

J. M. McDONALD.
AIR VALVE FOR TANKS.
APPLICATION FILED OCT. 10, 1911.

1,046,208.

Patented Dec. 3, 1912.

2 SHEETS—SHEET 1.

Fig. 5.

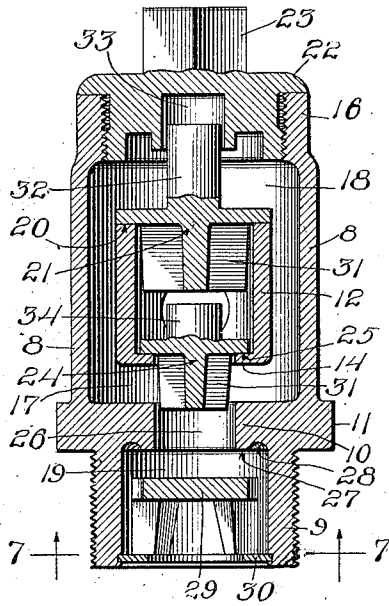


Fig. 1.

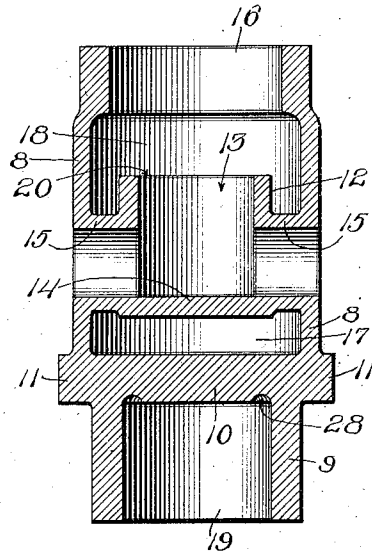


Fig. 7.

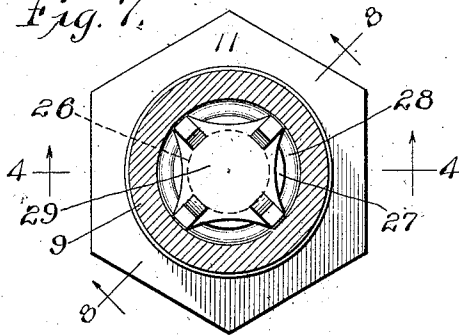


Fig. 6.

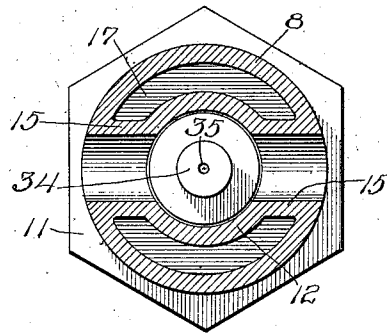
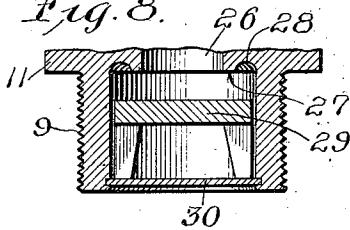


Fig. 8.



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2 SHEETS—SHEET 2.

Fig. 2.

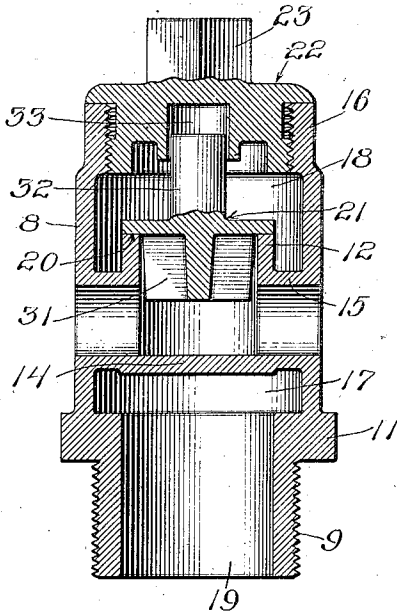


Fig. 3.

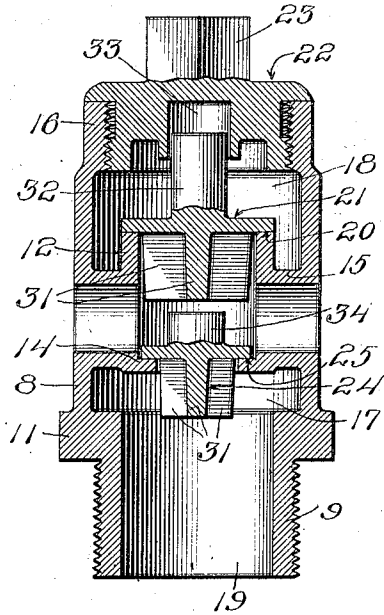
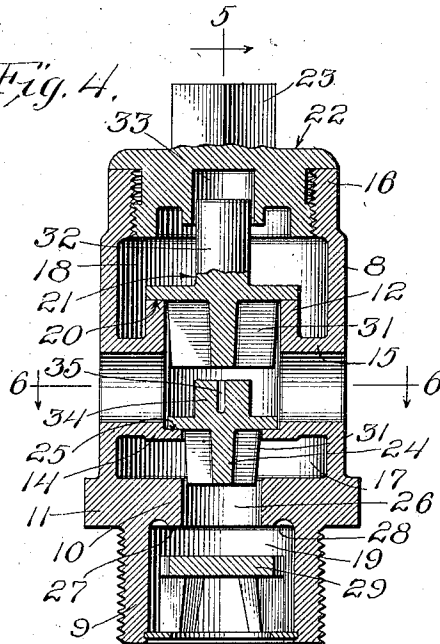


Fig. 4.



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UNITED STATES PATENT OFFICE.

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AIR-VALVE FOR TANKS.

1,046,208

Specification of Letters Patent.

Patented Dec. 3, 1912.

Application filed October 10, 1911. Serial No. 653,851.

To all whom it may concern:

Be it known that I, JOHN M. McDONALD, a citizen of the United States, residing at Dubuque, in the county of Dubuque and State of Iowa, have invented certain new and useful Improvements in Air-Valves for Tanks, of which the following is a specification.

The present invention relates to an air valve adapted particularly for use on oil tanks.

It will be understood that in distributing oil, such as kerosene or gasoline, the same is ordinarily conveyed about the city in a metallic wagon tank. These tanks are air tight and fluid tight, so that unless special means are provided, air cannot enter them to take the place of oil which may be drawn off, and the air cannot pass away from them when they are being filled.

The main object of this invention is to provide an air valve for use particularly on wagon tanks to meet the aforementioned contingencies. It is intended that one form of this valve shall be so constructed that the air may either enter or pass away from the tank through this valve. The valve is to be so constructed, however, that it will remain normally closed in order to prevent the free access of air to the volatile liquids contained within the tank.

Another object of the invention is to provide a combination air and over-flow valve of such construction that it will meet the aforementioned requirements, and also will prevent a loss of oil in case an attempt is made to overfill the tank, or in case the tank overturns.

Another object of the invention is to provide a body for the valve the same being so formed that it may be finished up either into an inlet valve which will allow air to enter the tank but will not allow it to pass away therefrom; or which may be finished up into a combination valve which will allow the air to enter or leave the tank, or which may be finished up to allow the air to enter or leave the tank, and will also prevent the aforementioned over-flow of oil. By forming the body portion of the valve in this manner, I have provided a standard construction thereby largely reducing the cost of manufacture, and making it unnecessary to carry as large a number

of castings in stock as would otherwise be necessary.

Another object of the invention is to provide an extremely compact valve, and therefore one which can be cheaply built and will occupy only a small amount of space. Also to group the inlet and outlet valve seats within the casing in such manner that a single opening will give access to both of them. In this manner, the construction will be simplified, and greater assurance will be had that the structure will be air-tight when completed.

Other objects and uses will appear from a detailed description of the invention which consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 shows a cross-section through the casting which constitutes the body portion of the device; Fig. 2 shows a vertical section through a completed device when used simply as an inlet valve; Fig. 3 shows a section through a completed device when used as a combination inlet and outlet valve; Fig. 4 shows a section taken on the lines 4-4 of Fig. 7, looking in the direction of the arrows, through a completed device when used as a combination inlet, outlet, and over-flow valve; Fig. 5 is a section taken on the line 5-5 of Fig. 4 looking in the direction of the arrows; Fig. 6 is a section taken on the line 6-6 of Fig. 4 looking in the direction of the arrows; Fig. 7 is a section taken on the line 7-7 of Fig. 5 looking in the direction of the arrows; and Fig. 8 is a section taken on the line 8-8 of Fig. 7 looking in the direction of the arrows.

In order to simplify the description and prevent confusion I shall hereafter speak of the entire device as the valve, and shall speak of the separate valve members within the casing as the "puppets." Thus the term outlet puppet will relate to the member within the casing which moves to permit air to pass away from the tank. By the use of this term I do not restrict myself to the form of construction shown and described.

As stated in the preamble, one of the objects of the invention is to provide a body portion of such construction that it may be finished up into either one of the three forms of completed device. To this end, I

have provided a casting of the form shown in Fig. 1. The same is cylindrical, the cylinder being designated by the numeral 8. When this casting is first made up it is provided with a flange 9, and a partition 10. The casting is extended out at the points 11 a slight amount beyond the wall 8, this extended portion constituting a nut, as shown in Fig. 6. An internal cylinder body 12 is formed within the main body 8. The upper portion 13 of this internal cylinder is open, the lower portion 14 being closed and the internal cylinder is united to the outer cylinder by one or more hollow spokes 15. It is preferred that the upper portion 16 of the outer cylinder should be contracted a slight amount for reasons which will hereinafter appear.

When it is desired to finish up the body for use simply as an inlet valve, the partition 10 is partially or wholly removed as shown in Fig. 2. It will be understood that the space 17 below the inner cylinder communicates with the space 18 above the same, the inner cylinder being connected to the outer one only by means of the spokes. Therefore, removing the partition 10 places the upper portion 18 in communication with the opening 19 in the bottom of the device. This establishes communication between the bottom opening 19 and atmosphere, through the interior of the cylinder 13, and the hollow spokes.

The upper face 20 of the inner cylinder may be ground to receive a vertically movable puppet 21 which normally seats by gravity to shut off the space 18 from the interior of the cylinder and therefore from atmosphere. A cap 22 having a nut head 23 is threaded into the upper end of the device to close the interior of the same.

It is obvious that a decrease of pressure in the opening 19, such as would be occasioned by a withdrawal of oil from the tank, will cause the puppet 21 to rise and permit air to enter through the spokes, up into the space 18, down around the spokes, into the space 17, and finally into the tank of the wagon. An increase of pressure within the wagon tank will exert a direct downward pressure on the puppet 21 to seat the same more firmly. For this reason, the device when finished up, as shown in Fig. 2, can be used only for permitting an access of air to the tank, and not for permitting an escape therefrom.

The device constituted as just described may be converted into a double valve for permitting the air to either enter or leave the tank in the manner now to be described. To accomplish this end, it is only necessary to provide a hole through the partition 14, and to seat a puppet 24 in such hole. It will be noticed that the central portion of the partition is of increased thickness. For

this reason, its upper surface 25 may be ground down to provide an accurate seat for the puppet 24 in order to make the device gas-tight.

The device, as now constituted, will permit an escape of air or vapor from the wagon tank, because although the puppet 21 will be seated by the excess pressure, still the puppet 24 can rise upward to permit the air or vapor to escape directly through the spokes.

It sometimes happens that a wagon tank overturns, or that the attendant does not notice when the tank is full. Under either of these circumstances, some oil will ordinarily run off through the puppet 24. In order to guard against loss of oil in this manner, means should be provided in the valve for automatically cutting off the oil. The device herein described is particularly adapted to meet the aforementioned requirements. In order to provide an oil over-flow valve, a hole 26 is formed in the partition 10. It will be noticed that the casting shown in Fig. 1 is provided with an annular depression 28, so that when the hole is formed in the partition, as shown in Fig. 4, a relatively narrow seat 27 is left. This can be readily ground to provide an accurate puppet seat.

A light puppet 29 is placed within the opening, and moves loosely up and down within the same. A ring 30 holds said puppet in place, said ring being held by the wall 9 in any suitable manner. The puppet 29 should be made of light material, such as aluminum, for example, so that in case the oil rises into the opening 19, the puppet will float and rise up against the seat 27. As soon as this occurs the opening 26 will be closed and a further escape of oil will be prevented. It is also found by test that if the wagon tank should be overturned so that the valve would lie on its side then the puppet 29 will be held buoyantly by the oil and will move over against its seat, thus only a few drops of oil will escape.

The above shows how the body casting of the present invention can be finished up into either one of the three forms of valve. It will be seen that the overflow arrangement is practically the same as the combination inlet and outlet valve with the addition of the third puppet 29.

It will be noted that each of the puppets 21 and 24 is provided with a number of wings 31, which extend down through the opening. These guide the puppets in their movements and insure their proper seating. The inlet puppet is provided with a comparatively long upwardly extending finger 32 which moves within a recess 33 in the cap. This assists in guiding the inlet puppet in its movements. At the same time this

puppet is limited in its upward movement by this finger so that the wings will never rise beyond the puppet seat. The outlet puppet 24 is provided with a finger 34 which will strike against the lower end of the wings of the inlet puppet. The parts are so proportioned that in case the device were to be over-turned, for example, in shipment, the combined movement of the inlet and outlet puppet would not be sufficient to raise the wings of the outlet puppet beyond the seat thereof, so that even under these circumstances this puppet would be sure to seat properly when the device was righted.

It will also be noted that the outlet opening is slightly smaller than the inlet opening, and that the inlet puppet in turn is smaller than the opening 16 in the upper end of the body. For this reason, the parts can be set together directly through this opening 16, and then the cap can be secured in place. Reference to Fig. 6 will also show that the finger 34 of the outlet puppet is provided with a hole 35. A pencil or rod of any kind can be passed down through the openings 13 and 16 into this hole, in order to move the outlet puppet back and forth until its wings seat properly through its opening.

I wish particularly to point out the fact that the construction of the body portion of this valve is such that it can readily be finished into either one of the three forms above enumerated. This is largely on account of the peculiar grouping of the valves taken in conjunction with the use of the inner and outer valve bodies joined together by means of the hollow spokes. In casting the body the spokes may be either solid or cored, in which former case the perforations may afterward be drilled into them.

It is evident that any desired number of the hollow spokes or pipes 15 may be used. By the use of two spokes oppositely placed, an extremely rigid and durable construction is obtained, the distribution of air movement is equalized and smaller spokes may be used than would otherwise be necessary.

It will be understood that I do not in any way limit myself to the exact details of construction herein shown except as called for by the claims, but that I include within the scope of my invention equivalent constructions.

I claim:

1. In a device of the class described, the combination of an inner casing having inlet and outlet valve seats in its upper and lower portions respectively, an outer casing surrounding the inner casing and spaced away therefrom a sufficient distance to provide a

clearance between the two casings, an arm securing the inner casing to the outer casing and having a passage-way for placing the interior of the inner casing in communication with the atmosphere, there being an opening in the upper portion of the outer casing in vertical alinement with the valve seats of the inner casing, an inlet valve seated on the upper valve seat of the inner casing, an outlet valve seated on the lower valve seat of the inner casing, downwardly extending guide wings on both of said valves, said guide wings riding in their respective valve openings for the purpose of guiding the valves in their vertical movements, a cap for closing the opening in the upper end of the outer casing, an abutment on the inlet valve adapted to engage said cap for limiting the upward movements of the inlet valve while the guide wings of said valve ride in the inlet valve opening, and an abutment on the outlet valve adapted to engage the lower portion of the inlet valve to limit the vertical movements of the outlet valve while the guide wings of the same ride in the outlet valve opening, substantially as described.

2. In a device of the class described, the combination of an inner casing having upper and lower valve seats, an outer casing surrounding the same and spaced away therefrom to provide a passage between both of said casings, an arm connecting the inner and outer casings together, there being a passage-way in said arm for placing the interior of the inner casing in communication with the atmosphere, inlet and outlet valves seated respectively on the upper and lower valve seats of the inner casing, an overflow valve seat in the outer casing located at a point below the outlet valve, a buoyant valve below the overflow valve seat of the outer casing, and means for retaining said valve in operative position, substantially as described.

3. As a new article of manufacture, a body comprising an inner casing, an outer casing surrounding the same and spaced away therefrom a distance to provide a passage-way between both of said casings, an arm connecting said casings together, there being a passage-way in said arm for placing the interior of the inner casing in communication with the atmosphere, and a partition extending across the outer casing at a point beneath the inner casing, substantially as described.

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Witnesses:

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