

May 24, 1927.

1,629,627

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VALVE CONTROL MECHANISM

Filed Aug. 2, 1920

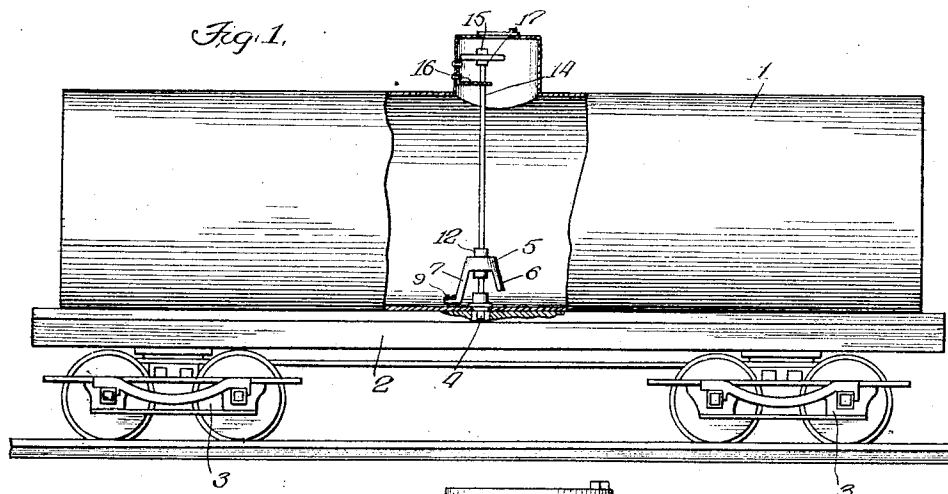


Fig. 2.

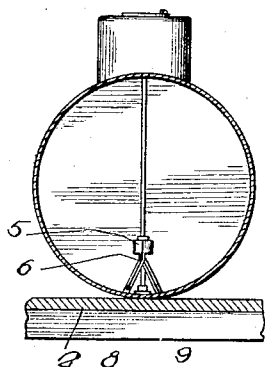
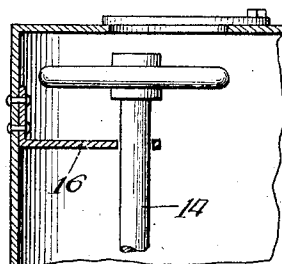
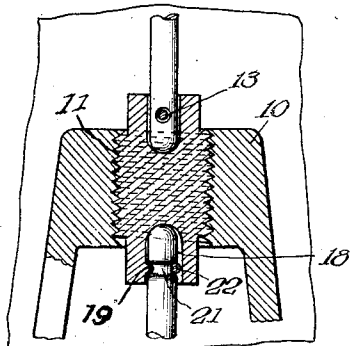
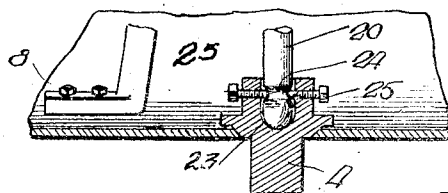


Fig. 3.



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VALVE-CONTROL MECHANISM.

Application filed August 2, 1920. Serial No. 400,842.

My invention relates to valve control means, and it has especial reference to means of the character designated which may be employed in connection with tanks, especially those comprised in tank cars wherein the side walls of the tank are subject to deflection and distortion upon receiving sudden strains.

In tank cars of the usual type, the tank is less rigid at its center than any other place because of the large opening formed at the top of the tank which provides for the dome. The result of this is that when the car is traveling around a sharp curve the tank may assume an oval contour in cross section. The valve may be opened thereby permitting the contents of the tank to leak out or escape. It is also possible that the valve will open when the tank car is in transit because of the vibrations that may be occasioned by the movement of the car. When the tank is empty it will be substantially circular in cross section but when filled it may attain a more or less oval form owing to the weight of the liquid contained in the tank. Unequal expansion and contraction because of temperature changes may affect the tank in length as well as diameter. All of these conditions tend to affect the valve. As a consequence, in such tank cars the valve rod under the above strains may be so moved that the valve itself is frequently opened slightly and a loss of the liquid contents of the tank is suffered.

In my present invention, I contemplate overcoming the effect of these distorting strains and stresses upon the valve so that the valve will always remain closed under all circumstances except when it is desired to empty the contents from the tank by authorized persons.

One object of my invention, therefore, is to provide a valve control which comprises a bracket that serves to firmly hold the valve opening-and-closing member in fixed position under all circumstances. In this connection I position a mechanism between a valve operating rod and the valve opening-and-closing member which mechanism is so connected to the operating rod and to the valve member that said valve member may seat itself accurately irrespective of the distance which the valve operating rod departs from the axis of the valve itself when the

tank is distorted or undergoing distorting strains. This latter is of extreme advantage in that it eliminates the necessity for a machine-like accuracy in the positioning of the valve-control support or bracket.

It is, of course, obvious that in structures of this character the matter of cost consideration in installment is of considerable importance and all of the present structures heretofore devised are so constituted that unless the various parts and elements are accurately machined and placed in position in the tank body, inaccurate operation of the valve will result. Furthermore, the guide bracket now in present use at the top of the tank being subjected to vibration because of the operation of the car and to other stresses and strains, will almost inevitably depart from its original placement, irrespective of the accuracy of its original installment. To those skilled in the art, all of these circumstances represent a considerable monetary outlay and it is the purpose of my invention to so form a valve control means that the necessity for all of the above accuracy is eliminated because my control mechanism between the operating rod and the valve opening-and-closing member is so connected therebetween that the latter member seats itself in the valve opening with substantial accuracy irrespective of the departure from alignment of the guide bracket and the valve operating rod.

Another object of my invention is to so form a bracket support for the valve control mechanism that the trapping of the liquid is eliminated and, at the same time, the leg members of the bracket still extend in a preferably longitudinal direction whereby they are substantially divorced from the deflection of the sides of the tank.

Referring to the accompanying drawings, for a better understanding of my invention:

Fig. 1 is a side elevational view, partly in section, of a tank car embodying my invention;

Fig. 2 is a cross section thereof illustrating the manner in which the valve control bracket is formed and positioned; and

Fig. 3 is a detail fragmentary view in elevational section showing the manner in which the various valve control elements are positioned and connected.

The tank 1 is mounted upon a car-line

body 2 which is supported on trucks 3—3. A valve of any desired type comprises a valve opening-and-closing member 4.

A bracket or supporting member 5 is secured to the bottom of the tank 1 and, by reference to Fig. 2, it will be observed that the leg portions 6 and 7 thereof are bent in opposite directions whereby feet 8 and 9, which are secured to the bottom of the tank, are positioned at points other than the lowest point of the tank, although the legs 6 and 7 extend preferably longitudinally of the tank and are so positioned that they are substantially at the lowest point of the tank. This particular construction of bracket removes the obstruction from the lowest point of the tank which would otherwise be present if the feet were positioned in alignment at the extreme bottom point of the tank. As above pointed out, it is apparent that considerable liquid will be trapped in the tank when the bracket which we have just described has both of its feet positioned and aligned at the bottom point of the tank.

The yoke portion 10 of the bracket is interiorly provided with screw-threads 11 with which engage the threads of a member 12 which by rotation is moved vertically upwardly and downwardly through the collar or yoke portion 10. Attached to the top of the member 12 by a pin 13 is an operating rod 14 which is turned by a wheel 15 at its upper end and which is supported by a guide bracket 16 situated within a dome 17 at the upper portion of the tank. It is to be understood that the rod 14 slides freely in the support 16 and, therefore, that the deflection of the sides of the tank 1, although it may cause the guide bracket 16 to move out of its initial position does not affect the rod 14 as is the case in the usual present forms of structure wherein the rod 14 is in any manner firmly secured to a high-point bracket such as 16. The rotation of the rod 14 serves to move the member 12 vertically in either direction in the screw threads 11.

The bottom of the member 12 has formed therein a reentrant portion 18 in which a lug 19 is integrally cast. The portion 18 is of sufficient dimensions to permit the entrance thereto of a rod 20 which is provided at its upper end with an annular channel 21. The rod is slipped into the opening 18 and then moved sidewardly to cause the lug 19 to engage in the channel 21 and thereafter a pin 22 is passed through the member 12 in such position that the rod 20 is secured thereto. The particular manner in which the rod is secured to the member 12, as just described, permits of loose movement of said rod.

The valve opening-and-closing member 4 has formed therein a seat 23 into which the lower end of the rod 20 extends. An annular channel 24 is formed near the bottom end

of the rod 20 and is engaged after the seating of said rod in the member 4 by set screws 25—25. This latter connection also permits of the loose movement of the rod 20 in the member 4.

The structure which I have just described effects the opening and closing movement of the valve by the movement of the operating rod 14 which, however, is supported at the yoke of the bracket 5, the latter being supported, as shown, at the bottom of the tank whereby the flexible sides of the tank do not cause the rod 20 to move relatively to the member 4 and thereby accidentally open the valve as would be the case if said rod 20 were attached to a bracket supported at the top of the tank. Moreover, I have so connected the valve opening-and-closing member 4 and the operating rod 14 that machine-like accuracy in placing of the bracket is not necessary. This follows because of the loose connecting rod 20. Should the bracket 5 be somewhat out of alignment with the valve this rod 20 will so swing from its true vertical position that the member 4 will always seat itself with desirable accuracy which would not be the case, obviously, if the connection between the valve operating rod 14 and the member 4 were rigid. Under the latter circumstances the closure member 4 would be tilted to such a degree that it would not accurately seat itself and a consequent loss of material would result.

From the foregoing description of my valve control it will be apparent that the valve opening-and-closing member 4 is connected to the rod 20 at its lower end by means of a loose joint. This joint, however, does not permit vertical movement of the member 4 unless the rod 20 is moved vertically. Also, the rod 20 at its upper end is seated in the member 12 but is connected thereto by means of a loose joint which permits of relative movement between the member 12 and the rod 20 although there is a very slight longitudinal movement allowed between these two members. The member 12 is rigidly positioned within the bracket 5 which is subjected to few distorting strains only. Any lost motion between the rod 20 and the member 4 may be taken up when the valve operating rod 14 is screwed downwardly.

The valve operating rod 14 while slidingly engaging with the guide-bracket 16 serves to move the member 12 upwardly and downwardly. By reason of the relative movement between the rod 20 and the valve operating rod 14 the rod 20 is not subject to the distorting strains imposed upon the rod 14.

It is thus obvious that the valve will remain closed under all circumstances until opened by means of the proper operation of the valve operating rod 14. Moreover,

my valve control mechanism prohibits the valve opening-and-closing member 4 from being moved by any means exterior of the tank car which prevents pilfering of the contents of the tank, inasmuch as the valve opening-and-closing member 4 cannot be pushed upwardly with a stick or other implement.

While I have described but one embodiment of my invention, I believe that the disposition of the various control elements, and particularly the employment of a loose rod, as shown in this particular connection, is entirely novel and I desire, therefore, that my invention be interpreted in its broadest aspects and be limited only by the showing of the prior art and by the scope of the appended claims.

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

1. In combination with a vessel having flexible walls, a valve therein, a valve opening and closing member therefor, a control rod for the latter, and a threadedly supported member universally connected to both said rod and said valve opening and closing member.

2. In combination with a vessel having flexible walls, an opening in said vessel, a valve opening and closing member co-operating with said opening, a supporting bracket located adjacent said opening, a control rod operable from a point remote from said bracket to open and close said opening, and a member threaded in said bracket and universally connected to said control rod and to said valve opening and closing member.

3. In combination with a tank having flexible walls, a valve comprising a valve opening and closing member, a valve control member one end of which is adapted to be operated from a portion of said tank substantially opposite said valve and to be guided by means in combination with said tank portion, said tank portion being subject to movement because of the flexibility of said walls, means for supporting the other end of said valve control member comprising a guide therefor, and means connecting said member to said valve opening and closing member comprising a rod universally connected to each of said members whereby the latter is unaffected by the movement of said tank walls.

4. In combination with a vessel having

flexible walls, a valve adapted to close an opening in said vessel, a bracket positioned adjacent said opening, a member threaded in said bracket, a control rod operable from the top of said vessel and universally connected to said member, and another universal connection between said valve and said member.

5. In combination with a vessel having flexible walls, a valve therein subject to accidental opening and closing because of the flexibility of said walls, a control rod for said valve having a threaded member loosely connected to the bottom thereof, a bracket supported adjacent said walls having a threaded portion engaged by said threaded member, and means comprising a rod loosely connected at one end to said threaded member and at the other end to said valve to open and close the latter by the movement of the former.

6. In combination with a vessel having flexible walls, a valve therein subject to accidental opening and closing because of said flexibility, a control rod operable from the top of the vessel, a valve rod universally connected to said valve, a bracket adjacent said valve, and means embodied in said bracket and guided thereby for permitting the universal movement of said control rod with respect to said valve rod.

7. In combination with a vessel having flexible walls, a valve therein subject to accidental opening and closing because of said flexibility, a control rod operable from the top of the vessel, a valve rod universally connected to said valve, and means embodied in said bracket and guided thereby for permitting the universal movement of said control rod with respect to said valve rod, said means comprising a member threaded in said bracket and universally connected with said control rod and said valve rod.

8. In combination with a valve closure member and a valve rod controlling the same, a connecting member between the two which is so universally connected to each of the same that said valve closure member may be seated in accurate position irrespective of the departure from proper axial alignment of said valve control rod, and a bracket threadedly supporting said connecting member.

In witness whereof, I have hereunto subscribed my name.

GEO. D. KAISER.