R. TEMPLE.

EXPLOSIVELY ACTUATED AFFIXING DEVICE.

APPLICATION FILED DEC. 15, 1919.

1,365,870. **Patented Jan. 18, 1921.**

2 SHEETS—SHEET 1.

Fig. 1

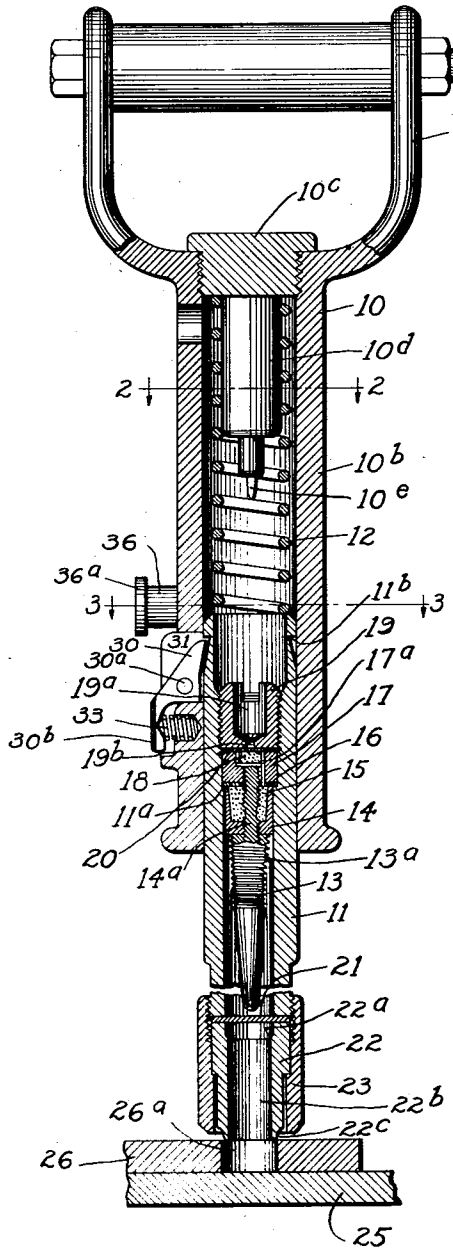
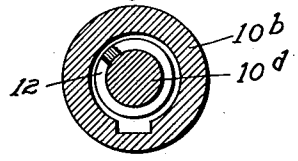


Fig. 2



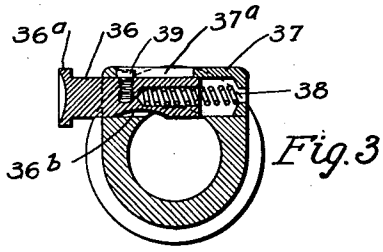
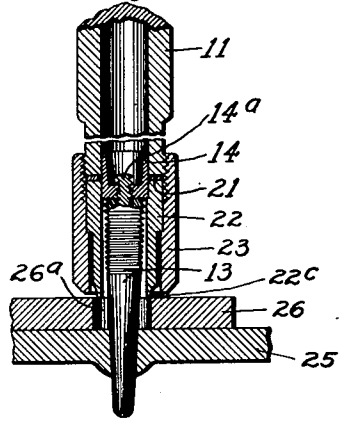


Fig. 3

Fig. 4



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2 SHEETS—SHEET 2.

Fig. 5

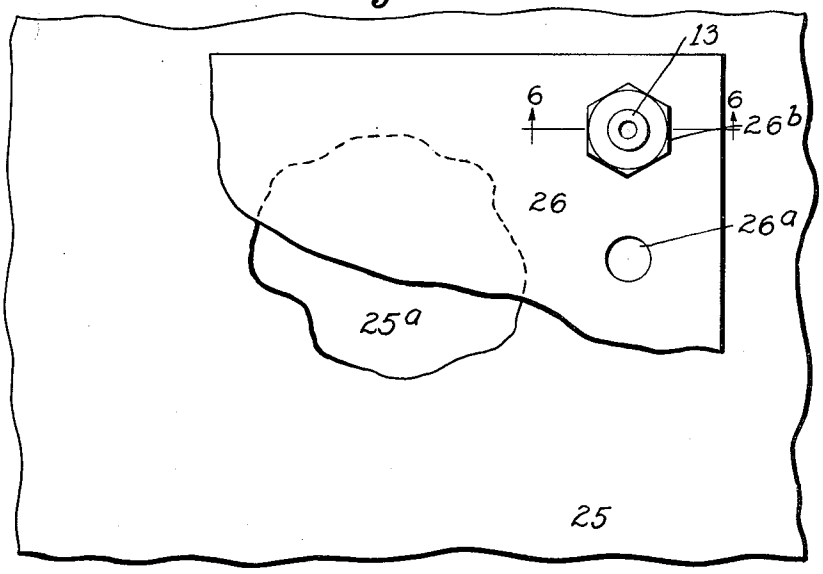
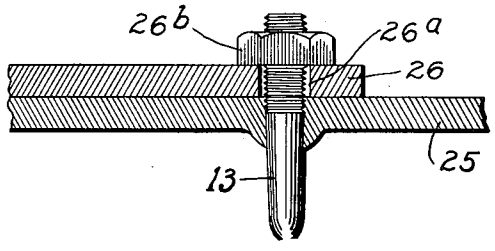


Fig. 6



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UNITED STATES PATENT OFFICE.

ROBERT TEMPLE, OF BROMLEY, ENGLAND.

EXPLOSIVELY-ACTUATED AFFIXING DEVICE.

1,365,870. Specification of Letters Patent. Patented Jan. 18, 1921.

Application filed December 15, 1919. Serial No. 345,001.

To all whom it may concern:

Be it known that I, ROBERT TEMPLE, a subject of the King of Great Britain, residing at Bromley, in the county of Kent, England, have invented certain new and useful Improvements in Explosively-Actuated Affixing Devices, of which the following is a specification.

This invention relates to improvements in explosively-actuated affixing devices and is an improvement on my invention set forth and described in co-pending application, Ser. No. 329,795, filed October 10, 1919.

The main object of this invention is to provide a device of the class described in which the barrel or projectile-carrying member is readily attached to or detached from the holder member.

Another object consists in the provision of a safety release means co-acting with the holder and barrel members to prevent accidental discharge of the projectile member.

Still another object consists in the provision of improved means located at the discharge end of the barrel member to insure proper positioning of the projectile member and to provide a simplified structure.

This invention relates to improvements in explosively-actuated affixing devices and is an improvement on my invention set forth and described in co-pending application, Serial No. 329,795, filed October 10th, 1919.

The main object of this invention is to provide a device of the class described in which the barrel or projectile carrying member is readily attached to or detached from the holder member.

Another object consists in the provision of a safety release means co-acting with the holder and barrel members to prevent accidental discharge of the projectile member.

Still another object consists in the provision of improved means located at the discharge end of the barrel member to insure proper positioning of the projectile member and to provide a simplified structure.

These and other objects will be more fully set forth and described in the following specification as shown in the accompanying drawings in which—

Figure 1 is a vertical longitudinal section through my improved device.

Fig. 2 is a horizontal section along the line 2—2 of Fig. 1.

Fig. 3 is a similar section along the line 3—3 of Fig. 1.

Fig. 4 is a vertical section of the discharge end portion of the device showing relative arrangement of the parts after the discharge of the projectile and its penetration through the ship's plate, or other object, just prior to its disassociation from the attached cup.

Fig. 5 is a side elevation indicating one application of my invention for practical use.

Fig. 6 is a section taken along the line 6—6 of Fig. 5.

Like numerals refer to like elements throughout the drawings in which 10 indicates generally the holder member, as I term it, comprising a handle portion 10^a and a tubular portion 10^b centrally bored to receive the barrel member 11 shown in place prior to discharge of the projectile in Fig. 1. A plug 10^c is threaded into the handle end of the tubular portion 10^b and carries a firing block 10^d of reduced diameter from the lower end of which projects the firing pin 10^e and a coiled spring 12 is located within the tubular portion 10^b around the firing block 10^d and being positioned thereby, this spring extending from the plug 10^c to the end of the barrel member 11.

As described in my co-pending application the barrel member 11 is provided with the projectile 13. The cup 14, which closely fits the bore of the barrel 11, is attached to the projectile 13 by means of the threaded stud 14^a. A charge of explosive 15 is carried in the cup 14 and is sealed therein by means of a copper disk 16, or the like, interposed between the cup 14 and the detonator block 17, the shoulder 11^a serving as a seat for the disk 16 and block 17. The detonator block 17 carries a detonator 18 which communicates through the duct 17^a with the explosive charge 15. The plug 19 is threaded into the upper portion of the barrel 11 and is provided with the central recess 19^a to accommodate the firing pin 10^e, a reduced aperture 19^b leading from the recess 19^a, as shown in Fig. 1. A relatively heavy copper disk 20, or the like, is located between the plug 19 of the detonator block 17 to substantially seal the explosive effect of the charge within the holder. The projectile is tapered, as shown in the drawings, and is threaded at 13^a at its upper end until the thread vanishes on account of the taper.

When the holder 10 is moved rapidly relative to the barrel 11 to detonate the detonator and charge through the medium

of firing pin 10^e, the effect of such explosion will be restrained and built up owing to the threaded connection of the stud 14^a with the detonator block 17 until such effect is of sufficient strength to shear the stud 14^a at a point of relative weakness, after which the cup 14, acting as a piston, will be forced outwardly through the bore of the barrel 11. Movement of the projectile is retarded by means of a thick, copper disk 21, or the like, located at the end of the barrel 11 and secured in place by means of the muzzle block 22, which in turn is secured in place by means of the nut or tip 23. This disk 21 not only serves to partially restrain or retard the movement of the projectile, but also prevents the entrance of water into the bore of the barrel 11, as will be obvious. In addition, impact of the projectile with the disk 21 will serve to assist in neutralizing recoil.

The muzzle block 22 is provided with the enlarged recess 22^a at its upper end beneath the disk 21 and the central bore 22^b leading therefrom, the latter being of sufficient size to permit free passage therethrough of the projectile 13 without stripping the threads 13^a therefrom. At its end the block 22 is provided with the rounded reduced portion 22^c for a purpose to be hereinafter described. After the explosion, as described, the projectile 13 will strike and pierce the disk 21, being slightly retarded thereby, and will pass outwardly through the bore 22^b until the cup 14 encounters the remainder of the disk 21 and is negatively accelerated thereby until brought to rest in the seat formed by the enlarged aperture 22^a, as shown in Fig. 4. This arrest of the movement of the cup 14 further retards the projectile 13, which has now penetrated the metallic side of the ship 25, or the like, as indicated in Fig. 4. Sufficient velocity and momentum, however, will be retained by the projectile 13 to detach it from the cup 14, the threads of the stud 14^a either shearing or the stud itself shearing to permit this detachment. Owing to its tapered construction the projectile 13 will now be brought to rest with its threaded end projecting from the ship's plate 25, or the like, as viewed in Fig. 6, for example. The projectile 13 if discharged by a properly selected explosive charge will penetrate the plate 25 until a portion of the threads 13^a are in engagement therewith, the metal of the plate flowing around such threads, thereby resisting removal of the projectile. The holder or barrel member may now be removed from the projectile, the barrel removed from the holder and a new barrel and projectile substituted therefor.

To render a replacement of the barrels easy, I construct the same with an undercut peripheral groove, forming the shoulder 11^b. A detent or latch 30 is pivoted at 30^a in a suitable slot 31 in the holder 10. This detent 30 is provided with an end normally seating in the peripheral groove 11^b, as shown in Fig. 1, and is provided with the outwardly disposed thumb-depressible portion 30^b. A coiled spring 33 extends between the portion 30^b and the holder 11 and normally maintains the detent 30 in the position shown in Fig. 1. When it is desired to release the barrel from the holder the portion 30^b is depressed. Thereupon the barrel may be removed or allowed to drop out and a new barrel may be inserted in the holder and forced upwardly past the detent 30 until the latter seats in the groove 11^b, as will be obvious.

To prevent accidental discharge of the projectile, I provide a safety member consisting of a plunger 36 having the head 36^a and the cut-away portion 36^b. This plunger is slidably mounted in a suitable housing 37 carried by the holder 11, the coiled spring 38 normally retaining the plunger 36 in the position shown in Fig. 3. The slot 37^a is provided in the housing in which is slidably mounted the head of a stud or set screw 39 carried by the plunger 36, this stud serving to limit movement of the plunger in either direction. When the plunger 36 is in the position shown in the drawings, the same will co-act with the end of the barrel 11 to prevent relative movement of the same and the holder. Depression of the plunger 36, however, will aline the cut-away portion 36^b with the bore of the holder so as to permit such relative movement.

In the operation of my device, when it is desired to discharge the projectile, the operator will grasp the handle 10^a in one hand to press the plunger 36 with the other hand and force the firing pin 10^e home against the detonator 18. In Figs. 5 and 6 I have shown one method of use of my device in which 25 indicates the side plate of a ship, or the like, having a hole 25^a therethrough. During the salvaging of a vessel it becomes necessary to patch such hole at least temporarily. For that purpose a temporary patch plate 26 is provided having a plurality of apertures 26^a therethrough, this plate being of the proper size and with the desired number of apertures, the latter being slightly larger than the diameter of the projectile 13. Assuming the patch plate 26 to be in its proper position a diver, or other repair man, will locate his apparatus with the reduced tip 22^c fitting in the aperture 26^a and thereafter discharging the explosive charge. The projectile will be brought to rest in the ship's plate 25, as shown in Fig. 6, with the threaded end projecting through the patch plate 26, after which the nut 26^b may be threaded upon the end of the projectile 13. A new holder will then be substituted for the one used and the second aperture will be utilized for the location of one of the affixing projec-

tiles and so on until the patch plate 26 is firmly bolted into position in the hole 25ª.

It will be obvious that this is only one of many applications possible and I do not wish to be restricted to the form shown and described or to the method of application of my device, except as defined in the appended claims.

What I claim is:—

1. In a device of the class described, a projectile member, and means to project said member into a plate, or the like, said member being externally threaded for engagement by a nut, or the like.

2. In a device of the class described, a tapered projectile member, and means to project said member into a plate, or the like, said member being externally threaded for engagement by a nut or the like.

3. In a device of the class described, a barrel member, and a projectile member carried thereby, said barrel member being provided with a bore at its discharge end, the diameter greater than the diameter of said projectile, said projectile being threaded for engagement by a nut or the like.

4. In a device of the class described, a barrel member, and a tip member detachably secured thereto, the latter being provided with a bore, said tip member having a projecting extremity for location in an aperture for proper positioning of said barrel member.

5. In a device of the class described, a barrel member, a tip member, said tip member being provided with a reduced extremity to form a shoulder, and a nut threadedly engaging said barrel member and engaging said shoulder of said tip member to secure the latter in assembled relation to said barrel member.

6. In a device of the class described, a barrel member, a tip member, said tip member being provided with a reduced extremity to form a shoulder, and a nut threadedly engaging said barrel member and engaging said shoulder of said tip member to secure the latter in assembled relation to said barrel member, said reduced portion of said tip member extending beyond and projecting from said nut member.

7. In combination with a holder member centrally bored, a barrel member being constructed to slidably fit said bore of said holder member, and means to normally prevent withdrawal of said barrel member from said holder member, said means comprising a detent.

8. In combination, a centrally bored holder member, a barrel member slidable in said bore, said barrel member being provided with a peripheral groove or notch, and a detent member carried by said holder and engageable with said notch to normally prevent withdrawal of said barrel member from said holder.

9. In combination, a centrally bored holder member, a barrel member slidable in said bore, said barrel member being provided with a peripheral groove or notch, and a detent member carried by said holder and engageable with said notch to normally prevent withdrawal of said barrel member from said holder, said detent being operable to release said barrel member.

10. In combination, a holder member, a barrel member slidably mounted therein, means to normally prevent relative sliding movement of said members, said means comprising a transversely movable plunger.

11. In combination, a holder member, a barrel member slidably mounted therein, means to normally prevent relative sliding movement of said members, said means comprising a transversely movable plunger, said plunger being provided with a cut-away portion to permit passage thereby of said barrel member when in one position.

12. In combination a holder member, a barrel member slidably mounted therein, means to normally prevent relative sliding movement of said members, said means comprising a transversely movable plunger, said plunger being provided with a cut-away portion to permit passage thereby of said barrel member when in one position, and means to normally maintain said plunger out of said position.

13. In combination a holder member, a barrel member slidably mounted therein, means to normally prevent relative sliding movement of said members, said means comprising a transversely movable plunger, said plunger being provided with a cut-away portion to permit passage thereby of said barrel member when in one position, and means to normally maintain said plunger out of said position, said last-named means comprising a spring.

In testimony whereof I have subscribed my name.

ROBERT TEMPLE.