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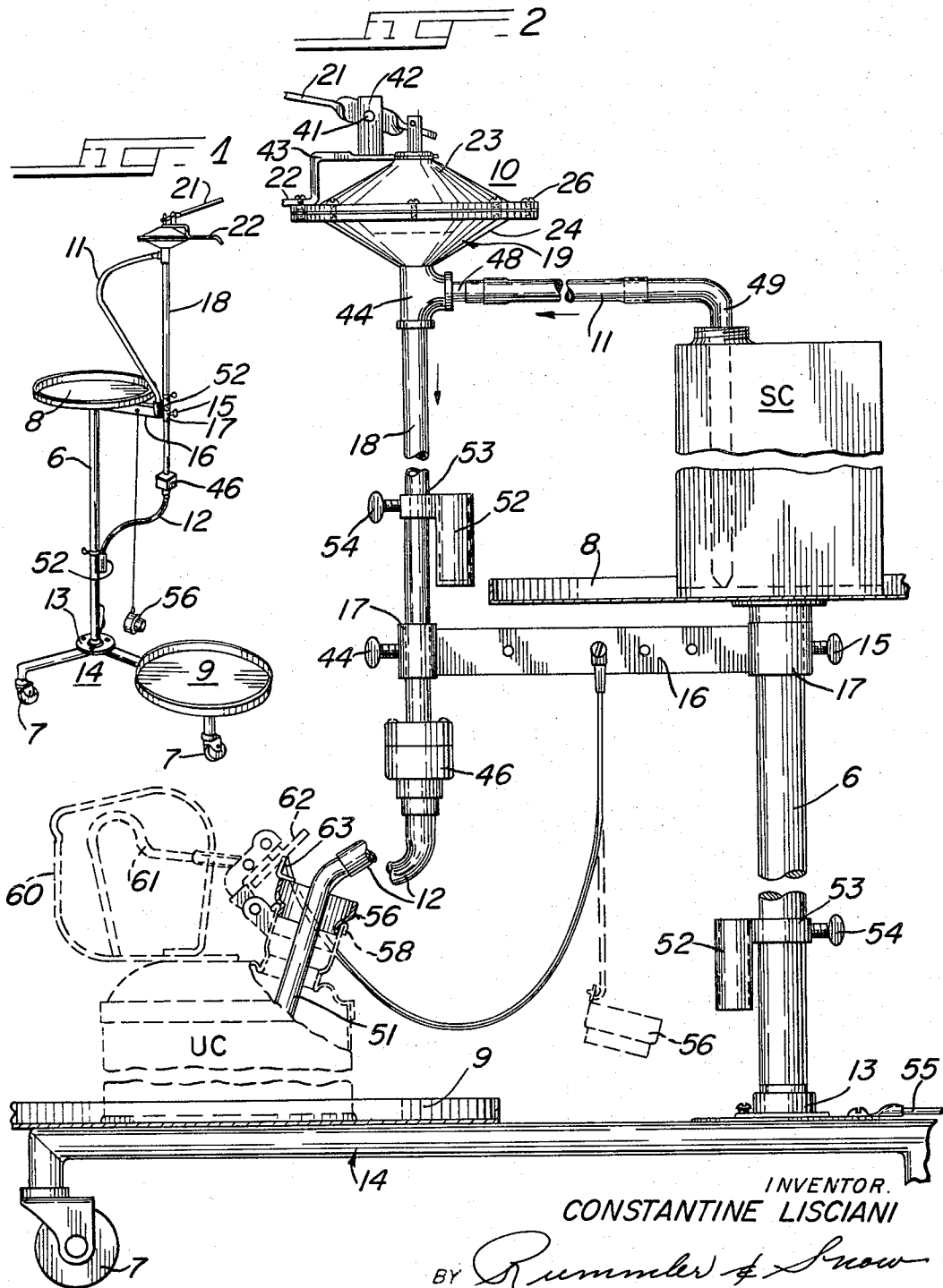
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FLAMMABLE LIQUID TRANSFER STATION

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2 Sheets-Sheet 1



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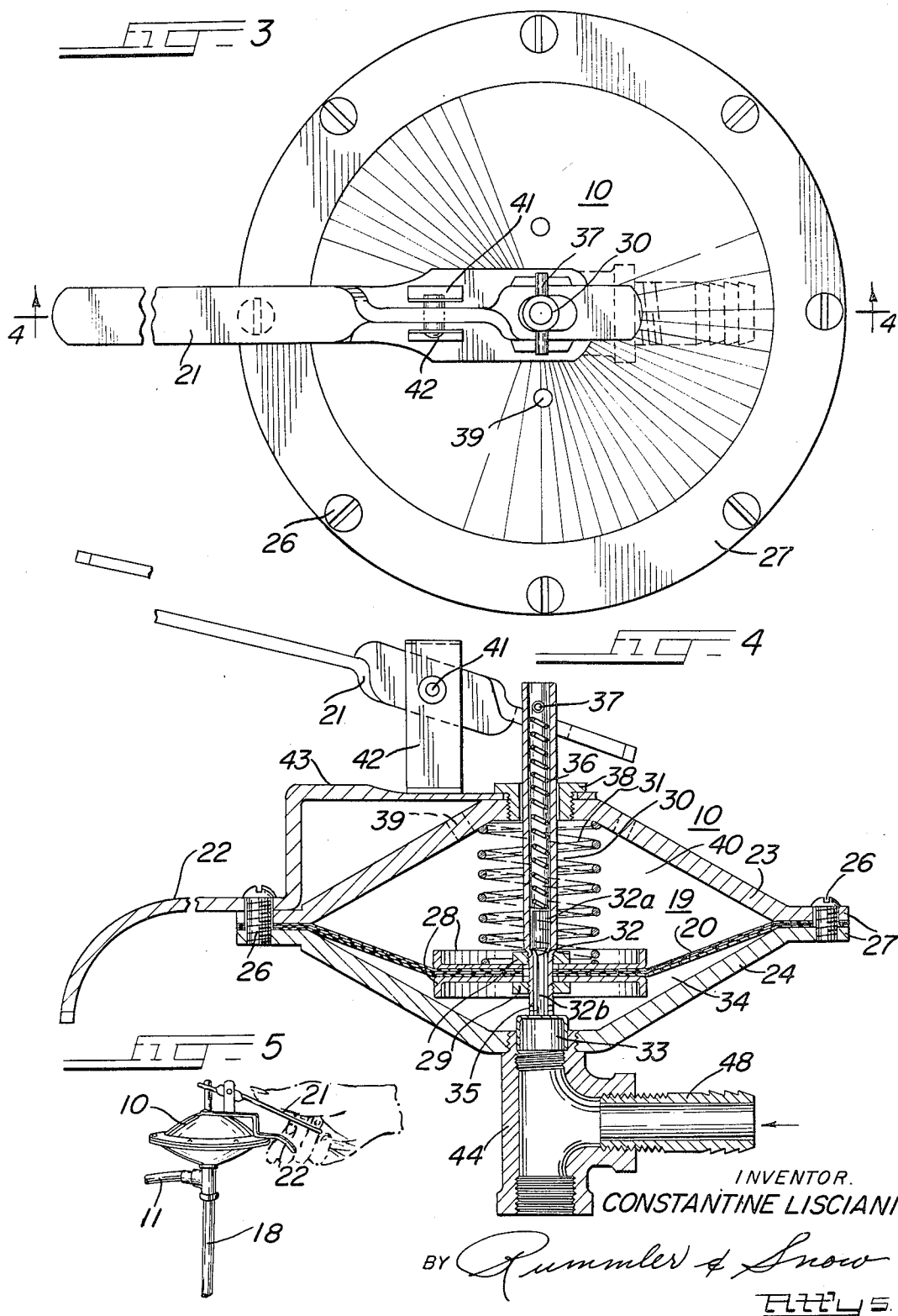
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2 Sheets-Sheet 2



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3,384,132
FLAMMABLE LIQUID TRANSFER STATION
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4 Claims. (Cl. 141-18)

ABSTRACT OF THE DISCLOSURE

The disclosure describes a pair of container-supporting platforms secured in vertically-spaced relationship on a mobile standard which mounts an elevated manually controlled pump for the purpose of effecting the transfer of flammable liquids from one container to another and meeting all safety standards.

This invention relates to safety equipment for use in the transfer of flammable liquids from a storage container to a use container.

In industries which require the use of flammable liquids there always is the problem of the safe transfer of the liquid from a storage container to another container from which the liquid is to be put into a desired use. The concern always is to effect such transfer without creating circumstances that might possibly result in an explosion and/or fire hazard as a consequence of the spilling of some of the liquid or the creation of static electricity.

The main objects of this invention are; to provide the improved structuring of a piece of equipment in the nature of a "Transfer Station" for use in the transfer of the flammable liquids from one container to another with the very least likelihood of encountering any hazard; to provide a transfer station of this kind having vertically-spaced platforms for the respective support of the containers and equipped with a diaphragm-type suction pump with hose-type conduits for inserting the free ends into the respective containers; to provide a suction pump of this kind which is manually operable for quick initiation of the flow of liquid from one to the other containers; to provide a pump of this kind which functions to effect such a flow only so long as it is under the direct control of an operator; to provide an improved transfer station of this kind which avoids the creation of static electricity during its use; and to provide an improved transfer station of this kind of such simple and practical structure as to make very economical its manufacturing and marketing and highly safe and satisfactory the use thereof.

In the adaptation shown in the accompanying drawings:

FIGURE 1 is a perspective view of the device of the present invention.

FIG. 2 is a fragmentary enlarged side elevational view partly in cross section.

FIG. 3 is a top plan view of the pump.

FIG. 4 is a cross sectional view through the lines 4-4 of FIG. 3.

FIG. 5 is a perspective view showing the pump handle in operative position.

A flammable-liquid transfer-station, embodying the foregoing concept, comprises a standard 6 supported on casters 7 and mounting a pair of platforms 8 and 9 and a pump 10 connected to a pair of flexible conduits 11 and 12 for insertion of the free ends thereof into the respective containers to effect the transfer of liquid from one container to the other.

The standard 6 here is shown as of cylindrical form telescoped at its lower end into a cup-plate 13 anchored to a tri-bar base element 14 mounted on casters 7.

The platform 8, herein shown of rimmed circular form,

is fixed to the upper end of the standard 6. A bracket 16 extends transversely outward from the standard 6 directly adjacent the platform 8. The bracket 16 terminates in a sleeve 17 for the support of an aluminum tube 18 whereto is connected the conduits 11 and 12 the nature of which will be described presently. A thumb screw 15 fixes the position of the bracket on the tube.

The platform 9, also shown as of rimmed circular form, is fixed on the base 14 adjacent the outer end of one of the three bars to the ends of which the casters 7 are attached. Thus the two platforms 8 and 9 are horizontally offset so that the respective liquid containers mounted thereon are relatively positioned so as to make most convenient the drawing of liquid from a storage container SC on the upper platform 8 to a use container UC on the lower platform 9, as shown in FIG. 2.

The pump 10, as herein shown, is a suction-type comprising a housing 19 embracing a diaphragm 20 and mounting an operating lever 21 and a hand grip 22.

The housing 19 comprises a pair of opposed conical-shaped members 23 and 24. These members are stamped aluminum and are secured together in opposed relationship by a series of fasteners 26 spaced around the perimetrical flanges 27. Thus, between these flanges 27 the rim of the diaphragm 20 is clamped to effect a fluid seal between the two members 23 and 24.

The diaphragm 20 is formed of Du Pont "Teflon" with the central portion thereof clamped between a pair of cup-shaped disks 28. Such a pair of disks 28 are secured to the diaphragm 20 by a pair of nuts 29 threaded on the lower end of a tubular stem 30 that extends outwardly above the member 23. A compression spring 31, embracing the stem 30 and interposed between the cone member 23 and the opposed nut 29, biases the diaphragm 20 toward its depressed position as shown in FIG. 4.

The stem 30 is of reduced diameter at its lower end. In this lower stem end is enclosed a plunger 32 integrated with an inverted valve cup 33. This valve cup 33 serves to close communication between the chamber 34 of the pump 10 and the tube 18 and the conduits 11 and 12 when the transfer of liquid is not taking place. The plunger 32 is formed with a head 32a and a smaller shank 32b each of which is smaller than the corresponding parts of the stem 30. The juncture of these head and shank parts of the plunger conforms with the juncture of the differing diameters of the opposed parts of the stem 30. Thus, the plunger 32 serves as a valve for controlling air conditions in the chamber 34 of the pump 20, as will be explained presently. Directly above the cup 33 are orifices 35 in the stem 30 through which ambient air may enter the chamber 34 when the cup 33 is seated in the liquid inlet to the chamber 34, and at which time the plunger 32 is retracted against the spring 36, after the release of the lever 21. A spring 36, enclosed in the stem 30 between the plunger 32 and a pin 37, biases the plunger 32 and the cup 33 downwardly to close communication of the pump 10 with a container on the platform 8. The stem 30 extends outwardly through a bushing 38 and above the housing member 23 for attachment thereto of the operating lever 21. Vents 39 in the housing member 23 provide for the exhaust and intake of air for the chamber 40 during the opposite shifting of the diaphragm 20 for controlling the flow of liquid from a container SC to a container UC, as will be explained presently.

The pump-operating lever 21, as herein shown, is a flat bar pivoted at 41 to a post 42 anchored to the inner end of an angled extension 43 on the hand grip 22. The inner end of the lever 21 extends inwardly beyond and below the pin 37, in the upper end of the stem 30 (FIGS. 2 and 4), whereby the lever is operatively connected to the stem 30. The major portion of the lever 21 therefore

3

extends transversely outward of the pump 10 for easy grasp by an operator of the equipment.

The hand grip 22 here is shown as a flat bar similar to the lever 21, and is secured medially of its length to the pump housing 10 by one of the fasteners 26. This disposes the angled extension 43 in position to mount the post 42 for the pivoting of the lever 21. The hand grip 22 is located below the lever 21 but close enough thereto so that when the lever 21 is depressed to effect the functioning of the pump one hand of the operator may grasp both the lever 21 and the grip 22 and retain the diaphragm 20 in its retracted elevated position.

The pump 10 has its lower member 24 threaded onto a standard T-fitting 44 which has one end of the transverse portion cut away and threaded to fit in the thread opening of the member 24. Such fitting 44 mounts the pump housing 19 on the tube 18. Such tube 18 is embraced by the sleeve 17 on the bracket 16 and secured thereto by a thumb-screw 45 to position the pump 10 at the desired elevation above the platform 8. At its lower end the tube 18 mounts an aluminum check-valve 46 having a conventional gravity-biased flapper 47 (dotted in FIG. 2) preferably formed of Du Pont's "Teflon."

The conduits 11 and 12 are flexible plastic material, such as U.S. Stoneware Company's "Tygon."

The conduit 11 has one end set over the serrated end of a nipple 48 screwed into the T-fitting 44. The conduit 11 is of a length to permit a right-angle extension 49 (FIG. 2) to be inserted the full depth into the storage container SC on the upper platform 8. The conduit 12 has one end secured to the check-valve 46 and is of a length to permit an extension 52 to extend well into the use container UC on the lower platform 9.

A pair of drip cups 52, integrated to rings 53 adjustably embracing the standard 6 and the tube 18, respectively, are secured in desired positions by thumb screws 54. Such cups 52 permit the free ends of the conduit extensions 49 and 51 to be seated therein when the station is not in use for transferring liquid from one container to another.

To avoid all possibility of the creation of static electricity, in the use of this transfer station with flammable liquids, two facilities are provided. One is a provision for the attachment of a ground cable 55. The other is a container-spout bushing 56 suspended by a metal cable 57 from the bracket 16 (FIGS. 1 and 2).

The bushing 56, as best shown in FIG. 2, is contoured to provide a reduced rim 58 to seat in the spout 59 of a use container UC on the lower platform 9. Where it is likely that different types of containers UC are used with such a transfer station, a second and somewhat differently-contoured bushing 56 would be suspended by a second cable from the bracket 16.

The use container UC, shown in FIG. 2, is one of many types available. This one has a bail 60 and a grip rod 61 where to is fixed a hinged closure cap 62 for the container spout. Hence, the bushing 56, as herein shown, mounts a stop 63 for holding the cap 62 retracted during the liquid transfer operation.

A transfer station of the above described type is used in the following manner:

A storage container SC is set on the upper platform 8 and a use container UC is set on the lower platform 9. The respective caps for these containers are removed (or retracted) from the spouts and the conduits 11 and 12 have their respective extensions 49 and 51 inserted into the respective containers, as clearly indicated in FIG. 2. The use container UC has the bushing 56 set in the container spout before the extension 51 is inserted.

The operator in charge of the transfer station then depresses the lever 21 the full limit of its movement toward the hand grip 22. Such depression of the lever 21 retracts—i.e. lifts—the diaphragm 20 against the action of the spring 31 and withdraws the cup 33 from its seat in the T-fitting 44. This allows the spring 36 to seat the head 32a of the plunger 32 on the reduced end of the

4

stem 36 and thereby close off the entrance of ambient air into the chamber 34. Consequently a vacuum is created in the chamber 34 of the pump 10. Such a vacuum lifts the flapper valve 47 in the check-valve 46 and holds it to close the tube 18 until a flow of the liquid down through the tube 18 is established.

Thereupon there is initiated a continuing draught of the liquid from the container on the platform 8 and through the tube 18 and the conduit 12 into the use container UC on the platform 9. Such a liquid flow will continue just so long as the lever 21 is held depressed. Since it is a flammable liquid that is being transferred the operator must maintain the lever 21 depressed until the desired amount of liquid has been transferred to the use container UC. It is for that reason that the hand-grip 22 is juxtaposed closely below the lever 21 so that both the lever 21 and the grip 22 may be readily grasped by one hand of the operator (see FIG. 5). This leaves the other hand free for any use that may be required in the operation of the station.

The instant the lever 21 is released the spring 31 snaps the diaphragm 20 into its depressed lower position as shown in FIG. 4. This results in seating the cup 33 in the fitting 44 and clears the conduits 11 and 12 for the drainage of the liquid into the respective containers. The seating of the cup 33 elevates the plunger 32 and permits the entrance of ambient air into the chamber 34 through the stem 36 and the orifices 35. The conduits 11 and 12 then may be withdrawn from the respective containers and have the ends of the conduit extensions inserted into the respective cups 52 (FIG. 1). The bushing 56 is removed from the container UC and a suitable cap (not shown) is seated over the spout of the container SC.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. A flammable-liquid transfer-station comprising,
 - (a) a base element supported on a plurality of casters,
 - (b) a vertically-disposed standard fixed to the base element,
 - (c) a first platform fixed on the base element for supporting a liquid container,
 - (d) a second platform fixed on the standard above and offset from the first platform for supporting a second liquid container,
 - (e) a bracket fixed on the standard adjacent the upper end thereof,
 - (f) a rigid tube fixed on the bracket with the opposite ends disposed respectively above and below the second platform,
 - (g) a check valve connected to the tube to permit one-way flow of liquid through the tube,
 - (h) a housing fixed on the upper end of the tube and enclosing a syphon-type diaphragm and having communication with the tube,
 - (i) a stem secured to the diaphragm and extending outwardly above the housing,
 - (j) a spring biasing the diaphragm toward a depressed position,
 - (k) a hand-lever hinged on the housing and connected to the stem to shift and retain the diaphragm in a retracted position against the action of the spring,

5

- (l) a hand-grip bar
fixed on the housing adjacent the lever to permit
the lever and bar to be grasped by one hand of
an operator to retain the diaphragm against the
spring,
- (m) a first flexible conduit
connected to the tube directly below the housing
and of a length to permit inserting the free end
of the conduit into a spout of a container on the
second platform, and
- (n) a second flexible conduit
connected to the tube below the check-valve and
of a length to permit inserting the free end of
the conduit into the spout of a container on the
first platform.
2. A flammable-liquid transfer-station as set forth in
claim 1 wherein the stem is of tubular form with a re-
duced-diameter lower end extending through the dia-
phragm and having orifices therein for air flow from the
housing into the stem, and wherein
- (o) a plunger
is telescopically supported in the lower end of the
stem and
mounts a valve cup on its inner end below the
orifices for controlling fluid flow between the
housing and the tube, and
seats in the stem when the diaphragm is retracted
to prevent the entrance of ambient air through
the stem orifices to the housing below the dia-
phragm.

6

3. A flammable-liquid transfer-station as set forth in
claim 2 wherein
- (p) a metal nipple-type fitting
is contoured in the seat in the spout of a con-
tainer on the first platform, and
- (q) a metal cable
is attached at one end to the fitting and at the
other end to the standard to ground the con-
tainer on the first platform when the fitting is
in the container spout.
4. A flammable-liquid transfer-station as set forth in
claim 2 wherein
- (r) drip cups
are attached to the tube to seat the free ends of
the respective conduits when they are not in use
for the transfer of liquid from one container to
another.

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