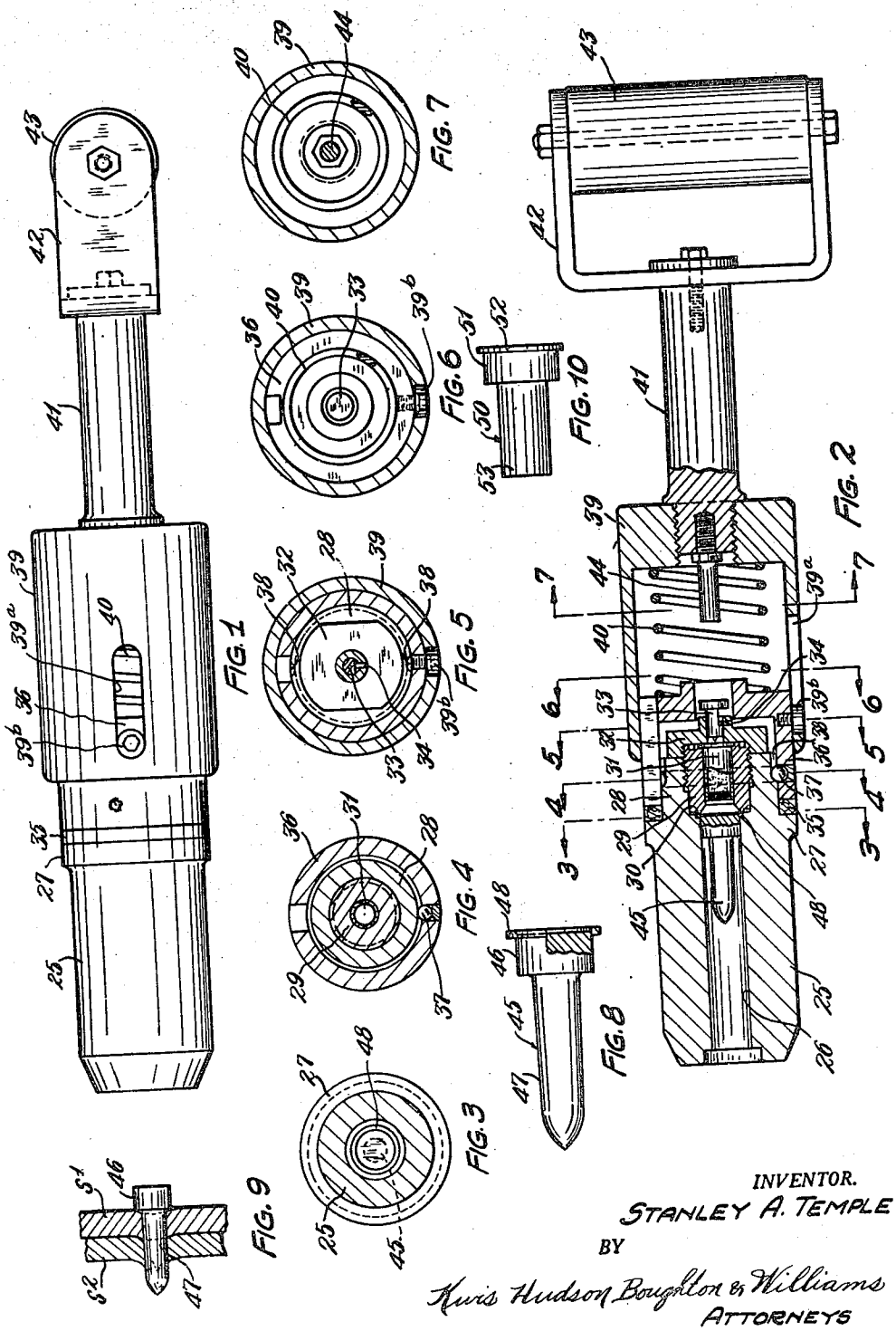
May 17, 1949. S. A. TEMPLE 2,470,117

GUN AND PROJECTILE THEREFOR

Filed Nov. 24, 1943

2 Sheets-Sheet 1

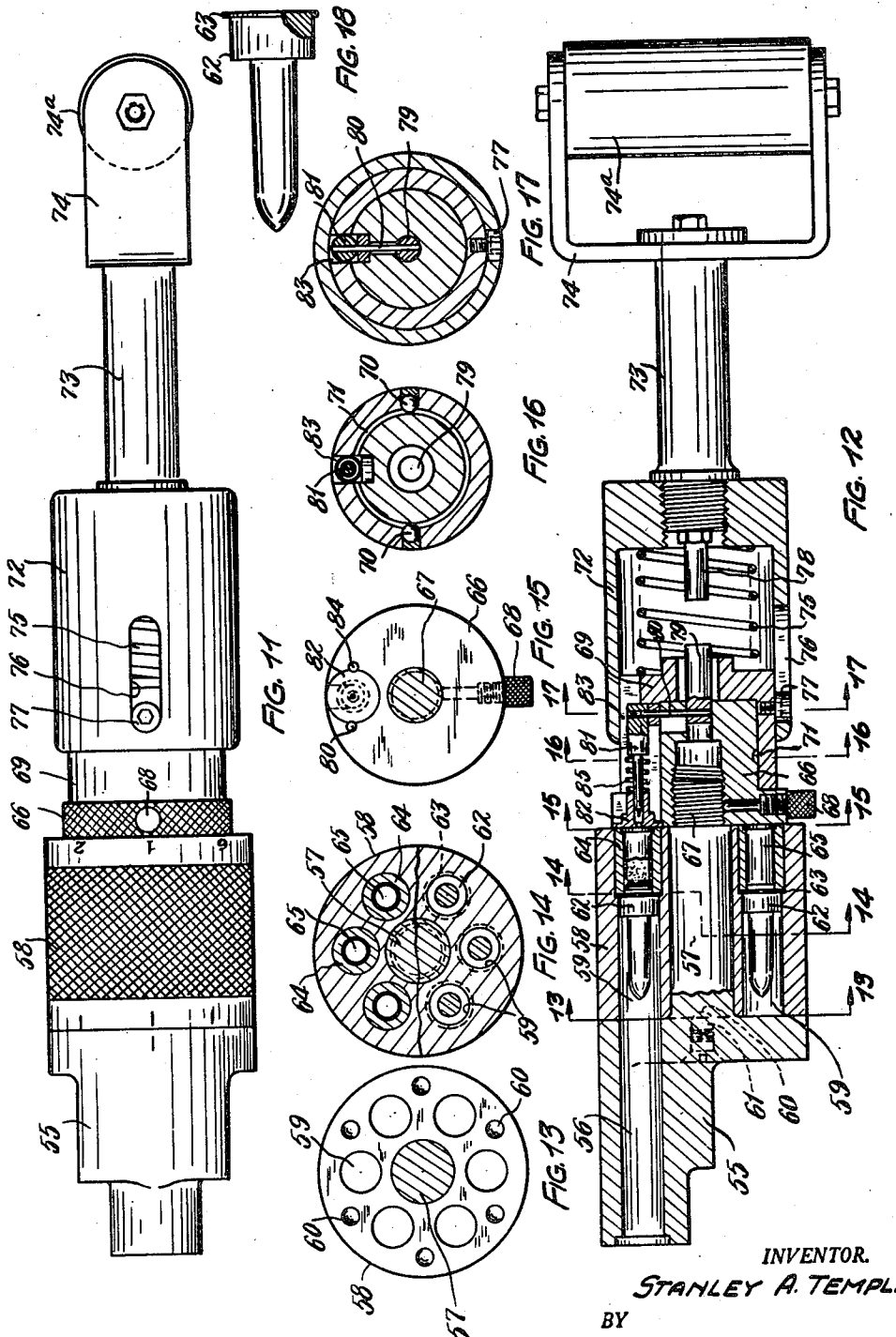


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GUN AND PROJECTILE THEREFOR

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1

This invention relates to a gun which is adapted to be fired under water and has for its chief object to provide a gun which can be effectively employed for riveting together sheets of metal, for perforating single or double sheets, and for cutting wires or cables, all under water.

The invention may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the accompanying sheet of drawings showing certain embodiments of my invention,

Fig. 1 is a plan view of a device which is adapted to fire a single shot;

Fig. 2 is a sectional view of the same taken with the device turned 90 degrees from the position shown in Fig. 1;

Figs. 3, 4, 5, 6, and 7 are transverse sectional views, along the lines 3—3, 4—4, 5—5, 6—6, and 7—7 respectively, of Fig. 2, looking in the directions indicated by the arrows;

Fig. 8 is an elevation with parts in section showing one style of steel bullet which is fired from the gun;

Fig. 9 shows the effect of the bullet in riveting two adjoining sheets;

Fig. 10 is a view showing a different type of bullet which may be employed;

Fig. 11 is a view similar to Fig. 1 showing a modification, the gun in this instance having a magazine by which a series of projectiles or bullets may be fired from the gun before reloading is necessary;

Fig. 12 is a view of the modified construction corresponding to Fig. 2;

Figs. 13, 14, 15, 16, and 17 are views taken respectively along the lines 13—13, 14—14, 15—15, 16—16, and 17—17 of Fig. 12 looking in the directions of the arrows;

Fig. 18 is a view similar to Fig. 8 showing a slightly different form of steel bullet.

Referring first to the construction shown on sheet 1 in Figs. 1 to 10, it will be seen that my improved under-water gun includes a cylindrically shaped barrel 25 having a bore 26. The barrel has a slight annular projecting flange 27 and rearwardly of the flange an internally threaded reduced extension 28.

Screwed into the internally threaded extension 28 of the barrel is a breech block 29. The forward part of the barrel extension 28 and the forward part of the breech block are unthreaded and these two portions of the barrel and breech block have a sliding fit when the breech block is

2

screwed into the barrel extension. The forward end of the breech block is provided with an annular axially extending flange indicated at 30 and inwardly of this flange the breech block has a conical opening, and, rearwardly of the forward end, the breech block is cylindrical to receive a blank cartridge which is indicated at 31.

The threaded end of breech block 29 extends slightly beyond the rear of the barrel 25 and screwed onto the rear end of the breech block is a firing pin holder 32. Mounted centrally of the holder 32 in line with the axis of the bore 26 of the barrel is a firing pin 33 which may slide freely back and forth in the rear end of the firing pin holder under the guiding action of a pin and slot connection indicated at 34. The forward end of the firing pin 33 is pointed and its rear end is enlarged.

Next to the external annular flange 27 of the barrel 25 is a fiber washer 35 which prevents metal to metal contact during recoil and fitted onto the rearward extension 28 of the barrel is a barrel carrier 36. The barrel carrier is held in place on the extension 28 of the barrel by a detent in the form of either one or two balls 37 which fit into an annular groove in the extension, the ball or balls 37 being carried by the barrel carrier 36, as shown in the lower part of Fig. 2. Either one or two grooves 38 (depending upon whether there are one or two detent balls 37) extend from the free end of the barrel extension to the annular groove. In assembling the barrel carrier on the extension 28 of the barrel, the barrel carrier is slid onto the extension with the detent ball or balls 37 riding forwardly through the grooves 38 and when the detent ball or balls enter the annular groove, the barrel is turned somewhat so as to lock it onto the extension of the barrel.

The barrel carrier 36 has a centrally disposed hollow boss at its rear end and freely slidable on the barrel carrier 36 is a hollow member 39 which houses a coil spring 40 which at its forward end bears against the barrel carrier 36 outwardly of the boss and at its rear end bears against the rear end of the member 39.

Screwed into the rear end of the hollow member 39 is a handle stem or stock 41 to the rear end of which is secured a U-shaped hand grip 42 carrying a handle 43.

Projecting forwardly into the chamber within member 39 from the forward end of the handle stem 41 is a hammer 44 which, when the member 39 is forcibly slid forwardly on the barrel carrier 36, is adapted to strike the firing pin 33 and to

drive it forwardly into the percussion cap of the cartridge or shell 31 and thus explode the shell. The hollow member 39 is guided in its forward movement by a slot 39a which is engaged by the head of a screw 39b which is screwed into the barrel carrier 36.

The projectile 45 shown in Figs. 2 and 8 is adapted to be used for riveting together a pair of adjoining sheets of metal. It is provided with an enlarged head portion 46 which fits loosely into the bore 26 of the barrel 25 (see Fig. 2). The travel of the projectile is guided by the bearing of the head 46 within the bore 26. The particular type of projectile shown in Figs. 2 and 8 is a rivet, which is adapted to pierce the two sheets which are to be riveted together, as shown in Fig. 9, where the sheets are designated S' and S^2. Additionally, the projectile has at its rear end a flange 48 which fits into a slight recess formed at the rear end of the bore 26. When the breech block is fitted into the rear end of the barrel it presses the flange 48 into the recess formed at the rear end of the bore. Flange 48 holds the projectile against displacement after the gun is loaded and before it is fired, and it also performs the important function of sealing the inner end of the bore against the passage of water into the breech.

When the breech block 29 is screwed into the barrel a shell 31 may be inserted into the block, extending the major portion of the length of the breech block and lying just to the rear of the projectile. The shell has a flange at its rear end which fits into an annular recess formed at the rear end of the breech block, the shell being held in position in the breech block by the firing pin holder 32.

To fire the shell, as, for example, in riveting two sheets together, the handle 43 is grasped, the forward end of the barrel is placed against one of the two sheets to be riveted together, and the handle is then pushed forwardly with considerable force until the hammer 44 strikes the firing pin 33 and drives it forwardly so that the pointed end of the firing pin will strike the shell contained in the breech block, whereupon the powder in the shell is ignited and the projectile is driven through the sheets, the flange 48 being sheared off.

In Fig. 10 is shown at 50 a somewhat different form of projectile having an enlarged head portion 51 which fits into the bore of the barrel, a flange 52 which fits into the recess formed at the rear end of the bore, and a cylindrical portion 53 which takes the place of the tapered portion 47 of the projectile 45 which tapered portion is adapted for use in riveting two sheets together, as before stated. The projectile shown in Fig. 10 is adapted to be used for perforating either one or two sheets of metal. After the projectile has been shot through the sheet or sheets, it can be readily dislodged if it does not itself fall out of the opening.

As shown in Fig. 8, the rear end of the head 46 of the projectile may have a shallow recess 20 therein, which has the effect of reducing the fin of metal by which the flange 48 is attached to the head. A small part of the force exterted by the explosion of the blank cartridge is used up in shearing off this flange. Therefore by varying the depth of the recess, or eliminating it entirely as in Fig. 18, the remaining force available for performing the riveting or other operation may be varied to suit different conditions.

After the gun has been fired, and it is desired to reload the gun, the barrel carrier 36 is removed

by turning the same until the detent or detents are in line with the grooves 38 and is then slid from the barrel extension. Then the firing pin holder is removed the same being shaped as shown in Fig. 5 so that a wrench can be readily applied thereto. Then the breech block is removed by means of a spanner wrench to permit a new projectile to be inserted in the bore of the barrel and a new shell to be inserted in the breech block. Then the parts are restored to their former positions and the gun is again ready for use.

The shell is practically filled with powder, its forward end being closed by one or two sheets of wadding and its outer end by a steel disk. The projectiles are generally formed from steel or an alloy of steel, and the tip at the outer tapered end of the shell may be hardened if necessary.

In Figs. 11 to 18 inclusive on Sheet 2 of the drawings I have shown a construction wherein a number of projectiles (six in this instance) may be fired from the gun before the gun need be reloaded. This gun includes a barrel 55 having a bore 56 which is located eccentrically with respect to the barrel. Extending rearwardly from the central part of the barrel is an extension 57 which for the major portion of its length is cylindrical in shape to receive a rotatable chamber block 58 which in this instance has six chamber bores 59 and six detent holes 60 which are adapted to be engaged by a detent in the form of a ball 61 pressed rearwardly by a screw and spring located in the forward portion of the barrel so as to definitely locate the chamber block in each of its firing positions.

Each bore 59 of the chamber block is adapted to be aligned with the bore 56 of the barrel in all the different positions of the block. Each bore 59 is adapted to receive a projectile 62 the rear end of which has a flange 63 which abuts against a shoulder at the end of the bore. At the rear of the several projectiles in the chamber block and located in bores which are somewhat larger than the bores 59 and formed as extensions of the latter are shell holders or breech blocks 64 which may be formed individually or in one unit if desired and which hold the projectiles 62 in place. Each shell holder or breech block receives a shell 65 which is formed in the same manner as the shell described in connection with the first embodiment of the invention.

Bearing against the shell holders or breech blocks 64 is a breech block holder and firing unit holder 66 which is screwed onto the threaded rear end 67 of the barrel extension and is held in place by a screw 68. Slidably fitted onto the holder 66 is a barrel carrier 69 which is held in place by ball detents 70, the ball detents engaging in a groove 71 as shown in Fig. 16. Two ball detents 70 are preferably employed. The barrel carrier 69 can be applied in the same way that the barrel carrier 36 is applied in the construction first described, i. e., by having a pair of grooves which extend from the free end of the holder 66 until they intersect the annular groove 71, and by sliding the detents through these longitudinally extending grooves until they reach the annular groove, and then by turning the carrier 69, it is locked in position.

Slidable on the barrel carrier 69 is a sleeve 72 which receives a handle stem 73 to which is secured a U-shaped hand grip 74 having a handle 74a. The sleeve 72 houses a coil spring 75 which normally keeps the sleeve 72 in its rearward position but permits it to slide forwardly on the exertion of pressure because of the slot and pin con-

nection shown in Fig. 12, the slot, which is located in the wall of the sleeve 72, being designated 76 and the pin which is screwed into the barrel carrier 69 being designated 77.

The front wall of the sleeve 72 carries, as in the construction first described, a hammer 78 which, when the chamber is pushed forwardly, instead of striking the firing pin, strikes a slide 79 which is slidable centrally of the holder 66. This slide 79 carries a radially extending pin 80 which at its outer end carries a firing pin 81 the forward end of which slides in a guide member 82. The outer end of the radially extending pin 80, the firing pin 81, and the guide member 82 are located in a slot 83 formed partly in the holder 66 and partly in the barrel carrier 69. The guide 82 is held in position by a pair of pins 84 shown in Fig. 15. The firing pin 81 is normally held in its inoperative position by a spring 85 which surrounds the reduced part of the firing pin.

When the sleeve member 72 is moved forwardly, the hammer 78 strikes the slide 79 which causes the firing pin to strike the percussion cap of the shell in the extension of bore 59 of the chamber block which is in alignment with the bore 56, and this ignites the powder in the shell and shoots the projectile 62 associated with the shell out through the bore 56 of the barrel. To again fire the gun, it is only necessary for the operator to turn the chamber block one step to bring a new shell and projectile in line with the firing pin and in line with the bore 56 of the barrel.

To reload this gun, the barrel is removed from the carrier 69, then the holder 66 is unscrewed, carrying the firing unit with it. Access is then had to the chamber block for reloading purposes.

The handle 43, stock 41, sleeve member 39 and hammer 44 of the Fig. 2 construction make up a unit which is interchangeable with the like unit in the Fig. 12 construction, the means for actuating the firing pin in Fig. 12 including a plunger 79 in position to be contacted by the axially located hammer.

By providing a thick walled barrel, as shown particularly in Fig. 2, which will stand the heavy lateral forces transmitted through the incompressible water, I avoid the necessity of sealing the outer end of the barrel, and thus simplify the construction. Furthermore, because of this departure from the prior art it is entirely feasible to load my gun under water.

While I have shown several constructions, I do not desire to be confined to the precise details shown but aim in my claims to cover all modifications which do not involve a departure from the spirit and the scope of the invention.

Having thus described my invention, I claim:

1. In a gun having a barrel provided with an outwardly extending shoulder at the inner end of its bore and also having means for supporting a cartridge rearwardly of said shoulder and in line with the bore and also having means for firing said cartridge, a projectile having a head for disposition in said barrel bore and having an outwardly extending shearable flange connected to and surrounding said head at the rear end thereof for seating engagement against the barrel shoulder ahead of the cartridge, to thereby normally prevent advance of the projectile forwardly through the barrel bore, the rear end of said projectile head surrounded by said projectile flange being recessed to a depth less than the depth or thickness of said flange and to a diameter substantially equal to the diameter of the head, to thereby facilitate the shearing of the flange from the projectile head upon the firing of the cartridge.

2. In a gun having a barrel provided with an outwardly extending shoulder at the inner end of its bore and also having means for supporting a cartridge rearwardly of such shoulder and in line with the bore and also having means for firing said cartridge, a projectile having a body for disposition in said barrel bore and having an outwardly extending shearable flange at the rear end of said body for seating engagement against the barrel shoulder ahead of the cartridge, to thereby normally prevent advance of the projectile body forwardly through the barrel bore, said flange being connected to the projectile body by a portion which is weak in comparison to either the flange or the projectile body to thereby facilitate the shearing of the flange from the projectile body through said weak portion upon the firing of the cartridge.

3. In a gun having a barrel provided with an outwardly extending shoulder at the inner end of its bore and also having means for supporting a cartridge rearwardly of said shoulder and in line with the bore and also having means for firing said cartridge, a projectile having a body for disposition in said barrel bore and having an outwardly extending shearable flange at the rear end of said body for seating engagement against the barrel shoulder ahead of the cartridge, to thereby normally prevent advance of the projectile body forwardly through the barrel bore, said flange being connected to the projectile body by a portion of less thickness than that of the flange to thereby facilitate the shearing of the flange from the projectile body through said portion of less thickness upon the firing of the cartridge.

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