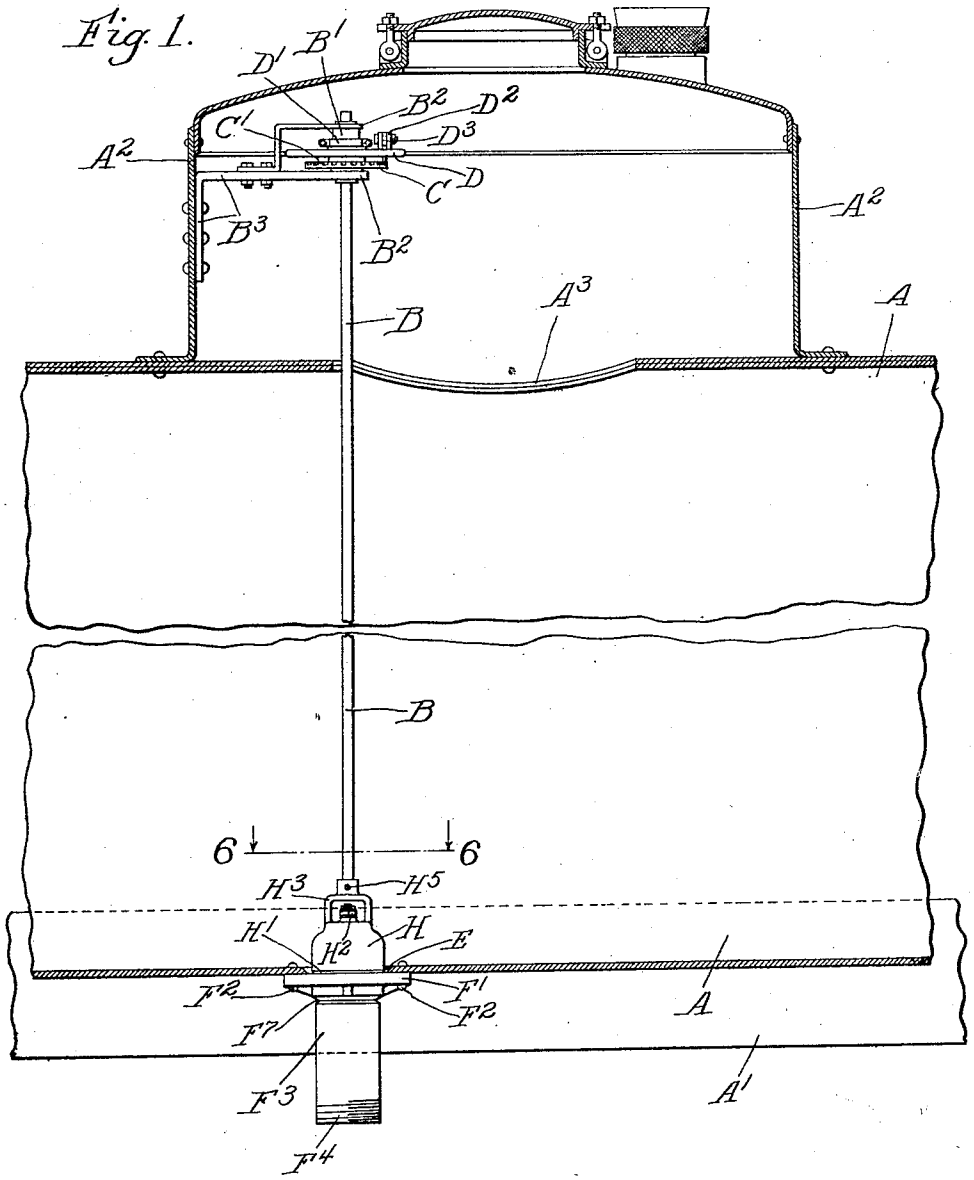
Sept. 8, 1925. 1,552,632

C. E. MILLER

TANK CAR OUTLET VALVE

Filed June 6, 1921 4 Sheets-Sheet 1

Fig. 1.



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TANK CAR OUTLET VALVE

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Fig. 2.

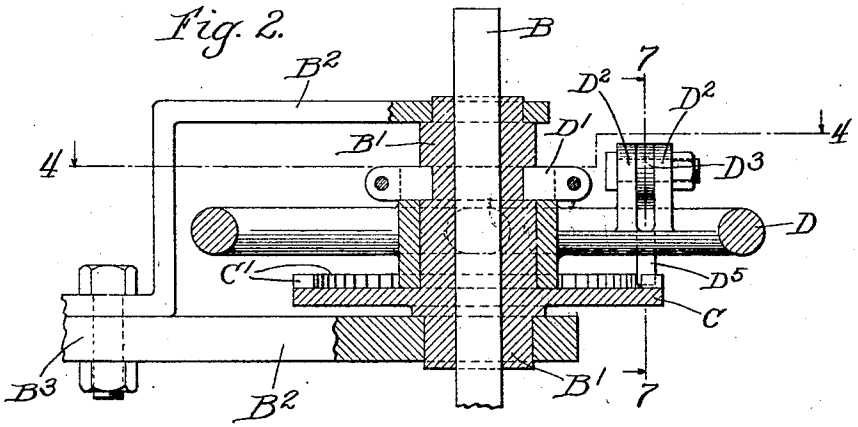


Fig. 7.

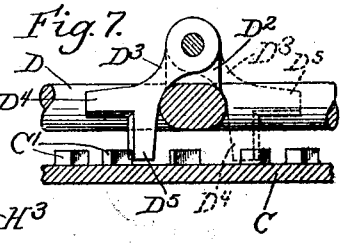


Fig. 3.

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TANK CAR OUTLET VALVE

Filed June 6, 1921 4 Sheets-Sheet 3

Fig. 4.

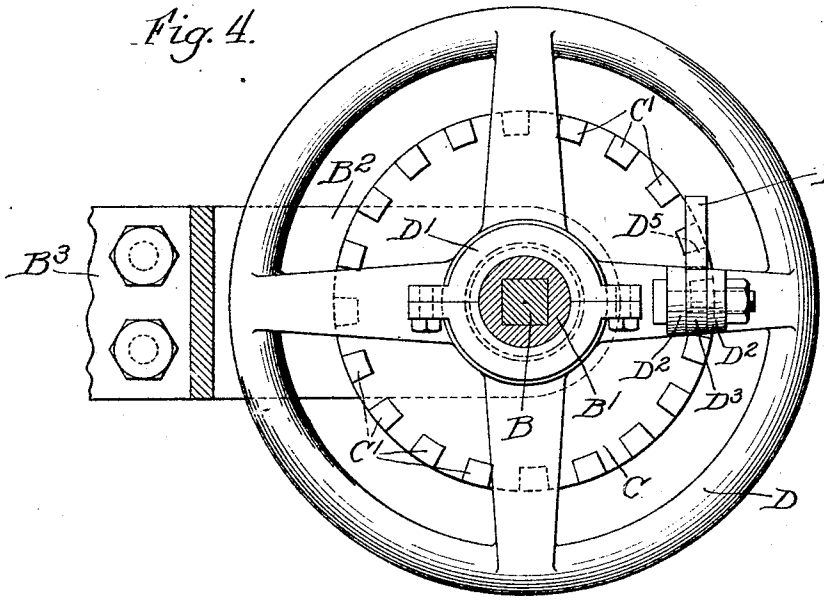
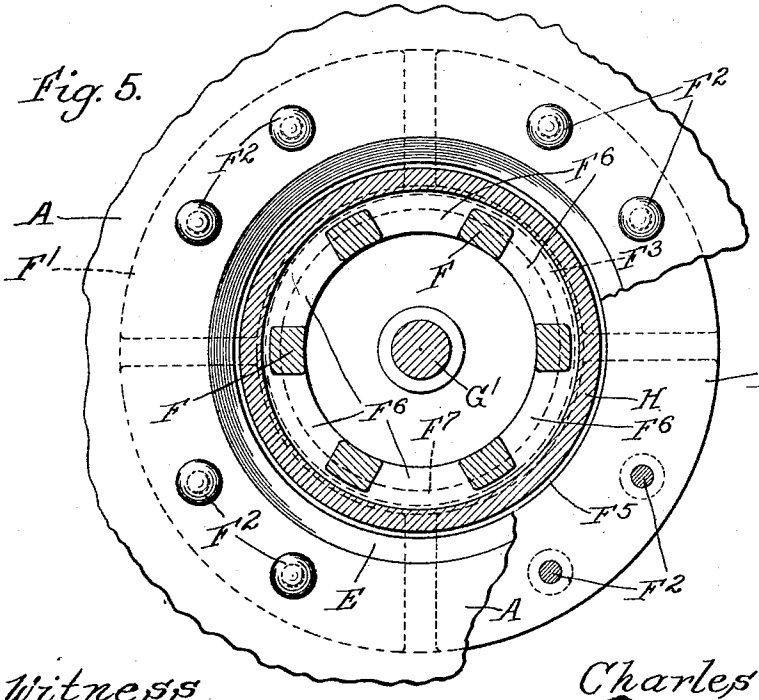


Fig. 5.



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TANK CAR OUTLET VALVE

Filed June 6, 1921 4 Sheets-Sheet 4

Fig. 8.

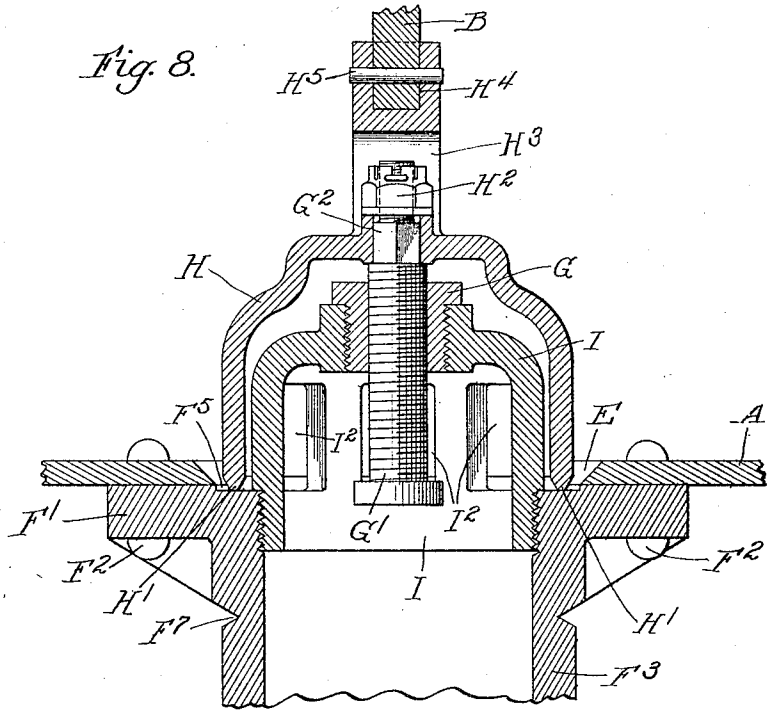
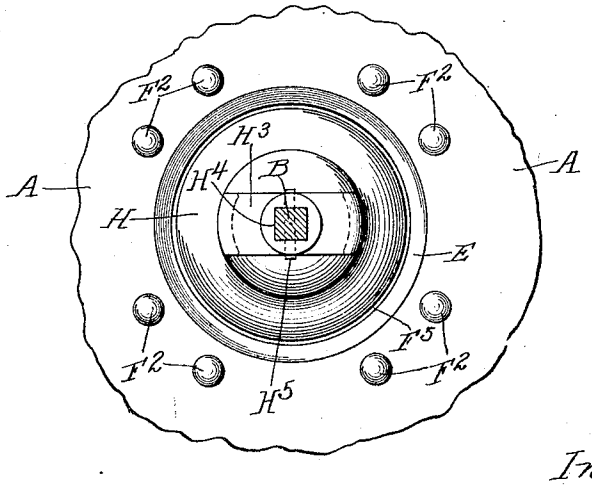


Fig. 6.



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Patented Sept. 8, 1925. 1,552,632

UNITED STATES PATENT OFFICE.

CHARLES E. MILLER, OF CHICAGO, ILLINOIS.

TANK-CAR OUTLET VALVE.

Application filed June 6, 1921. Serial No. 475,219.

To all whom it may concern:

Be it known that I, CHARLES E. MILLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Tank-Car Outlet Valves, of which the following is a specification.

This invention relates to an outlet valve for tank cars and has for one object to provide a valve of such construction that it will not be unseated by a distortion of the tank. Another object is to provide a valve of such construction that it cannot be broken or forced open by the accidental introduction from the outside of some projecting member. Other objects will appear from time to time throughout the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a section through a tank car with valve parts shown in elevation;

Fig. 2 is a section showing the valve operating mechanism;

Fig. 3 is a vertical section of the valve;

Fig. 4 is a horizontal section on line 4—4 of Fig. 2;

Fig. 5 is a horizontal section on line 5—5 of Fig. 3;

Fig. 6 is a horizontal section on line 6—6 of Fig. 1, giving a plan view of the valve;

Fig. 7 is a vertical section on line 7—7 of Fig. 2;

Fig. 8 is a section similar to Fig. 3 showing a modified form of the valve rotated through an angle of 90°.

Like parts are designated by like characters throughout.

A is a tank car body resting upon a car frame A′ and having the upper dome A^2. A^3 is a man-hole in the upper part of the tank through which the valve operating mechanism penetrates.

B is a rectangular valve operating shaft. About its upper end is loosely positioned the hub B′ which is mounted for rotation in the bracket arms B^2 B^2 of the bracket B^3 which is secured on the inside of the dome A^2 in any suitable manner. Toward the bottom of the hub B′ is the laterally extending ratchet plate C which carries in its upper face the teeth C′. Mounted for rotation about the central portion of the hub B′ is the hand wheel D. It is loosely held in position by means of the split ring D′. On one of the spokes of the hand wheel D is positioned a pair of ears D^2 D^2. Pivoted between these ears is the dog D^3 carrying at its outer end the two engaging points D^4 D^5 positioned 90° apart. This dog may be swung over so as to engage the teeth C′ on the ratchet wheel C, and to cause it to rotate in response to the rotation of the hand wheel. Thus the shaft B controlling the valve may be rotated in either direction so as to open or close the valve at the option of the operator. The shaft B is rotated with the rotation of the hub B′ by means of the hand wheel and ratchet connection, but is free to slide up or down within this hub.

In the floor of the car is the perforation E within which the inner valve casing F is positioned and secured by means of the lateral ring F′ which is integral with it. This ring is riveted as at F^2 and is thus rigidly positioned. The inner valve casing F has the downwardly extending portion F^3 which is finished at its bottom as at F^4 for connection with a hose or other suitable discharge means. Immediately beneath the ring F′ and about the extension F^3 is the groove F^7. This groove is provided so that in case of accident the extension F^3 may be broken off without necessarily injuring or distorting the valve. Surrounding the member F and positioned a little below the level of the bottom of the floor of the tank is the annular groove F^5. Through the casing F are a plurality of discharge ports F^6 F^6. Through these ports when the valve is open the contents of the car is discharged. Positioned within the top of the casing F is the screw threaded plug G. Screw threaded within this plug is the valve screw G′ which is squared at its upper end as at G^2.

Surrounding the casing F and adapted to close it is the valve H which is cup shaped as shown and preferably made of brass or bronze. This surrounds the casing F which is out of contact with it and at its lower edge it is somewhat sharpened as at H′ and at its outer edge it extends into the annular groove F^5. When screwed into place, it closes the ports. The upper squared end G^2 of the screw G′ passes through the square hole in the top of the valve H and is secured in position by means of the castellated nut H^2. Surmounting the valve H is the yoke H^3 which carries in its top the square hole H^4 which corresponds in size to the squared

shaft B in which the end of the shaft is fitted or pinned or otherwise secured by means of the pin H^5.

In Fig. 8 is shown a modified form in which the valve is used in connection with an enlarged outlet of the type now commonly in use. In this form it is necessary in order to use the valve of the present invention to remove the earlier valve and to insert and secure in place the new valve in the original outlet connection. In place of the casing F, a casing I similar to it is used. This casing is shortened and does not have integral with it the downwardly depending outlet connection shown in the preferred form of the valve. The casing I is exactly similar to the casing F shown and described in detail in connection with Fig. 3. The valve and valve operating mechanism are identical with those shown in Fig. 3. In the valve shown in Fig. 8 the outlet ports I^2 are exactly the same as those shown in Fig. 3 and designated by the letter F^6.

Although I have shown an operative invention, still it will be obvious that many changes both of form, shape, and relation of parts may be made without departing materially from the spirit of my invention, and I wish therefore that my showing be taken as in a sense diagrammatic.

The use and operation of my invention are as follows:

The valve is adapted to be used preferably in connection with the standard type of tank car now in use, although it might of course be adapted to other cars. In connection with tank cars, it is desirable to have a valve which cannot be jammed and which cannot be unseated because of distortion of the tank body. Such distortion might take place in the event of a wreck, and it is in the event of a wreck that the unseating is most likely to occur, because at that time sticks and other foreign members may be violently projected inside the valve connection and might thus force the valve open. The structure of the present application avoids such difficulties because the valve is seated entirely independent of the size, or shape of the tank and is complete within itself. Heretofore, it has been the practice to seat a valve by means of pressure exerted along the entire valve operating connection, and many valves have been spring seated, the spring depending for its effect upon the maintenance of the symmetry of the body. When for example the body is flattened at the sides, its vertical height is increased and the spring tension thus diminishes and the valve is unseated. The valve of the present invention is a screw seated valve and is entirely complete in itself.

The valve is assembled as shown in Fig. 3. The combined outlet connection and casing are secured in position. The screw threaded plug in the top of the valve casing is then placed in position with the valve screw positioned within it. The valve is then lowered over the squared upper portion of the valve screw and is permanently fixed in position. Thereafter any rotation of the valve will cause the screw to rotate and will thus open and close the valve. The valve operating connection is located at the top of the valve rod in the dome and the valve operating mechanism is slidably mounted by the valve rod so that it will turn it no matter what the relative vertical position of the two members is. Thus the valve rod may slide over the operating mechanism so as to lie within it or the mechanism may turn the rod so as to open and close the valve.

The arrangement and construction of the ratchet is such that the initial movement of the hand wheel in either direction will not cause a corresponding movement of the ratchet wheel. This is due to the fact that there is a certain amount of play between the dog and the teeth, and therefore the hand wheel may be moved throughout an appreciable interval before movement of the ratchet commences. This arrangement permits of a rapid initial movement of the hand wheel and thus the ratchet is struck a sudden blow and a violent starting force is exerted upon the shaft and thus the valve, however it may be stuck is cracked open by means of the sudden starting blow and subsequently after that the hand wheel and the ratchet move together easily.

I do not wish to be limited in my invention to the use of a ratchet wheel. Any mechanism which constitutes an actuating and an actuated part with a loose connection between the two so that a sudden initial jerk may be given to the actuated member is within the contemplation of my invention.

While I have above described the operation of my valve particularly with reference to opening it, the initial jerking action is of equal importance in closing the valve, as it is necessary to close the valve very tightly and positively. Thus in closing the valve, in order to attain the jerking movement, the hand wheel is reversed slightly so as to free the dog from contact with the ratchet tooth, and it is then jerked forward and a sudden jerking movement is imparted to the ratchet and through it to the valve to close it in exactly the same manner as the valve is opened.

I claim—

1. In a valve assembly the combination with an upwardly extending casing having outlet ports in said casing of a valve surrounding said casing and adapted to cut off said ports, but out of contact with said casing.

2. In a valve assembly the combination with an upwardly extending casing closed

at its top, and having outlet ports in said casing of a valve surrounding said casing and adapted to cut off said ports, but out of contact with said casing.

3. In a valve assembly the combination with an upwardly extending casing closed at its top and open at its bottom and having outlet ports in its sides, of a valve surrounding said casing and adapted to cut off said ports, but out of contact with said casing.

4. In a valve assembly the combination with an upwardly extending casing having outlet ports in said casing of a valve surrounding said casing and adapted to cut off said ports, but out of contact with said casing, means for rotating said valve and means in said casing and connected with said valve for positively guiding and moving said valve in response to said rotation.

5. In a valve assembly the combination with an upwardly extending casing closed at its top and having outlet ports in said casing of a valve surrounding said casing and adapted to cut off said ports, but out of contact with said casing, means for rotating said valve and means in said casing and connected with said valve for positively guiding and moving said valve in response to said rotation.

6. In a valve assembly the combination with an upwardly extending casing closed at its top and open at its bottom and having outlet ports in its sides, of a valve surrounding said casing and adapted to cut off said ports, but out of contact with said casing, means for rotating said valve and means in said casing and connected with said valve for positively guiding and moving said valve in response to said rotation.

7. In a valve assembly a valve mounted for rotation and adapted to be raised and lowered in response to said rotation, said valve carried at one end of a shaft and a valve operating mechanism upon said shaft separated from said valve, said mechanism adapted to rotate said shaft and free to move uninterruptedly along the length of the shaft.

8. In a valve assembly the combination with a ported casing of a valve adapted to surround said casing and mounted for rotation, said valve carried at one end of a shaft, a valve operating mechanism upon said shaft separated from said valve, said mechanism adapted to rotate said shaft and free to move uninterruptedly along the length of the shaft.

9. In a valve assembly the combination with a ported casing of a valve adapted to surround said casing and mounted for rotation, said valve carried at one end of a shaft, a valve operating mechanism upon said shaft separated from said valve, said mechanism adapted to rotate said shaft and free to move uninterruptedly along the length of the shaft, and positive means for guiding and moving said valve in response to said rotation.

10. In a valve assembly the combination with a ported casing of a valve adapted to surround said casing and mounted for rotation, said valve carried at one end of a shaft, a valve operating mechanism upon said shaft separated from said valve, said mechanism adapted to rotate said shaft and free to move longitudinally with relation thereto, and positive means for guiding and moving said valve in response to said rotation, said means comprising a screw positioned within said casing and connected to and adapted to rotate with said valve.

11. In combination with a valve mounted upon a stem and adapted to rotate with said stem, means for rotating said stem including a ratchet wheel mounted about said stem and a hand wheel free to move with relation to said ratchet and means for causing said ratchet to move with said wheel when said wheel is moved in one direction and adapted to permit relative movement of the two when said wheel is moved in the opposite direction, said stem free to move longitudinally with relation to said rotating mechanism a distance greater than that of the normal valve movement.

12. In combination with a valve mounted upon a stem and adapted to rotate with said stem, means for rotating said stem including a ratchet wheel mounted about said stem, said stem free to move longitudinally with relation to said rotating mechanism, and a hand wheel free to move with relation to said ratchet and means for causing said ratchet to move with said wheel when said wheel is moved in one direction and adapted to permit relative movement of the two when said wheel is moved in the opposite direction, said stem free to move longitudinally with relation to said rotating mechanism, said means reversible so that said ratchet may be moved in either direction a distance greater than that of the normal valve movement.

13. In a valve assembly the combination with a valve casing and a groove adjacent it of a valve out of contact with said casing and adapted to surround and cover it and penetrate into said groove so as to close said valve.

14. A valve operating mechanism comprising a shaft mounted for rotation and carrying a valve at one end, comprising a hub mounted upon said shaft for rotation therewith, and free to move longitudinally with relation therewith a distance greater than that of the normal valve movement, said hub carried on a ratchet plate, and a hand wheel adapted to rotate with relation to said plate, said ratchet provided in its upper surface with teeth, and a dog pivoted

upon said hand wheel and adapted to engage the teeth of said ratchet so as to cause the two wheels to move together when said hand wheel is moved in one direction and so as to permit relative movement when said wheel is reversed.

15. A valve operating mechanism comprising a shaft mounted for rotation and carrying a valve at one end, comprising a hub mounted upon said shaft for rotation therewith, and free to move longitudinally with relation therewith a distance greater than that of the normal valve movement, said hub carried on a ratchet plate, and a hand wheel adapted to rotate with relation to said plate, said ratchet provided in its upper surface with teeth, and a dog pivoted upon said hand wheel and adapted to engage the teeth of said ratchet so as to cause the two wheels to move together when said hand wheel is moved in one direction and so as to permit relative movement when said wheel is reversed, said dog reversible so as to permit movement of said ratchet in response to the movement of said hand wheel in either direction.

16. In a valve assembly the combination with an upwardly extending casing having outlet ports in said casing of a valve surrounding said casing and adapted to cut off said ports, but out of contact with said casing, and means for opening said valve adapted to impart a violent initial movement.

17. In a valve assembly the combination with an upwardly extending casing having outlet ports in said casing of a valve surrounding said casing and adapted to cut off said ports, but out of contact with said casing, and means for opening said valve adapted to impart to said valve an initial opening force largely in excess of the opening force subsequently applied.

18. In a valve assembly the combination with an upwardly extending casing having outlet ports in said casing of a valve surrounding said casing and adapted to cut off said ports, but out of contact with said casing, and means for opening said valve adapted to impart a violent initial movement, said means including an operating handle and a loose connection between said handle and said valve,

19. In a valve assembly the combination with an upwardly extending casing having outlet ports in said casing of a valve surrounding said casing and adapted to cut off said ports, and out of contact with said casing, and means for opening said valve adapted to impart to said valve an initial opening force largely in excess of the opening force subsequently applied, said means including an operating handle and a loose connection between said handle and said valve.

20. In a valve assembly, in combination with a valve, a shaft extending from said valve and operating means adapted to move said shaft to open said valve, said means adapted to impart a series of violent hammer blows during the initial stages of the opening movement and to be used for the remainder of the opening movement without change in the grip of the operator.

Signed at Chicago county of Cook and State of Illinois, this 2nd day of May 1921.

CHARLES E. MILLER.