

Oct. 11, 1960

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2,955,543

PUMPS FOR LIQUID DISPENSERS

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2 Sheets-Sheet 1

Fig. 4.

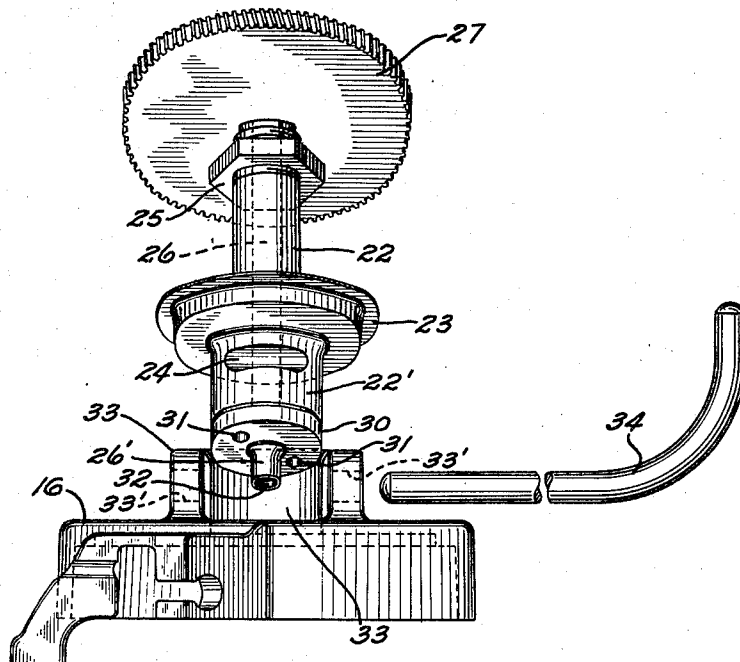


Fig. 1.

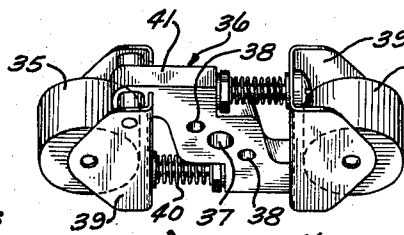
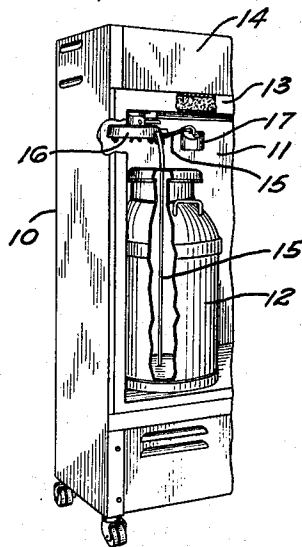


Fig. 5.

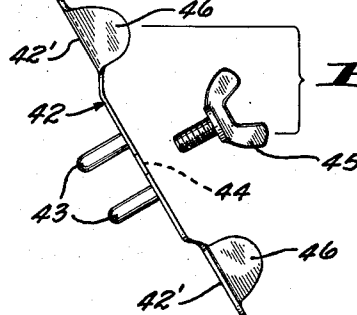


Fig. 6.

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2 Sheets-Sheet 2

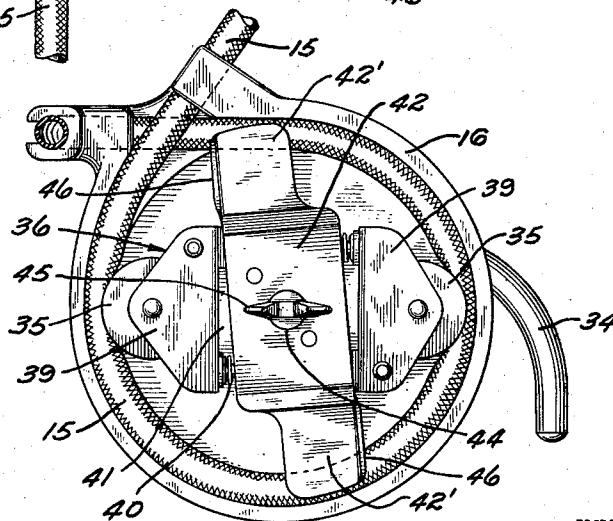
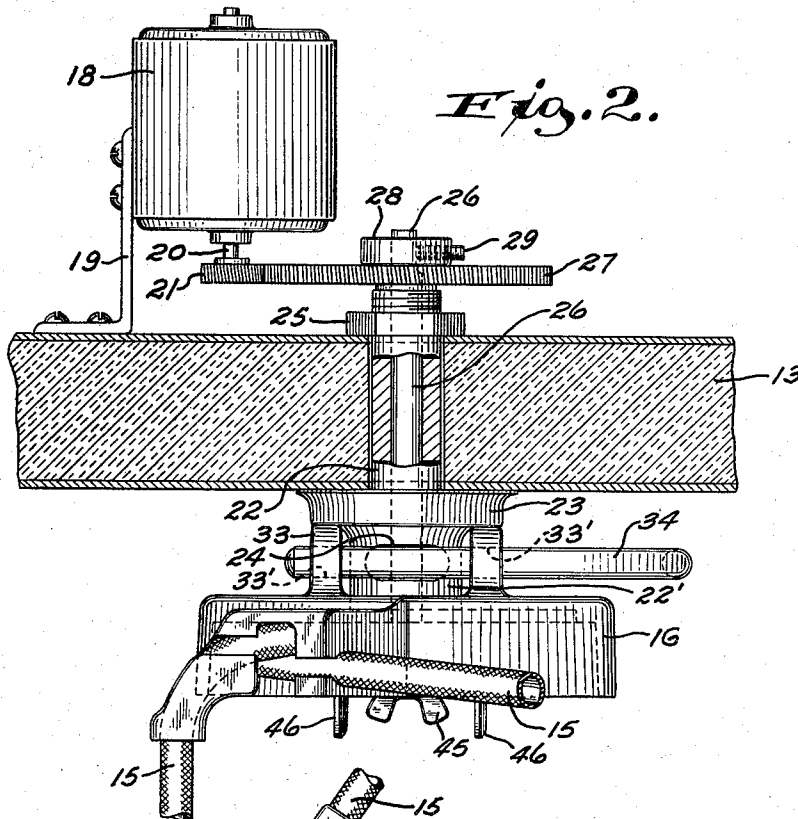


Fig. 3.

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2,955,543

PUMPS FOR LIQUID DISPENSERS

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12 Claims. (Cl. 103—149)

This invention relates to improvements in pumps for liquid dispensers, and more particularly to a pump or lift assemblage for use in automatic dispensers for milk or other beverages. This invention is an improvement upon the device disclosed in my co-pending application Serial No. 559,297, filed January 16, 1956 now Patent No. 2,909,125.

The health departments of many States now require that the motors used in automatic beverage dispensers be isolated from the main cabinet chamber to avoid contamination of the food, and that the pump or lift which is mounted in the main chamber be readily disassemblable without tools to permit easy and thorough cleaning. It is the principal object of the present invention, therefore, to provide a pump construction wherein the motor and pump units are mounted in separate compartments, and wherein the pump may be quickly and easily disassembled without tools for cleaning.

A more specific object of the present invention is to provide a readily disconnectable pump assemblage for liquid dispensers of the type described wherein a sleeve is projected through and removably secured to the wall separating the main chamber from the motor compartment, and wherein the pump on one side of said wall is driven by a shaft rotatably journaled in said sleeve and operatively connected to a motor on the other side of said wall.

A further specific object is to provide a pump assemblage as described wherein a housing containing rotary lift mechanism is removably mounted on a projecting portion of the pump shaft sleeve, and wherein the pump components within said housing are removably connected to said pump shaft, the entire unit being adapted to be quickly disassembled without tools.

Still further objects of the present invention are to provide an improved pump assemblage for liquid dispensers which is relatively simple, which is durable, and which is efficient in operation.

With the above and other objects in view, the invention consists of the improved pump for liquid dispensers, and all of its parts and combinations, as set forth in the claims, and all equivalents thereof.

In the accompanying drawings, illustrating one complete embodiment of the preferred form of the invention, in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is a fragmentary perspective view of a beverage dispenser cabinet, with parts thereof being broken away, showing dispensing mechanism including the improved pump or lift mounted therein;

Fig. 2 is a vertical sectional view through the main chamber top wall, showing the complete pump assemblage in side elevation;

Fig. 3 is a bottom plan view of the pump housing with the pump components mounted therein;

Fig. 4 is an exploded view showing the pump housing in side elevation and showing the sleeve and associated

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drive mechanism in perspective, with the locking pin removed;

Fig. 5 is a perspective view of the pump rotor; and

Fig. 6 is an exploded side elevational view of the rotor retaining plate and locking bolt.

Referring now more particularly to Fig. 1 of the drawings, the numeral 10 designates a dispenser cabinet for an automatic milk vending machine. The cabinet includes a refrigerated main chamber 11, containing one or more conventional milk cans 12 and an insulated horizontal wall 13 separating said main chamber from a motor compartment 14. In the illustrated cabinet the motor compartment is located directly above the main chamber but other arrangements are also possible, and the present invention is designed for use in any cabinet wherein the motor is mounted in a separate compartment. Moreover, it is to be understood that while the illustrated dispenser is of the type used in milk vending machines, the pump or lift assemblage comprising the present invention is equally well adapted for use in machines dispensing coffee and other beverages.

As will be seen in Fig. 1, a flexible tube 15 leads upwardly from the interior of the milk container 12 into a pump housing 16, suspended from the top wall 13. An outlet portion of the tube extends from the pump housing to a dispensing outlet or cup port 17 formed in a wall of the cabinet. In operation, milk is sucked upwardly through the tube 15 by the pump or lift, in the manner disclosed in my co-pending application Serial No. 559,297, and discharged through a spout in the dispensing outlet.

Referring now to Fig. 2, the electric motor 18 which drives the pump in the present invention is mounted on and above the top wall 13 by means of a bracket 19 and includes a vertical drive shaft 20 having a pinion 21 thereon. A cylindrical sleeve 22 is projected upwardly through said top wall 13, with a portion projecting into the motor compartment and being externally threaded. The portion of said sleeve in the main chamber below the wall 13 is of a larger diameter than the upper portion as at 22' and includes a clamping disk 23 forming a circumferential shoulder abutting the underside of said wall 13. Said portion 22' of the sleeve has a tangential groove 24 (Fig. 4) formed therein, the purpose of which will be hereinafter explained. A nut 25 is threaded onto the upper end of said sleeve and coacts with the annular shoulder formed by the disk 23 to removably clamp said sleeve and associated parts onto the wall.

Rotatably journaled within the sleeve 22, and projecting from each end thereof, is a driven shaft 26. The portion of said driven shaft projecting upwardly into the motor compartment has a gear 27 rigidly mounted thereon, which gear meshes with, and is adapted to be driven by, the pinion 21 on the motor shaft. A collar 28 having a set screw 29 therein is carried by the upper end of said driven shaft 26 and is designed to rigidly connect the gear to the shaft for rotation therewith. The lower end of said driven shaft has a circular collar 30 connected thereto (Fig. 4), with its upper surface abutting the lower end of the sleeve 22 and rotatable therebeneath with the driven shaft, which collar has a pair of spaced key holes 31 therein and also has a projecting stem 26' with a threaded bore 32.

As will be seen in Fig. 2, an inverted cup-like housing 16 is mounted on the lower enlarged projecting portion 22' of the sleeve, the housing top having a central bore through which said sleeve portion extends to position the collar 30 within the housing. Formed on the top of said housing, and partially surrounding said sleeve, is a horseshoe collar 33 having a pair of aligned holes 33' adjacent the ends of said collar. When the pump is in its assembled condition, a tapered pin 34 is projected through said aligned collar holes and is wedgingly en-

gaged in the aforementioned tangential sleeve groove 24, thereby removably securing the housing to the sleeve enlargement 22' and effectively preventing rotation or vertical movement of the sleeve. As will be readily appreciated, the pin may be manually withdrawn and the housing easily removed from the sleeve when it is desired to clean or replace the members.

The flexible tube 15, leading from the milk can 12 as hereinbefore described, extends around the inside of the peripheral wall of the housing and is adapted to be engaged and compressed by spaced rollers 35 carried by a rotor 36 mounted on the lower projecting portion of the drive shaft. Said rotor is illustrated in Fig. 5 and includes an arm 41, roller brackets 39 disposed at opposite ends of said arm and providing a transverse recess therebetween, and coil springs 40 secured to and between said arm and bracket members. Said rotor arm 41 has a transverse central hole 37 through which the internally threaded stem 26 on the collar 30 at the lower portion of the driven shaft 26 is projected. The rotor arm also has a pair of spaced key holes 38 designed to register with the key holes 31 in the drive shaft collar when the rotor is properly mounted on said drive shaft.

An elongated retaining plate 42 (Figs. 3 and 6) is carried on the lower projecting portion of the drive shaft adjacent the rotor 36, said plate having a central hole 44 and being mounted transversely to the longitudinal axis of the rotor arm. As will be seen in Fig. 6, the outer end portions 42' are preferably raised slightly from the normal plane of the plate body and form retaining arms to retain the tube 15 in assembled position within the housing. Said outer end portions 42' also have perpendicular ears 46 formed thereon, which ears are adapted to be gripped by the fingers to facilitate moving of the rollers when the tube 15 is being installed. When the rotor 36 and retaining plate 42 are in proper assembled relationship, a pair of pins 43 formed on said plate project into the registering rotor and drive shaft collar key holes 33 and 31 to drivably connect the rotor and plate to the driving shaft 26. A wing head bolt 45 is adapted to be threaded into the threaded bore 32 of the stem 26' to removably lock said rotor and retaining plate in position on said shaft. With this keying arrangement if the rotor is not right side up, then the retaining plate pins 43 will not enter the keying holes when the plate is extending transversely through the recess between the two brackets 39 as it must.

In the operation of the pump device comprising the present invention, the electric motor 18, acting through the meshing pinion 21 and gear 27, rotates the driven shaft 26 journaled within the sleeve 22. The driven shaft 26 in turn rotates the rotor 36 thereon and causes the rollers 35 to act on the flexible tube 15, milk being thereby lifted from the container 12 and caused to flow through the tube to the dispensing outlet 17.

As will be readily appreciated from the foregoing detailed description, the present invention provides a pump assemblage for automatic beverage dispensers wherein the pump and the operating motor may be mounted in separate compartments, and wherein the several pump portions in the main cabinet chamber may be quickly disassembled without tools, as required by the health departments of many States. To disassemble the pump, the locking bolt 45 is first manually removed from the internally threaded stem 26' at the lower end of the driven shaft, and the retaining plate and rotor slid from their positions on said shaft. The housing 16 may then be disengaged from the sleeve by merely withdrawing the wedge pin 34 and sliding said housing downwardly off of the sleeve, thereby completing the disassembly and permitting the thorough cleaning of the individual pump portions. As before mentioned, the keying arrangement insures proper reassembly of the rotor and plate.

Various changes and modifications may be made in the structure described herein without departing from

the spirit of the invention, and all of such changes are contemplated as may come within the scope of the following claims.

What I claim is:

1. In a beverage dispenser having a main chamber and having a motor compartment and there being a separating wall between said chamber and motor compartment, a pump assemblage comprising: a motor mounted in said motor compartment; a sleeve extending through said separating wall and having a portion extending into the main chamber, the portion of said sleeve which extends into said main chamber being of enlarged diameter and having a tangential groove; a pump shaft rotatably journaled in said sleeve and projecting from both ends thereof; means on the end of said pump shaft in the motor compartment operatively connecting said shaft to the motor; a housing within the main chamber and having a collar receiving said sleeve, said collar having holes oppositely disposed and alineable with said tangential groove, a removable pin projected through said aligned collar holes and engaged in the tangential sleeve groove for removably locking the housing on said sleeve; and pumping means including a pump rotor on the pump shaft within said housing.
2. In a beverage dispenser having a main chamber and having a motor compartment and there being a separating wall between said chamber and motor compartment, a pump assemblage comprising: a motor mounted in said motor compartment; a sleeve extending through said separating wall and having a portion projecting from a side of said separating wall into the main chamber; a pump shaft rotatably journaled in said sleeve and projecting from both ends thereof; means on the portion of said pump shaft projecting into the motor compartment operatively connecting the same to the motor; a housing having an opening through which said pump shaft extends removably mounted on said projecting portion of the sleeve within the main chamber; a removable dispensing tube within said housing; a collar on said portion of said pump shaft which projects into said housing, said collar having a projecting stud and having at least one key hole; a rotor in said housing adapted to engage and depress the dispensing tube and having a central opening through which said collar stud extends, said rotor having a key hole in registration with the key hole in said collar; a retaining plate having a pin inserted into said registering rotor and collar key holes; and means removably engaged with the end of said collar stud to removably secure said rotor and retaining plate in assembled position.
3. In a beverage dispenser having a main chamber and having a motor compartment and there being a separating wall between said chamber and motor compartment, a pump assemblage comprising: a motor mounted in said motor compartment; a sleeve extending through said separating wall and having a portion projecting from a side of said separating wall into the main chamber; a pump shaft rotatably journaled in said sleeve and projecting from both ends thereof; means on the portion of said pump shaft projecting into the motor compartment operatively connecting the same to the motor; a housing having an opening through which said pump shaft extends removably mounted on said projecting portion of the sleeve within the main chamber; a removable dispensing tube within said housing; a collar on said portion of said pump shaft which projects into said housing, said collar having a projecting stud and having at least one key hole; a rotor in said housing adapted to engage and depress the dispensing tube and having a central opening through which said collar stud extends, said rotor having a key hole in registration with the key hole in said collar; a retaining plate having a pin inserted into said registering rotor and collar key holes; and means removably engaged with the end of said collar stud to removably secure said rotor and retaining plate in assembled position, said plate having projecting ends

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overlapping said dispensing tube to maintain the latter in position in the housing.

4. In an automatic beverage dispenser having a main chamber and a motor compartment and there being a separating wall between said chamber and motor compartment, a pump assemblage comprising: a motor mounted in said motor compartment; a sleeve extending through said separating wall and having a portion projecting in the main chamber which has a tangential groove; a pump shaft rotatably journaled in said sleeve and projecting from both ends thereof, the end of said pump shaft in the main chamber having an internally threaded end bore; means on the portion of said shaft projecting into the motor compartment operatively connecting the same to the motor; a housing having an opening through which said pump shaft extends; a collar on said housing receiving said projecting portion of the sleeve; said collar having aligned holes therethrough alineable with the tangential groove; a removable pin projected through said aligned collar holes and engaged in the tangential groove of the sleeve portion to removably lock the housing on said sleeve; a removable dispensing tube in said housing; keying means on said pump shaft and positioned within said housing having at least one key hole; a rotor in said housing adapted to engage and depress the dispensing tube and having a central opening through which the pump shaft is projected and having a keying hole therethrough in registration with the key hole in said keying means; a retaining plate having a pin inserted into said registering rotor and keying means key holes; and a bolt threaded into the bore at the end of said pump shaft to removably secure the rotor and plate in assembled position.

5. In an automatic beverage dispenser of the type having a cabinet with a main chamber and a motor compartment and there being a separating wall between said chamber and motor compartment, and having a motor, including a shaft with a pinion thereon, mounted in said motor compartment, a pump assemblage comprising: a sleeve projected transversely through said separating wall and having portions projecting from both sides thereof, the portion of said sleeve which extends into said motor compartment being externally threaded and the portion projecting into the main chamber having a tangential groove and having a shoulder above said groove abutting said wall; a nut on the threaded end of said sleeve cooperating with said shoulder to removably clamp the sleeve on said wall; a pump shaft rotatably journaled in said sleeve and projecting from both ends thereof, the end of said pump shaft within the main chamber having an internally-threaded end bore; a gear mounted on the portion of said pump shaft within the motor compartment and engaged with the motor shaft pinion; a housing mounted in the main chamber and having a peripheral wall; a flexible liquid dispensing tube removably carried about the inner side of said wall; a horseshoe collar on said housing partially surrounding said projecting portion of the sleeve, said collar having a pair of aligned holes alineable with the tangential groove of the sleeve; a tapered pin projected through said aligned collar holes and engaged in said tangential groove removably locking the housing on the sleeve; keying means on said pump shaft within the housing and having at least one key hole; a rotor in the housing adapted to engage and depress the dispensing tube and having a central opening through which the pump shaft end is projected, and said rotor having a key hole therethrough in registration with the key hole in said pump shaft keying means; a retaining plate over said rotor and having a central hole and having a pin inserted into said registering rotor and keying means key holes; and a bolt extending through the central hole of said plate and threaded into said bore in the end of said pump shaft to removably secure the rotor and plate thereon.

6. In a beverage dispenser having a main chamber and

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having a motor compartment and there being separating wall between said chamber and motor compartment, a pump assemblage comprising: a motor mounted in said motor compartment, a sleeve extending through said separating wall and having a portion projecting beyond both sides thereof, means on said projecting portions of the sleeve for removably clamping the same to the wall; a pump shaft rotatably journaled in said sleeve and projecting from both ends thereof, means on the end of the pump shaft which is in the motor compartment operably connecting the same to said motor, a housing into which said pump shaft projects removably mounted on the portion of the sleeve which projects into the main chamber, and pumping means including a pump rotor within said housing and removably mounted on said pump shaft.

7. A lift pump assemblage comprising a tubular support having an external tangential groove, a housing having a collar removably receiving said tubular support and said collar having oppositely disposed holes alineable with said tangential groove of the support, a removable pin extending through said aligned collar holes and engaged in said tangential groove for removably locking the housing on said tubular support, a pump shaft journaled in said tubular support and having an end projecting rotatably into said housing, and pumping means including a pump motor removably mounted on said end within said housing.

8. A lift pump assemblage comprising a tubular support having an external tangential groove, a housing having a collar receiving said tubular support and said collar having oppositely disposed holes alineable with said tangential groove of the support, a removable pin extending through said aligned collar holes and engaged in said tangential groove for removably locking the housing on said tubular support, a pump shaft journaled in said tubular support and having an end projecting into said housing and provided with keying means, pumping means including a pump rotor removably mounted on said end within said housing and having registering keying means, a plate on said rotor and having keying means removably coacting with said registering keying means, and means on the pump shaft and rotor for removably attaching said plate to said pump shaft end.

9. A lift pump assemblage comprising a housing having a central opening, a pump shaft extending rotatably through said central opening and having an end within the housing, a removable dispensing tube within the housing, a collar on said end of the pump shaft having a projecting stud and having at least one key hole, a rotor in said housing positioned to engage and depress the dispensing tube and having a central opening through which said collar stud extends, said rotor having a key hole in registration with the key hole in said collar, a retaining plate on said rotor having a projecting pin inserted in said registering rotor and collar key holes, and means readily detachably connecting said plate to said collar stud to removably secure the rotor in assembled position.

10. A lift pump assemblage comprising a housing having a central opening, a pump shaft extending rotatably through said central opening and having an end within the housing, a removable dispensing tube within the housing, a collar on said end of the pump shaft having a projecting stud and having at least one key hole, a rotor in said housing positioned to engage and depress the dispensing tube and having a central opening through which said collar stud extends, said rotor having a key hole in registration with the key hole in said collar, a retaining plate on said rotor having a projecting pin inserted in said registering rotor and collar key holes, and means readily detachably connecting said plate to said collar stud to removably secure the rotor in assembled position, said plate having projecting ends overlapping said dispensing tube to maintain the latter in position in the housing.

11. A lift pump assemblage comprising a housing having a central opening, a pump shaft extending rotat-

ably through said central opening and having an end within the housing, a removable dispensing tube within the housing, a collar on said end of the pump shaft having a projecting stud and having at least one key hole, a rotor in said housing positioned to engage and depress the dispensing tube and having a central opening through which said collar stud extends, said rotor having a key hole in registration with the key hole in said collar, a retaining plate on said rotor having a projecting pin inserted in said registering rotor and collar key holes, and means readily detachably connecting said plate to said collar stud to removably secure the rotor in assembled position, said plate having projecting ends overlapping said dispensing tube to maintain the latter in position in the housing, and manually operable ears bent outwardly from said projecting ends.

12. A lift pump assemblage comprising a housing having a central opening, a pump shaft extending rotatably through said central opening and having an end

within the housing, a removable dispensing tube within the housing, a collar on said end of the pump shaft having a projecting stud and having spaced key holes, a rotor in said housing positioned to engage and depress the dispensing tube and having a central opening through which said collar stud extends and having a transverse central recess, said rotor having spaced key holes in registration with the key holes in said collar, a retaining plate on said rotor having projecting pins positioned for insertion in said registering rotor and collar key holes only when the rotor is right side up and when the plate is extending transversely of the rotor in the transverse recess thereof, and means readily detachably connecting said plate to said collar stud to removably secure the rotor and plate in proper assembled position.

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