

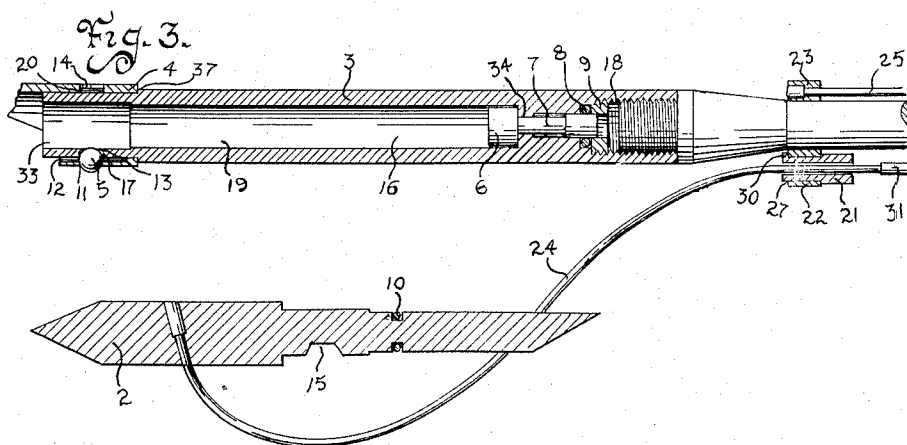
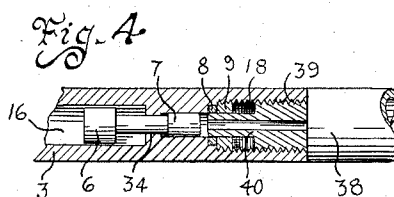
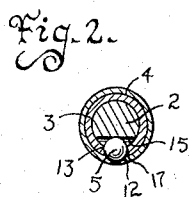
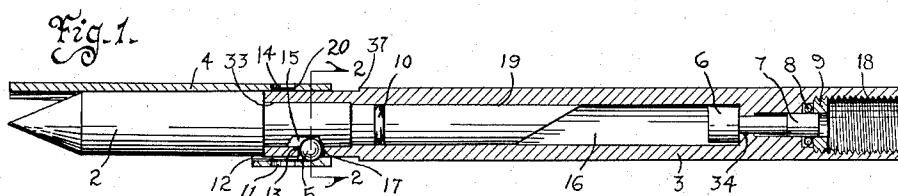
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HIGH PRESSURE SPEARHEAD ATTACHMENT

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HIGH PRESSURE SPEARHEAD ATTACHMENT

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3 Claims. (Cl. 273—106.5)

The main object of my invention is to provide a high pressure device that can be readily adapted for use in high pressure gas guns and high pressure spearhead attachments. A device that consists mainly of a pressure chamber unit working in co-action with and sealed relative to a spearhead, spearshaft or other type missile for the purpose of expelling the missile therefrom.

A further object of my invention is to provide a high pressure spearhead device that can be adapted for use on various types of spearshafts to increase the penetration of the spearhead when the spear has been shot into a fish or other quarry. A device that is streamlined and compact so that it provides little resistance to the density of water when it is propelled through the water.

A further object is to provide a spearhead device; the main part being a sleeve member having a bore through its entire length, with the front of the bore sealed relative to a spearhead and the rear of the bore sealed relative to a check valve, with the sleeve member being of a length for a pressure chamber in the central portion of the bore between the spearhead and check valve.

Another object is to provide a fast means of refilling the spearhead device by using a nipple fitting on a supply cylinder that will co-act with the check valve and replace it as a sealing means.

Another object is to provide a trigger mechanism comprised of a ball shaped member and sleeve member that is attached to the front of the pressure chamber unit to work in co-action with the spearhead to provide a means of holding the spearhead associated with the pressure chamber and of releasing the spearhead to the action of the pressure, when the spearhead device hits a target.

A still further object is to adapt my invention or parts of my invention for use as a pressure chamber mechanism in different types and designs of gas guns using other types of trigger mechanisms and refill means than are shown within the scope of my description and claims, yet not to the extent of departing from the original purpose of my invention.

A further object of my invention is to make the mechanism of my invention as simple as possible for easy operation and parts replacement and make the parts from alloy metals and materials that resist the corrosion of salt water.

Figure 1 is a side section view showing all the parts of the spearhead device associated with each other, with the trigger mechanism in a set position.

Figure 2 is a front section view on line 2—2 of Figure 1.

Figure 3 is a side section view showing the cable connections with the spearhead disassociated from the pressure chamber and the trigger mechanism in a released position.

Figure 4 is a side section view of the rear portion of the spearhead device, with a nipple fitting fully associated with the spearhead device for refilling.

The spearhead 2 is a freely operating member con-

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trolled by the spearfisherman by means of line connections 24, 21, 31, 23, and 25 and is adapted for association with and sealed relative to a power unit comprising a sleeve member 3, trigger mechanism 4 and 5, and a check valve 6, 7, 8, and 9, as shown in Figures 1 and 3.

The enlarged portions 33 and 19 of the bore of the sleeve member 3 are of a size and diameter to permit the full association of the spearhead 2 with the sleeve member 3. The bore 19 has a smooth and finished wall at the front to provide a sealing surface for an O ring type seal 10 or other type of sealing washer and is of sufficient length to provide an area for a pressure chamber at the rear when the spearhead 2 is fully associated in the bore, as shown in Figure 1. The bore 33 is slightly larger in diameter than the bore 19 to provide clearance for the outermost surface of a ring seal 10, so the seal will not be cut or damaged on the sharp edges of the vertical bore 17, when the spearhead is expelled out of or inserted into the bore 19.

The spearhead is sealed relative to the sleeve member 3 by means of an O ring type seal 10 or other sealing washer composed of a suitable composition that is slightly resilient. The ring seal is set in a ring groove of the spearhead 2 and has a bore slightly smaller in diameter than the bottom of the ring groove and an external diameter slightly larger than the bore 19 to insure a snug fit and a pressure tight seal when the spearhead is fully associated with the sleeve member 3, as shown in Figure 1.

The trigger mechanism, comprising a slideably mounted sleeve member 4 and ball member 5, provides the means of holding the spearhead in full association with the sleeve member 3 and of releasing the spearhead relative to the sleeve member 3 to the action of the high pressure gas contained within the pressure chamber 16.

A vertically bored entry hole 14 is slightly larger in diameter than the ball 5 to provide an entry for the ball into the pocket formed by the cross slot 15, bore 17, lip 13, and sleeve member 4. The lip 13 is a smaller portion at the inside edge of the vertical bore 17 and is slightly smaller in diameter than the ball 5 to restrict the inward movement of the ball when the spearhead is not associated with the sleeve member 3.

To associate the trigger mechanism 4 and 5 with the sleeve member 3 the sleeve member 4 must first be mounted on the smaller front end of the sleeve member 3 and pushed backwards until the sleeve engages the shoulder 37. The sleeve 3 can then be rotated until the vertical bore 14 lines up with the vertical bore 17. The ball 5 can then be inserted into the pocket provided.

A ring groove 20 is machined into the bore wall of the sleeve member 3 directly in line with the vertical bores 11 and 14 to provide clearance for the slightly projecting ball 5, so the sleeve 3 can be rotated until the ball lines up with the bore 11 after it has been inserted into the pocket through the bore 14.

When the ball 5 is fully associated with the sleeve 3, the inwardly curved portion of the ball engages the lip 13 leaving a large portion of the inner part of the ball projecting into the bore of the sleeve member 3 and the larger portion in the vertical bore 17, with the outermost curved surface projecting slightly beyond the outline of the sleeve member 3.

The outer projecting portion of the ball provides the means of holding the slideably mounted sleeve member 4 in full association with the sleeve member 3 at all times.

The spearhead device can be easily refilled after inserting the spearhead into the pressure chamber body 3 and holding it in association by the trigger mechanism 4 and 5. This is accomplished by pushing the ball 5

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inwards against the lip 13 and rotating the sleeve 4 until the ball lines up with the hole 11. The sleeve 4 can then be pushed forward until the ball contacts the rear face of the guide groove 12. This association of parts holds the ball projecting into the cross slot 15 of the spearhead 2, securely holding the spearhead associated with the sleeve member 3 when pressure is released into the pressure chamber 16 as shown in Figure 4.

In the rear portion of the sleeve member 3 I have provided a slideably mounted check valve 6 and 7 that is adapted to co-act with a nipple fitting 38 that is attached to a supply cylinder or other refill device. The check valve member 7 operates in the bore of an O ring or other washer seal 8 that provides the means of sealing the check valve relative to the sleeve member 3. The ring seal 8 is held in position by an externally threaded washer 9. The inward movement of the check valve is controlled by the enlarged portion of the front of the check valve 7 stopping against the lip 34 and the outward movement is controlled by the internally threaded washer 6 stopping against the rear face of the bore 19.

The spearhead device can be taken hold of and threaded onto the externally threaded portion 39 of the nipple fitting by the internally threaded portion 18. The inward movement of said nipple fitting pushes said check valve from the bore of the O ring 8, thereby replacing it as a sealing means.

When the nipple fitting is fully associated with the spearhead device, as shown in Figure 5, compressed gas or liquid, with carbon dioxide is used or combinations thereof can be released from the supply cylinder which flows from the nipple fitting, forcing the check valve inwards against the lip 34 and flows around the check valve into the pressure chamber 16 where it is held compressed by the spearhead 2 that closes the discharge tube and the check valve 7 which moves outward by the action of the pressure into the bore of the O ring as the nipple fitting is withdrawn.

A cable 25 is attached to the holder at one end as shown in Figure 3 and connected to a longer cord or line at the other end, with the usual slip ring and attachments, so the spear can be shot from a gun and retrieved by the spearfisherman.

After refilling, the spearhead device can be easily and quickly attached to the front end of a spearshaft by the threaded connection 18 as shown in Figure 1. The cable 24 can be slipped sideways through the slot 22 into the bore 27 so the sleeve 21 can be pushed into the bore 27 from the rear and rotated until the tab 30 points downward for full association with the holder. This provides a continuous line connection from the spearhead 2 to the speargun or other device controlled by the spearfisherman.

The spear with the spearhead device projecting from the front can be loaded into a gun and taken into the water, where the spearfisherman can dive and shoot fish underwater.

The speargun supplies the initial power to propel the spear from the gun to the fish. Upon striking the fish, the slightly projecting trigger sleeve 4 is forced backwards against the shoulder 37, thereby releasing the spearhead to the action of the pressure contained in the pressure chamber 16, which forces the ball 5 outward from the cross slot 15 into the hole 11 and propels the spearhead deep into the body of the fish. The forward motion of the spearhead pulls the short cable 24 through the sleeve 21 until the clip 31 stops against the rear face of the sleeve.

The action of the fish pulling on the line pulls the power unit and spears shaft away from the fish's body, thereby reducing the danger of damaging the mechanism while the fish is being played and retrieved.

By providing a spearhead device of the type illustrated,

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low powered and inefficient spear guns can become very efficient devices for taking very large fish or other game that could not ordinarily be caught. The compact mechanism and easy operating procedure makes my invention a very useful and efficient device that can be adapted for use in various types of spear guns and other types of equipment as well.

Some changes may be made in the construction and arrangement of the mechanism of my invention without changing the original purpose shown in my description and claims.

I claim:

1. In a spearhead device, a sleeve member operating in co-action with and sealed relative to a slideably inserted spearhead, said sleeve member having a bore enlarged at the front to receive said spearhead, said enlarged bore being of sufficient length to provide an area for a pressure chamber at the rear when the spearhead is fully associated with same, said enlarged bore providing a combination pressure chamber and discharge tube, said pressure chamber adapted to receive and contain high pressure gas, said bore adapted at the rear for a slideably mounted check valve, said rear portion adapted to receive a refill means, said refill means for releasing compressed gas into the rear of said bore, said check valve being pushed open by the action of the compressed gas passing around the check valve into said chamber and closed by the action of the compressed gas in said chamber, when the refill means is detached, said check valve providing the means for closing the rear of said bore, an O ring washer seal providing the means for sealing the spearhead relative to the pressure chamber in the discharge tube, said seal having a bore to fit snugly against the body of said spearhead, said seal having an outside diameter to fit snugly against the wall of said discharge bore, said seal being composed of a resilient material that will contract when exposed to pressure from within said chamber, which causes said seal to expand against the wall of said bore and to contract against the body of said spearhead, thereby effecting a pressure tight seal between the two members in such a manner that the spearhead will slide freely in and out of said bore, a vertical bore through the wall of the pressure chamber discharge tube at the front, said vertical bore being on the outward side of said ring seal when said spearhead is fully associated with said pressure chamber, a ball shaped member slideable in said vertical bore, a lip on the inward end of said vertical bore to stop the inward movement of said ball, yet permit a large portion of said ball to project into the discharge passage, a slot in said spearhead that will engage the inner portion of the ball and push the ball outward in said vertical bore when the spearhead is forced outward from said pressure chamber, means for holding said ball engaged with said spearhead to hold the spearhead associated with said pressure chamber, means for releasing said ball for outward movement from said slot, thereby releasing the spearhead from association with said chamber to the action of the compressed gas within the chamber.

2. In a spearhead device, a sleeve member operating in co-action with and sealed relative to a slideably inserted spearhead, said sleeve member having a bore enlarged at the front to receive said spearhead, said enlarged bore being of sufficient length to provide an area for a pressure chamber at the rear when the spearhead is fully associated with same, said enlarged bore providing a combination pressure chamber and discharge tube, said pressure chamber adapted to receive and contain high pressure gas, said sleeve member adapted in the rear portion of said bore for a slideably mounted check valve member and ring seal, said seal having an outside diameter to fit snugly against the wall of said bore and a bore to fit snugly against the body of said check valve member in such a manner that a pressure tight seal is

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made between the two members when said check valve is moved outward and stopped against means provided, said rear portion adapted for connection to a refill means, said check valve forced inward by pressure flowing from said refill means and stopped against means provided, so the pressure will flow through the bore of said seal, around said check valve and into said pressure chamber, an O ring washer seal providing the means for sealing the spearhead relative to the pressure chamber in the discharge tube, a ring groove in said spearhead adapted for said ring seal, said seal having a bore to fit snugly against the bottom of said ring groove, said seal having an outside diameter to fit snugly against the wall of said discharge bore, said seal being composed of a resilient material that will contract when exposed to pressure from within said chamber, which causes said seal to expand against the wall of said bore and to contract against the body to said spearhead, thereby effecting a pressure tight seal between the two members in such a manner that the spearhead will slide freely in and out of said bore, a vertical bore through the wall of the pressure chamber discharge tube at the front, said vertical bore being on the outward side of said ring seal when said spearhead is fully associated with said pressure chamber, a ball shaped member slideable in said vertical bore, a lip on the inward end of said vertical bore to stop the inward movement of said ball, yet permit a large portion of said ball to project into the discharge passage, a slot in said spearhead that will engage the inner portion of the ball and push the ball outward in said vertical bore when the spearhead is forced outward from said pressure chamber, said discharge tube adapted on the front for association with a slideably mounted trigger sleeve, said adaption being a smaller diameter portion from the front of the discharge tube to a shoulder inward of said vertical bore, said ball projecting slightly beyond the outline of said smaller portion when said ball is stopped against said lip, an entry port in the side of said trigger sleeve for inserting said ball into said vertical bore, when said sleeve is mounted on said adaption, a ring groove in the bore wall of said trigger sleeve through the inner end of said entry port to provide clearance for said slightly projecting ball, so said trigger sleeve can be rotated on said tube, when the ball is in said vertical bore, a horizontal groove in the bore wall of said trigger sleeve from the front inward near the rear edge to guide said sleeve relative to said ball to a constraining position and release port for said ball, said horizontal groove preferably opposite said entry port, the forward movement of said sleeve stopped when said inward edge of said horizontal groove contacts said projecting ball and the backward movement of said trigger sleeve stopped when said sleeve contacts said shoulder, forward movement of said trigger sleeve forcing said ball to move inward against said lip, so said slot will engage the inner portion of said ball and force the ball outward against the trigger sleeve, securely holding the spearhead fully associated with the pressure chamber, said release port directly in line with said vertical bore, when said trigger sleeve is pushed backward against said shoulder, so said ball will be pushed outward into said release port by the outward movement of said spearhead being expelled by the action of the compressed gas contained in said pressure chamber.

3. In a spearhead device, a sleeve member operating in co-action with and sealed relative to a slideably inserted spearhead, said sleeve member having a bore enlarged at the front to receive said spearhead, said enlarged bore being of sufficient length to provide an area for a pressure chamber at the rear when the spearhead is fully associated with same, said enlarged bore providing a combination pressure chamber and discharge tube, said pressure chamber adapted to receive and contain high pressure gas, an O ring washer seal providing the means

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of sealing the spearhead relative to the pressure chamber in the discharge tube, a ring groove in said spearhead adapted for said ring seal, said seal having a bore to fit snugly against the bottom of said ring groove, said seal having an outside diameter to fit snugly against the wall of said discharge bore, said seal being composed of a resilient material that will contract when exposed to pressure from within said chamber, which causes said seal to expand against the wall of said bore and to contract against the body of said spearhead, thereby effecting a pressure tight seal between the two members in such a manner that the spearhead will slide freely in and out of said bore, a vertical bore through the wall of the pressure chamber discharge tube at the front, said vertical bore being on the outward side of said ring seal when said spearhead is fully associated with said pressure chamber, a ball shaped member slideable in said vertical bore, a lip on the inward end of said vertical bore to stop the inward movement of said ball, yet permit a large portion of said ball to project into the discharge passage, a slot in said spearhead that will engage the inner portion of the ball and push the ball outward in said vertical bore when the spearhead is forced outward from said pressure chamber, said discharge tube adapted on the front for association with a slideably mounted trigger sleeve, said adaption being a smaller diameter portion from the front of the discharge tube to a shoulder inward of said vertical bore, said ball projecting slightly beyond the outline of said smaller portion when said ball is stopped against said lip, an entry port in the side of said trigger sleeve for inserting said ball into said vertical bore, when said sleeve is mounted on said adaption, a ring groove in the bore wall of said trigger sleeve through the inner end of said entry port to provide clearance for said slightly projecting ball, so said trigger sleeve can be rotated on said tube, when the ball is in said vertical bore, a horizontal groove in the bore wall of said trigger sleeve from the front inward near the rear edge to guide said sleeve relative to said ball to a constraining position and release port for said ball, said horizontal groove preferably opposite said entry port, the forward movement of said sleeve stopped when said inward edge of said horizontal groove contacts said projecting ball and the backward movement of said trigger sleeve stopped when said sleeve contacts said shoulder, forward movement of said trigger sleeve forcing said ball to move inward against said lip, so said slot will engage the inner portion of said ball and force the ball outward against the trigger sleeve, securely holding the spearhead fully associated with the pressure chamber, said release port directly in line with said vertical bore, when said trigger sleeve is pushed backward against said shoulder, so said ball will be pushed outward into said release port by the outward movement of said spearhead being expelled by the action of the compressed gas contained in said pressure chamber, said sleeve member adapted in the rear portion of said bore for a slideably mounted check valve member and O ring washer seal, said adaption having a smaller diameter portion outward from said pressure chamber bore, a lip at the inward end of said smaller portion, a larger diameter portion from the outer end of said smaller portion to the rear end of said sleeve member, the inner end of said larger portion adapted for said ring seal and the outer remaining portion threaded inward to said last adaption, said last adaption having a smooth and polished bore to snugly receive said ring seal, an externally threaded washer providing the means of holding said seal associated with said last adaption, said check valve slideable inward and outward in said smaller bore, the front portion of said check valve having a diameter slightly larger than the bore of said ring seal and a smooth surface for a sealing edge of said ring seal bore, a smaller diameter remaining portion of said check valve that projects inward through said lip into

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said chamber, an internally threaded washer attached to the inner end of said check valve on the chamber side, the inward movement of said check valve stopped by the shoulder, at the rear end of said front portion, stopping against said lip, the outward movement of said check valve stopped by said last washer stopping against the inward side of said lip, after said valve has entered the bore of said ring seal, said seal composed of a resilient material that will contract when exposed to pressure from within said chamber, which causes said seal to expand against the wall of said bore and to contract against the body of said check valve, thereby effecting a pressure tight seal between the two members in such a manner that the check valve will slide freely in and out of said seal bore, a nipple fitting on a refill means, that is adapted to co-act with said check valve by pushing said check valve from the bore of said ring seal and replacing said check valve as a sealing means in the bore of said ring seal, said nipple fitting having a front portion slightly larger in diameter than the bore of said ring seal and a smooth surface for a sealing edge of

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the bore of said seal, a larger externally threaded portion to the rear of said last front portion, the nipple fitting or spearhead device can be taken hold of and threaded together by said threaded connections until said nipple fitting engages said valve and pushes the valve from said bore, thereby replacing the valve as a sealing means, whereby compressed gas can be released from said refill means, which flows from said nipple fitting, around said check valve, through said lip and into said pressure chamber, the check valve will be forced outward with said nipple fitting into the bore of said ring seal by the action of the pressure in said chamber as the nipple fitting is withdrawn.

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