

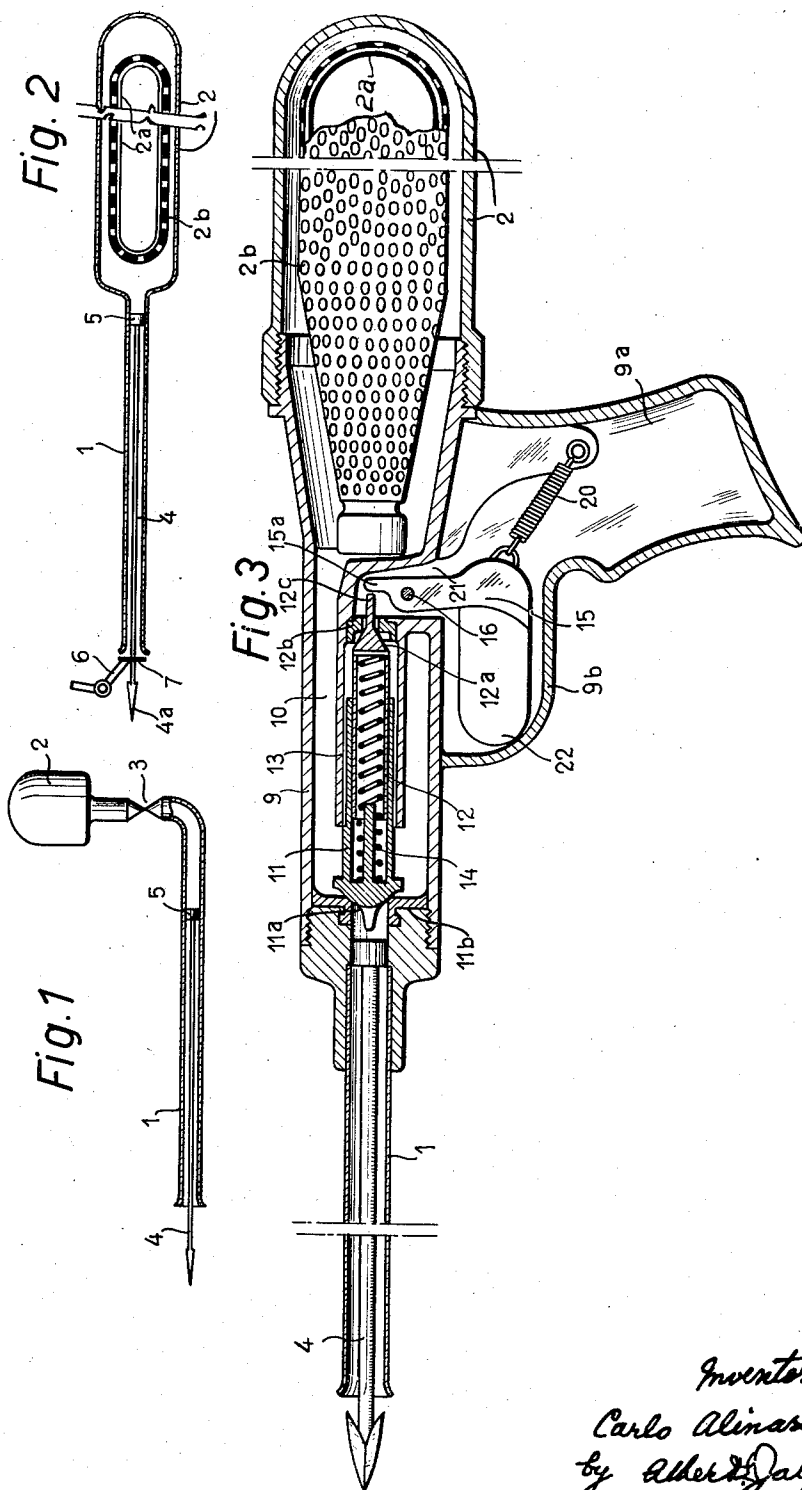
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GUN FOR UNDERWATER FISHING

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GUN FOR UNDERWATER FISHING

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5 Claims. (Cl. 124—13)

This invention relates to guns employed in underwater fishing or hunting.

An object of this invention is to provide an improved gun constructed and provided with means such that the arrow is shot by utilising water under pressure stored in a hydraulic accumulator of any type coupled with the gun barrel.

Further characteristics and advantages of this invention will be understood from the appended specification in which reference is made to the accompanying drawing, wherein:

Figure 1 is a diagrammatic section showing the principle on which the gun operates,

Figure 2 is a sectional view of a modification of the gun,

Figure 3 is a longitudinal section of the gun according to a further modification.

Referring to Figure 1, 1 denotes the gun barrel open at one end and connected at its other end to a pressure accumulator 2 through a hand-operated valve 3.

4 denotes an arrow provided with a cylindrical packing seal 5 which is introduced into the barrel at the forward end of the latter.

As the arrow 4 is introduced into the barrel, the valve 3 being kept open, the liquid in the barrel flows to the pressure accumulator 2, raising the pressure in the latter. Upon closing the valve 3, the gun is loaded and ready for firing.

When the arrow is to be shot at the chase, it will be sufficient to open the valve 3, whereby the liquid pressure in the pressure accumulator 2 is discharged through the barrel and ejects the arrow from the barrel in the direction of the chase.

The accumulator could be charged by other means, independently of the introduction of the arrow.

According to a modification of the gun shown in Figure 2, the valve 3 can be omitted, the arrow being retained within the barrel, after compression of the liquid, by a hand-actuated bolt 6 engaging a collar 7 fixedly secured to the stem of the arrow and fixed in proximity to its head 4a.

The pressure accumulator can be in the form of a flask 2a of resilient material, filled with air or any other preferably pre-compressed gas.

In view of the high pressure which is desirable within the flask, in order to obtain higher pressures in the pressure accumulator, the flask is provided with an outer sheathing 2b of perforated metals, which prevents any excessive expansion of the resilient flask when, with the gun in discharged condition, the flask is subjected merely to the pressure of the water column in proximity to the bottom or is simply exposed to the atmospheric pressure at the surface.

A further gun construction is shown in Figure 3, in which the connection between the barrel and pressure accumulator is established through a quick release valve.

9 denotes an intermediate casing connecting together the barrel 1 and rear casing 2 enclosing the pressure

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accumulator. The casing 9 is equipped with a hollow handle 9a having an arcuate projection 9b surrounding the trigger 15.

10 denotes the inner chamber of the casing 9 communicating at one end with the inside of the barrel and at its rear portion with the pressure accumulator.

11 denotes a first valve in the form of a hollow cylinder open at one end and having at its other end a tapered head 11a cooperating with a seating of frustum conical shape in an annular packing 11b at the mouth of the barrel. A second valve 12 is slidably mounted within the rear cylindrical portion of the valve 11, the valve 12 being in the shape of a hollow cylinder open at one end and having at its other end a tapered head 12a on its portion projecting from the valve 11 and bearing on a seating bored in an annular member 12b fitted in a tubular seating or guide 13 fixedly connected to the casing 9 in which the valve 11 is slidably mounted with a slight peripheral play. The seating 13 is coaxial with the barrel 1 and with the seating in the annular packing 11b and has one end facing said packing 11b and the other end communicating through a portion bent at right angles with the inner end of the handle 9 and through lateral openings 22 cut in the arcuate projection 9b of the latter with the outside of the gun. The inner diameter of the portion of said seating or guide in which the valve 11 slides is greater than the outer diameter of said seating of frustum conical shape provided in the annular packing 11b. A spring 14 interposed between the valves 11 and 12 and arranged inside the hollow bodies of the latter holds the valves normally in their closed position. The hole bored in the bottom of the cylindrical seating 13 connects the inside of said seating 13 with the surrounding space during opening of the valve 12.

12c denotes an extension on the valve 12 projecting rearwardly through the opening in the bottom of the seating 13 and bearing against an arm 15a of a trigger 15 mounted for oscillation on a spindle 16 and is subjected to the action of a helical spring 20 ensuring constantly the contact between the free end of the extension 12c and the arm 15a of the trigger 15.

The gun operates as follows.

On introduction of the arrow into the barrel 1, the water in the latter is compressed and, upon overcoming the tension of the spring 14, opens the valve 11, transferring pressure to the pressure accumulator 2, in which pressure rises as the flask 2a is compressed and reduced in volume.

As the arrow is pushed home within the barrel it can be left free and the inner pressure existing in the pressure accumulator 2, hence in the chamber 10, causes, together with the tension of spring 14, the valve to close.

For shooting the arrow, it will be sufficient to depress the trigger 15, causing the valve 12 to open against the tension of spring 14.

Opening the valve 12 causes the pressure to sink within the seating 13, in which the stem of valve 11 is slidably mounted. The latter is such that a certain flow of liquid from the chamber 10 takes place along its external circumference in order to equalize pressures ahead and past the valve under static conditions.

Opening of the valve 12a lowers the pressure past the valve 11 in the inner of the seating 13. Since the above arrangement does not allow of a flow of water sufficient for again equalizing pressures, a first impulse acts on the head 11a of the valve 11 which is capable of overcoming both the tension of spring 14 and the force generated by the static pressure tending to close the valve 11.

This starts opening of the valve 11, which is rapidly completed as pressure is transferred towards the barrel 1 through the opening in the packing 11b whereby the

arrow is instantaneously shot from the barrel and pressures within the chamber 10 and externally of the gun are equalized.

What I claim is:

1. A gun for underwater fishing or hunting comprising, in combination, a barrel, a hollow casing communicating with one end of said barrel, a pressure gas-filled tightly closed container of resilient material arranged within said hollow casing, an outer container of perforated sheet metal surrounding said tightly closed gas-filled container of resilient material, an arrow for introducing in said barrel and freely slidable therein, a packing gland at the rear end of the said arrow tightly closing the barrel upon introducing of said arrow in said barrel, whereby said hollow casing acts as a hydraulic pressure accumulator when the arrow is fitted within the barrel in submerged condition of the gun, a non-return valve for controlling the communication between the rear end of the barrel and said hollow casing and means for opening said non-return valve for the purpose of shooting said arrow.

2. A gun for underwater fishing or hunting comprising, in combination, a barrel, an intermediate hollow casing and a cup-shaped rear casing, said barrel and said rear casing being secured to the opposite ends of said intermediate casing and supported by the latter, the inner hole of said intermediate casing enclosing a chamber communicating with the inside of the barrel at the rear end of the latter and with the inside of said cup-shaped rear casing, a pressure accumulator in said rear casing consisting in a pressure gas-filled tightly closed container of resilient material, means for preventing an excessive expansion of said container, when the gun is in discharged condition, an arrow for introducing in said barrel and freely slidable therein, a packing gland fast to the rear end of said arrow and tightly closing the barrel upon introducing of said arrow in the barrel, a first valve seat at the rear end of the barrel facing the inner chamber of said intermediate casing, a tubular guide arranged in said chamber and fixedly connected to said intermediate casing, one end of said guide facing said first valve seat and being spaced therefrom, the other end of said guide communicating with the outside of the gun and being closed by an annular member having a central bore forming a second valve seat, a first valve for cooperating with said first valve seat, said valve having a tubular stem slidably supported in said guide and having its free end spaced from said second valve seat in said guide when said first valve bears on said first valve seat, and stem having its diameter greater than that of said valve seat, a second valve for cooperating with said second valve seat and having a tubular stem mounted slidably within the tubular stem of said first valve, the free end of the stem of said second valve being spaced from said first valve when said valves bear on the first and second seats, respectively, said second valve having an extension extending through the central bore of said annular member forming said second valve seat and protruding beyond said member, a spring interposed between said first and second valve and arranged inside of their tubular stems for urging said valves against said first and second seat, respectively; a hollow handle fast with said intermediate casing for supporting the gun, a trigger rotatably supported by a spindle fast to the intermediate casing and arranged below the end of the extension of said second valve protruding from the central bore of said second valve seat, an arm on the trigger extending beyond said spindle for engaging said end of the extension of said second valve and displacing the latter against the action of said spring upon depressing of said trigger, the mounting of the stem of said first valve in said tubular guide allowing a certain flow of liquid from the chamber of said intermediate casing towards the portion of the inside of said tubular guide near said annular member.

3. A gun for underwater fishing or hunting comprising, in combination, a barrel, an intermediate hollow casing

and a cup-shaped rear casing, said barrel and said rear casing being secured to the opposite ends of said intermediate casing and supported by the latter, the inner hole of said intermediate casing enclosing a chamber communicating with the inside of the barrel at the rear end of the latter and with the inside of said cup-shaped rear casing, a pressure accumulator in said rear casing consisting in a pressure gas-filled tightly closed container of resilient material, means for preventing an excessive expansion of said container, when the gun is in discharged condition, an arrow for introducing in said barrel and freely slidable therein, a packing gland fast to the rear end of said arrow and tightly closing the barrel upon introducing of said arrow in the barrel, a first valve seat at the rear end of the barrel facing the inner chamber of said intermediate casing, a tubular guide arranged in said chamber and fixedly connected to said intermediate casing, one end of said guide facing said first valve seat and being spaced therefrom, the other end of said guide communicating with the outside of the gun and being closed by an annular member having a central bore forming a second valve seat, a first valve for cooperating with said first valve seat, said valve having a tubular stem slidably supported with a slight play in said guide and having its free end spaced from said second valve seat in said guide when said first valve bears on said first valve seat, said stem having its diameter greater than that of said valve seat, a second valve for cooperating with said second valve seat and having a tubular stem mounted slidably within the tubular stem of said first valve, the free end of the stem of said second valve being spaced from said first valve when said valves bear on the first and second seats, respectively, said second valve having an extension extending through the central bore of said annular member forming said second valve seat and protruding beyond said member, a spring interposed between said first and second valves and arranged inside of their tubular stems for urging said valves against said first and second seat, respectively, a hollow handle fast with said intermediate casing for supporting the gun, a trigger rotatably supported by a spindle fast to the intermediate casing and arranged below the end of the extension of said second valve protruding from the central bore of said second valve seat, an arm on the trigger extending beyond said spindle for engaging said end of the extension of said second valve and displacing the latter against the action of said spring upon depressing of said trigger.

4. A gun for underwater fishing or hunting comprising, in combination, a barrel, a hollow casing provided with a hollow handle for supporting said barrel, a chamber inside said casing communicating at its one end with the inside of the barrel at its other end, a pressure accumulator formed by a tightly closed container of resilient material filled with pressure gas, means for preventing an excessive expansion of said container when the gun is discharged, an arrow for introducing in said barrel and freely slidable therein, a packing gland at the rear end of the said arrow for tightly closing said barrel upon introducing said arrow therein, valve means for controlling the communication between said chamber and the barrel inside receiving the arrow and directly with the outside, said valve means being arranged in said chamber near the end of the latter adjacent the barrel, said valve means comprising a first valve in the form of a hollow cylinder open at one end, a tapered head at the other end of said first valve, an annular packing at the end of said chamber communicating with the barrel inside a seat of frustum conical shape in said packing for cooperating with the tapered head of said first valve, a second valve in the form of a hollow cylinder slidably mounted within the end portion of said first valve opposite the head of the latter and projecting therefrom, a tapered head at the end of said second valve, a tubular seating inside said chamber fixedly secured to the said casing and coaxial with said barrel and said seat in said annular packing and

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spaced from the latter, the end portion of said first valve opposite the head of the latter being slidably mounted with a slight peripheral play in said tubular seating, the inner diameter of said tubular seating being greater than the outer diameter of said seat of frustum conical shape in said annular packing, an annular member having a central bore forming a seat for said second valve and near the end portion of said tubular seating opposite its end receiving said first valve and communicating with the inner end of said hollow handle, an extension on the head of said second valve projecting through the bore of said annular member, a trigger mounted for oscillation on a spindle fast to the casing of the gun and arranged within said handle, and an arm fast with said trigger and bearing on the end of said extension protruding through said annular member.

5. A gun for underwater fishing or hunting comprising, in combination, a barrel, a hollow casing provided with a hollow handle for supporting said barrel, a chamber inside said casing communicating at its one end with the inside of the barrel, at its other end a pressure accumulator formed by a tightly closed container of resilient material filled with pressure gas, an outer sheathing of perforated sheet metal surrounding said container of resilient material, an arrow for introducing in said barrel and freely slidable therein, a packing gland at the rear end of the said arrow for tightly closing said barrel upon introducing said arrow therein, valve means for controlling the communication between said chamber and the barrel inside receiving the arrow and directly with the outside, said valve means being arranged in said chamber near the end of the latter adjacent the barrel, said valve means comprising a first valve in the form of a hollow cylinder open at one end, a tapered head at the other end of said first valve, an annular packing at the end of

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said chamber communicating with the barrel inside a seat of frustum conical shape in said packing for cooperating with the tapered head of said first valve, a second valve in the form of a hollow cylinder slidably mounted within the end portion of said first valve opposite the head of the latter and projecting therefrom, a tapered head at the end of said second valve, a tubular seating inside said chamber fixedly secured to the said casing and coaxial with said barrel and said seat in said annular packing and spaced from the latter, the end portion of said first valve opposite the head of the latter being slidably mounted with a slight peripheral play in said tubular seating, the inner diameter of said tubular seating being greater than the outer diameter of said seat of frustum conical shape in said annular packing, an annular member having a central bore forming a seat for said second valve and near the end portion of said tubular seating opposite its end receiving said first valve and communicating with the inner end of said hollow handle, an extension on the head of said second valve projecting through the bore of said annular member, a trigger mounted for oscillation on a spindle fast to the casing of the gun and arranged within said handle, and an arm fast with said trigger and bearing on the end of said extension protruding through said annular member.

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