Feb. 4, 1964 P. WINCHELL 3,120,192

HAND PUMP FOR TRANSFERRING LIQUIDS

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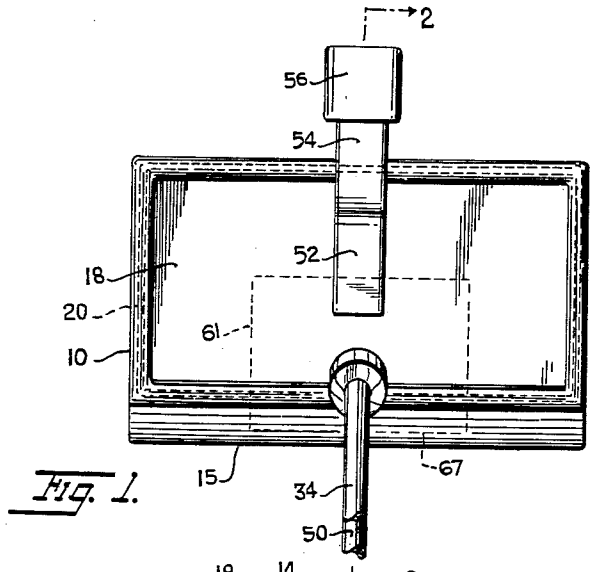

Fig. 1.

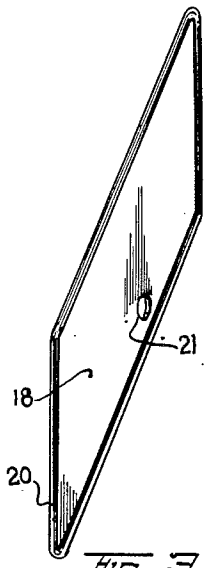

Fig. 3.

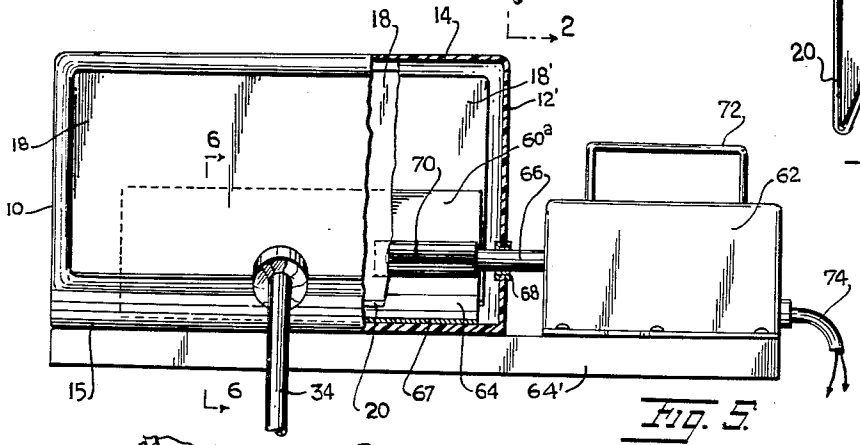

Fig. 5.

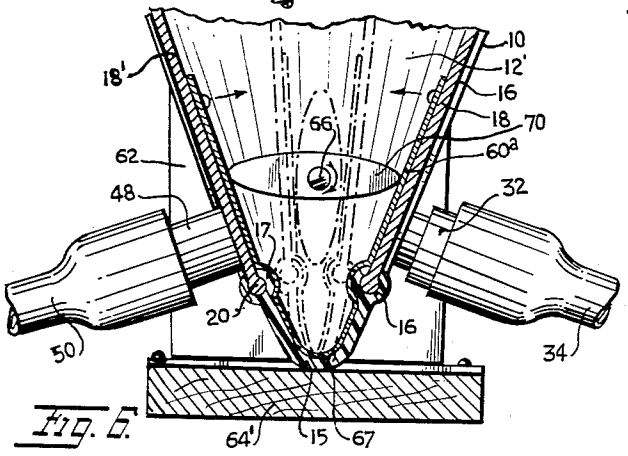

Fig. 6.

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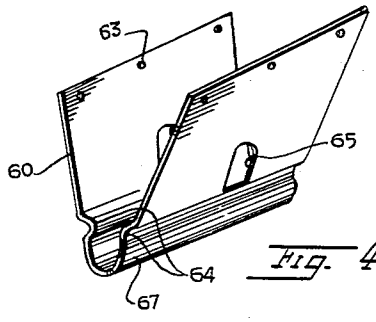

Fig. 4.

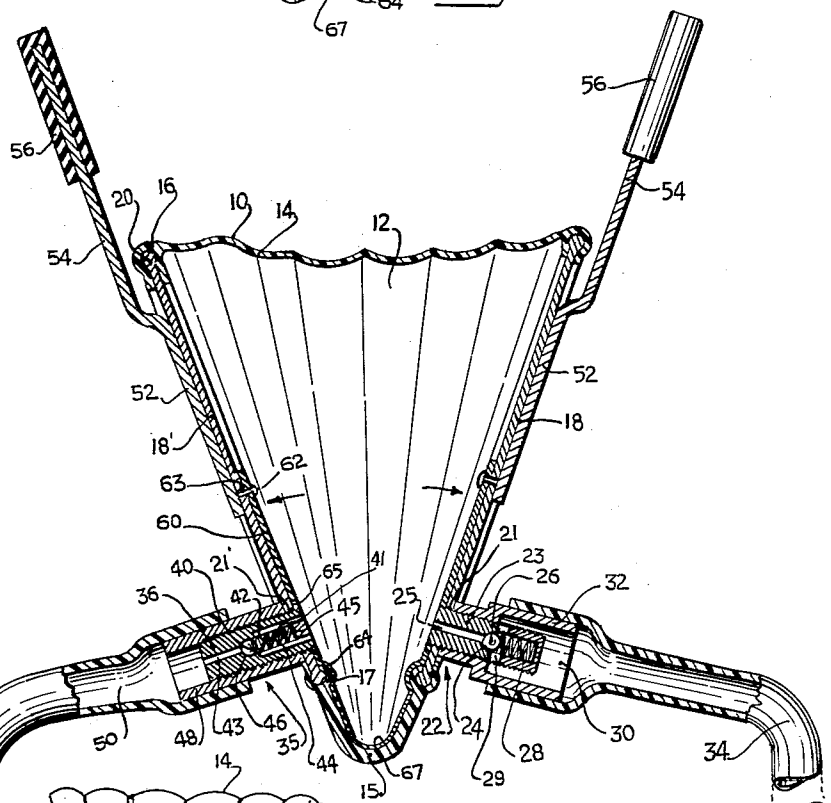

Fig. 2.

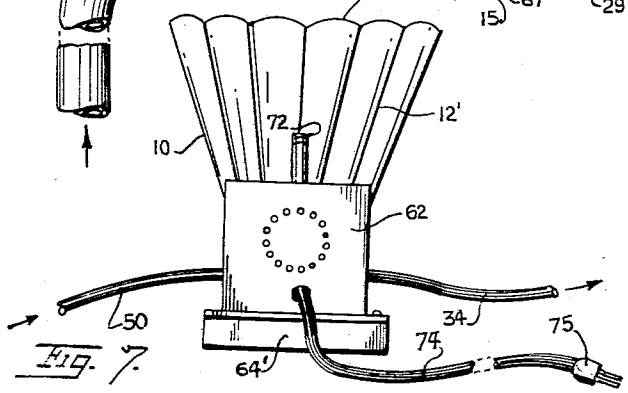

Fig. 7.

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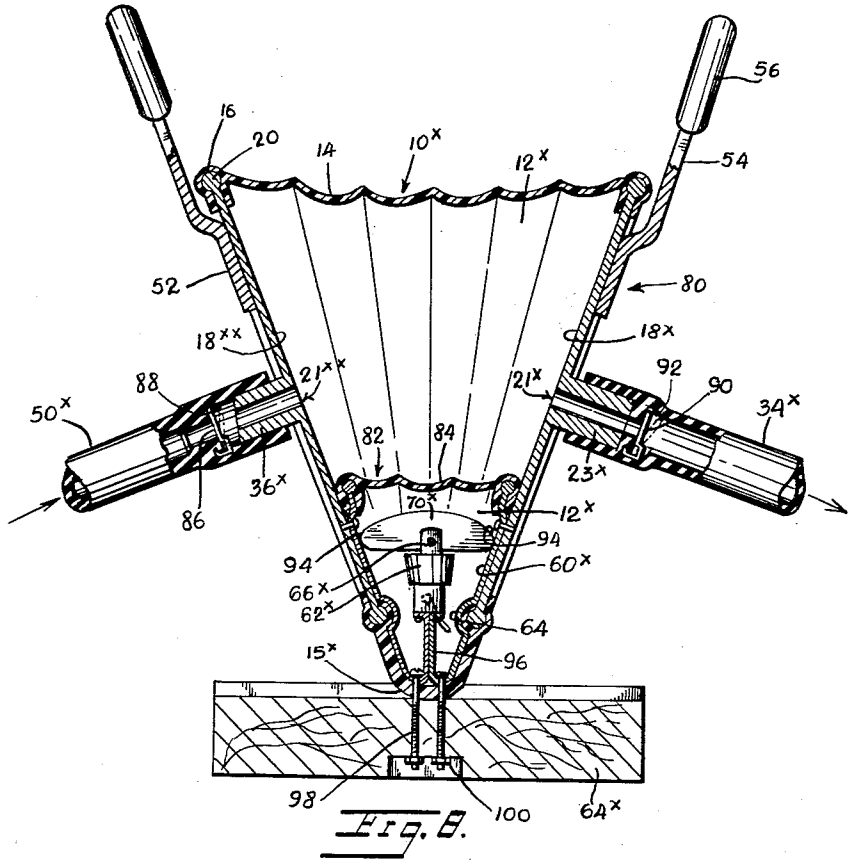

Fig. 8.

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3,120,192

HAND PUMP FOR TRANSFERRING LIQUIDS

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2 Claims. (Cl. 103—152)

This invention relates to a pump for transferring liquid from one area to another and more particularly concerns a pump especially adapted for transferring gasoline from the tank of one vehicle to the tank of another vehicle.

According to the invention there is provided a bellows-like casing provided with handles which can be worked to expand and contract the casing. Inlet and outlet tubes are connected to the casing and are provided with one-way valves permitting liquid to enter the casing through the inlet and to leave the casing through the outlet. In a modification of the invention, a motor is provided for expanding and contracting the casing to draw in liquid and to drive liquid therefrom.

It is therefore one object of the invention to provide a pump which is manually actuated for transferring liquids therethrough.

A further object is to provide a liquid transfer pump including an expansible casing and an electric motor for expanding the casing.

For further comprehesion of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a side elevational view of a pump embodying one form of the invention.

FIG. 2 is an enlarged sectional view taken on line 2—2 of FIG. 1.

FIG. 3 is a perspective view of a side plate of the pump.

FIG. 4 is a perspective view of a spring plate employed in the pump.

FIG. 5 is a side elevational view partially in section of a pump embodying a modified form of the invention.

FIG. 6 is a sectional view on an enlarged scale taken on line 6—6 of FIG. 5.

FIG. 7 is an end view of the pump of FIGS. 5 and 6.

FIG. 8 is a view similar to FIG. 2 of a pump embodying a further modified form of the invention.

Referring to FIGS. 1 and 2, there is shown a flexible bellows-like casing 10 which is V-shaped in cross section. The opposite ends 12 and top 14 define gussets permitting expansion and contraction of the casing. The sides of the casing are open and formed with rectangular channels 16 in which are fitted edges of rigid metal or plastic plates 18, 18'. Each plate 18 and 18', as clearly shown in FIGS. 1–3, has a peripheral bead 20 which fits snugly into the channel 16 at each side of the casing. Each of the plates 18, 18' has a hole 21, 21' near its bottom edge. A valve assembly 22 has a core 23 screwed into hole 21. This core has an axial passage 25 terminating at a seat 24 against which a ball 26 is pressed by a coil spring 28 in the core. The core has lateral holes 29 which open into a cylindrical bore 30 formed in a valve housing 32 in which the core is screwed. A flexible tube 34 is attached to the end of housing 32 and serves as an outlet tube for liquid which may fill the casing.

In hole 21' of the other plate 18' is screwed a valve core 36 of another valve assembly 35. A ball 40 is freely and movably disposed in bore 42 in the core and is pressed on its seat by a coil spring 41. The core has lateral slits or holes 44 communicating with the bore 42

and with the interior of the casing. A plug 45 closes the end of bore 42 to hold the spring and ball in the core. The core has a central passage 43 communicating with the axial bore 42. A seat 46 is defined at the inner end of bore 42 at passage 43 against which the ball can be pressed to close the passage. A valve housing 48 is threaded on core 36. On this cylindrical housing 48 is fitted a flexible tube 50. The tube serves as an inlet pipe or conduit for passing fluid into the casing.

Handle bars 52 are welded or otherwise secured to plates 18, 18' at opposite sides of the casing. These bars extend upwardly to form handles 54 on which may be disposed hand grips 56. A leaf spring 60 is disposed in the casing with apex 67 abutting the apical bottom end 15 of the casing. Rivets 62 extend through aligned holes 63 in the spring and plates and secure the spring to plates 18, 18'. Spring plate 60 may have external grooves 64 in which are received beaded portions 17 of the channel 16 engaging the beads 20 of the plates 18, 18'. As shown best in FIGS. 2 and 4, the spring plate 60 has holes 65 in opposite sides through which the openings in the valve cores 23, 26 are exposed. The spring plate 60 may be formed to assume a general V-shaped as shown in FIGS. 2 and 4, so that some force must be exerted to bring the sides of the spring together. Alternately, the spring plate may have its sides substantially juxtaposed so that force must be exerted to separate them.

In the embodiment of FIGS. 1 and 2, the sides of the plate 60 are normally spread apart and the casing 10 is in an expanded condition. When the handles are brought together against tension in the apex 67 of the spring 60, the casing is contracted. If, upon such contraction, the free end of tube 50 is inserted in a gasoline tank of one vehicle such as an automobile and if the free end of tube 34 is inserted into another tank or container, the contents of the first-named tank will be drawn by suction through valve assembly 35 into the casing 10 and when the casing is expanded the contents of the filled casing will be expelled through the one-way valve assembly 22 into outlet 34 to the other tank, container or receptacle therefor. Valve 22 closes when valve 35 opens and vice versa.

If desired, spring 60 may be omitted, since the handles 54 may be worked to expand and contract the casing without assistance of the spring in expansion and opposition of the spring in contraction.

In FIGS. 5–7 there is shown another form of the invention, in which parts corresponding to those of FIGS. 1–4 are identically numbered. A motor 62 mounted on a base 64' has a shaft 66 which passes through a packing sleeve 68 in the end wall 12' of the casing. An elliptical roller 70 is axially mounted on the shaft between the sides of leaf spring plate 60^a. The spring plate is formed so that its sides are normally close together. The roller, during rotation, serves to separate or spread the sides of the spring 60^a when the roller's major axis is horizontal, as shown by the solid line position of the roller in FIG. 6.

When the minor axis of the roller is horizontal, as shown by the dotted line position of the roller in FIG. 6, the spring contracts and the casing contracts also. The motor thus serves to expand the casing to establish a suction therein and liquid then enters the casing through valved inlet 50. When the spring 60^a contracts, the casing contracts and the liquid in the casing is expelled through the valved outlet tube 34.

A handle 72 is provided for carrying the device. The motor has a power cable 74 which terminates in a plug 75 for connection to an external power supply, either a convenience outlet or to a suitable socket or receptacle

connected to the battery or cigarette lighter of an automobile or other vehicle.

Referring now to the modified form of pump 80 illustrated in FIG. 8, this is a motor operated pump somewhat similar to the pump of FIGS. 5 to 7, inclusive. In pump 80, however, an auxiliary flexible plastic casing 82 is provided in the interior bottom of the main casing 10^x. The auxiliary inner casing 82 is defined by a top 84 and by the ends 12^x and bottom 15^x of the main casing 10^x and by the sides of the spring plate 60^x. In main casing 10^x, the side plates 18^x, 18^{xx} are formed with holes 21^x, 21^{xx}, respectively, midway the ends thereof, and projecting radially from said openings are integral tubular bearing members 23^x and 36^x communicating with the holes in the plates and with the interior of the main casing. The end of a plastic supply hose 50^x is sleeved around the bearing member 36^x, and the end of a discharge hose 34^x is sleeved around the bearing member 23^x.

The end of the supply hose 50^x is equipped with a pivoted valve plate 86 normally engaging a shouldered seat 88 in the end of the hose and sealing off the inlet end of the hose. Upon expansion of the casing 10^x, however, the vacuum together with the force of the liquid force the valve plate 86 off of its seat permitting the liquid to flow therearound and into the main casing 10^x, the top 82 of the auxiliary casing preventing the liquid from flowing into the auxiliary casing. A similar pivoted valve plate 90 is mounted in the end of the outlet hose 34^x, normally engaging a shouldered seat 92 therein. Upon contraction of the casing 10^x, the force of the liquid therein will move the valve plate 90 off of its seat 92 permitting the liquid to flow through the outlet hose 34^x to its destination.

The contraction and expansion of the casing 10^x is accomplished by means of a substantially rectangular-shaped roller 70^x having rounded ends 94 fixed on the bifurcated end of a vertically disposed shaft 66^x of a motor 62^x supported on upstanding brackets 96 formed integrally with the bottom ends of the sides of the spring plate 60^x. The pump 80 is supported in upright position on the base 64^x by means of a bolt and nut assembly including bolts 98 and nuts 99.

In all other respects, the pump 80 is similar to the pump of FIGS. 5 to 7, inclusive, and similar numerals are used to indicate similar parts.

The pump 80 operates similarly to the pump 10 of FIGS. 5 to 7, inclusive, that is, the spring plate 60^x is formed so that its sides are normally closed together thereby drawing the sides of the main casing 10^x close together. The roller 70^x during rotation serves to separate or spread the sides of the spring and sides of the main casing 10^x. When the minor axis of the roller is horizontal, the spring 60^x contracts and the main casing 10^x contracts also. The motor thus serves to expand the casing 10^x to establish a suction therein and liquid then enters the casing through the bore in inlet bearing member 36^x. When the spring 60^x contracts, the casing 10^x contracts and the liquid in the casing is expelled through the valve outlet tube 34^x.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A pump for transferring liquid from the tank of one vehicle to the tank of another vehicle, comprising a bellows-shaped casing having rigid sides, flexible ends, flexible top and flexible bottom, a tubular inlet on one of the rigid sides, a tubular outlet on the other of the rigid sides, a supply hose sleeved around the tubular inlet, a discharge hose sleeved around the tubular outlet, valve means in the sleeved end of the inlet hose actuated by suction in the casing and by the force of the liquid in the inlet hose upon expansion of the casing, valve means in the sleeved end of the discharge hose operable by the movement of the liquid from the casing upon contraction thereof, a motor actuated elliptical roller mounted inside the casing and in rolling engagement with the sides thereof for expanding the casing, and a spring plate operatively connected to the sides of the casing for contracting the casing.

2. A pump for transferring liquid from the tank of one vehicle to the tank of another vehicle, comprising a main bellows-shaped casing having rigid sides, flexible ends, a flexible top and a flexible bottom, a tubular inlet on one of the rigid sides, a tubular outlet on the other of the rigid sides, a supply hose sleeved around the tubular inlet, a pivoted valve plate in the sleeved end of the inlet hose actuated by suction in the casing and by the force of the liquid through the inlet hose upon expansion of the casing, a pivoted valve plate in the sleeved end of the discharge hose operable by the movement of the liquid from the casing upon contraction thereof, an auxiliary bellows-shaped casing inside the bottom of the main casing, said auxiliary casing including a flexible top portion, a V-shaped spring plate constituting the sides of the auxiliary casing, said sides normally being in closely spaced condition, an elongated roller member having rounded ends supported inside the auxiliary casing with its ends adapted to engage the side of the spring plate and expand the same, and a motor inside the auxiliary casing having a shaft operably connected to the roller for rotating said roller for expanding the main casing, said spring plate adapted to automatically contract said main casing.

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