July 28, 1959 D. I. REBIKOFF 2,896,604

UNDERWATER GUN

Filed July 31, 1956 2 Sheets-Sheet 1

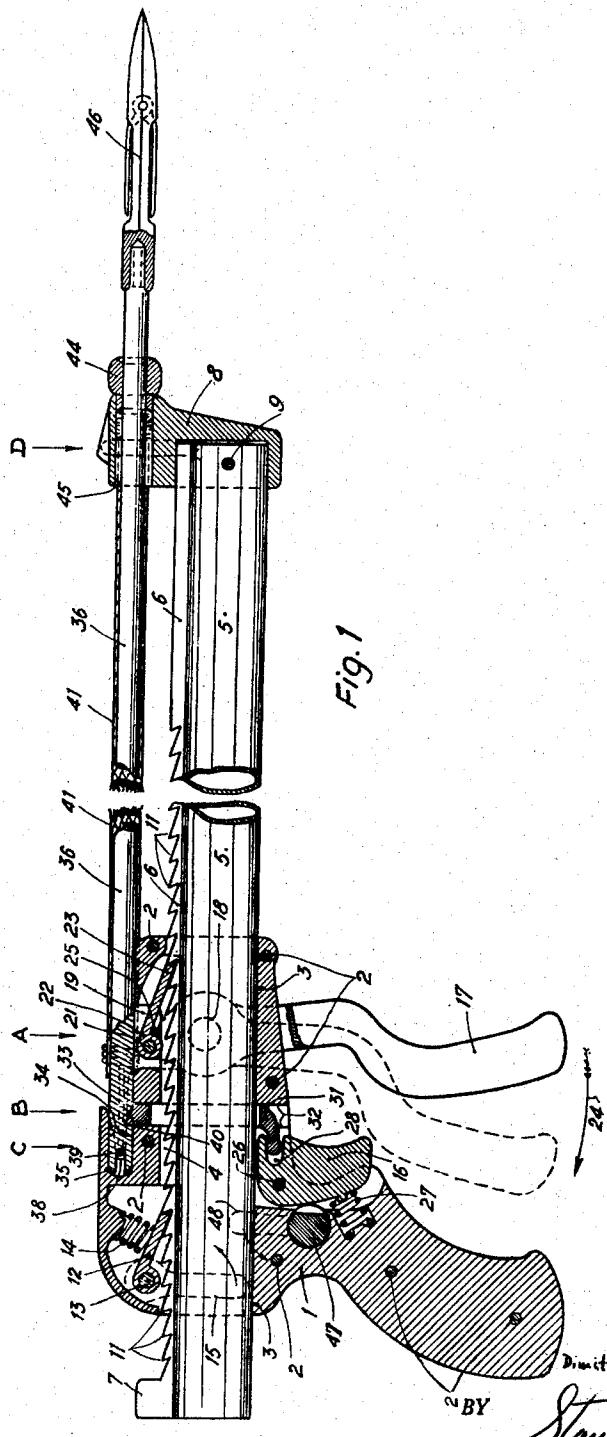


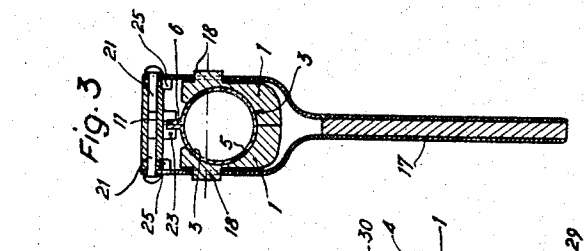
Fig. 1

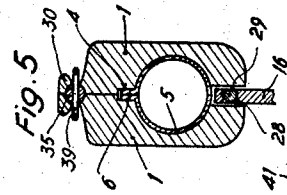
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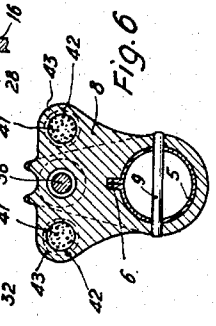
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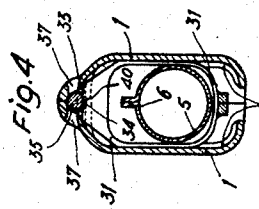
UNDERWATER GUN

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UNDERWATER GUN

Dimitri Issaiewitch Rebikoff, Cannes, France

Application July 31, 1956, Serial No. 601,239
Claims priority, application France November 7, 1955
7 Claims. (Cl. 124—22)

The present invention relates to an underwater gun and more particularly to the type driven by elastic means and adapted to propel a harpoon.

The principal drawback to such guns has been the need to load them either by unaided manual effort, i.e. brute force, or by complex mechanical means such as windlasses and the like. Both such loading procedures demand the use of two hands. The brute force means has the additional disadvantage of limiting the discharge energy of the gun. In either case an underwater swimmer usually has to surface in order to load.

An object of the present invention is to provide an underwater gun of simple construction which may be easily loaded to provide great discharge energy.

Another object thereof is the provision of such a gun which a swimmer may load underwater, employing only one hand.

These and other objects are achieved in the preferred form illustrated in the drawing by a gun including a handle apertured from front to rear and in which aperture there is slideably mounted a cylindrical tube having an upper ridge in which teeth are cut to provide a rack portion, a loading lever pivotally mounted to said handle bearing a pawl positioned to engage said rack and progressively move the same in a forward direction as said lever is reciprocated, the front of the tube bearing said rack portion having a fitting thereon to which the free ends of an elastic sling are secured, the closed end thereof being releasably engaged at said handle by means connected to a trigger, said fitting being apertured to permit the shaft of a harpoon to extend therethrough, the rear end of the shaft thereof being fitted to the closed end of said sling. Reciprocation of said loading lever stretches said sling, loading the gun. Actuation of the trigger releases the sling allowing it to propel the harpoon.

Other objects and a fuller understanding of the present invention may be had by referring to the following expanded description and claims taken in conjunction with the accompanying drawings which illustrate a preferred embodiment thereof, it being understood that the foregoing statement of the objects of the subject invention and the brief summary thereof are intended to generally explain the same without limiting it in any manner.

Fig. 1 is a side elevation of a gun embodying the present invention in the loaded position, with an inserted harpoon, parts being broken away to better reveal the structure.

Fig. 2 is a similar view thereof in the unloaded position.

Fig. 3 is a sectional view taken along A.

Fig. 4 is a sectional view taken along B.

Fig. 5 is a sectional view taken along C.

Fig. 6 is a sectional view taken along D.

Referring to the drawings which illustrate a preferred form of the present invention, the gun there shown consists of a handle 1, preferably of plastic or the like, which may be made in two halves joined at numerous

places by rivets 2, cavities being left within said handle to provide housings for the various parts to be described.

A cylindrical passage 3, which extends through said handle from front to rear, has an upper rectangular groove 4, extending the length thereof, said passage and groove being dimensioned to permit a cylindrical tube 5, having a radially extending rib 6 of rectangular cross-section extending the length thereof, to slide freely within the same and be guided thereby, said rib 6 lying within groove 4 and preventing rotation of said tube within said passage. The rear or heel of said rib may be elevated to form a detent 7 engageable with the rear of handle 1 to limit the forward travel of said tube.

A head 8 is fixedly secured to the front of tube 5 by means of a pin 9. Rib 6 is serrated starting at the rear to form rearwardly pointed teeth 11 over the greater part of its length, thus permitting said rib to function as a rack. Tube 5 may be made by rolling a strip about a mandrel and securing by welding the two bent edges to form rib 6 which in turn may be milled to form the rack section.

A pawl 12 is keyed to a pin 13 rotatably mounted across an upper rear cavity in handle 1, said pawl being normally biased against teeth 11 of rib 6 by means of spring 14. Said pawl may be disengaged from said teeth by rotating handle 15 fixed to pin 13 in the direction of the arrow associated therewith in the drawing. Hence, pawl 12 and the members connected thereto act as a safety.

In front of the grip portion of handle 1, leaving room for the users forefinger which will normally be placed on the trigger 16 is a loading lever 17 which is forked at the upper portion to spread about tube 5 without touching the same, said lever being pivotally mounted to handle 1 by means of a pair of trunnions 18, projecting from opposite sides of said handle through apertures in said lever.

The upper margins of the branches of lever 17 are oppositely apertured to permit the insertion of an opposed pair of half-pins 21 which act as axles for the bored base 22 of a second pawl 23 which pivots about said pins. As the lower portion of loading lever 17 is pulled rearwardly in the direction of arrow 24, pawl 23 engages a tooth 11 of rib 6 advancing tube 5, against the pull of an elastic member to be described, more than the distance between two of said teeth. When rearward pressure on the lower portion of said lever ceases, pawl 12 (the safety pawl) prevents opposite or rearward travel of tube 5. The lower portion of lever 17 may be biased in a forward direction by means of a spring, not shown.

Extending inwardly from upper portions of the branches of lever 17 are a pair of opposed projections 25 which are positioned to be engaged by pawl 23 when lever 17 is in the extreme forward position (see Fig. 2). When so engaged they prevent the free end of pawl 23 from entering contacting teeth 11 of rib 6. Hence, when lever 17 is in the free or normal position to which it is biased by said spring, tube 5 rides free of the action of pawl 23. However, as lever 17 is slightly displaced in the direction of arrow 24, the contact between projections 25 and pawl 23 is broken and said pawl engages a tooth 11.

Trigger 16 is mounted to pivot on a pin 26 attached across a trigger recess in handle 1, a spring 27 lying within said handle and bearing on the rear of said trigger normally biasing the same in a forward direction. The upper front portion of trigger 16 is recessed to form a slot 28 which loosely houses the rearwardly angled lower rounded end 29 of a vertically extending O-shaped frame 31, which straddles tube 5 being guided by travelling within walls 32 of lateral grooves formed in handle 1, the

upper portion of said frame ending in a latch extension 33 dimensioned to fit into a recess 34 which lies radially in a rear or heel portion of the shaft of harpoon 36. When engaged in said recess 34, said extension 33 acts as a latch to prevent harpoon 36 from moving out of the gun under the influence of the elastic member to be described. When said extension is disengaged therefrom as by the action of a user in pressing the trigger rearwardly and hence depressing frame 31, the harpoon is free to be propelled from the gun.

The median upper portion of handle 1 is indented to form a roughly cylindrical chamber 34 which ends inwardly in a rounded terminal recess 38. A pair of opposed slots 37 extend laterally along opposite walls of chamber 34, broadening as they approach the open end thereof. Slots 37 serve as guide channels to a U-shaped stirrup 39 of piano wire, the loop of which is dimensioned to fit within a notch 40 in the heel 35 of harpoon 36. The ends of said stirrup are each secured to a strong flexible band 41, the other ends of said bands being secured to fitting 8 after passing through apertures 42 in lateral ribs 43 of said fitting. Bands 41 and stirrup 39 form a flexible sling which provides the propulsion means for the gun. The length of said sling is such that when tube 5 is within the retracted position wherein pawl 23 lies over the frontmost tooth 11 of rib 6 of said tube, stirrup 39 may be positioned easily within chamber 34 without extending the sling from its normal or rest state.

The gun may be loaded by passing the heel portion through muzzle 44 and bore 45 coaxial with said muzzle and then after threading stirrup 39 in notch 40 in said heel, passing the heel into chamber 34 against the rounded terminal portion 38 of said chamber at which point latch extension 33 of frame 31 will engage notch 40 in the shaft of harpoon 36. Point 46 of harpoon 36 will lie well outside of muzzle 44. Safety lever 15 is then placed in the vertical position so as to permit pawl 12 to ride on rib 6 and successively engage teeth 11 thereof. Another safety lever 48, is pinned to a truncated cylindrical cam 47 rotatably mounted in housing 1 immediately to the rear of trigger 16. If this lever is rotated in the direction of the associated arrow (Fig. 1), so as to present an arcuate surface of said cam to the rear of said trigger, the assembly just described functions as a trigger safety lock. The user may then, by reciprocating loading lever 17, push tube 5 forward thus extending and stretching the flexible sling consisting of stirrup 39 and elastic bands 41. When the said sling is stretched to the desired length, the user may fire the gun after first disengaging the safety mechanism described i.e. elevating safety lever 48 to the dotted position shown in Fig. 1.

It will be observed that the gun described may be prepared for firing merely by the use of one hand. The limitations on the loading of underwater guns which were formerly encountered, i.e. in brute force devices, the limit of the user's strength and in others, the complication of windlass and equivalent tightening means which require both of the user's hands, has been successfully overcome by the described gun.

Although the subject invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous additions and changes in the details of construction, combination and arrangement may be resorted to without transcending the scope of the invention as hereinafter claimed.

What is claimed is:

1. An underwater gun for firing a missile, comprising a handle, means mounted to said handle to releasably retain a missile in connection therewith, an elongated loading member having a rack portion slideably mounted to said handle to travel in a forward and rearward direction, an elastic sling member disposed in the form of a U-shaped loop open at its forward end, the forward end portions of said sling member being connected to transversely spaced forward portions of said loading member, the closed end of said loop engaging a rear portion of said missile, a lever pivotally mounted to said handle, to move forward and away from confronting portion of said handle, a pawl connected to said lever and positioned to engage successive teeth of said rack portion upon reciprocation of said lever to advance said member in a forward direction as said lever is moved toward said confronting portion and means to releasably retain said member in such advanced position when said lever is moved away from such confronting portion and a barrel fixedly mounted to said loading member between said transversely spaced forward portions thereof and extending longitudinally in the direction of travel of said loading member and about the path of said missile whereby as said lever is reciprocated said elastic sling means are stretched, said loading member and said barrel moving forwardly relative to said missile and whereby upon release said missile is projected forwardly through said barrel

2. An underwater gun for firing a missile comprising a handle, means mounted to said handle to releaseably retain a missile in connection therewith, said missile having a concave portion, an elongated loading member slideably mounted to said handle having a rack portion along an upper part of said member, an elastic sling member disposed in the form of a U-shaped loop open at its forward end, the forward end portions of said sling member being connected to transversely spaced forward portions of said loading member, the closed end of said loop engaging said concave portion of said missile, a lever pivotally mounted to said handle to move toward and away from a confronting portion of said handle, a pawl connected to said lever and positioned to engage successive teeth of said rack portion upon reciprocation of said lever to advance said loading member in predetermined increments in a direction to stretch said elastic means as said lever is moved toward said confronting portion and means to releasably retain said member in such advanced position when said lever is moved away from such confronting portion and a barrel fixedly mounted to said loading member between said transversely spaced forward portions thereof and extending longitudinally in the direction of travel of said loading member and about the path of said missile.

3. In combination with an underwater gun for firing a missile, including a handle having a depending grip portion, means mounted to said handle to releasably retain a missile in connection therewith, a loading member having a rack portion slideably mounted to said handle to travel in a forward and rearward direction and elastic means connected to a forward portion of said member detachably engageable with said missile, loading means comprising a lever pivotally mounted to said handle, said lever including a lower section confronting said grip portion of said handle and moveable towards and away from said grip portion, the upper portion of said lever being bifurcated to provide two arms, said arms lying about the sides of said loading member, said rack portion of said loading member being positioned along an upper portion thereof, and a pawl connected to said arms of said lever lying over said rack portion of said loading member and engageable with the teeth of said rack portion to move said member to an advanced position relative said handle as said lower lower section of said lever is moved toward said grip portion and means to maintain said member in said advanced position when said lower section is moved away from said grip portion.

4. An underwater gun for firing a missile comprising a handle, means mounted to said handle to releasably retain a missile in connection therewith, a loading member slideably mounted to said handle to travel in a forward and rearward direction, an elastic sling member disposed in the form of a U-shaped loop open at its forward end, the forward end portions of said sling member being connected to transversely spaced forward portions of said

loading member, the closed end of said loop engaging a rear portion of said missile, said sling member extending generally in the same plane as the missile extends when engaging said missile, a lever pivotally mounted to said handle to move toward and away from a confronting portion of said handle, means connecting said lever to said loading member to move said member in a forward direction as said lever is moved toward said confronting portion of said handle, and means to releasably retain said member in such advanced position and a barrel fixedly mounted to said loading member between said transversely spaced forward portions thereof and extending longitudinally in the direction of travel of said loading member and about the path of said missile.

5. The combination described in claim 3 and a barrel fixedly mounted to a forward portion of said loading member and extending longitudinally in the direction of travel of said loading member and about the path of said missile.

6. An underwater gun for firing an elongated missile comprising a handle and a depending grip portion, an elongated loading member slideably mounted to said handle to travel in a forward or rearward direction, a barrel fixedly mounted to the forward portion of said loading member, the longitudinal axis of said barrel being parallel to the path of said loading member, and means mounted to said handle to releasably maintain a missile positioned within said barrel, elastic means connected to a

forward portion of said loading member at one end and detachably engaging said missile at the other, and loading means to advance said loading member relative to said handle.

7. An underwater gun as described in claim 6, said loading means comprising a lever pivotally mounted to said handle, said lever including a lower section confronting said grip portion of said handle and moveable towards and away from said grip portion, the upper portion of said lever being bifurcated to provide two arms, said arms lying about the sides of said loading member, said loading member including a rack portion, said rack portion of said loading member being positioned along an upper portion thereof, and a pawl connected to said arms of said lever lying over said rack portion of said loading member and engageable with the teeth of said rack portion to move said member to an advanced position relative said handle as said lower section of said lever is moved toward said grip portion and means to maintain said member in said advanced position when said lower section is moved away from said grip portion.

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