B. B. LEWIS.

GUN AND PROJECTILE.

APPLICATION FILED AUG. 21, 1915.

1,202,744.

Patented Oct. 24, 1916.

3 SHEETS—SHEET 1.

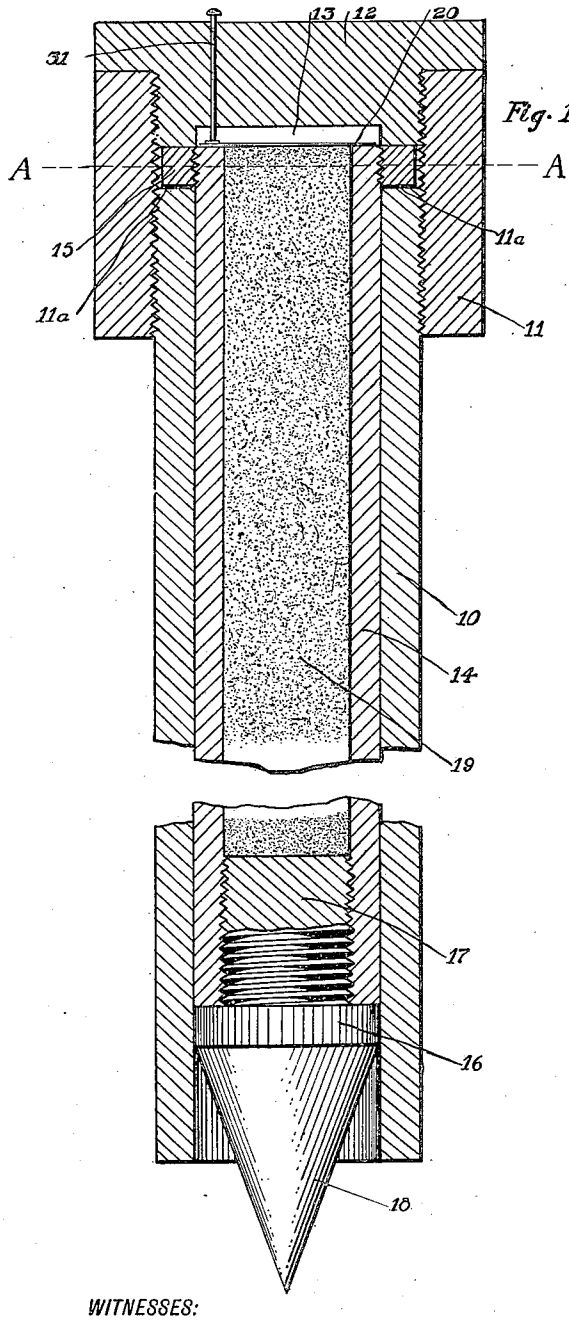


Fig. 1.

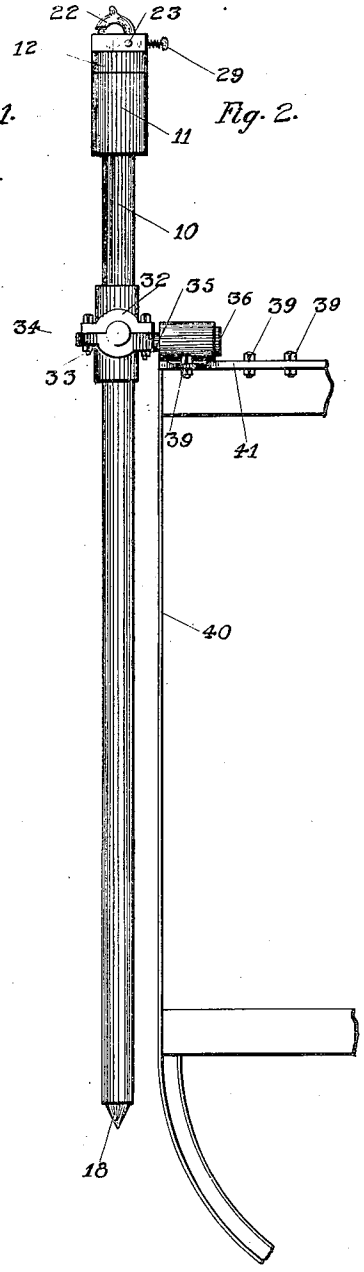


Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 5

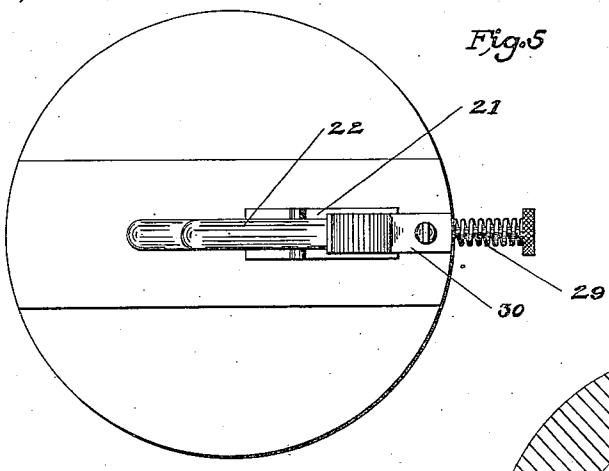


Fig. 3

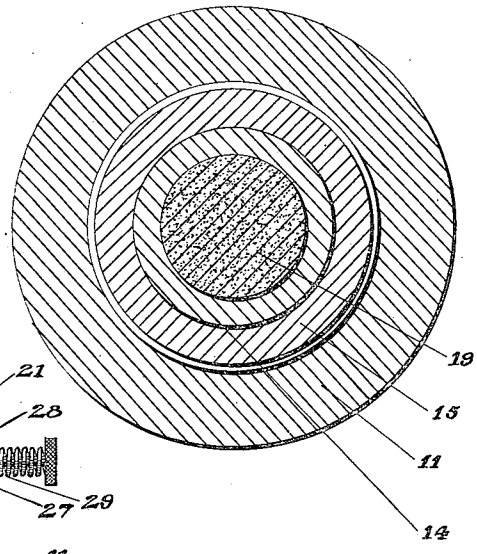
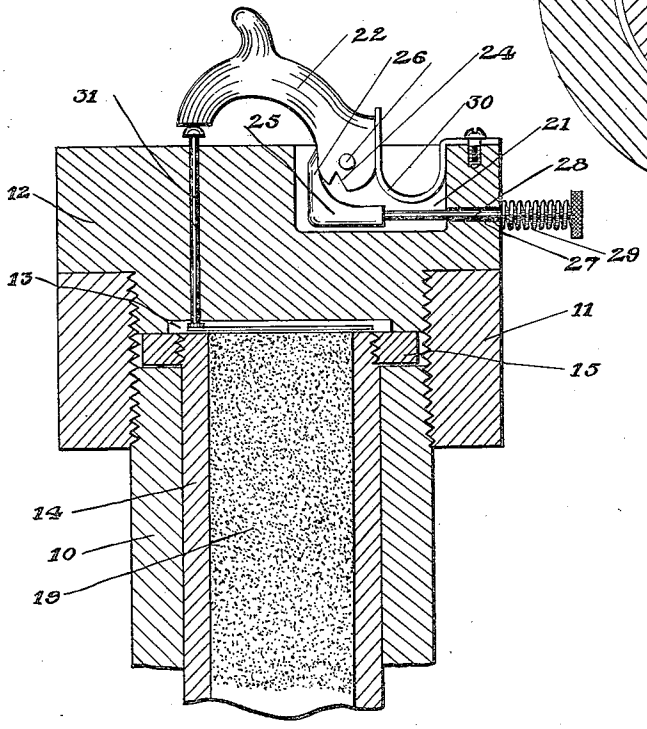


Fig. 4



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3 SHEETS—SHEET 3.

Fig. 7.

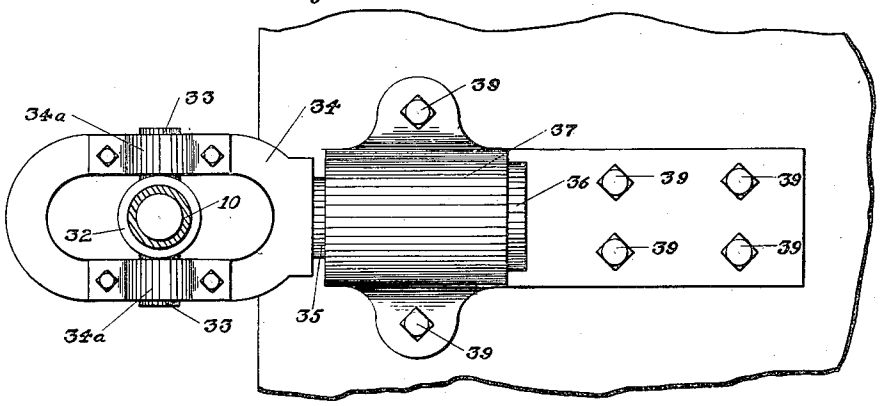
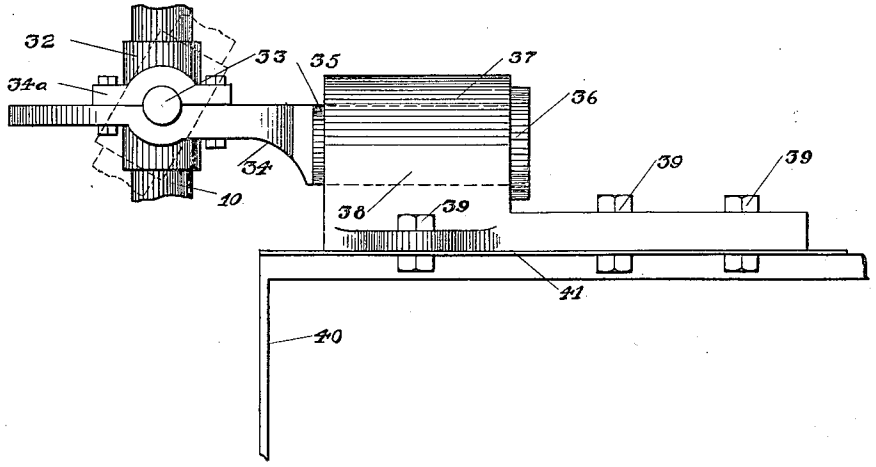


Fig. 6.



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UNITED STATES PATENT OFFICE.

BENJAMIN B. LEWIS, OF BRIDGEPORT, CONNECTICUT.

GUN AND PROJECTILE.

1,202,744. Specification of Letters Patent. Patented Oct. 24, 1916.

Application filed August 21, 1915. Serial No. 46,674.

To all whom it may concern:

Be it known that I, BENJAMIN B. LEWIS, a citizen of the United States, and a resident of the city of Bridgeport, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Guns and Projectiles, of which the following is a specification.

My invention consists in certain peculiarities of construction in a gun for the discharge of projectiles, in combination with a projectile of a peculiar formation, and especially adapted for use in connection therewith. Special provision has been made for its use in such vertical direction as may be called for to meet the exigencies of submarine warfare as at present carried on.

More specifically the object of my invention is to provide a gun which shall be light enough to be safely mounted upon a vessel of a comparatively small size, but which shall at the same time discharge a projectile with a sufficient force to pierce the shell of a submarine even at a considerable depth beneath the surface.

To meet the differing phases of such submarine combat I also provide a method of mounting by means of which a discharge may be made at varying angles laterally from the directly vertical and also longitudinally, both forward and aft, at any lateral elevation.

In the drawing Figure 1 is a sectional elevation of the gun and projectile when loaded, preparatory to the discharge. Fig. 2 shows the gun mounted and in a vertical position on the side of a vessel. Fig. 3 is a sectional view on the line AA of Fig. 1. Fig. 4 is a detail of construction of breech piece, in sectional elevation, showing an igniting mechanism for use in connection therewith. Fig. 5 is a plan view of the same. Fig. 6 is a side elevation of the mounting mechanism bolted to the deck of a vessel. Fig. 7 is a plan view, partly in section, of the part shown in Fig. 6.

Numerals 10 of the drawing indicate a gun tube, preferably of a smooth bore, its upper end terminating within a breech enlargement 11, either integral with or fixedly attached to the same, 11^a is the shoulder surrounding the end of the projectile tube. Into the breech enlargement is screw threaded the breech block 12. Within the gun tube 10 is seen the elongated tubular projectile 14, having at its outer extremity a plug 16, having a shank 17 screwed into the end of the projectile tube and with its outward end terminating in a pointed cone 18. Threaded upon the upper end of the projectile tube is a collar 15, its upper surface approximately flush with the end of the projectile tube, its lower surface resting upon the shoulder 11^a of the gun tube and loosely filling the space between the projectile tube and the wall of the breech enlargement, thus holding securely in place the tubular projectile 14.

I preferably employ a collar made of a soft quality of metal, as compounds of lead or aluminum. This collar forms an important operative feature in the practical working of my invention. A suitable degree of hardness in the material of which it is composed, in conjunction with the depth of the thread with which it is screwed onto the projectile tube, serving to regulate the amount of pressure required to strip the screw threads of the collar and thus to impart the required initial velocity needed for the projectile. The explosive charge 19, preferably of a slow firing quality, is contained within the tubular projectile 14 open at the top. Detonator 20 is placed with its exterior circumference resting upon the end of the projectile tube and within the hollowed out chamber 13 of the breech plugs interior; detonating rod 31 passes through the breech plug and makes contact with detonator 20 directly over the wall of the projectile tube.

In Figs. 4 and 5 is shown a hammer and device for actuating the same so as to produce the proper degree of percussion needed for the firing mechanism. In this 21 is an elongated slot within the breech block itself, its sides parallel with those of the central raised portion of the breech block. Within the slot is pivotally mounted a hammer 22, having its outer extremity making operative contact with the end of detonating rod 31. A spring 30, fixedly attached at its outer end of the breech block, bears at its opposite extremity on the rear of the hammer. A sliding pawl 25, having a rectangular end 26, making operative contact with indent 24 of the hammer shank, and having a shaft 27 passing through a hole 28 in the breech block, has upon its exterior end an operating spring 29.

The operation of this form of firing mechanism is substantially as follows:—When

hammer 22 is raised to an approximately quarter turn, the interior end of spring 30 is thrown backward, thus compressing the spring. The same movement throws forward and upward the lower extremity of the hammer shank, allowing pawl 26 to make connection with indent 24 of the hammer, thus holding the hammer in a cocked position and ready for firing. A push on the projecting end of rod 27 releases the hammer, which is instantaneously driven down by spring 30 upon the end of detonating rod 31, resulting in an explosive discharge of the projectile.

I do not limit the scope of my invention to its use in connection with the precise form of detonating apparatus here shown, as a blow on the projecting end of the detonating rod by means of the gun hammer and trigger in ordinary use suitably installed within the breech block would be similarly efficacious.

The combination of parts made use of in mounting the gun may be specified as follows:—A band 32 is fixedly attached to the gun tube. Trunnions 33, preferably integral with the band, rest in bearings 34ª of a trunnion holder 34, longitudinally oval in its structure and having a shank 35 rotatively mounted in bearings 38 of gun base 37, said base being securely bolted to the deck of the vessel at suitable points as indicated by the numerals 39 of the drawing. A collar 36, fixedly attached to the outer terminal of shaft 38, serves to retain the same in operative position within the bearing of the gun base. The lateral movement of the gun tube within the trunnion holder is indicated by the dotted lines of the drawing shown in Fig. 6. It is evident that the gun, at whatever lateral angle it may be placed may be readily turned longitudinally, either fore or aft, by means of power applied to the gun head, thus causing a partial revolution of the trunnion holder within the bearing 38 of the gun base.

I am aware that the tubular projectile, opening posteriorly into the firing chamber and containing an explosive charge has been previously made use of in a certain class of firearms in which a funnel-like expansion of the end of the projectile tube fitting into a similar shaped expansion of the gun barrel where it enters the firing chamber has been utilized as a means of retaining such projectile in position. Frictional contact—more especially in connection with the ordinary rifled barrel—has also been largely depended on for maintaining such projectile in a relatively fixed position within the gun tube. When, however, a gun tube of smooth bore is to be employed in connection with an equally smooth tubular projectile, more especially when a vertical position of the firing piece is necessitated as at times in submarine warfare, some more definite means of retaining the weighty projectile and also of regulating the initial explosive force of the discharge becomes essential. This I accomplish as previously stated, by means of metal collars of differing degrees of hardness and using therefor for the most part, the softer metals as lead and aluminum, and their alloys, and which may be readily screwed on or removed from the interior end of the projectile tube. Submarine mines have also been constructed in which the holding breech block is screw-threaded into the casing of the mine—such screw-threading being forcibly stripped at the moment of explosion.

My improvement, as may be seen, consists in making use of a collar not integral with the projectile, but forming a separate unit of the combination, and which may be readily removed and another substituted in its place whenever a differing amount or quality of the explosive charge may require a less or greater degree of holding tension for obtaining a suitable initial velocity of discharge in the projectile.

I claim:

1. A gun tube enlarged at the breech, the enlargement forming a shoulder around the gun tube, a breech block closing the end of the enlarged portion, a tubular projectile closed at its outward end, the breech end being open, a removable collar screw-threaded upon the breech end of the projectile tube and resting upon the shoulder of the gun tube enlargement, an explosive charge within the tubular projectile and means for firing the same.

2. A gun tube enlarged at the breech, the enlargement forming a shoulder around the gun tube, a breech block closing the end of the enlarged portion, a tubular projectile closed at its outward end, the breech end being open, a removable collar screw-threaded upon the breech end of the projectile tube and resting upon the shoulder of the gun tube enlargement, a slot in the exterior of the breech block, a hammer pivoted within the slot, a spring actuating the hammer, an indent in the shank of the hammer, a pawl making operative connection with the indent and a spring actuating the same, an explosive charge within the projectile tube, and a detonating rod actuated by the hammer.

3. A gun tube enlarged at the breech, the enlargement forming a shoulder around the gun tube, a breech block closing the end of the enlarged portion, a tubular projectile closed at its outward end, the breech end being open, a removable collar screw-threaded upon the breech end of the projectile tube and resting upon the shoulder of the gun tube enlargement, an explosive charge within the tubular projectile, and means for firing the same, a band having trunnions,

fixedly attached to the gun tube, a trunnion holder whose shank forms a shaft turning freely within a bearing of the gun base, a collar upon the said shaft, and a gun base bolted to the deck of the vessel.

4. A gun tube enlarged at the breech, the enlargement forming a shoulder around the gun tube, a breech block closing the end of the enlarged portion, a tubular projectile closed at its outward end, the breech end being open, a removable collar screw-threaded upon the breech end of the projectile tube and resting upon the shoulder of the gun tube enlargement; a slot in the exterior of the breech block, a hammer pivoted within the slot, a spring actuating the hammer, an indent in the shank of the hammer, a pawl making operative connection with the indent, a spring actuating the pawl, an explosive charge within the projectile tube and a detonating rod actuated by the hammer; a band having trunnions, fixedly attached to the gun tube, a trunnion holder whose shank forms a shaft turning freely in a bearing of the gun base, a collar upon the said shaft and a gun base bolted to the deck of the vessel.

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Witnesses:
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