Feb. 7, 1950 F. G. HODSDON 2,496,470

VACUUM TANK DRAIN VALVE

Filed March 20, 1948

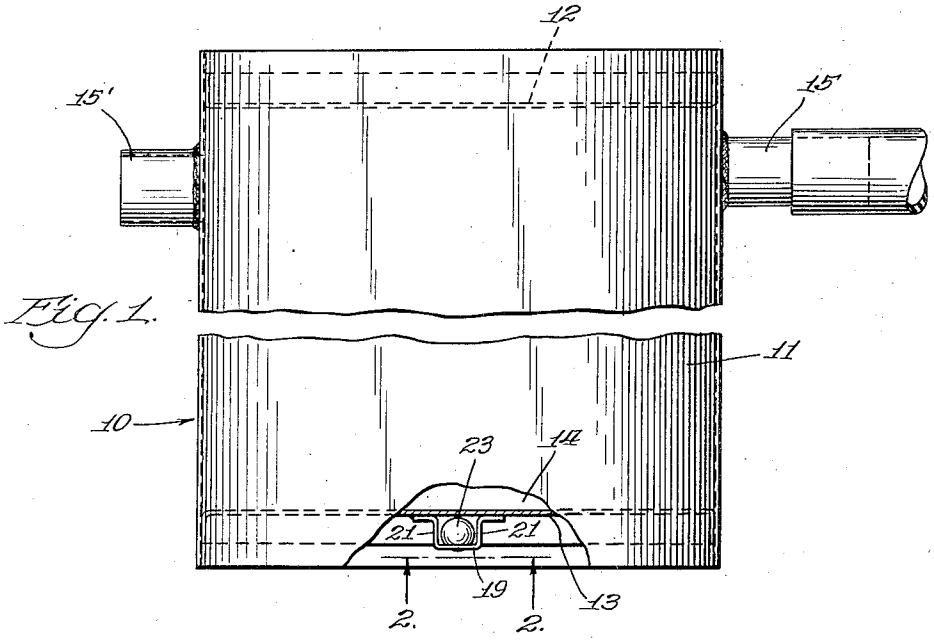


Fig. 1.

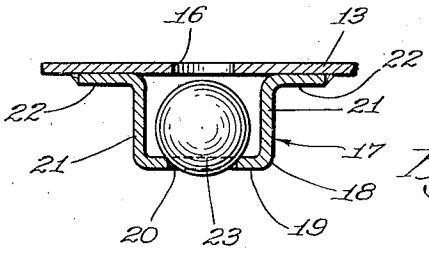
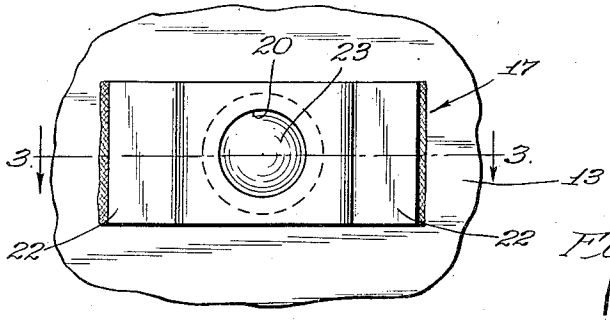


Fig. 3.

Fig. 2.



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Patented Feb. 7, 1950 2,496,470

UNITED STATES PATENT OFFICE

2,496,470

VACUUM TANK DRAIN VALVE

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Application March 20, 1948, Serial No. 16,002

3 Claims. (Cl. 137—21)

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This invention relates to a drain valve for a vacuum tank, and more particularly to a ball type drain valve automatically operable by a source of vacuum. Specifically, this invention relates to a ball valve for a vacuum tank of a type used with a milking machine vacuum tank or pipe line installation.

In vacuum tanks and especially those of the type used with milker installations, it is extremely desirable to drain out liquids that have collected in the tank during its use. These liquids may result due to condensation, or, as in the case of a milker installation, droplets of the milk may eventually be drawn into the tank. Various manually operable drain valves have been provided for this purpose, but these have proved undesirable since the operator must in each case remember to open or close the valve after each operation. It is a prime object therefore to provide an improved automatic drain valve for draining liquids from a vacuum tank or system.

Another object is to provide an inexpensive drain valve construction that will operate automatically and positively to seal a vacuum tank or vacuum line installation during use.

A still further object is to provide a ball type drain valve for a vacuum tank, said valve being automatically operable to seal the tank when the same has a vacuum depression therein and automatically operable to open when the tank is no longer in use, thereby permitting the drainage of liquids that have collected within the tank.

These and other objects will become more readily apparent upon a reading of the specification when examined in conjunction with the drawing.

In the drawing:

Fig. 1 is an elevational view partially in section of a vacuum tank showing the automatic drain valve.

Fig. 2 is a detail view looking upwardly along the line 2—2 of Fig. 1.

Fig. 3 is a sectional view through the valve along the line 3—3 of Fig. 2.

A vacuum tank is generally designated by the reference character 10. The vacuum tank comprises a cylindrical wall 11 which has its upper end closed by means of an upper wall 12. A lower or bottom wall 13 encloses the lower end of the cylindrical wall 11, thereby providing a vacuum chamber 14. A conduit 15 is in communication with the vacuum chamber and is in turn connected to a vacuum pump (not shown). A conduit 15' is also in communication with the vacuum chamber 14 and this conduit leads to a milking machine or milker line installation (not shown).

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The lower wall 13 is provided with a centrally located drain opening 16. Positioned beneath the drain opening 16 is a drain valve generally designated by the reference character 17. The drain valve 17 consists of a U-shaped bracket 18 having a horizontal portion 19. The horizontal portion 19 includes a centrally located aperture 20 which is in vertical alignment with the drain opening 16. The U-shaped bracket 18 also includes a pair of spaced vertically extending members 21 which are provided at their upper ends with outwardly extending portions 22. The portions 22 may be suitably fastened to the lower wall 13 by means of welding, soldering, or other fastening methods.

A ball valve 23, as best shown in Fig. 3, is seated in the opening or aperture 20 immediately adjacent to and below the drain opening 16. During use the chamber 14 is under a vacuum depression and the ball 23 is thereupon forced upwardly, due to vacuum, and thereupon seats over the drain opening 16, thereby sealing the same. Since the chamber 14 is under a continuous vacuum, the opening 16 is therefore continuously sealed. When the vacuum tank is no longer in use, the vacuum within the tank is destroyed and the chamber may be open to the atmosphere. When this occurs, the ball valve 23 promptly drops down under the action of gravity into the opening 20. The drain opening 16 is now open and any liquids that may have gathered during the operation of the tank will now be free to drain outwardly through the drain opening 16. When the tank is ready for use again, a vacuum is provided in the chamber 14 and the valve 23 thereupon promptly again seats over the drain opening 16 by the velocity of inlet air that lifts the rubber ball to its seat.

As best shown in Fig. 3, the ball 23 is of a substantially larger diameter than the vertical distance between the lower wall 13 and the horizontal portion 19. In view of this difference in dimension, it can readily be seen that the ball valve 23 during use will remain supported by the bracket 17 and thus cannot be displaced therefrom. The valve may be made of rubber sufficiently resilient to permit the same to be manually pressed between the bracket and the tank for replacement purposes. Thus the continued positive functioning of the valve is assured, since in the non-operating position it is at all times resting within the aperture 20 of the horizontal portion 19. The ball valve and bracket construction can be utilized in any system where a vac-

uum chamber is present, such as in a tank or pipe line installation.

It can now be seen that a positive, inexpensive, and simple automatic drain valve has been provided for draining the vacuum tank after the tank has served its purpose. The action of the ball valve is completely automatic and does not require the attention of an operator.

It is to be understood that changes and modifications may be made in this construction which do not necessarily depart from the spirit of the invention as disclosed nor the scope thereof as defined in the appended claims.

What is claimed is:

1. A vacuum tank comprising a sealed vacuum chamber; a vacuum conduit in communication with the chamber; a lower wall having a drain opening; means for sealing said drain opening; said means including a bracket connected to the lower wall below said chamber; said bracket including a portion having an opening therein, said opening being in vertical alignment with the drain opening; a rubber-like ball valve seated in the opening of said portion; said ball valve being of larger diameter than the vertical spacing between said portion and said lower wall; said ball valve being adapted to be held upwardly in sealing relation against said drain opening by the vacuum within said chamber, and releasable therefrom upon the destruction of the vacuum within the chamber whereby liquids within said chamber are free to drain through said drain opening.

2. In a vacuum system having a vacuum chamber, said vacuum chamber including a bottom wall having a drain opening therein, a drain valve for said drain opening, said valve including a substantially U-shaped bracket permanently secured to the bottom wall and having a portion vertically spaced from said drain opening, a resilient ball valve supported by the U-shaped bracket and adapted to be drawn against the drain opening in sealing relation when a vacuum exists within the chamber, said bracket portion

having a depression for receiving the ball upon the release of vacuum within the chamber whereby liquids are free to drain from the chamber, said ball valve being of larger diameter than the vertical spacing between the drain opening and the vertically spaced portion and resilient whereby the ball may readily be resiliently flattened so that the same may be removed and inserted into the U-shaped bracket.

3. In a vacuum system having a vacuum chamber, said vacuum chamber including a bottom wall having a drain opening therein, a drain valve for said drain opening, said valve including a substantially U-shaped bracket having a portion vertically spaced from said bottom wall, a resilient ball valve supported by the vertically spaced portion and adapted to be drawn against the drain opening in sealing relation when a vacuum exists within the chamber, said wall portion having a depression in axial alignment with the drain opening for receiving the ball upon the release of vacuum within the chamber whereby liquids are free to drain from the chamber, said ball valve being of larger diameter than the vertical spacing between said wall and the vertically spaced portion and resilient whereby the ball may readily be resiliently flattened so that the same may be removed and inserted between said wall and said portion for insertion and removal from said bracket.

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