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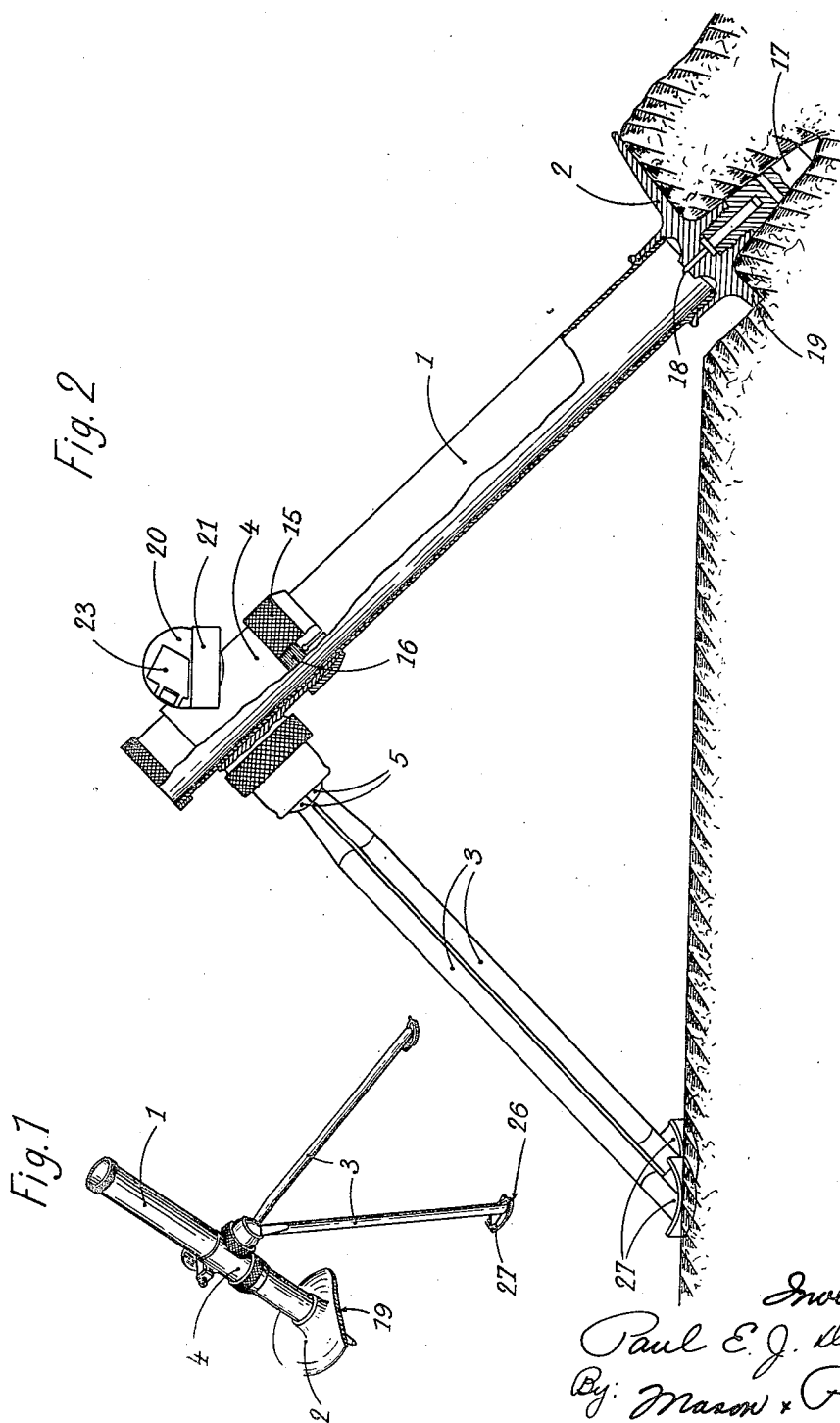
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2,176,524

ORDNANCE

Filed April 21, 1938

4 Sheets-Sheet 1



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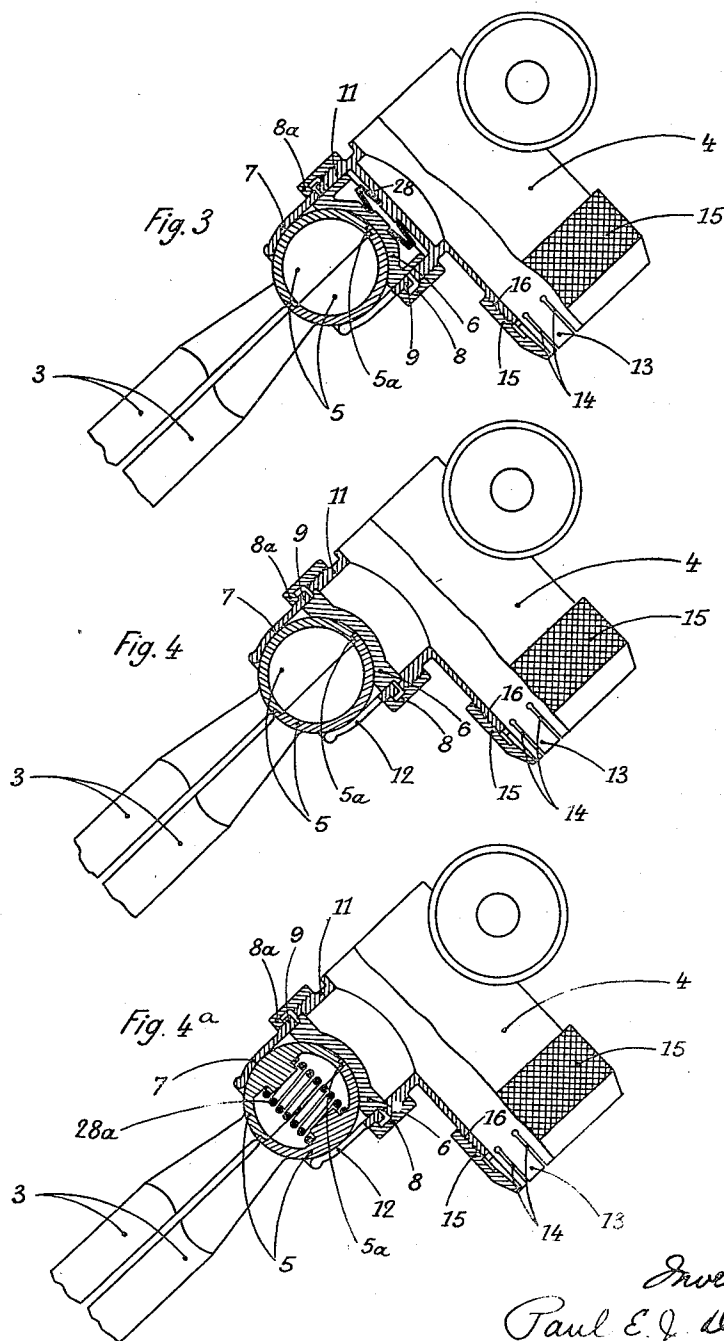
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4 Sheets-Sheet 2



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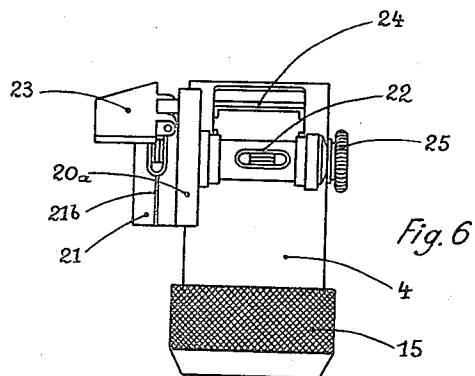
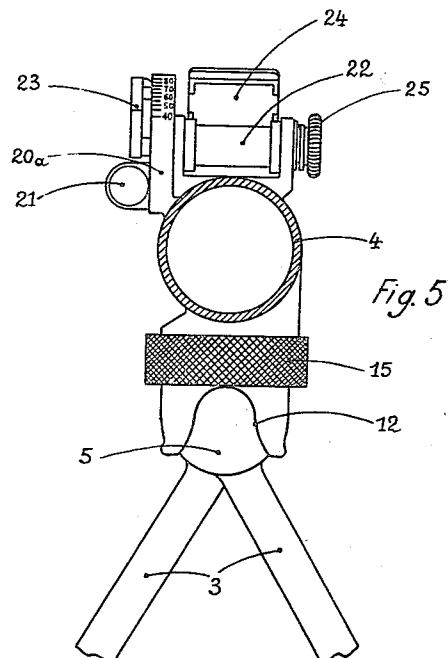
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Fig. 9

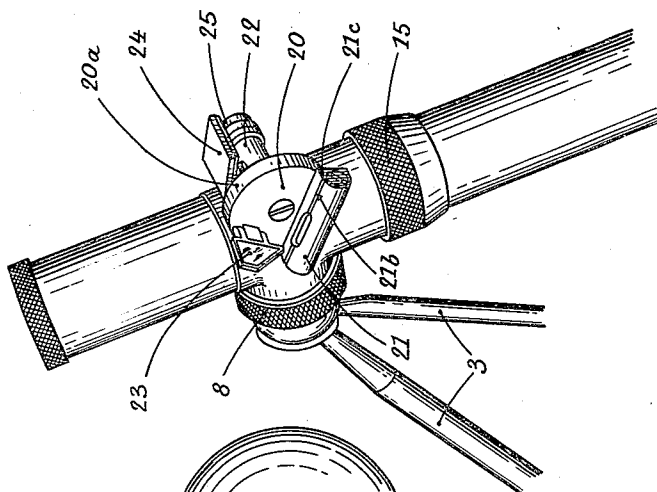


Fig. 8

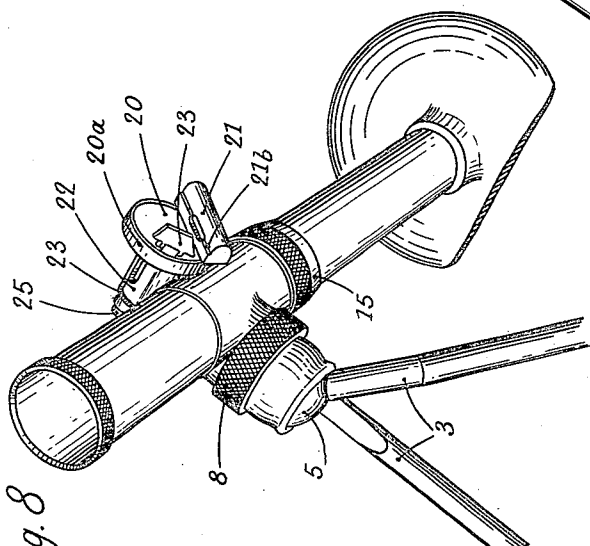
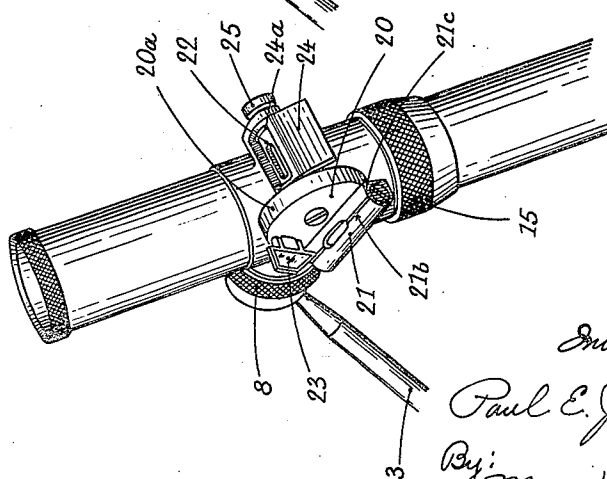


Fig. 7



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UNITED STATES PATENT OFFICE

2,176,524

ORDNANCE

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5 Claims. (Cl. 89—40)

This invention relates to ordnance and especially to trench mortars of the type comprising a gun the lower end of which rests on the ground through the agency of a base plate, while the chase rests on a support, preferably in the form of a bipod.

The invention aims at providing a piece of ordnance of the foregoing type, which is of simple and stout construction and very easily handled, and which, when of small calibre, can be easily carried and served by one man.

According to this invention the gun barrel of the piece of ordnance is connected to its support by means of a universal joint.

The male member of said universal joint is preferably composed of two cups, each integral with a leg of the support, and jointly forming a complete sphere, said cups being arranged in such a manner as to be relatively pivotable, in order to enable the legs to be straddled.

The assembled universal joint is mounted in a female member, or cage, integral with a collar adapted to slide along the barrel of the gun.

In one embodiment of the invention, the cage of the joint comprises a cheek, which is movable in relation to the collar and is adapted to be tightened, to a greater or less degree, on the joint by means of a nut engaging on the one hand with the joint and on the other with a thread provided on the collar. Said cage also comprises a cap, preferably independent of said cheek, and bearing against the collar, either directly or through the agency of resilient members such as Belleville washers.

The sliding collar connecting the universal joint with the gun barrel comprises, preferably, a device enabling the grip on the gun to be adjusted at will.

This arrangement facilitates the operation of pointing the gun barrel and, at the same time, enables the grip to be adjusted to a value sufficiently light to allow the gun barrel to recoil, by sliding in the collar, when the gun is fired, without disturbing the support. The grip can be adjusted in such a way as to allow the parts to be shifted by hand during the operation of pointing, whilst preventing untimely shifting under the effect of shocks occurring during manipulation.

The baseplate, which is fixed to the breech of the gun, in known manner, is composed of a circular platform from the lower portion of which (intended to be situated underneath the gun) a segment is removed in order to ensure firmer seating on the ground.

The invention also covers the arrangement of

the pointing accessories with which the gun is fitted and which comprise mirrors enabling the longitudinal and transverse levels, provided thereon, to be viewed from below.

The foregoing and other features of the present invention will become apparent from the following description taken in conjunction with the accompanying drawings which illustrate diagrammatically and purely by way of example, one embodiment thereof, and in which:

Fig. 1 is a perspective view of a trench mortar in the firing position;

Fig. 2 is a longitudinal section along the axis of the barrel;

Fig. 3 is a longitudinal section, on a larger scale, of the universal joint connecting the gun with the support;

Figs. 4 and 4a are corresponding views of modifications of the joint of Fig. 3;

Fig. 5 is a side elevation of a detail, on a larger scale;

Fig. 6 is an elevation of the collar slidably mounted on the barrel; and

Figs. 7, 8 and 9 are perspective views showing the details of the pointing arrangements.

In the drawings, 1 denotes the gun barrel, the rear end of which rests on the ground through the agency of a baseplate 2, while the chase on upper part of the barrel rests on a support composed of two legs 3, articulated on a collar 4 surrounding the gun and adapted to be rendered immovable thereon in a convenient position (Figs. 1 and 2).

The bipod and the collar 4 are connected together by a spherical joint, the male member of which is formed by two cups 5 (Fig. 4) which are preferably hemispherical, and each of which is integral with one leg. The cups fit, one in the other, by means of their suitably shaped rims 5a, or articulate together in any other way, in such a manner as to enable the legs 3 to be straddled. The sphere 5—5 formed in this manner is mounted in the female member or cage of the joint, which is integral with the collar 4 and comprises a cap 6, corresponding in curvature with the sphere 5—5, and a cheek 7, the assembly of the cap and cheek surrounding more than one half of the sphere. The cheek 7 is so arranged that it can be tightened, to a greater or less degree, against the head 5—5 which it embraces, this result being attained in the present instance, by means of a nut 8, the rim 8a of which engages a flange 9 on the cheek 7, said nut being adapted to screw on a thread provided on a nipple 11 of the collar 4. The cheek 7 is cut away

at 12 to enable the bipod to be folded back alongside the gun, to facilitate transportation of the mortar.

The positions of the swivel 5—5 and cage 6, 7 may, of course, be inverted, the swivel being then integral with the collar, whilst all, or some, of the members of the cage are integral with the legs 3.

The collar 4 has a tightening device comprising a resilient band 13 (Fig. 4) with a trunco-conical outer surface and longitudinal slots 14. Said band may be pressed, more or less firmly, on the barrel by the trunco-conical inner wall of a nut 15 which screws on to a thread 16 on the collar 4.

Attached to the rear end of the gun 1 is the base-plate 2 (Figs. 1 and 2) provided with a point 17, which in the case of a self-firing gun, carries a fixed striker pin 18 projecting permanently inside the bottom of the barrel.

The plate 2, of substantially circular shape, has one segment removed at the part marked 19 (which is intended to be situated under the gun 1), in such a way as to facilitate resting the gun on the ground. The form of the base-plate itself is accordingly that of a segment of a circle.

Detachably mounted on the collar is a simplified sighting apparatus (Figs. 5 to 9) comprising a drum 20 which carries a longitudinal level 21 and is adapted to pivot on an axis perpendicular to the axis of the gun, opposite a band 20a fixed on the collar 4. The level 21 carries a sighting line 21b and a datum line 21c which enables the angular position of the level to be observed in relation to the graduation on the band 20a.

A transverse level 22 is mounted in the axis of the drum 20 and serves for correcting lateral tilt. The angular displacement of this level is the same as that of the drum, in order that its bubble may always be visible in a vertical plane passing through the axis of the drum. Mirrors 23 and 24, adapted to turn on pivots, integral with the drum 20 in the one case, and with the rotational axis of the drum in the other, enable the bubbles in the levels 21 and 22 to be observed from below (Fig. 9), thus facilitating the adjustment. One portion of the mount carrying the mirror 24 is cut away at 24a, to enable the level 22 to be observed from above when the mirror 24 is turned down (Figs. 7 and 8). 25 denotes a button which compresses a Belleville washer (not shown), the suitable tightening of which acts up, between the sighting apparatus and the collar 4, a degree of friction which allows the apparatus to be rotated when the firing angle is being adjusted, whilst preventing the apparatus from shifting by inertia during the act of firing.

In order to set up the gun in battery position, all that is needed is to unfold the legs 3 and spread them apart, the gun being then set in position on the ground and pointing towards the objective. The points 17 of the breech and those 23 of the shoes 27 anchor the gun to the ground.

Tilt is corrected by turning the unit formed by the gun 1 and collar 4, in relation to the joint 5, so as to bring the level 22 into the horizontal position.

The angle of fire is adjusted by bringing the collar into the desired position on the barrel by means of the nut, and adjusting the inclination by means of the level 21 and the scale opposite the drum 20.

The projectile is, preferably, of the type which carries, on the rear end, the propulsive charge, duly primed and enclosed, for example, in a cartridge. The gun is loaded through the muzzle,

the barrel being suitably inclined in relation to the horizon. The cartridge impinges against the pin 18 and the shot is fired automatically. The barrel 1 recoils without appreciably moving the collar 4, which grips the barrel lightly and tends to remain stationary by inertia. The barrel 1 returns into position—under the effect of the reaction of the ground—before the collar has practically had time to shift. By virtue of this arrangement, the sighting apparatus is shielded from any rough shock during the act of firing.

Fig. 3 shows a modification of the universal joint, in which the cap 6 bears against the collar 4 through the agency of a resilient device, such as Belleville washers.

Fig. 4a shows another modification, in which a spring 28a, interposed between the cups 5, tends to keep them apart.

With the two arrangements shown in Figs. 3 and 4a, the friction applied to the swivel 5—5 is more uniformly distributed than in the construction shown in Fig. 4.

The gun 1 may, if desired, be provided with an operated percussion device, instead of a fixed striker pin. It may, in such event, even be provided with a movable breech and fire projectiles of any kind whatsoever.

It is self-evident that the present devices have been described and represented solely by way of explanation and without being restrictive, and that various structural modifications may be introduced therein without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a piece of ordnance the combination of a barrel, a base-plate at the lower end of said barrel, a support to bear the upper part of said barrel, said support having two legs, and a ball and socket joint between said support and said barrel, said ball and socket joint comprising two cups forming as a whole a complete sphere, each of said cups being integral with one of said legs, said cups being arranged to pivot on one another to enable the legs to be straddled.

2. In a piece of ordnance the combination of a barrel, a base-plate at the lower end of said barrel, a support to bear the upper part of said barrel, said support having two legs, a collar adapted to slide along the barrel, and a ball and socket joint between said support and said barrel, said ball and socket joint comprising two cups forming, as a whole, a swivel, each of said cups being integral with one of the legs, said cups being arranged to pivot on one another to enable the legs to be straddled, whereas a swivel cage, adapted to receive said swivel, is integral with said collar.

3. In a piece of ordnance the combination of a barrel, a base plate at the lower end of said barrel, a support to bear the upper part of said barrel, said support having two legs, a collar adapted to slide along the barrel, and a ball and socket joint between said support and said barrel, said ball and socket joint comprising two cups forming, as a whole, a swivel, each of said cups being integral with one of the legs, a swivel cage adapted to receive said swivel and integral with said collar, said swivel cage having a cheek movable in relation to the collar and adapted to grip the swivel, a threaded part on the collar, and a nut engaging said threaded part of the collar, on the one hand, and said cheek, on the other hand, said nut being adapted to adjust the grip of said cheek on said swivel.

4. In a piece of ordnance the combination of
a barrel, a base-plate at the lower end of said
barrel, a support to bear the upper part of the
barrel, said support having two legs, a collar
5 adapted to slide along the barrel and a ball and
socket joint comprising two cups forming, as a
whole, a swivel, each of said cups being integral
with one of the legs, a swivel cage adapted to
receive said swivel and integral with said collar,
10 said swivel cage having a cheek movable in re-
lation to the collar and adapted to grip the
swivel, a cap bearing directly against the collar,
a threaded part on the collar, and a nut engag-
ing said threaded part on the collar, on the one
15 hand, and said cheek on the other hand, said
nut being adapted to adjust the grip of said
cheek on said swivel.

5. In a piece of ordnance the combination of

a barrel, a base-plate at the lower end of said
barrel, a support to bear the upper part of the
barrel, said support having two legs, a collar
adapted to slide along the barrel and a ball and
5 socket joint comprising two cups forming, as a
whole, a swivel, each of said cups being integral
with one of the legs, a swivel cage adapted to
receive said swivel and integral with said collar,
said swivel cage having a cheek movable in re-
10 lation to the collar and adapted to grip the
swivel, a cap movable in said swivel cage, at
least one resilient member between said cap and
said collar, a threaded part on the collar and a
nut engaging said threaded part on the collar,
on the one hand, and said cheek on the other
15 hand, said nut being adapted to adjust the grip
of said cheek on said swivel.

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