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# STOKES' TRENCH HOWITZER 3", Mark I

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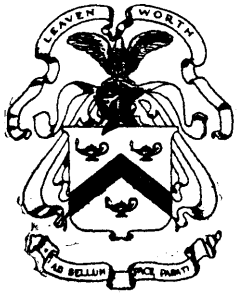
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WAR DEPARTMENT,

WASHINGTON, *January 25, 1918.*

The following pamphlet, "Stokes Trench Howitzer, 3", Mark I," is published for the information of all concerned.

(062.1, A. G. O.)

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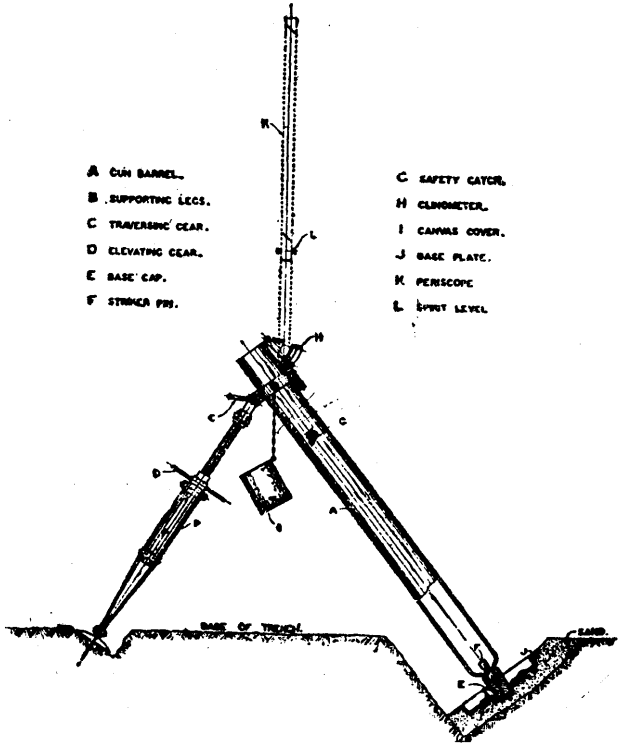
JOHN BIDDLE,
*Major General, Acting Chief of Staff.*

OFFICIAL:
H. P. MCCAIN,
*The Adjutant General.*

# STOKES' TRENCH HOWITZER

## 3-INCH MARK I

### DIAGRAM OF STOKES' HOWITZER.



## GENERAL DESCRIPTION.

Each howitzer equipment is issued in a case complete, and consists of—

1. The barrel.
2. The supporting legs, with traversing and elevating screws.
3. The base plate.
4. The clinometer.
5. The periscope.
6. Cleaning rods, tommy bar, spanner, oil can, 2 pounds cotton waste.

1. *The barrel* is made with a removable screw cap to close the base and to carry the striker which explodes the cartridge.

A tommy bar is provided for removing the cap.

A catch or bolt is fitted in the side of the barrel, which, when in position, prevents the shell sliding down the barrel. The end of this bolt is fitted with an L-shaped shackle, to which is attached a lanyard for withdrawing the bolt to fire the shell.

When rapid fire is to be carried out, the shackle should be placed so that the short projecting arm prevents the bolt from accidentally sliding into the barrel. Shells can then be hand-fed into the muzzle as soon as each preceding shell has left the barrel.

2. *The supporting legs* consist of an A-frame, arranged to fold up for transport, the horizontal cross-bars hinging upward as the legs come together.

The bottom of each side frame is fitted with a dished disk and spike to facilitate supporting the legs firmly and steadily on the ground.

The traversing and elevating motions can be operated by turning the handles in the required direction.

3. *Base Plate.*—The base plate is formed of pressed steel, stiffened so as to take the recoil of the barrel. Three hemispherical depressions are provided to receive the base cap of the howitzer and to facilitate rapid traversing by transferring the cap from one depression to another.

A rope handle is provided for carrying the plate.

4. *The clinometer,* when in position, indicates the angle of elevation of the barrel. It should be placed on the barrel with the feet resting against the leg collar. It should be upright and in line with the barrel axis.

Range tables are marked on the clinometer; on one side in yards and seconds corresponding to the distances and times which the shell will travel with the red cartridges, and on the other side the distances and times for green cartridges, when the spirit level bubble is central at the respective readings.

5. *The periscope* is arranged with a tail piece, which, when inserted in the leg collar, and *when the periscope* is vertical, as indicated by the spirit level, will give the line of fire of the barrel.

Any desired object can be brought into the field of view by traversing and inclining the periscope forward or backward.

## DESCRIPTION OF SHELL.

The shell is filled with high explosive, which is exploded by means of a short length of Bickford time fuze and a detonator.

The fuze is lighted by a cap fitted to its end, which is struck at the moment of firing. The length of the fuze determines the time the shell explodes, and the fuze must therefore be cut to the required length before the detonator is attached.

The accompanying diagram shows the construction of the shell and fuze.

The container A holds the propellant cartridge; the body B has two ends C screwed into it, and contains the high explosive. The detonator tube D passes through the fuze head nipple E, and contains the time fuze F and detonator G. The fuze cap holder H is attached to the time fuze F, and has vent holes covered with waterproof paper to keep the end of the fuze dry.

The fuze head I screws on to the nipple E and keeps the fuze in position.

When the spring-controlled striker L is released by the fly-off lever J, the fuze cap is struck and the fuze is lighted.

The fly-off lever J is kept in position by a set-back release K, kept in position by a spring and a safety pin M. The safety pin N prevents the striker accidentally coming in contact with the fuze cap.

Unless the safety pin is withdrawn, the set-back release cannot operate and the fuze will not be lighted when the shell is fired. Just before firing, therefore, it is necessary to remove this safety pin, and also the pin under the striker.

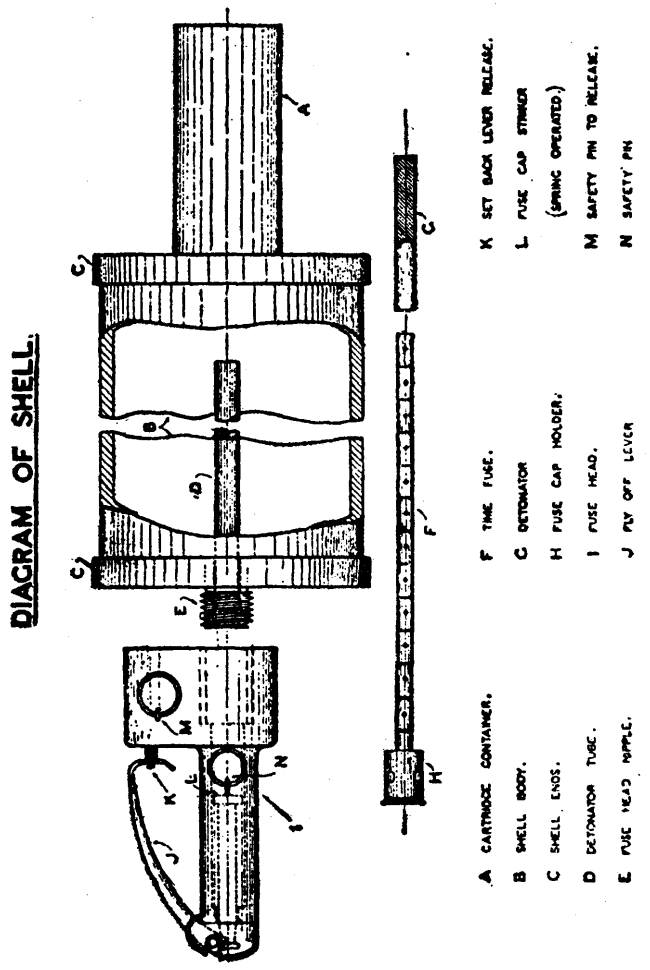
At the moment of firing the action of the fuze is as follows:

1. The lever release K is set back, leaving the fly-off lever free to move outward until it comes against the side of the barrel.

2. On leaving the barrel the fly-off lever becomes detached and allows the spring behind the fuze cap striker to force the striker

against the fuze cap, which, on going off, blows the vent holes free and lights the fuze, which burns till it reaches the detonator, which it explodes, and detonates the high explosive in the shell.

The 3-inch shells are issued in boxes containing three sets of



shell, fuzes and detonators. The cartridges are issued in boxes holding nine packets of 25 each. The red and green cartridges are issued in separate boxes. The end of the green cases has a wad with a small hole in it for identification in the dark.

## DIRECTIONS FOR FIRING.

The howitzer is arranged to fire a special design of shell, in the base of which is placed a cartridge containing the propellant charge.

The howitzer is muzzle loading, and must be set up at such an angle that the shell will slide down the barrel freely. When the cap of the cartridge receives the blow resulting from the striker at the base of the barrel stopping the downward motion of the shell, the contents of the cartridge explode, driving the shell from the howitzer, carrying the cartridge case with it.

It is then ready to fire another round.

To set up howitzer, proceed as follows:

1. Dig in the trench a small excavation to receive the base plate of such a shape that the base plate can be well supported by a good, sound backing. The top of the base plate should be at least 6 inches below the level of the ground.

The base plate should be as nearly as possible square with the axis of the barrel when in the firing position; that is to say, if the howitzer is set up at an angle of 45 degrees, the base plate should also be at an angle of 45 degrees with the horizon, and should in the other direction exactly face the object to be fired at.

When the bottom of the trench is of clay, which is not well consolidated, it is advisable to provide a backing of about 2 inches of sand, if it is procurable, otherwise the kick of the barrel may cause it to spring back out of the depression in the base plate and prevent rapid firing.

*Accuracy of fire depends upon the base plate being well bedded.*

If it is necessary to alter the direction or angle of the barrel from time to time, it is not necessary also to alter the position of the base plate, so long as the plate is well bedded and reasonably square with the barrel.

The shelf angle on the base plate should be below the cup-shaped depressions and the rope handle on the top side of the plate.

When the base plate is well bedded in position, place the base of the gun in the central cup depression and place the legs, with the traversing motion in mid position, so that the barrel points in the desired direction, the legs pointing forward.

When the elevating screw is at right angles to the barrel the

recoil of the howitzer causes the least disturbance to the laying, and less strain is thrown on the legs. The feet of the legs should be well trodden into the ground when final adjustments are being completed.

Diagrams 1, 2, and 3 show how the howitzer should be set up so as to be quickly available for any ranges between maximum and minimum when two base plates are available, and it is important to instantly increase the range to support an attack.

## STOKES TRENCH HOWITZER
### 3-INCH MARK I.

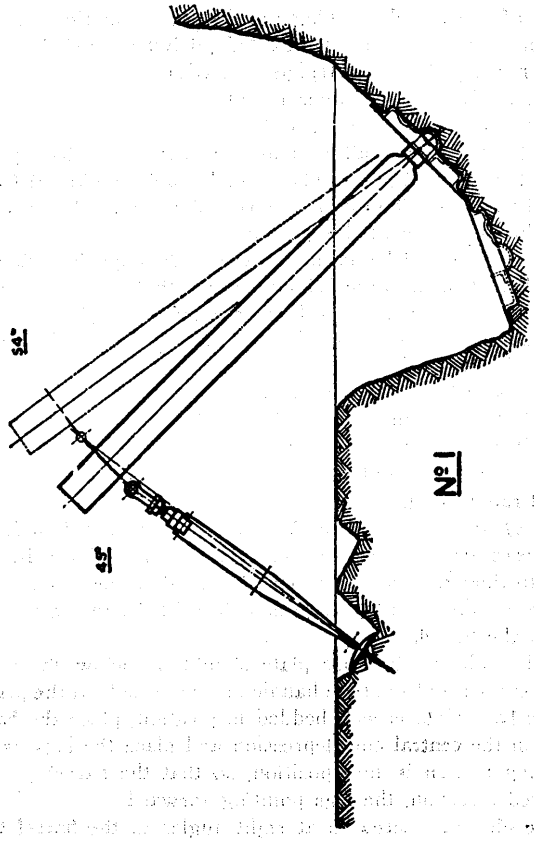



DIAGRAM SHEWING HOW TO SET UP HOWITZER SO AS QUICKLY TO CHANGE FROM MINIMUM TO MAXIMUM RANGE.

To hit an object at a known distance, which can be seen, set the barrel to the inclination which will give the distance as indicated by the clinometer, remove the clinometer and substitute the periscope, care being taken to see that it is vertical, as shown by the spirit level. Traverse the barrel till the object to be hit can be seen on the center of the mirrors. The periscope can be hinged backward or forward without affecting the correct result, so long as the spirit level shows it to be upright in the other direction.

If an observer can spot the position of the first shot, the neces-

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### 3-INCH MARK I.

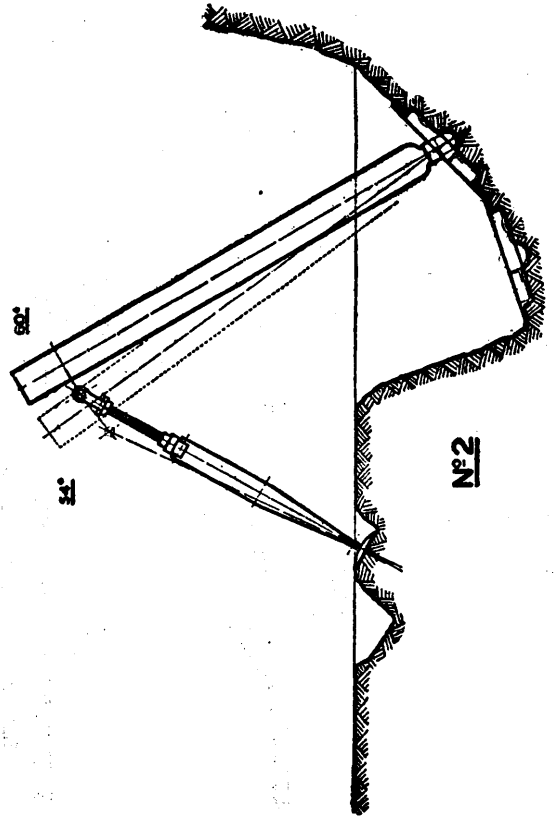



DIAGRAM SHEWING HOW TO SET UP HOWITZER SO AS QUICKLY TO CHANGE FROM MINIMUM TO MAXIMUM RANGE.

sary correction can be made by means of the periscope before again firing. The periscope should not be in position when firing.

Corrections for distance may similarly be made by means of the clinometer.

It may not always be possible to fuze the shell to suit the distance of the trench or object directly opposite the howitzer. The range may then be increased by agreement with other howitzer teams to fire obliquely at such an angle as will suit the fuzes

## STOKES' TRENCH HOWITZER

### 3-INCH MARK I

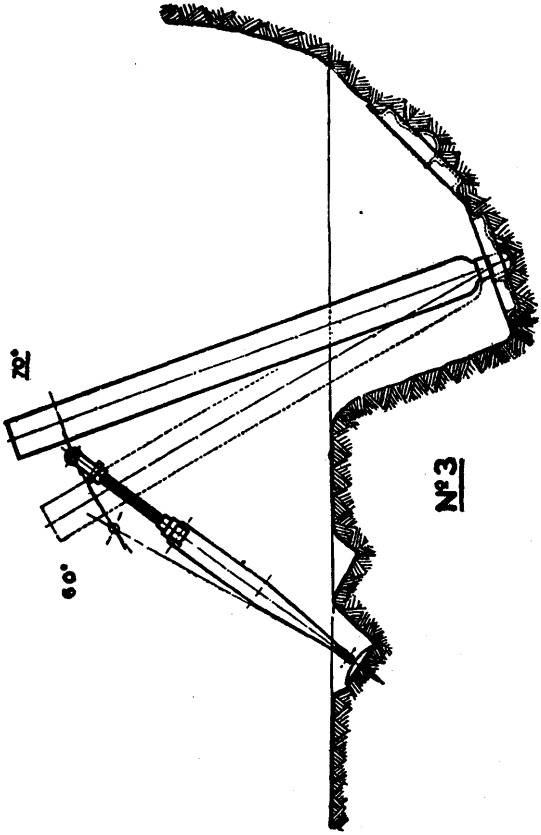



DIAGRAM SHEWING HOW TO SET UP HOWITZER SO AS QUICKLY TO CHANGE FROM MINIMUM TO MAXIMUM RANGE.

available A crossed or laced fire is very effective and confusing to the enemy.

Two sizes of cartridges are issued for use with shell, viz.:

3-INCH HOWITZER.

Green cases..... 190 to 300 yards.
Red cases..... 270 to 430 yards.

When not in use the muzzle cap should be left on the barrel.

In wet weather, rain should be kept from the barrel, as it affects the range.

The cartridges, fuzes, and detonators should be kept as dry as possible, as damp is detrimental to them.

The cartridges should also be kept at an even temperature before firing, as changes in temperature affect the range.

*Preparation of Shell.*—If the shell is issued to the trenches ready fitted with time fuze and detonator, all that is necessary is to place the propellant cartridge in the container at the base of the shell.

The "turnover" at the forward end of each cartridge must first be deformed outward by pressing it against a sharp edge of the shell. This will cause the cartridge to be a tight fit in the cartridge container and prevent it from falling out.

Next remove both the safety pins in the head of the shell and place the shell in the muzzle of the howitzer.

For rapid firing a fresh shell can be placed in the muzzle as soon as the previous shot has been fired. For slow firing the catch bolt may be used, which maintains the shell in position until the bolt is pulled back by the lanyard.

In case of a misfire, lift the base of the howitzer as gently as possible until the shell slides out of the muzzle. When the shell has thus been removed, still further lift the base of howitzer so as to remove anything which has caused the misfire.

It may occasionally happen that the previous cartridge holder has burst open and remained in the howitzer. Sometimes small pieces of cartridge cases cause a misfire. If there does not appear to be any reason for the misfire and the cap has been well marked by the striker, remove the cartridge and replace it by another, after which again attempt to fire the shell. The machined bands at each end of the shell should be clean and free from rust, otherwise accuracy of shooting will not be obtained.

In the type of fuze head fitted with a fly-off lever this should be examined to see that it is clean and free from anything that will prevent its proper working.

In cases where the shells are delivered into the trenches with-

out the time fuze inserted, the following directions should be followed:

Having ascertained the time which will suit the distance of shell to be fired (this may be done by consulting the reading of the clinometer), take a time fuze and detonator from the box, cut fuze to the required length, crimp detonator onto fuze, unscrew the fuze head from the shell, insert the fuze (detonator first) in the central tube, and press gently home until the top brass holder is well seated in the cavity in the shell nipple. Next screw the fuze head on the shell once more, seeing that the safety pins are in position.

The fuzes are marked with dots and dashes, representing half-seconds of burning.

Great care should be taken when handling the detonators.

When detonators are being attached to the time fuze, the greatest care must be taken to insure that the crimping is well done in order to fix the detonator firmly onto the fuze; otherwise it will become detached by the setback at the moment of firing.

The end of fuze should almost touch the fulminate in the detonator.

*Maintenance of Howitzer.*—The howitzer should be kept clean and free from rust, and lightly oiled, more particularly the screw traversing the elevating gears, and the shell catch or bolt.

The propellant used does not foul the barrel, but it encourages rust.

If the howitzer is not to be used for some time, it should be rubbed down inside with cotton waste and a little paraffin oil.

Thick lubricating oil is not suitable as it chars and tends to clog the barrel and prevent the shell sliding down freely.

The striker pin may be examined from time to time by removing the base cap by means of the tommy bar.

If the central nipple shows signs of wear, such as will result in misfires, a new striker should be placed in the howitzer. It should, however, be remembered that the central nipple should only project very slightly to produce the desired result, and that both the striker and cap *should be tightly screwed home.*

If the base plate has been fired with earth on its face between it and the howitzer, the caked earth should be removed so as to restore the depth of the depressions for receiving the howitzer base cap.

From time to time the various nuts and set screws should be gone over with a spanner and the slack ones tightened up, as the kick of the howitzer tends to shake them loose.

## MISFIRES.

CAUSES.

1. Dirty or oily barrel.
2. Dirty shell.
3. Loose striker.
4. Angle of gun too low, *i. e.*, below about 40 degrees.
5. Bad cap, or cartridge not properly home in container.
6. Cartridge débris or burst container from previous firing.

With practice shell it may be found that the cartridge container has been bent by falling on the ground from a previous shot. The cap will then not be struck centrally by the striker and will misfire.

The shell collars may also be so badly marked as to stick in the barrel.

## IMPORTANT NOTE.

The howitzer has been kept as light as possible in order to make it easily portable. It should therefore be treated with care, and set up in accordance with the instructions on pages 8, 10, and 12.

The recoil is exceptionally severe, because the barrel is only about three times the weight of the projectile, instead of about one hundred times the weight, as in artillery.

Unless the legs are properly set up they are liable to injury.