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2,736,308

UNDERWATER SPEAR GUN

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FIG. 1

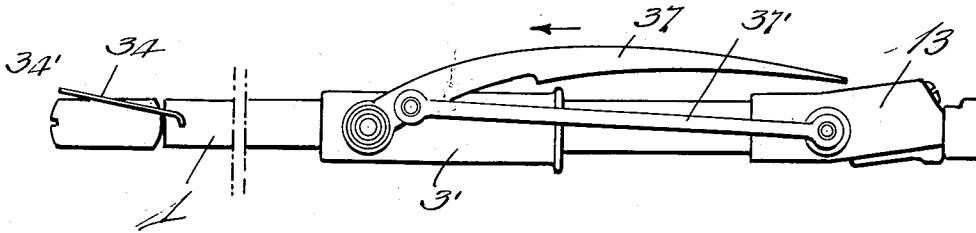


FIG. 2

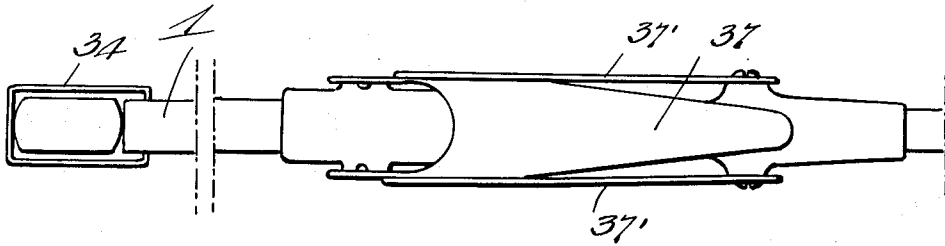


FIG. 3

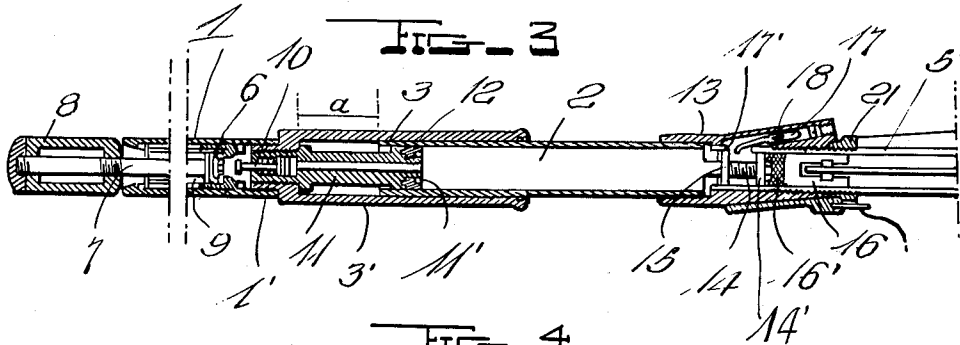


FIG. 4

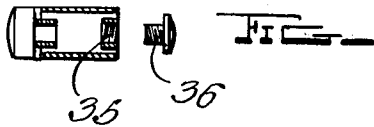
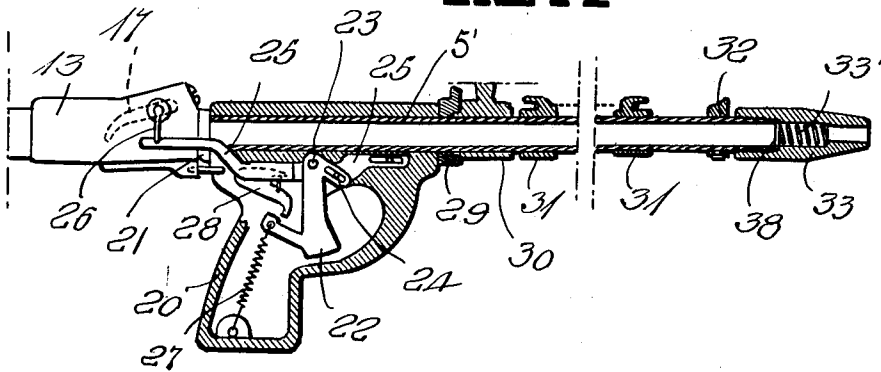


FIG. 5

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UNDERWATER SPEAR GUN

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4 Claims. (Cl. 124—13)

This invention relates to improvements in propulsion means of guns employed in under sea fishing which substitutes for the means heretofore employed, such as metallic springs and various rubber links, compressed air. This improvement not only eliminates the short life of these known materials due to the loss of temper and oxidation in winter of the metallic springs and the stretching and decomposition of the rubber of the pulleys as a consequence of the action of salt water thereon, but considerably lessens the required muscular effort of the user with this new charge. The charge which is produced through a compression pump which is a part of the butt-end of the gun will last for repeated use because the charge is not wasted, but only transformed, with no losses except unimportant infiltrations through the joints and can serve for all discharges effected during various immersions over a period of several days.

Another great improvement, doubtlessly the most important, provided by this means of propulsion consists in the provision of an external lever which rests on the bottom of the body or air chamber coupled through links to the end of said chamber and which can reduce by some centimeters the length of the pneumatic chamber, increasing its internal pressure and capacity of reaction.

In the accompanying drawings:

Fig. 1 is a side elevation of the rear half of the gun.

Fig. 2 is a top view of the posterior half of the gun showing the location and form of the lever for producing pressure and the cooperating links.

Fig. 3 is a longitudinal detail section through the rear half of the gun showing the internal mechanism.

Fig. 4 is a longitudinal detail section through the front half of the gun.

Fig. 5 is a cylindrical cap which can be used to close off the compressed air chamber while the pump is detached.

Fig. 3 shows an air pump 1, pneumatic chamber 2 provided by sleeve 3, inlet valve 10 and a second sleeve 4 which contains the coupling between said air chamber and the barrel of the gun including the means for retention and discharge of the harpoon or projectile 5. The pump is composed of the piston 6 with its threaded shaft 7 extending to the inner threaded bore of the handle 8 and the body 1 formed by a cylindrical pipe threaded internally at 1' at the end wherein is screwed the threaded sleeve 3' joining it with said chamber and internally supporting another pipe 9 of less diameter in which slides the piston 6. The piston is formed by an angular gasket of leather retained at the end of said shaft 7 by rings and nuts. Following this gasket is the coupling sleeve 3' having the inlet valve 10, similar to that used in the tires of bicycles, in the end thereof. The valve body 11 which supports this valve 10 extends internally into and hermetically seals the tube 3 of said air chamber by means of a rubber gasket 12 attached by a nut 11' to the body 11.

At the end of the pneumatic chamber 2 is positioned the barrel 5' of the gun which is of a smaller diameter

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than said chamber. This arrangement is supported and hermetically closed by the sleeve 13 inside of which is the propulsion mechanism constituted by a second piston consisting of the following parts: a cylindrical spindle 14 having a fixed collar 15 at one end thereof, the edge of which is retained by the end of the catch 17. At the other end of the spindle there is another gasket 14' of a greater thickness which presses against an annular gasket of rubber 16', which gasket is of the same diameter as the bore of the barrel 5'. A carrier 16 in which fits the end of the shank of the harpoon 5 as can be viewed in the Fig. 3 is positioned in front of gasket 16' and a retention lever 17, mounted in the top of said sleeve 13, is fixed to the handle by a quadrangular spindle 18 for the easy oscillation of this lever which releases the propulsion mechanism. Said lever's descent to the new charge retaining position is effected by a spring (not shown), which forms a part of the lever 17, rests by its end on the butt of the upper handle. The opening 17' which is provided by the end of the gun barrel 5' permits the penetration of the tail of this retention lever.

Fig. 4 shows the sleeve 13 with the lever 17 indicated by dotted lines and the handle 20 of the gun, both pieces being coupled by the threaded gasket 21. Within this handle is located the trigger mechanism 22. By manually pressing this trigger the same pivots rearwardly about the fixed spindle 23 and through its sliding connection with the pivot 24 causes the piece 25, which extends out of the handle, to move backward contacting a second lever 26 which forms a part of the spindle 18 and by oscillating raises the lever 17 which produces the discharge. Other elements of this mechanism are the spring 27 to retain the trigger and the security button 28 operated externally and which is similar to security buttons of guns of this type.

On the external part of the gun there is a series of circular pieces, namely the first sight 29, the fastening for the fishing pulley 30, the rubber hooks 31 and a front sight 32. Finally at the end of the gun is located a threaded conical truncated piece 33 which reduces gradually the muzzle of the gun to nearly the internal diameter of the same. And in the middle portion there is a spring 33' held by the end of the muzzle within said piece 33 and extending towards the bore but retained by a gasket 38. Through the central space provided in spring 33' the shank of the harpoon passes freely upon its departure but the carrier 16 is stopped by this spring.

Other secondary improvements of this gun are the retention or security arrangement of the handle 8 of the pump which consists in a hoop of wire 34 pivotally connected to the body 1 of the pump and which fits into a notch 34' in the head of said handle 34 as shown in Figs. 1 and 2.

Other advantages are to be found in the fact that the entire pump can be unscrewed and removed from sleeve 3' to lighten the gun from this unnecessary load after its use and the valve of the chamber which will be exposed can be protected by screwing to the neck of the sleeve 3' the throat 35 of the cylindrical cap of the Fig. 5 which will serve as a cover and protection, after that the plug 36 of said cap can be inserted in the body 1 of the pump to protect the same.

Still another advantage is that to lighten the fishing pulley on the swift travel of the harpoon it is possible to have a long coil of cord retained between the rubber hooks 31 of Fig. 4 so that the fishing pulley does not function until two or three meters of cord have been loosened.

Lever 37 is pivotally connected to sleeve 3' while a pair of links 37' pivotally connected at one end to coupling 13 are pivotally connected at their opposite end to said lever.

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 The operation of this improved gun is as follows: After a certain number of charges are introduced by operating pump handle 8 the air contained in the chamber is compressed by operating lever 37. This pressure is retained at one end by the inlet valve 10 and at the other end by said collar 15. Now, after the maximum pressure is obtained by the action of the pump through the operation of lever 37 which being moved rearwards as indicated by the arrow of Fig. 1 compels the sleeve 3 of the pneumatic chamber to enter into the bore of the sleeve 3' until it reaches the maximum position which is the distance indicated by —a— in Fig. 3 so that its interior length is reduced thereby increasing very much the pressure of the charge.

To discharge after the safety 28 is moved down, the lever of the trigger 22 is pulled rearwards and this movement raises the rear end of the lever 17 releasing the collar 15 which by the action of the compressed air which acts against it impels the harpoon 5 which runs the length of the gun barrel and is launched with a very great force while said carrier 16 is retained by the spring 33' in the muzzle. As this mechanism constitutes also a second piston which hermetically closes the pneumatic chamber at each discharge, there will be produced an increasing of the volume but no loss or waste of the compressed air so that upon introducing the shank of the harpoon again in the bore of the gun and pushing energetically against its end, the air is returned to its prior pressure in the chamber and remains ready to effect a new discharge. This possible reuse of the charge provides one of the most interesting advantages of the described improvements.

All the other elements related with the mounting and working of the shank of the harpoon do not constitute an essential part of the mechanism described and can vary considerably.

We claim:

1. A gun for discharging a harpoon in undersea fishing comprising an air chamber having an air outlet port, means for supplying compressed air to said chamber, a barrel connected to said chamber for receiving and guiding said harpoon, a harpoon carrier slidably positioned in the bore of said barrel and capable of closing said chamber outlet port, means manually operable exteriorly of and mounted on said gun for quickly reducing the interior area of said chamber for increasing the pressure of the air therein when desired and a trigger mechanism normally holding said carrier against said chamber outlet port.

2. A gun for discharging a harpoon in undersea fishing comprising an open ended tube, a cylindrical sleeve slidably mounted on one end of said tube, a piston having a bore therethrough being slidably mounted in the bore of said tube and carried by said sleeve, an air valve for closing said piston bore, means for supplying compressed air to said air valve and through said piston bore to the

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 interior of said tube, a barrel for holding and guiding said harpoon connected to the other end of said tube, a piston slidably mounted in said barrel for movement longitudinally thereof to project a harpoon therefrom and capable of closing said other end of said tube, means for normally retaining said second mentioned piston in its tube closing position whereby upon the sliding of said tube into said sleeve the pressure of air in said tube can be increased.

3. A gun for discharging a harpoon in undersea fishing comprising an open ended tube, a cylindrical sleeve slidably mounted on one end of said tube, a piston having a bore therethrough connected to said sleeve and slidably positioned in the bore of said tube, an air valve mounted in said piston bore, means detachably connected to said air valve for supplying compressed air thereto and into said tube, a barrel for guiding said harpoon, a coupling connecting the opposite end of said tube to an end of said barrel, a second piston slidably positioned in the bore of said barrel and against said opposite end of said tube for closing same, a trigger mechanism extending through said coupling for normally retaining said second piston against said opposite end of said tube, a lever pivotally connected to said sleeve, links pivotally connected to said coupling and said lever whereby pivoting of said lever slides said sleeve and its piston along said tube.

4. A gun for discharging a harpoon in undersea fishing comprising an open ended tube, a piston slidably mounted in the bore of said tube for compressing air therein and having an axial opening therethrough, an air valve extending from said piston for admitting air through said piston bore, a cylindrical sleeve slidably mounted on said tube and having a head opening through which said air valve extends, a manually operable air pump mounted on said air valve exteriorly of said sleeve, a harpoon barrel connected to the opposite end of said tube, means for opening and closing said opposite end of said tube, a harpoon carrier slidable mounted in the bore of said barrel for being projected therealong by air from said tube, and means connected to the muzzle end of said barrel for retaining said carrier and the air therebehind from expulsion from said muzzle end of said barrel.

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