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SUCTION DEVICE FOR THE TRANSFER OF LIQUID
FROM ONE CONTAINER TO ANOTHER
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Fig. 1

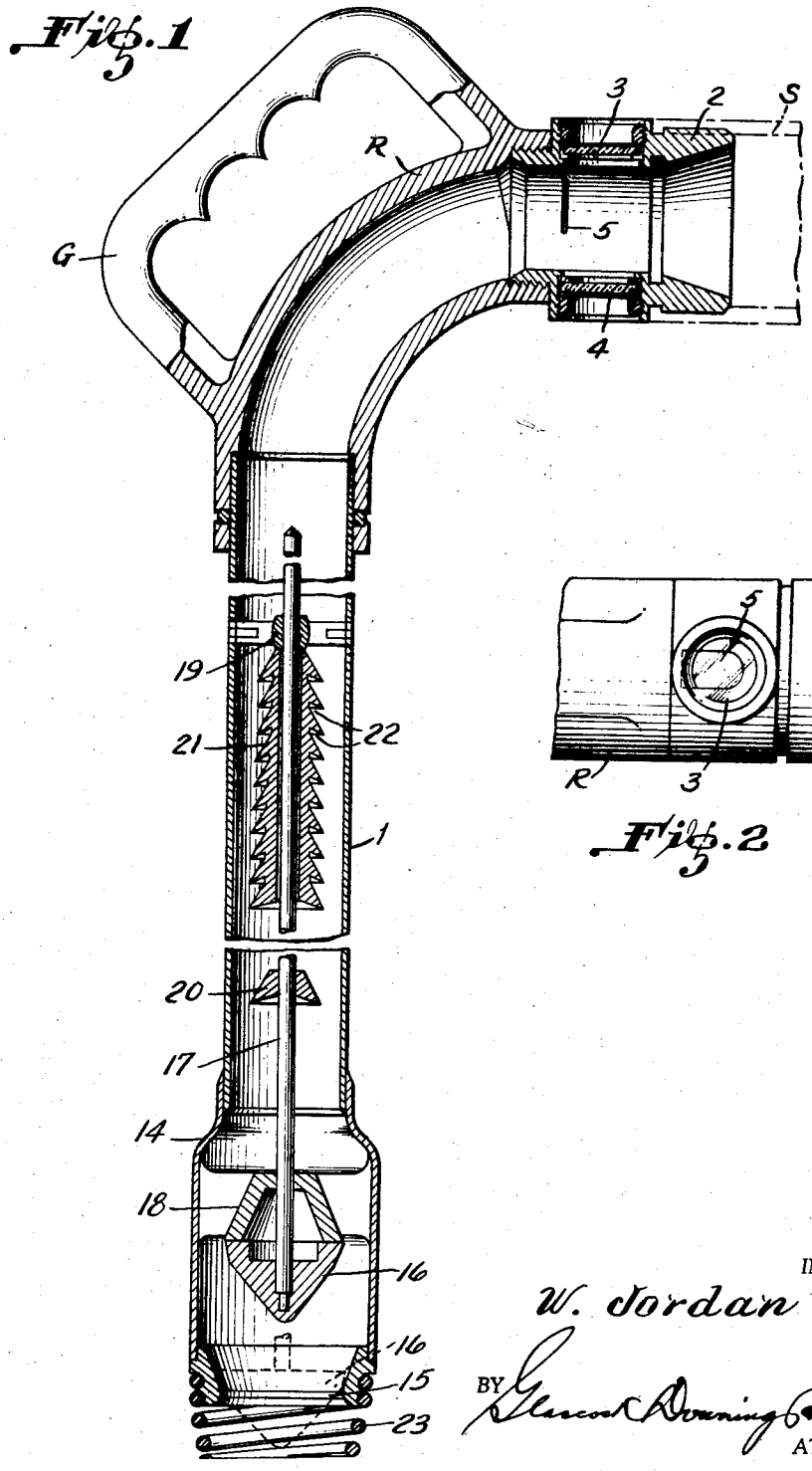


Fig. 2

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SUCTION DEVICE FOR THE TRANSFER OF LIQUID FROM ONE CONTAINER TO ANOTHER

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2 Claims. (Cl. 251—76)

The present invention relates to a suction device for drawing off liquid from containers, or for transferring liquid from one container to another, for instance from barrels to tanks or vice versa. For certain liquids, such as gasoline, diesel-oil, petroleum or the like, it is undesirable or even dangerous, if during the transfer of the liquid from one container to another, air is sucked into the container.

It is necessary, therefore, that the suction device, when it is removed from one container for use in another, should be tightly closed and reliably safeguarded against undesired opening. This is of particular importance for suction plants having a plurality of suction devices connected to a common suction conduit, and where at a time, one or more of the suction devices may be in action, while the remaining suction devices may be at rest or ready to be transferred to another container.

According to the invention the suction device consists of a bottom-valve, that is to say, of a valve provided at that end of a suction conduit which, when the device is in action, rests against the bottom of the container to be emptied, and which automatically closes when the container is empty or when the device is pulled out of the container for being introduced into another container.

The invention further contemplates to devise the construction of the bottom-valve in such a way that the closing element of the valve is forced by gravity into self-locking clamping position on its valve-seat in such a manner that it can be removed from its seat only through mechanical pushing, and not at an undesired moment, for instance through the sucking effect of the suction plant.

The invention further proposes to provide the closing element of the valve with baffle-walls or lifting-walls against which the flow-pressure of the sucked-in liquid bears with the result that the closing element is thereby maintained in opened-up position as long as the flow of the liquid continues.

According to another form of the invention the closing element of the bottom-valve is devised as a float.

My invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings, forming a part of this specification, and in which embodiments of the invention have been shown by way of illustration. However, it has to be understood that the invention is not confined to any strict conformity with the showing of the drawings, but may be changed or modified, so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Fig. 1 is a sectional view of a construction in which the closing element of the bottom-valve is maintained in opened-up position by the flow-pressure of the sucked-in liquid;

Fig. 2 is a top-view of the observation window and indicating means of the construction of Fig. 1.

Referring now to the drawings in detail, the reference numeral 1 denotes a tube corresponding in length to approximately the height of the containers to be emptied, for instance gasoline barrels. The tube 1 is provided with a handle G by means of which it can easily be removed from one container and introduced into another. The handle G is fixedly connected to a curved tubular member R provided with the joining socket 2, to which the end of the suction conduit S is fastened. The joining socket 2 is preferably provided with two oppositely disposed observation windows 3 and 4 and a flow-vane 5, or some other flow indicating means, which makes it possible for the operator to observe the liquid flowing through the suction conduit.

In the construction of Fig. 1, the flow of the liquid sucked into the device is utilized as a means to maintain the locking member 16 in uplifted opened position as long as the flow of the liquid continues, whereupon when the flow-pressure ceases, the locking member 16 is automatically returned by gravity to its self-locking clamping position on the valve-seat, without making it necessary for the operator to lift the device from the bottom of the container. In other words, the device closes automatically as soon as the container is emptied, without requiring the particular attention of the person operating the same. This is the principle of the well-known return valve, with the only difference being that the locking member 16 can be removed from its locking position on the valve-seat solely through mechanical pushing, and that it requires for moving back into locking position the additional pressure of a special drop-weight.

From an inspection of Fig. 1 of the drawings, it will be seen that there has been fastened to the lower end of the tube 1 a suction basket 14 whose lower inwardly receding annular portion 15 forms the valve-seat into which at the end of the sucking action the locking member or valve-cone 16 drops into self-locking clamping position in such a way that it can be lifted from the same only through mechanical pushing, but not by the suction in the tube 1.

A comparatively long shaft 17 for the valve-cone 16 is guided at its upper and lower ends in guide-bushes 18 and 19 supported in position by cross-members arranged in the interior of the tube 1.

Fixedly secured to the shaft 17 between the guide-bushes 18 and 19 is a shade-like lifting member 20, against which, when the valve-cone 16 is in locking position, bears a drop-weight 21 which is slidingly mounted for displacement in the axial direction on the shaft 17 between the lifting member 20 and the upper guide-bush 19, and which is likewise provided with a plurality of peripheral annular lifting walls 22 extending in a direction opposite to the direction of the flow of the liquid.

In order to make certain that the lower conically pointed end of the valve-cone 16 is enabled to project from the suction basket 14 freely in downward direction when the device bears against the bottom of the container and when at the end of the sucking action the valve-cone 16 has dropped into locking position, the device is provided with a spring-buffer 23 which is clampingly secured to the receding portion 15 at the lower end of the suction basket 14, and which supports the device on the bottom of the container and thereby prevents the projecting end of the valve-cone 16 from coming in contact with the bottom of the container (see dotted line position of the valve-cone 16 in Fig. 1 of the drawings).

For operating this construction when the valve-cone 16 is in locking position and clampingly secured in air-tight position in the valve-seat 15 of the suction-basket 14, the device is introduced in a vertical position into the container to be emptied, for instance a gasoline barrel, and brought to bear with its lower end against the bottom

of the container in such a way that the spring-buffer **23** is thereby compressed and that the projecting end of the valve-cone **16** is thus forced into contact with the bottom of the container and forcibly removed from its clamping position in the valve-seat **15**.

The immediate consequence of this forcible removal of the valve-cone **16** from its valve-seat **15** is that, by means of the pressure exerted by the sucked-in liquid against the shade-like lifting member **20**, the valve-cone **16** is lifted to its uppermost position limited by the guide-bush **18** in which the device reaches its maximum conveying capacity.

The pressure of the sucked-in liquid is not only exerted against the shade-like lifting member **20**, but also against the annular lifting walls **22** of the drop-weight **21** with the result that the drop-weight **21** is thereby slidingly lifted from its seat on the lifting member **20** and forced up to its uppermost position limited by the guide-brush **19** of the shaft **17**, where it remains as long as the flow-pressure of the liquid continues.

After the container has been emptied to such an extent that the flow-pressure is no longer able to maintain the valve in open condition and that the valve-cone is caused by its dead weight to drop back onto its seat **15**, then the weight **21** dropping onto the lifting member **20** forces the valve-cone **16** without fail into the self-locking clamping position, from which it can not be removed by the air-suction in the suction conduit, but only through mechanical pushing, as has already been described.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a suction device for the transfer of liquid, such as gasoline, diesel oil, petroleum or the like, from one container to another container, a suction conduit having a suction end, the combination with the suction end of said conduit, of a tubular member connected at one end to and in communication with the suction end and at its opposite end open for the admission of liquid and provided with a conical valve seat, closing means for the open end of the tubular member, a guide stem on the closing means, said closing means having a conical surface portion fitting the conical valve seat at the open end of the tubular member and being provided with expelling

means projecting, when the closing means is in closing position on the conical valve seat, out of the open end of the tubular member in a downward direction, resilient safeguarding means provided at the open end of the tubular member and loosely surrounding the projecting expelling means in a cage-like manner, the safeguarding means being of such strength that un-intended explusive pressure against the expelling means is normally possible only through blow-like compression of the resilient safeguarding means, and means for maintaining the closing means in the open position including a body with a fluid impinging surface facing in the direction of flow rigidly secured to the guide stem, a second body having fluid impinging surfaces mounted on the guide stem so as to be axially shiftable thereon in response to the flowing fluid and positioned above the first mentioned body and adapted to be dropped by gravity upon cessation of flow in a blow-like fashion onto the first mentioned body thereby serving to automatically force the closing means onto the conical valve seat, the arrangement of the closing means and seat being such that when the closing means is forced onto its seat, it is retained thereon in self-locking closing engagement.

2. A suction device as claimed in claim 1 wherein said resilient safeguarding means is a coil spring secured to the open end of the tubular member adjacent the conical valve seat.

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