Sept. 9, 1952 G. E. BULLOCK 2,609,973

SPRAYER

Filed Sept. 16, 1950 2 SHEETS—SHEET 1

FIG. 1.

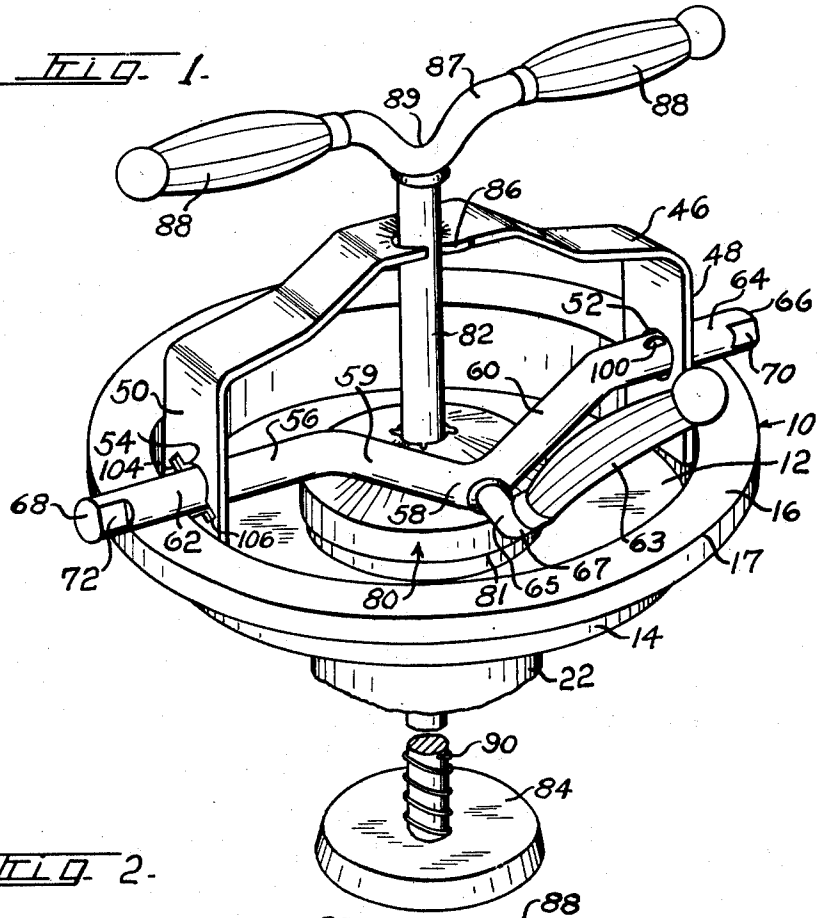
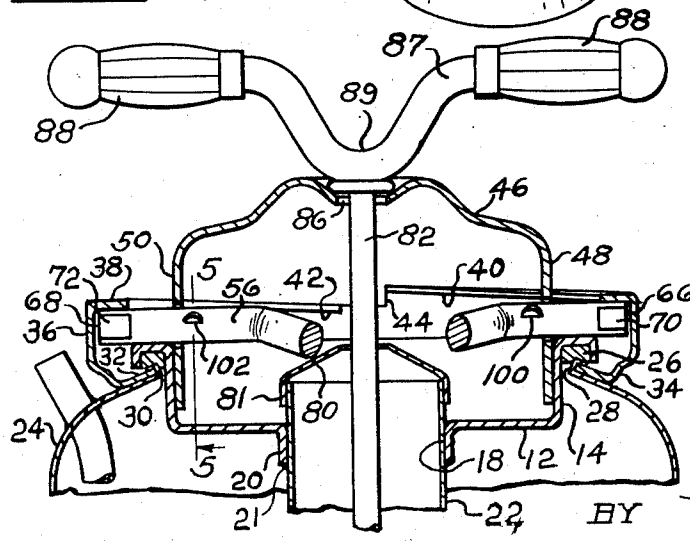


FIG. 2.



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FIG. 3.

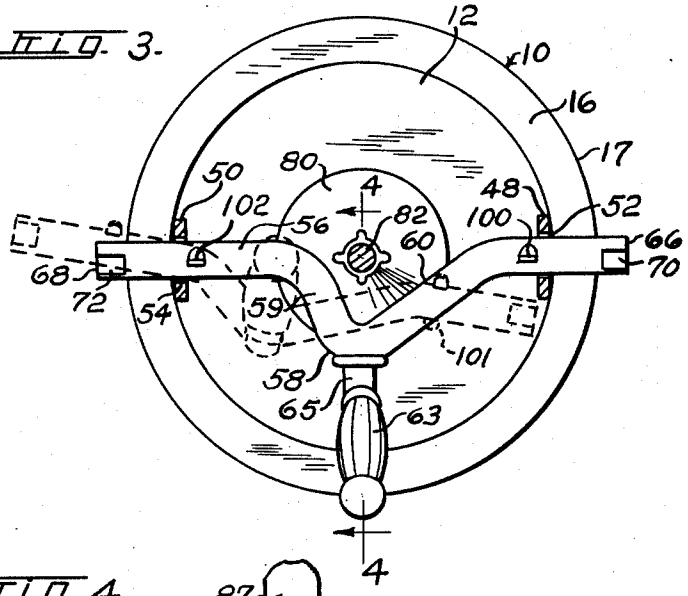


FIG. 4.

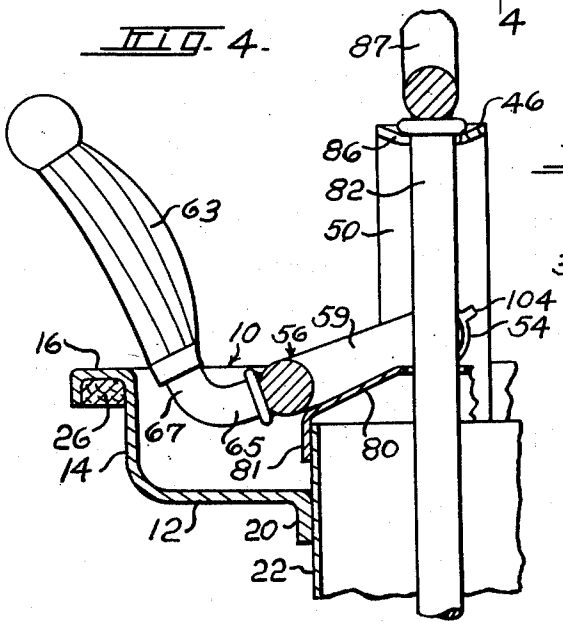
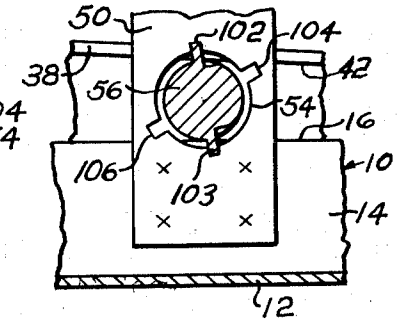


FIG. 5.



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UNITED STATES PATENT OFFICE

2,609,973

SPRAYER

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Application September 16, 1950, Serial No. 185,279

12 Claims. (Cl. 222—401)

1

The present invention relates to sprayers, and more particularly to a pressure head and pump assembly for open head pressure tanks.

The present invention is an improvement over the head and pump assembly disclosed in Patent No. 2,105,451, wherein there is shown an open end tank having a pressure head secured thereto in sealed relation by a transverse pressure withstanding lock bar coacting with a tank-carried locking flange. In such construction, there is provided an elongated pump cylinder centrally and detachably mounted beneath the head and extending into the tank to develop pressure within the tank.

The present invention relates to an arrangement in which such pump cylinder extends through the head and is permanently secured thereto in rigid air-tight manner, whereby the head forms a positive seal for the tank, and no leakage can occur through the juncture of the pump cylinder and head. With such an arrangement, the upper end of the cylinder is provided with a suitable cap and the piston is removable from the top by removal of such cap. The transverse lock bar lying in a position to interfere with the removal of the piston from the cylinder is made removable from the assembly, and is further so disposed in relation to the cylinder cap as to act to retain the cap when such lock bar is in the normal locking position for holding the head upon the tank.

By such an arrangement, the head and cylinder extending therethrough present an air-tight closure for the tank, and while the cylinder is thus rigidly secured to the head, complete access to the interior thereof, including the piston, is afforded, upon disassembly of the transverse lock bar.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressly understood that the drawings are employed for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings, in which like reference characters indicate like parts:

Figure 1 is a perspective view of the pump and pressure tank head assembly;

Figure 2 is a longitudinal section through the assembly, in sealed relation;

Figure 3 is a plan view of the head with the handle and piston rod broken away;

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Figure 4 is a fragmentary sectional view taken substantially on the line 4—4 of Figure 3; and

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 2.

Referring to Figures 1 and 2, there is shown a head member 10 of shallow cup or inverted hat shape, the member having a central disc-like portion 12 surrounded by a substantially cylindrical wall portion 14 having an inverted annular channel 16 formed around the edge or rim 17 thereof. The central disc-like portion is provided with a circular aperture 18, there being an inturned sleeve 20 formed around the marginal edge of the aperture.

A pump cylinder 22 extends through the aperture and is secured in sealed relation to the sleeve 20, as by soldering, brazing or the like 21, the annular joint being sealed against loss of pressure within the pressure tank 24 upon which the head is shown seated.

The annular channel is provided with a gasket 26, adapted to engage a seat 28 formed by the edge 30 of the open end of the tank 24, such edge being rolled or formed over the inner edge 32 of the lower flange 34 of the annular locking ring 36. The locking ring is provided with an upper flange 38, which as illustrated, is broken into two segments 40 and 42, spaced by slots 44, such flange segments being slightly helical to act as cams.

The head 10 is provided with a handle 46 having opposite depending arms 48 and 50, which arms are secured to the cylindrical portion 14 of the head at diametrically opposed points, as by spot welding or other means. The depending arms 48 and 50 each have an aperture 52 and 54, respectively, in which is loosely journaled a cam lock bar 56, such bar having a central offset 58, the same being knee-like and the leg portion 59 thereof extending at a greater angle to the bar axis than the leg portion 60, to provide a longer straight end portion 62 at one end than the other end portion 64. Attached to the knee of the offset is a handle extension rod 65, suitably bent as at 67 to clear the rim 17, and provided with a handle grip 69.

The ends 66 and 68 of the bar extend beyond the channel 16, and are adapted to pass through the diametrically opposed slots 44 in the upper flange 38, to engage beneath the helical segments 40 and 42 of the flange 38 in bayonet locking fashion. To this end, the ends are inserted through the opposed slots 44 between the helical flange segments 40 and 42, and by clockwise rotation of the head relative to the tank, the bar

ends 66 and 68 ride beneath the cam segments 40 and 42, causing the head to engage the gasket 26 upon the seat 28.

In order to force the head down upon the seat with sufficient pressure to withstand internal pressures within the tank, the opposite ends of the bar are provided with flats 70 and 72, which may be milled or otherwise cut into the ends of the bar. By rotating the bar to position the flats horizontally (about 75° counterclockwise from the bar position shown in Figure 1), the head may be freely turned on the tank seat until the thus horizontally disposed flats engage under faces of their respective helical cam flanges 40 and 42. Thereafter, the bar may be rotated to the position shown in Figures 1 and 2, the edge of the flats acting as a cam whereby the head gasket is driven under substantial force against the tank seat where the head is securely held by the bar by reason of the opposed bearing points beneath the helical flanges 40 and 42, and the rim 17, upon which the bar rests.

The pump cylinder is provided with a conical cap 80, with a skirt 81 forming a press fit on the end of the cylinder. The cap is provided with a central aperture through which extends a piston rod 82, the latter having at its lower end a cup piston 84. The rod extends upwardly through a suitable open guide slot 86 in the handle 46, and past the offset 58 in the bar 56. The upper end of the rod is fitted with a transverse handle 87 having grips 88. Such handle may have a central V portion 89 affixed to the piston rod 82 in any suitable manner, the V affording clearance for the lock bar handle grip 63 when rotated to the release position. The upper end of the piston stroke is yieldingly limited by the light coil spring 90, threaded on the rod 82, which spring engages the under side of the cylinder cap 80 to cushion movement at the upper end of the stroke. The cap, having a pressed fit, is readily removable to inspect the piston and rod, and internal cylinder wall, by withdrawing the same from the cylinder as by a sharp upward stroke of the piston beyond the normal upper limit.

In order to prevent the accidental displacement of the cap by movement of the piston beyond its normal upper limit when the head is secured in sealed engagement upon the pressure tank, the offset 58 of the bar 56 is turned to the locking position shown in Figures 1, 2 and 4. The friction bearing of the bar upon the rim 17 and under flanges 40 and 42, when under locking pressure and in the locking position, is sufficient to hold the bar in the position shown with the offset against the cap whereby to resist accidental dislocation of the cap.

On the other hand, if it be desired to remove the piston and rod from the cylinder, the bar may be completely removed from the assembly, thus eliminating all obstruction to the removal of the piston and rod and cylinder cap. For this purpose, the bar is provided with struck up ears 100, 101, 102 and 103 on the end portions 62 and 64 to locate and hold the bar in central position, the ears bearing against the arms 48 and 50. However, the aperture 54 is provided with complemental key slots 104 and 106 which are disposed at such an angle as to substantially align themselves with the lugs 102 and 103 of the bar, when turned to the unlocked position, previously described, when its flats 70 and 72 face upwardly and lie substantially horizontal.

The key slots 104 and 106 are large enough to permit the lugs 102 and 103 to freely pass there-

through when properly oriented with respect to the slots, so that the bar when in release position may be slid to the left sufficiently to draw the opposite right hand end from the aperture 52 and thereby free such end for angular displacement to clear the handle arm 48, whereupon the rod may be slid to the right until its left end has been withdrawn from the aperture 54 in the depending arm 50. By reason of the loose fit of the bar, particularly in the aperture 54, the right end of the bar may thus be moved forward angularly clear of the arm 48 to permit the bar to be slid to the right in the manner described for complete removal thereof from the assembly. In Figure 3, the bar is shown in dotted in the intermediate portion of removal. It will appear that the handle 63, and the bend 67 in the rod 65, are such as to readily clear the handle 46 in the initial sliding movement of the bar 56 to the left, prior to release of the end 66 from the aperture 52.

By reason of the slot guide 86 in the handle 46, it will appear that upon removal of the bar 56, the cylinder cap may be removed as by a sharp long upstroke beyond the normal upper limit, and upon release of the cap from the cylinder, the entire piston and rod assembly may be removed. Upon reassembly, the knee of the lock bar may be utilized to push the cylinder cap into place, as well as hold the same against accidental removal.

From the structure thus described, it will appear that the head and pump cylinder provide a permanently sealed air-tight cover assuring against the escape of air from the tank when sealed engagement of the head and tank is established. The pump cylinder inlet is normally submerged below the tank liquid level, as is the inlet end of the discharge tube, so that upon establishing the seal between head and tank, pressure developed within the tank by operation of the pump is maintained and rendered fully effective for the purpose of discharging spraying fluids or the like. On the other hand, the pump structure is readily disassembled for inspection, cleaning and repair, although the pump cylinder is in effect rendered a rigid part of the head.

Although a single embodiment of the invention has been illustrated and described, it is to be understood that the invention is not limited thereto. As various changes in the construction and arrangement may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In a pressure cylinder and pump combination, a pressure cylinder head having an inverted annular channel around its marginal edge, and a central aperture having an integral inturned sleeve, a pump cylinder extending through said aperture and secured to said sleeve in sealed permanent engagement, said pump cylinder having a removable cap on its upper end, and a piston actuating rod extending through an aperture in said cap, locking means located on said head and movable to a locking position for securing said head in sealed engagement with the open end of a pressure cylinder, and means when in locking position associated with said locking means for securing said cap upon the pump cylinder.

2. In a pressure cylinder and pump combination, a pressure cylinder head having a peripheral sealing means for engaging the open end of a pressure cylinder, and a central aperture, a

pump cylinder extending through said aperture and secured to said head in sealed relation, a press fit removable cap for the upper end of said pump cylinder having an aperture therein for a piston rod, locking means mounted upon the head movable to a locking position for securing said head in sealed engagement with the open end of a pressure cylinder, and means associated with said locking means when in locking position for obstructing removal of said cap.

3. In a pressure cylinder and pump combination, a pressure cylinder head having a peripheral sealing means for engaging the open end of a pressure cylinder, and a central aperture having an integral inturned sleeve, a pump cylinder extending through said aperture and secured to said sleeve in sealed relation thereto, a bridging member extending diametrically across said head and having downwardly extending end portions affixed to the head in opposed spaced relation, a removable cap for the upper end of said pump cylinder located beneath said bridging member, and movable means pivoted in the end portions of said bridging means adapted to bear upon said cap.

4. In a pressure cylinder and pump combination, a pressure cylinder head having a peripheral sealing means for engaging the open end of a pressure cylinder, and a central aperture having an integral inturned sleeve, a pump cylinder extending through said aperture and secured to said sleeve in sealed relation thereto, a bridging member extending diametrically across said head and having downwardly extending end portions affixed to the head in opposed spaced relation, said bridging member having a central piston rod guide slot, a cap for the upper end of said pump cylinder located beneath said bridging member having a central aperture for a piston rod, and a transversely extending rock bar journaled in said end portions, said rock bar having pressure sealing cams on the opposite ends thereof, and an offset centrally thereof adapted to engage said cap when turned to a cam sealing position, a piston rod extending through the aperture in said cap, the guide slot in said bridging member, and the offset in said rock bar, the offset in said rock bar being of knee shape to provide a sufficient free end on one end of said rock bar to permit sliding thereof to free the other end from the end portion of the bridging member whereby said bar may be slidably removed from the bridging member.

5. In a pressure tank and pump combination, a pressure tank head having a peripheral sealing means for engaging the open end of a pressure tank, a central aperture in said head having a pump cylinder extending therethrough, said cylinder being secured in said aperture in sealed relation to said head, a piston and rod assembly including an end cap for said cylinder removable from the upper end thereof, a bridging member and piston rod guide having end portions secured to said head on opposite sides thereof, a transverse cam rock bar journaled in said end portions, and having a central offset clearing said piston rod, means normally limiting endwise movement of said bar in the end portion journals, and means operative upon rotation of said rock bar to one position for rendering said first-named means ineffective whereby said lock bar may be slid to a position freeing one end thereof from the bracket to permit removal of the bar from the bracket.

6. In a pressure tank and pump combination, a pressure tank head having a peripheral sealing means for engaging the open end of a pressure tank, a central aperture in said head having a pump cylinder extending therethrough, said cylinder being secured in said aperture in sealed relation to said head, a piston and rod assembly including an end cap for said cylinder removable from the upper end thereof, a bridging member and piston rod guide having end portions secured to said head on opposite sides thereof, a transverse cam rock bar journaled in said end portions, and having a central offset clearing said piston rod, said offset being of knee shape to provide a longer straight end portion on one end of said rock bar than on the other, means normally limiting endwise movement of said bar in the end portion journals, and means associated with the longer end portion and operative upon rotation of said rock bar to one position for rendering said first-named means ineffective, whereby said lock bar may be slid to a position freeing one end thereof from the bracket to permit removal of the bar from the bracket.

7. In a pressure tank and pump combination, a pressure tank head having a peripheral sealing means for engaging the open end of a pressure tank, a central aperture in said head having a pump cylinder extending therethrough, said cylinder being secured in said aperture in sealed relation to said head, a piston and rod assembly including an end cap for said cylinder removable from the upper end thereof, a bridging member and piston rod guide having end portions secured to said head on opposite sides thereof, opposed journal apertures in said end portions, a transverse cam rock bar journaled in said end portion apertures, and having a central offset clearing said piston rod, means normally limiting endwise movement of said bar in the end portion journals, said means at one end including an ear upstruck from said bar, and key slot means associated with one of said journal apertures operative upon rotation of said rock bar to one position to pass said ear through said slot, whereby said lock bar may be slid to a position freeing one end thereof from the bracket to permit removal of the bar from the bracket.

8. In a pressure tank and pump combination, a pressure tank head having a peripheral sealing means for engaging the open end of a pressure tank, a central aperture in said head having a pump cylinder extending therethrough, said cylinder being permanently secured in said aperture in sealed relation to said head, a piston and rod assembly including an end cap for said cylinder removable from the upper end thereof, a bridging member and piston rod guide having end portions secured to said head on opposite sides thereof, opposed journal apertures in said end portions, a transverse cam rock bar journaled in said end portion apertures, and having a central offset clearing said piston rod, means normally limiting endwise movement of said bar in said journal apertures, and means operative upon rotation of said rock bar to one position for rendering said last-named means ineffective, whereby said lock bar may be slid to a position freeing one end thereof from the bracket to permit removal of the bar from the bracket, said cylinder cap when positioned upon the end of said cylinder being so positioned with respect to said rock bar whereby said offset will bear against said cap upon rotation of said rock bar to an end position established by said cap.

9. In a pressure cylinder and pump combina-

tion, a pressure cylinder head having a depressed central portion and surrounding substantially cylindrical wall, a peripheral rim and sealing means for engaging the open end of a pressure cylinder, and a central aperture in the central portion having an integral inturned sleeve, a pump cylinder extending through said aperture and permanently secured to said sleeve in sealed relation thereto, a bridging member extending diametrically across said head and having downwardly extending end portions affixed to the cylindrical wall of said head in opposed spaced relation, said bridging member having a central piston rod guide slot, a cap for the upper end of said pump cylinder located beneath said bridging member and having a central aperture for a piston rod, a transversely extending rock bar journaled in apertures in said end portions and adapted to bear upon said rim, said rock bar having pressure sealing cams on the opposite ends thereof, and an offset centrally thereof adapted to engage said cap when turned to a cam sealing position, the piston rod extending through the aperture in said cap, the guide slot in said bridging member, and the offset in said rock bar, the offset in said rock bar being of knee shape to provide a sufficient free end on one end of said rock shaft to permit sliding thereof to free the other end from the end portion of the bridging member whereby said bar may be slidably removed from the bridging member, lug means on said bar for limiting endwise movement thereof, and key slot means associated with one of said end portion apertures whereby the lug means at one end of said bar will pass through said slot upon rotation of said bar to one position.

10. In a pressure cylinder and pump combination, a pressure cylinder head having an inverted annular channel around its marginal edge, and a central aperture having an integral inturned sleeve, a pump cylinder extending through said aperture and secured to said sleeve in sealed engagement, said pump cylinder having a cap on its upper end, and a piston actuating rod extending through an aperture in said cap, transversely extending locking means located on said head and movable to a locking position for securing said head in sealed engagement with the open end of a pressure cylinder, means associated with said locking means for securing said cap upon the pump cylinder when in locking position, and means for effecting removal of said locking means from the head when moved to another position whereby said cap and piston rod may be removed from said pump cylinder free of obstruction from said locking means.

11. In a pressure cylinder and pump combination, a pressure cylinder head having an inverted annular channel around its marginal edge, and a central aperture having an integral inturned sleeve, a pump cylinder extending through said aperture and secured to said sleeve in sealed engagement, said pump cylinder having a cap on its upper end, and a piston actuating rod extending through an aperture in said cap, a locking bar located on said head extending transversely thereof and movable to a locking position for securing said head in sealed engagement with the open end of a pressure cylinder, offset means adapted to clear said piston rod associated with said locking bar for bearing against said cap upon the pump cylinder when in locking position, and means for effecting removal of said bar from the head when moved to another position, whereby said cap and piston rod may be removed from said pump cylinder free of obstruction from said locking bar.

12. In a pressure cylinder and pump combination, a pressure cylinder head having a peripheral seal around its marginal edge, and a central aperture, a pump cylinder extending through said aperture and permanently secured to said sleeve in sealed engagement, said pump cylinder having a cap on its upper end, and a piston actuating rod extending through an aperture in said cap, a transversely extending locking bar having a central offset rotatably mounted on said head and rotatable to a locking position for securing said head in sealed engagement with the open end of a pressure cylinder, said offset being adapted to bear against said cap upon the pump cylinder when in locking position, and means for effecting removal of said bar from said head whereby said cap and piston rod may be removed from said pump cylinder free of obstruction from said bar.

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