half of fuze; contains detonator relay cap and retard carrier.

RANGE TABLE, 6-INCH TRENCH MORTAR, MARK I.

6-Inch Trench Mortar Shell, Mark I; Fuze, Mark X VI, weight, 52 pounds 10 ounces=23.85 kilograms.

ZONE I.

[Charge, 3 ounces ballastite. M. V.=m/s.]

(Aberdeen Proving Ground, Dec. 9, 1918.)

Elevation.		Range (meters).	Time of flight (seconds).	Change in range for 100 mgm.; change in weight of liter of air (meters).	Change in range for 10 m/s following wind (meters).	Deflection due to 10 m/s cross wind.		50 per cent zone for range (meters).	50 per cent zone for deflection.	
Degrees.	Mils.					Meters.	Mils.		Meters.	Mils.
40	711	389	8.5	5	19	12	31	48	13	33
45	800	389	9.3	6	22	13	33	66	14	36
50	889	382	10.0	6	24	14	37	83	15	39
52	924	375	10.3	6	25	15	39	84	15	41
54	860	368	10.6	6	25	15	41	84	16	43
56	996	358	10.9	5	26	15	43	81	16	45
58	1,031	346	11.1	5	26	15	45	76	16	46
60	1,067	333	11.4	5	27	16	47	71	16	48
61	1,084	325	11.5	5	27	16	49	68	16	49
62	1,102	318	11.6	5	27	16	50	65	16	51
63	1,120	311	11.7	5	28	16	51	61	16	53
64	1,138	303	11.8	4	28	16	53	58	17	55
65	1,156	295	11.9	4	28	16	54	55	17	57
66	1,173	287	12.0	4	28	16	56	52	17	59
67	1,191	279	12.1	4	28	16	58	49	17	61
68	1,209	270	12.2	4	27	16	59	47	17	63
69	1,227	260	12.3	4	27	16	61	44	17	65
70	1,244	250	12.4	4	27	16	63	42	17	68
71	1,262	241	12.5	3	27	16	66	40	17	71
72	1,280	231	12.6	3	26	15	69	39	17	74
73	1,298	221	12.7	3	26	15	72	38	17	77
74	1,316	211	12.7	3	25	15	76	37	17	81
75	1,333	199	12.8	3	25	15	80	36	17	85

With the advent of trench warfare, the use of artillery proved problematic. Traditional artillery could not deliver the explosive at a steep enough angle to inflict damage. To solve this dilemma, the three major powers involved in World War I developed mortars, which had the added advantage that they could be fired from the safety of the trench. The following document describes the mortar's principle parts, its proper use, and its ammunition.