Oct. 8, 1963 T. A. CAMPBELL ETAL 3,106,320

HIGH-LOW PRESSURE PUMP

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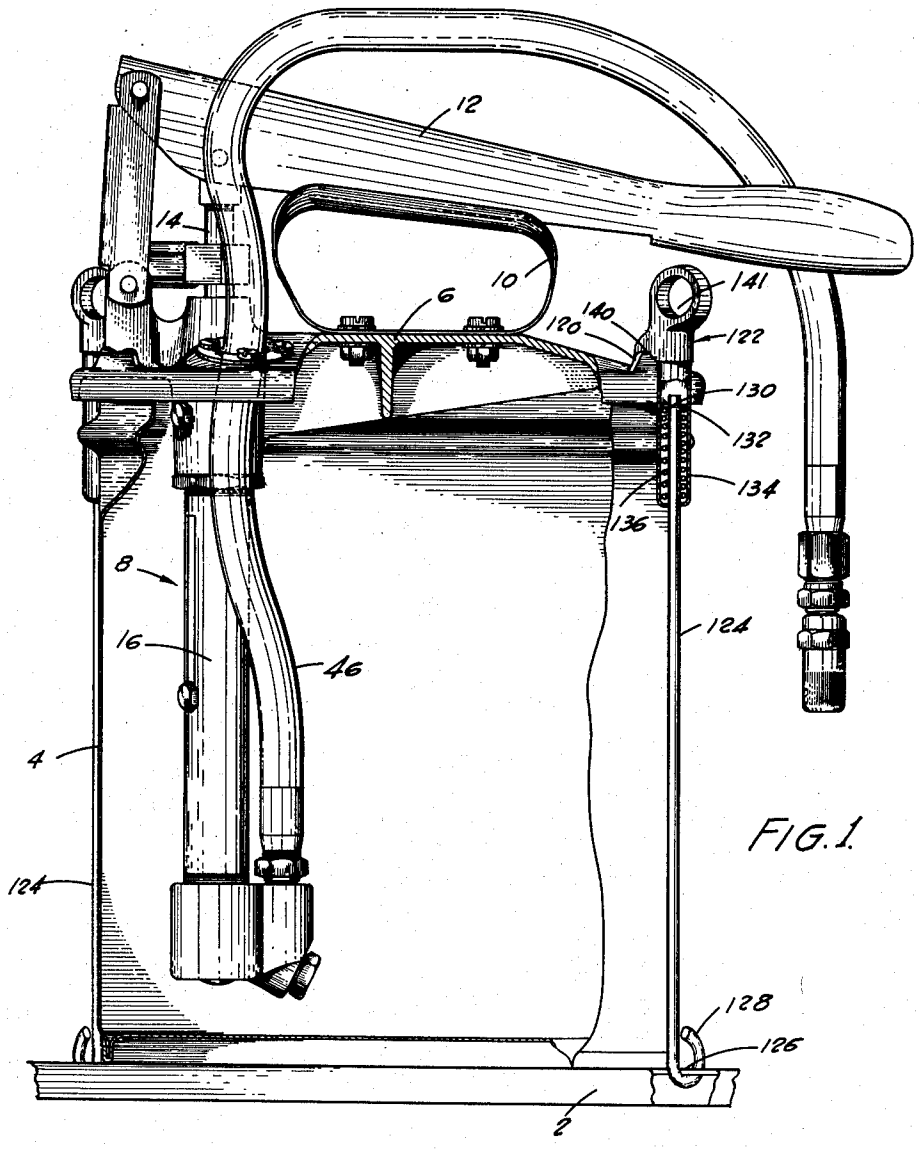


FIG. 1.

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HIGH-LOW PRESSURE PUMP

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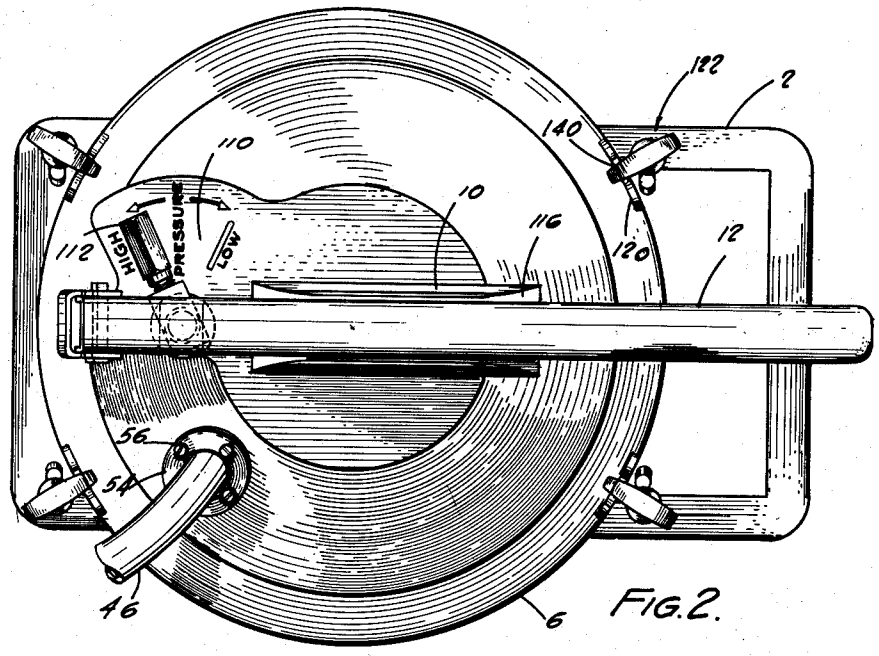


FIG. 2.

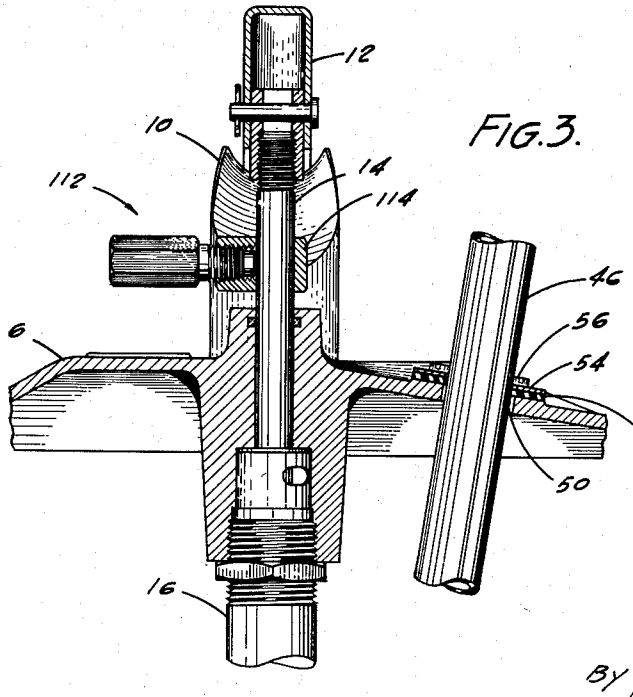


FIG. 3.

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FIG. 4a.

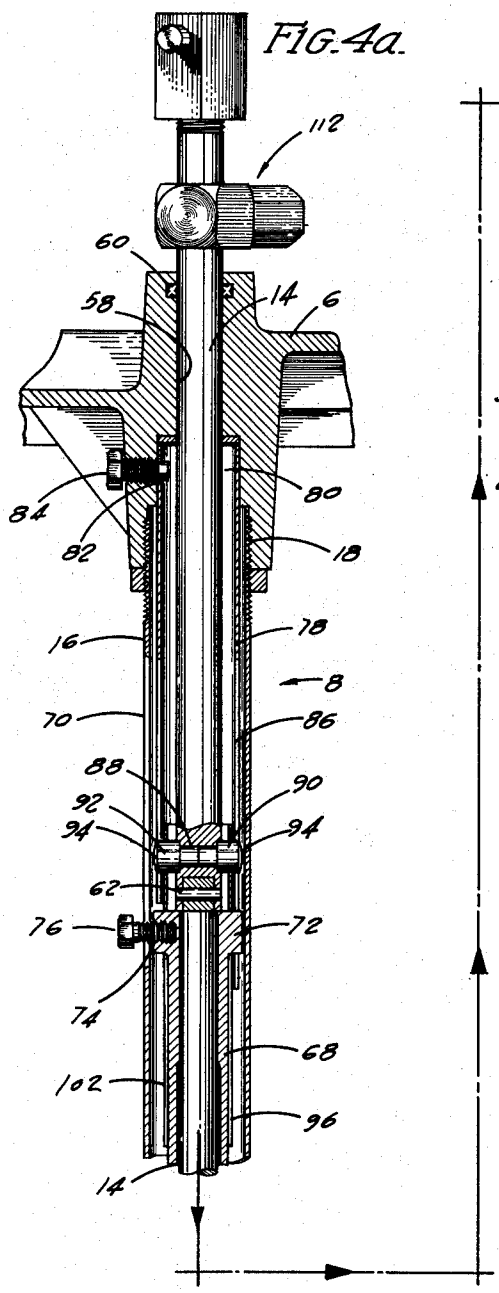
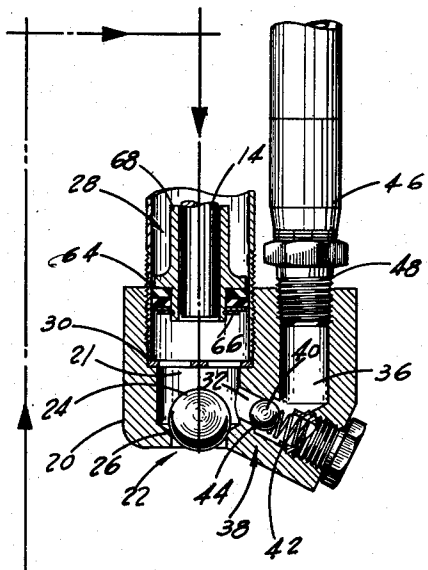


FIG. 4.



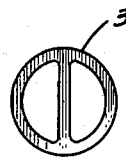


FIG. 11

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FIG. 5

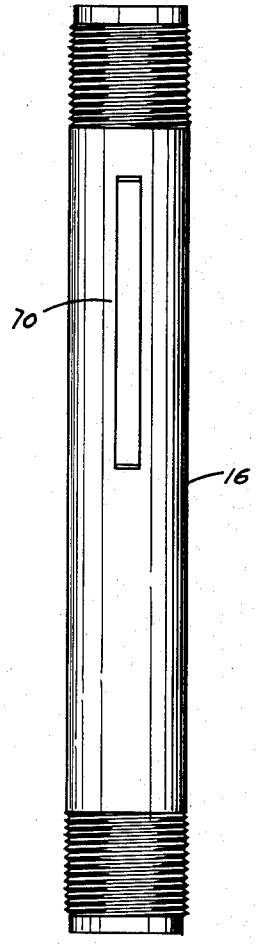


FIG. 6

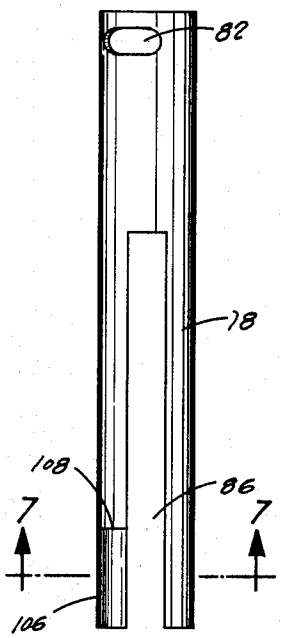
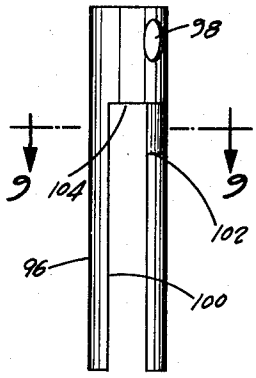


FIG. 8.



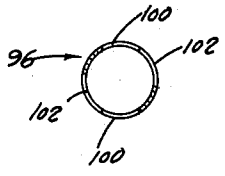


FIG. 9

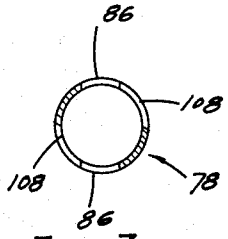


FIG. 7.

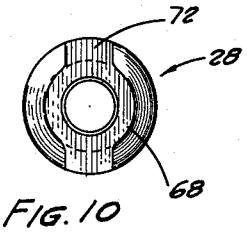


FIG. 10

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United States Patent Office

3,106,320
Patented Oct. 8, 1963

3,106,320

HIGH-LOW PRESSURE PUMP

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Filed Oct. 29, 1959, Ser. No. 849,476
9 Claims. (Cl. 222—318)

This invention relates to portable, hand-operated pumps adapted for use with buckets, or like containers, of lubricant and more particularly to pumps of this type having both high and low output pressure.

While pumps of this type have been used in the past, such pump structures are relatively costly and complicated especially when the pumps are designed to provide both a high and a low liquid output pressure. It is therefore an object of this invention to provide a simplified high and low pressure pump adapted to be used with a container of liquid such as lubricant or the like.

It is a further object of this invention to provide a high and low pressure pump assembly wherein the container or bucket holding the lubricant or the like fluid may be replaced in a simplified operation requiring much less time than that normally consumed by the prior structures.

Other objects of this invention will be pointed out in the following detailed description and claims and illustrated in accompanying drawings which disclose, by way of example, the principle of this invention and the best mode which has been contemplated of applying that principle.

In the drawings:

FIG. 1 is a side elevation of view, partially in section of the supporting base, bucket, cover, pump and clamp assembly;

FIG. 2 is a top plan view of the apparatus shown in FIG. 1;

FIG. 3 is a front elevational view, partially in section of the portion of the apparatus shown in FIGS. 1 and 2;

FIG. 4 is a front elevational view, partially in section of the lowermost portion of the high-low pressure pump forming a portion of this invention;

FIG. 4*a* is a front elevational view, partially in section of the remaining portion of the high-low pressure pump above that shown in FIG. 4;

FIG. 5 is a front elevational view of the outer stationary cylinder forming a portion of the pump shown in FIG. 4;

FIG. 6 is a front elevational view of the intermediate cylinder forming a portion of the same pump;

FIG. 7 is a bottom sectional view of the cylinder shown in FIG. 6 taken along lines 7—7;

FIG. 8 is a front elevational view of the inner cylinder of the pump shown in FIG. 4;

FIG. 9 is a bottom sectional view of the cylinder shown in FIG. 8 taken along lines 9—9;

FIG. 10 is a top plan view of the piston assembly of the pump shown in FIG. 4;

FIG. 11 is a plan view of the perforated retainer forming a part of the lower portion of the pump shown in FIG. 4.

In general, the apparatus of this invention includes a supporting base, which is adapted to receive a generally cylindrical bucket holding lubricant or other fluid to be pumped. A suitable circular cover is provided which serves as a support for the longitudinally extending reciprocating pump apparatus. In order to securely mount the container or bucket in its supporting base as well as to position the cover carrying the pumping apparatus upon the top of the container, a plurality of circumferentially spaced latch assemblies are provided. These latch assemblies include a pivot rod which extends parallel to

the sides of the container and a spring biased latch adapted to clamp the cover to the container and the container to the base.

Another feature of this invention resides in the simplified high and low output pressure reciprocating pump which comprises in general; an outer stationary cylinder forming an enclosed working chamber, a piston rod adapted to move axially within the cylinder and spaced therefrom, and piston means mounted on the piston rod, in sealing relation with the rod and cylinder. Means are provided for causing either the piston and the rod to move together relative to the cylinder for effecting low fluid output pressure or for causing only the rod to move relative to the cylinder to effect a high fluid output pressure.

Referring to the drawings, the bucket and pump assembly includes a generally rectangular base member 2, upon which is positioned a generally cylindrical reservoir 4 containing lubricant or other fluid to be pumped. Mounted at the top of the reservoir 4 is a suitable cover 6 of a generally circular shape and conforming to the diameter of the cylindrical reservoir 4. Suitably positioned on the cover 6 is the high-low pressure pump 8, which for convenience is shown positioned at the forward end of the cover in front of carrying handle 10.

The high-low pressure pump 8 is of the reciprocating piston and cylinder type including a pivotable lever 12 for causing the piston rod 14 to reciprocate within the main or outer stationary cylinder 16. The arrangement for pivoting the operating lever 12, causing the piston rod 14 to reciprocate axially of cylinder 16, is conventional and the present invention is not directed to this feature. Referring to FIGS. 4 and 4*a* it can be seen that outer, stationary cylinder 16 which defines a pumping chamber at the lower end thereof, threadably engages the cover 6 at 18. Likewise, the lower end of the cylinder 16 threadably engages a suitable housing 20. The housing 20 includes a vertical bore 21. A fluid inlet valve 22 comprising a ball check valve is of the gravity operated type wherein the ball 24 contacts seat 26 during downward movement of the piston assembly 28, while upward movement of the piston assembly 28 allows the ball 24 to rise, the ball being prevented from moving upward any great distance by the perforated disc-like retainer 30 which is positioned transversely of bore 21. A diagonal bore 32 extends downwardly from bore 21 at generally right angles to the main bore 21 of the housing 20. A second vertical bore 36 which is positioned generally parallel to the main bore 21 intersects the diagonal bore 32 and is adapted to transmit the pressurized output fluid.

A second ball check valve 38, including a ball 40 having a diameter slightly greater than the diameter of the diagonal bore 32, is spring biased against seat 44 by means of biasing spring 42 to keep the outlet passage way or bore 36 sealed except when the ball check valve is unseated by the pressurized lubricant as the piston assembly 28 moves downwardly within cylinder 16. A suitable flexible hose 46 is connected to the outlet bore 36 by means of a suitable screw threaded coupling 48. The hose 46 extends upwardly through the fluid body within the container and passes through a suitable aperture 50 formed within the cover 6. In order to seal the flexible hose 46 and the cover 6 a rubber gasket 52, FIG. 3, is positioned adjacent the outer surface of the cover and surrounds the flexible hose 46. A steel washer 54 is mounted on the top of the rubber gasket and suitable screws 56 provide sufficient compression force to keep the rubber gasket in place tightly compressed against the outer surface of the flexible hose 46.

Referring now to FIGS. 4 and 4*a*, the piston rod 14

extends downwardly through a suitable opening 58 formed within cover 6 such that the rod may rotate and reciprocate freely within the cover and the main stationary cylinder 16. Suitable sealing means 60 are provided to prevent egress of fluid between the relatively movable piston rod 14 and the stationary cover 6. The piston rod 14 is of a two part construction, the two parts of which are joined by means of a pin 62. This feature provides ease in assembly and disassembly and may be eliminated if desired.

One feature of the present invention is directed to a simplified method of providing both a high and low pressure output. The mechanism for accomplishing this purpose is found generally within the outer stationary cylinder 16. The mechanism includes a piston assembly 28 which is adapted to move along with piston rod 14 within the outer stationary cylinder 16 during low pressure operation. During high pressure operation, the piston assembly remains stationary with respect to the cylinder 16 and the piston rod 14 itself reciprocates within both the piston assembly 28 and the outer stationary cylinder 16. In order to accomplish this, the piston assembly 28 is provided with suitable sealing surfaces which may be formed of a pair of somewhat flexible disc members 64, the disc members being carried at the lower end of the piston assembly by suitable spring clamping means 66. The piston assembly 28 further includes an integral, generally elongated, sleeve 68 which extends upwardly within cylinder 16 for a distance which is roughly half the length of the cylindrical member 16. In order to allow the piston assembly 28 to move axially with respect to piston rod 14, but to prevent any rotatory movement between these two elements, the outer stationary cylinder 16 is provided with a suitable slot 70 shown in FIG. 5, extending longitudinally of the upper portion of outer stationary cylinder 16. The upper terminal end of sleeve 68 is provided with a pair of projections 72, shown in FIGS. 4 and 10, which are of somewhat greater diameter than the major portion of the sleeve 68 and of slightly less diameter than the internal diameter of the outer cylinder 16. One of the projections 72 has a threaded central bore 74, adapted to receive a suitable screw 76 which extends outwardly through the elongated slot 70 when the piston assembly 28 is positioned within the stationary cylinder 16. It is apparent therefore that the piston assembly 28 may be reciprocated within the cylinder 16 a distance determined by the elongated slot 70 while at the same time the piston rod 14 is freely slidable and rotatable within the piston assembly 28 since there is no positive connection between these elements. The sleeve 68 and the whole piston assembly 28 moves with the piston rod 14 for low pressure operation. However, the piston assembly 28 is stationary when the output of the pump is adjusted for high pressure. The ratio of high pressure to low pressure produced by the pump is determined by the relative cross-sectional areas of the piston assembly 28 as defined by the flexible disc member and the piston rod 14 since either the piston rod 14 and the piston rod assembly 28 move together or the piston rod 14 moves by itself.

The means for determining the stationary or moving condition of the piston assembly 28 will now be described. An intermediate or second cylinder or tube 78 is positioned concentrically in the outer stationary cylinder 16 at the upper end thereof. The intermediate cylinder is spaced slightly from the reciprocating piston rod 14 and extends upwardly within the enlarged bore 80 past the threaded end 18 of outer cylinder 16. The intermediate or second cylinder 78 includes a laterally extending slot 82 at the upper end thereof and the cover 6 is adapted to receive a threaded screw 84 such that the end of the threaded screw 84 extends within the lateral slot 82. This permits the second or intermediate cylinder 73 to be rotated on its axis but does not permit axial movement thereof with respect to the outer stationary cylinder 16.

The prime function of the intermediate cylinder is to prevent upward movement of the piston assembly during high pressure operation of the pump when only the piston rod reciprocates with respect to the outer cylinder 16. The intermediate cylinder 78 is further provided with a pair of longitudinal extended slots 86, FIGS. 6 and 7, which occupy the greater length of the cylinder and extend completely to the bottom thereof. The piston rod 14, FIG. 4*a*, immediately above the pin 62, has a laterally extending bore 88 running completely through the center thereof. A pair of actuator pins 90 and 92 are positioned within the bore 88 in back-to-back relation and have elongated head portions 94 extending from the piston rod 14. The head portions 94 of the actuator pins are so positioned as to reciprocate within the elongated slots 86 of intermediate cylinder 78 when the pump is operating to deliver fluid at low output pressure.

The pump assembly further includes a third or inner cylinder 96 which is positioned within the intermediate cylinder 78 and includes, at the upper end, a pair of aligned apertures 98 which are also adapted to receive head portions 94 of actuator pins 90 and 92. As best seen in FIG. 4*a*, the inner cylindrical member 96 is positioned such that the major portion of the cylinder extends downwardly past the sleeve 68 of piston assembly 28. It is apparent therefore, that when the actuator pins 90 and 92 reciprocate within slots 86 of the intermediate cylinder 78, the inner cylinder 96 will move along with the pins. In addition, whenever the pins 90 and 92 rotate as the piston rod 14 is rotated, they will cause the intermediate cylinder 78 to rotate therewith. Whether the pump is operating under high or low pressure conditions the inner cylinder 96 will always reciprocate with the piston rod 14 due to the pin connection.

It is the rotation of the piston rod 14 that sets up the high and low pressure conditions within the pump structure. In order to insure that the piston assembly 28 will not move in response to reciprocation of the piston rod 14 during the high pressure operation of the pump, the inner cylinder 96 further includes a pair of diametrically opposed elongated slots 100 which run almost the full length of the member from a point slightly below the transverse apertures 98 to the extreme lower end of the cylinder. The elongated slots 100 allow the member to receive the projection 72 formed on the upper end of sleeve 68, FIG. 10. In like manner, the intermediate cylinder 78 is also rotated by the actuator pins 90 and 92 so that its elongated slot 86 will receive the same projections 72 to permit reciprocable motion of the sleeve 68 therein. Therefore, when operating under low pressure conditions, the inner cylinder 96 carries the sleeve 68 with it when it is reciprocated by the piston rod 14. In order to provide a connection between reciprocating piston rod 14 and the piston assembly 28, the inner cylinder 96 is further provided with diametrically opposed slots 102, FIG. 8, which are positioned at the upper end of the elongated slots 100 at right angles thereto. In accordance with this arrangement, as the piston rod 14 is moved downwardly, the actuator pins 90 and 92 will carry the inner or third cylinder 96 along with piston rod 14. The projection 72 will be received by the elongated slots 100 with the inner cylinder 96 travelling down until the projection 72 contacts the upper end of the slots at surface 104. When the apparatus has reached this position, the piston rod 14 is rotated causing inner cylinder 96 to rotate in like manner until the projections 72 move fully within slot 102. It is apparent therefore, that further reciprocation of the piston rod 14 in either direction will cause a like reciprocation of the piston assembly 28 through the connection of the projections 23 and slot 102. Since both the piston assembly 28 and the piston rod 14 are moving in unison, low pressure output is achieved.

To change from low pressure operation to high pressure operation of the pump, it is only necessary to disengage the projections 72 on sleeve 68 from the diametri-

cally opposed slots **102** so that piston rod **14** and inner cylinder **96** may move relative to the piston assembly **28**. Rotation of piston rod **14** allows the projections **72** to be aligned with the elongated slots **100** to permit relative axial movement with respect to both the intermediate and inner cylinders. Referring to FIGS. 6 and 7, there is shown at the lower end of the second cylinder **78** a pair of diametrically opposed slots **106** having an upper surface **108**, the upper surface **108** making contact with the projections **72** to prevent any upward movement of the piston assembly **28** as the piston rod **14** reciprocates.

While the various elements making up the reciprocating high and low pressure may be located in various positions relative to each other, the manner contemplated by the present invention allows piston rod **14** to be rotated in the order of approximately 60 degrees to change the operation from high output pressure to low output pressure. In order to aid the user in operation of the pump, there is provided various indicia **110** upon the cover **6** in order that the position of the pump element in regard to high pressure and low pressure output operation may be readily ascertained. In order to change the position of the piston rod, there is included, a plug **112** which extends at right angles to the piston rod axis and may be grasped by the user and rotated to the desired position with ease. The plug **112** is rigidly coupled to the piston rod by suitable screwed threaded coupling means **114**, FIG. 3. Other appropriate means may be utilized for rotating the piston rod to effect change from high pressure to low pressure operation. It is also apparent that the present invention makes use of the advantageous positioning of the carrying handle **10** such that when the lever **12** is in a down position, it is resting completely within the groove **116** formed in the upper portion of handle **10**. Changing from high to low pressure or vice versa can be accomplished only at the downward end of the stroke so that inadvertent changes will not occur during pumping.

The present invention is also directed to providing a compact, readily assembled unit including a base member, a suitable container, a cover supporting the high and low pressure pump and the means for holding the elements in assembled relation while allowing easy and quick removal and replacement of the container carrying lubricant or other liquid to be pumped. Referring to FIGS. 1 and 2, the assembly includes a generally rectangular base member **2** which may be formed of U-shaped metal stock having a width slightly less than the diameter of the tank or container holding the lubricant and having a length somewhat greater than this diameter. The container or bucket **4** is formed of sheet metal. Containers of this type are generally uniform in nature. However, with the type of latching means employed by the present invention, slight variation in the height of the container or bucket may readily be taken care of inherently by the support means. The cover **6** is also formed of metal, and may be of cast or forged construction. Pertinent to the present invention is the placement of a number of circumferentially spaced upstanding flanges **120** along the outer periphery of the cover. The flanges have a generally U-shaped configuration along the upper surface so as to receive appropriate latch members **122**. A number of vertically positioned rods **124** are mounted on the base member **2** which are provided with suitable apertures **126** for receiving the lower terminal ends of the rods. Since a portion of the rod **124** is turned back on itself as at **128** after the rod has been positioned within the hole **126**, the rods will remain semi-fixed to the base **2** but will pivot somewhat at the point where the rod passes through the aperture **126**. The upper end of each of the rods **124** includes a circumferential groove **130** which is adapted to receive a C-shaped retaining ring **132**. Mounted for reciprocation upon this end of the rod is a barrel element **134** which is prevented from moving off the end of the rod by the retaining ring **132**. Positioned between the retaining ring **132** and the bottom of the barrel **134** is a compression spring **136** which tends to force the barrel downwardly on the rod **124**. The latch member **122** is rigidly coupled to the barrel **134** and includes a latch extension member **140** which cooperates with a U-shaped groove formed within member **120**, to effect a latching operation. It is readily apparent that the biasing spring **136** acts to frictionally seat the cover **6** on the container **4** while at the same time securely holding the cover and container upon the base **2**. When setting up the pump or changing the container **4**, it is only necessary to move the latch **122** upwardly against the bias of spring **136** and pivot the rods **124** with respect to the base and away from the container. In order to accomplish this, the latch members **122** include a ring **141** formed integrally at the upper end thereof such that the user may place one finger within the ring and pull upwardly against the spring tension. This simplified construction for holding the assembled parts in position during use of the pump makes possible the expenditure of minimum time and effort for replacing the lubricant containing buckets when they are empty. In addition, some variation in bucket size and height may be permitted without requiring different support means.

While the fundamental novelty features of the invention as applied to the preferred embodiment have been shown and described, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. A high and low output pressure pump for substantially incompressible fluid disposed within a vessel, comprising a first stationary cylinder secured within the vessel and adapted to have at least the lower portion thereof submerged in the fluid, a piston rod adapted to reciprocate and rotate within said first cylinder spaced therefrom and projecting outside of the vessel through a top opening therein, piston means slidably mounted on the lower end portion of said piston rod in sealing relation thereto and to the lower portion of said first cylinder, and forming within said lower portion of the first cylinder a pumping chamber, inlet and outlet check means for the first cylinder adapted to check fluid within the vessel to and from the pumping chamber, a second cylinder positioned within the remaining upper portion of said first cylinder and surrounding said reciprocating piston rod adjacent said piston means, said remaining portion of the first cylinder and the piston means remote of the pumping chamber communicating with said fluid within the vessel, connecting means formed on said second cylinder within said remaining portion of the first cylinder and adapted to couple said piston rod to said piston means when the piston rod is rotated to a first position and to allow relative movement between said piston rod and said piston means when the piston rod is rotated to a second position.

2. An improved high and low output pressure fluid pump for substantially incompressible fluid disposed within a vessel, comprising a first stationary cylinder, a piston rod adapted for rotation and reciprocation within said cylinder, piston means slidably mounted on said rod in sealing relation with said rod and said cylinder to define within a portion thereof a working fluid chamber, inlet and outlet check means for the fluid chamber, means in the first cylinder remote of the working chamber having direct connection to the fluid in the vessel, a second cylinder positioned within said first cylinder between said rod and said first cylinder adjacent said piston means, means allowing limited rotation of said second cylinder about its axis while preventing axial movement thereof, a third cylinder positioned within said second cylinder coaxially of said rod, adjacent said piston means, means connecting said piston rod and said third cylinder whereby said third

cylinder moves with said piston rod, said third cylinder including at least one longitudinal slot formed therein, said third cylinder further including a laterally extending slot formed therein adjacent said longitudinal slot at the end remote from said piston means, a stop means associated with said piston means, said stop means adapted to move upwardly within said longitudinal slot and laterally within said lateral slot to lock said piston means to said third cylinder during low pressure operation, while during high pressure output, said stop means reciprocates within said longitudinal slot whereby only said piston rod moves relative to said first stationary cylinder.

3. An improved high and low output pressure fluid pump for substantially incompressible fluid disposed within a vessel, comprising a first stationary cylinder adapted to be positioned within the vessel, a piston rod positioned within said cylinder adapted to rotate and reciprocate with respect thereto and projecting from the vessel, piston means slidably mounted on said piston rod in sealing relation with said rod and a portion of said cylinder to define therewith a fluid chamber, fluid inlet and outlet check means for the fluid chamber, the portion of said cylinder remote from said fluid chamber having direct communication with the fluid in said vessel, a second cylinder positioned within said first cylinder between said rod and said first cylinder adjacent said piston means, means rigidly connecting said second cylinder and said piston rod, said second cylinder including at least one longitudinal slot extending a portion of the length thereof, at least one lateral slot formed within said second cylinder and intersecting said longitudinal slot, stop means formed on said piston means, said stop means adapted to be received by said longitudinal and said lateral slots, whereby actuation upon the projected end of the piston rod including axial movement and rotation thereof to a first position effects coupling of said piston rod to said piston means to effect low pressure output, while rotation of said piston rod to a second position causes said stop means to reciprocate longitudinally within said longitudinal slot to effect high pressure output of said pump.

4. Apparatus as claimed in claim 3 further including means for preventing rotation of said piston means during reciprocation thereof.

5. Apparatus as claimed in claim 4 wherein said means recited in claim 6 comprise: a longitudinal slot formed within said first cylinder, and projecting means mounted on said piston means, said projection means adapted to extend outwardly within said longitudinal slot for guiding said piston means along a longitudinal path while preventing rotation of said piston means with respect to said stationary cylinder.

6. Apparatus as claimed in claim 3 further including means for preventing upward movement of said piston means under high pressure output conditions.

7. Apparatus as claimed in claim 6 wherein said means comprise: an intermediate cylinder positioned within said first stationary cylinder coaxially of said piston rod between said second cylinder and said outer stationary cylinder, means for mounting said intermediate cylinder for limited rotary movement but preventing axial movement thereof, stop means formed on said intermediate cylinder, said stop means adapted to contact said stop means formed on said piston means for preventing upward movement of said piston means when said piston rod is rotated to said second position.

8. An improved high and low output pressure fluid pump for substantially incompressible fluid disposed within a vessel, comprising a first stationary cylinder adapted to be positioned within the vessel, a piston rod positioned within said first cylinder for rotation and reciprocation therein and projecting from the vessel from a top opening therein, piston means slidably mounted on said piston rod in sealing relation with said rod and at least a portion of said cylinder and forming therewith a fluid chamber, fluid inlet and outlet check means for the fluid chamber, the remaining portion of the first cylinder remote from the fluid chamber having means therein providing direct connection to the fluid in the vessel, means for preventing rotation of said piston means but allowing reciprocation thereof with respect to said first cylinder, coupling means formed on said piston means, an intermediate cylinder positioned within said first cylinder coaxial of said piston rod, means for mounting said intermediate cylinder within said first cylinder for limited rotation with respect to said first cylinder but preventing axial movement therewith, said intermediate cylinder including at least one elongated slot extending the majority of the length of said intermediate cylinder and adapted to receive said coupling means, an inner cylinder positioned within said intermediate cylinder coaxially of said rod and coupled thereto, adjacent said piston means, said inner cylinder including at least one second elongated longitudinal slot extending along a portion of said inner cylinder away from the end of said inner cylinder adjacent said piston means, said inner cylinder further including at least one laterally extending slot at the end of said second longitudinal slot remote from said piston means and intersecting said second longitudinal slot, said lateral and longitudinal slots adapted to receive said coupling means, whereby actuation including rotation and reciprocation of said piston rod upon the projected end thereof to a first position causes said coupling means to slide within said longitudinal slots of said intermediate and inner cylinders and to rotate in said laterally extending slot to lock said piston rod and said piston means together to effect low output pressure operation of said fluid pump while rotation of said piston rod to a second position allows said coupling means to move freely, relative to said longitudinal slots of said intermediate and said inner cylinders whereby only said piston rod moves relative to said first stationary cylinder to effect high output pressure of said fluid pump.

9. Apparatus as claimed in claim 8 wherein said intermediate cylinder includes at least one longitudinally extending slot formed at an angle to said first longitudinally extending slot, said second longitudinally extending slot being of a length much shorter than the first longitudinally extending slot, whereby rotation of said piston rod to said second position allows limited axial movement of said coupling means within said second slot formed within said second cylinder but prevents further upward movement of said freely slidable piston means within said first stationary cylinder.

References Cited in the file of this patent

UNITED STATES PATENTS

717,084	Denham	Dec. 30, 1902
753,530	Eyck	Mar. 1, 1904
1,263,401	Fraser	Apr. 23, 1918
1,794,356	Baker	Mar. 3, 1931
2,083,854	McGee	June 15, 1937
2,204,838	Walstrom	June 18, 1940
2,387,233	Clapp	Oct. 23, 1945
2,510,972	Gray	June 13, 1950
2,513,461	Duncan	July 4, 1950
2,513,631	Erickson	July 4, 1950

FOREIGN PATENTS

6,539	Great Britain	Mar. 28, 1901
331,504	France	Apr. 23, 1903
331,641	France	Apr. 30, 1903