E. G. WATROUS.

REFILLING VALVE.

APPLICATION FILED DEC. 26, 1907.

975,091. Patented Nov. 8, 1910.

Fig. 1

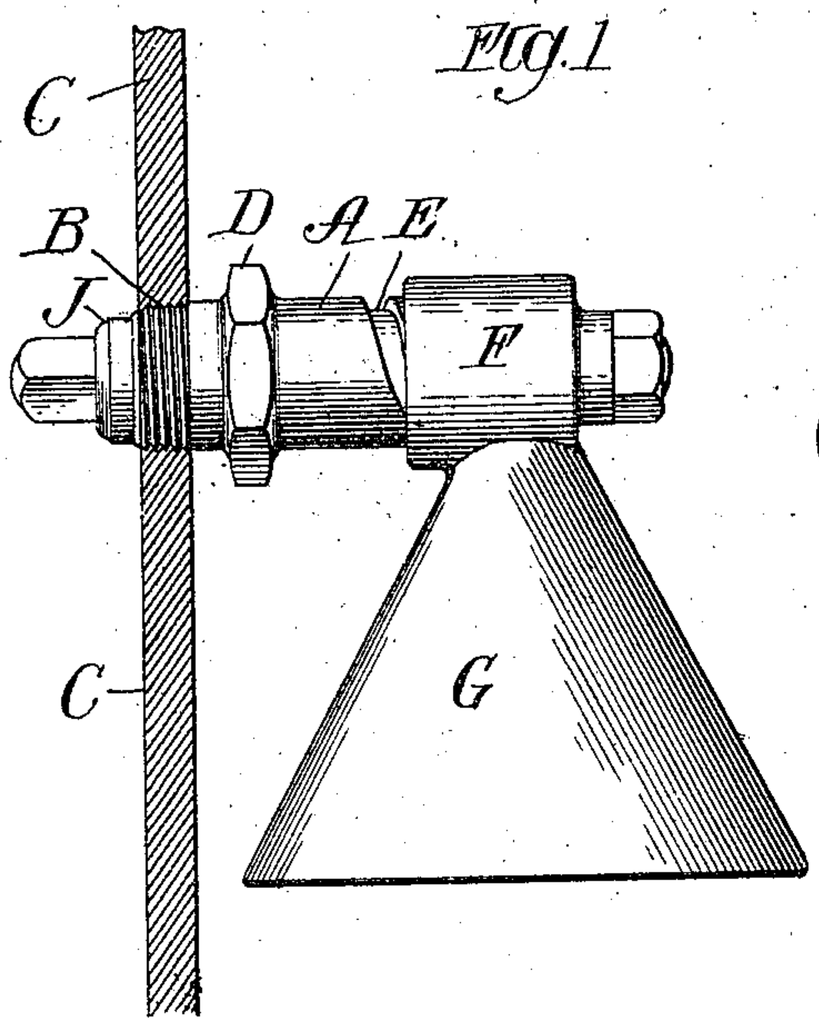


Fig. 3

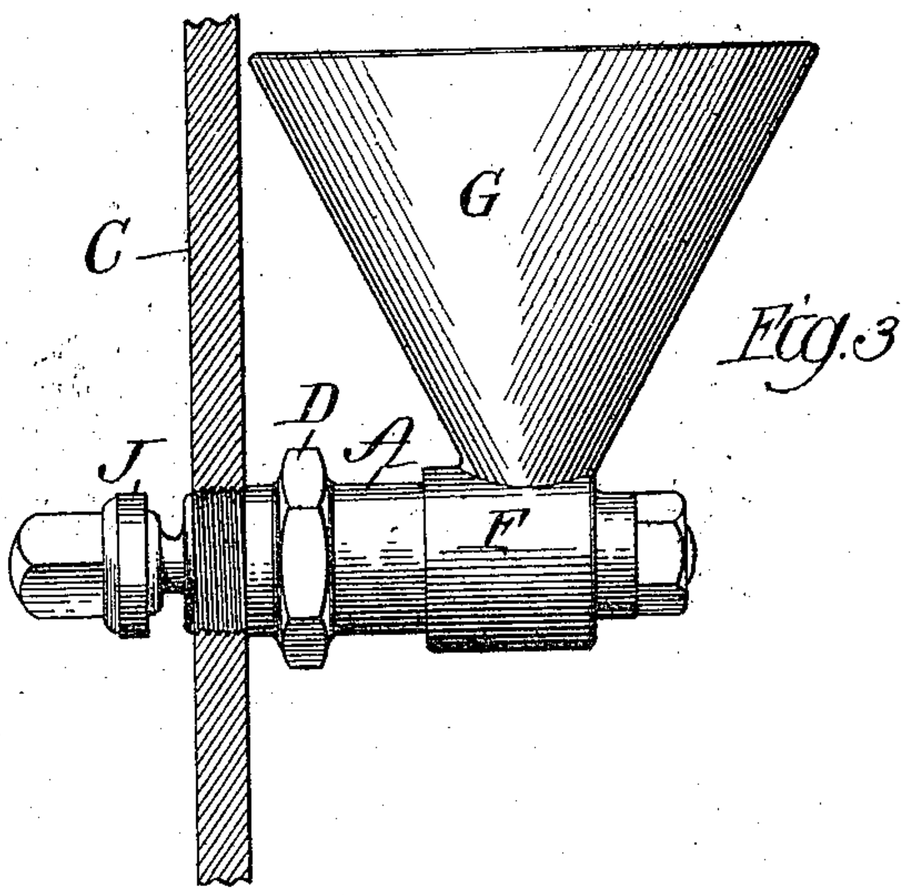


Fig. 4

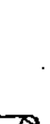
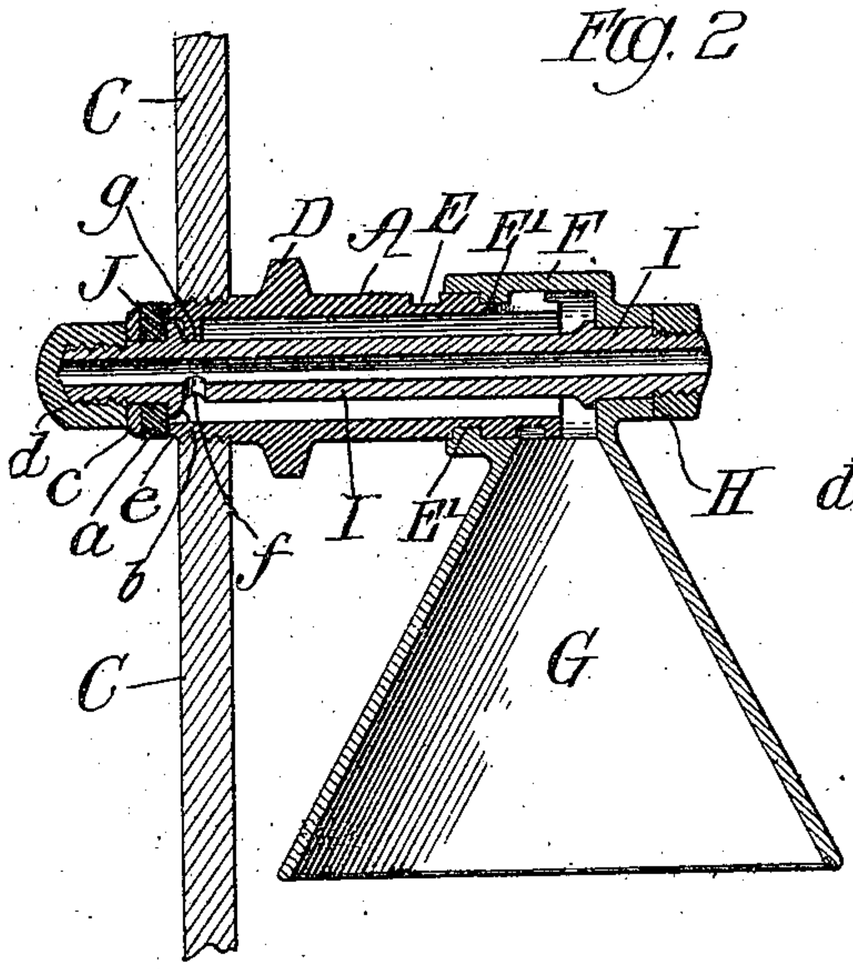


Fig. 2



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UNITED STATES PATENT OFFICE.

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REFILLING-VALVE.

975,091. Specification of Letters Patent. **Patented Nov. 8, 1910.**

Application filed December 26, 1907. Serial No. 407,995.

To all whom it may concern:

Be it known that I, EARL G. WATROUS, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented a certain new and useful Improvement in Refilling-Valves, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more particularly to re-filling valves for water tanks, such as the expansion drums of the heating systems of Pullman and other railway cars; and it has for its object the provision of a simple, efficient and durable valve, by means of which the tank may be readily filled when the valve is turned to open position, and by means of which the valve may be maintained tightly closed when turned to closed position.

In the accompanying drawings, Figure 1 is a side elevation of my improved valve, applied to a tank, with the funnel in inverted position and the valve closed; Fig. 2 a middle vertical section of the same; Fig. 3 a view corresponding to Fig. 1, with the funnel in upright position and the valve open; and Fig. 4 a middle vertical section with the parts in the position of Fig. 3.

The same letters of reference are used to indicate corresponding parts in the several views.

One end of the tubular valve body or casing A is externally threaded to screw into the internally threaded opening B in the wall of the tank C, the casing A being provided with a polygonal sided integral flange D for the application of a wrench. The body of the casing A at the right side of the flange D is provided with a female screw thread E, of coarse pitch, which is engaged by a corresponding male thread E′ formed in the hub F of a funnel G, this funnel communicating with the interior of the casing A, and being loosely hinged upon the latter so that it may be freely swung from the position of Figs. 1 and 2 to that of Figs. 3 and 4, and vice versa.

Firmly secured at its outer end in the hub F, at H, is a tubular valve stem I which extends longitudinally through the casing A and projects beyond the inner end of the same into the tank C. Within the tank C the tubular stem I carries a valve J, composed in the present instance of a circular disk *a*, of hard rubber or other suitable material, confined between a flange *b* formed on the stem I and a metal washer *c* clamped against the back of the disk *a* by a cap nut *d* screwed upon the end of the stem I. The inner end of the casing A, within the tank C, is suitably shaped to form a seat *e* for the valve J, so that when the valve is moved outward and its flexible disk *a* held firmly against the seat *e* the valve will be tightly closed. The tube I, whose inner end is closed by the cap nut *d*, is left open at its outer end, while at a point adjacent the valve J, and just within the tank C when the valve is in the open position of Figs. 3 and 4, the wall of the tube I is provided with an opening *f* which places its internal bore, and consequently the external atmosphere, in communication with the interior of the tank C, and thereby forms an escape passage for the air within the tank as the latter is being filled.

As will be understood from the foregoing description, the valve casing is firmly secured in fixed position in the wall of the tank C, while the funnel G is loosely hung upon the outer end of said casing, and is free to be swung from upright position to inverted position and vice versa. The valve stem I is firmly secured in the hub of the funnel G and consequently turns with it. When the funnel is swung to inverted position its threaded engagement with the casing A causes it to move outward along said casing, and consequently to draw the valve J outward against its seat *e*, and thereby close the valve. When, on the other hand, the funnel is swung to upright position, its threaded engagement with the casing A causes it to move inward along said casing, to carry the valve J away from the seat *e* and open the valve, as in Figs. 3 and 4. In this position of the parts the tank may be readily filled with water through the funnel G and valve casing A, the air displaced from the tank by the water passing out through the hole *f* and internal bore of the tube I until the tank has been filled to the level of said opening and seals the same. Upon then swinging the funnel down to inverted position the valve J will be closed tightly against its seat, and the gravity of the funnel will hold it there. The relation of the parts is preferably such that the valve closes against its seat before the funnel quite reaches vertical position, so that the gravity of the fun-

nel may the better hold the valve closed. Upon the interior of the valve casing A, near its inner end and immediately above the tube I, there is formed a curved lug or plate *g* which fits around the curved upper surface of the tube and, when the tank is being filled, prevents the water from passing through the opening *f* into the interior of the tube I and thereby obstructing the escape of air from the tank.

In the construction of my valve illustrated and described it will be noted that the valve J controls both the water supply passage leading into the tank and the air escape passage leading from it, so that both passages are opened by the turning of the funnel to upright position and both are closed by its return to inverted position. This is a very advantageous construction, and the control of both the water supply passage and the air escape passage by the valve and funnel constitutes an important and valuable feature of my invention, but the control of the water supply passage alone by the valve and funnel in the manner described may be nevertheless employed to advantage even where the tank is provided with a separate and independently controlled air escape passage. It will be further noted that the valve J, which controls both of the passages through the valve casing, is located at the inner end of the casing, within the tank C, so that when it is closed communication between the passages in the valve casing and the tank is entirely cut off. This, also, is an important feature of my invention, for the reason, among others, that the water usually employed in these heating systems is a saline solution, and if the passages in the valve casing are left in open communication with the tank when the valve is closed the saline solution will have access to them and they will become clogged and closed by its deposits in them.

Having thus fully described my invention, I claim:

1. A re-filling valve, comprising a casing having a water supply passage extending through it, a funnel loosely hung upon said casing near its outer end and communicating with the passage therein, a valve at the opposite inner end of the casing for closing the passage through the same, and means for causing the movement of the funnel to upright position to open the valve and its movement therefrom to close it.

2. A re-filling valve, comprising a casing having a water supply passage extending through it, a funnel loosely hung upon said casing near its outer end and having threaded engagement therewith, and communicating with the passage therein, and a valve at the opposite inner end of the casing connected with said funnel and controlling the passage through the casing, whereby the turning of the funnel upon the casing serves to open and close the valve.

3. A re-filling valve, comprising a casing having a water supply passage and an independent air escape passage extending through it, a funnel loosely hung upon said casing near its outer end and communicating with the water supply passage therein, a valve at the opposite inner end of the casing controlling both passages in the casing, and means for causing the movement of the funnel to upright position to open the valve and its movement therefrom to close it.

4. A re-filling valve, comprising a casing having a water supply passage and an independent air escape passage extending through it, a funnel loosely hung upon said casing near its outer end and having threaded engagement therewith, said funnel communicating with the water supply passage in the casing, and a valve at the opposite inner end of the casing connected with said funnel and controlling both passages in the casing, whereby the turning of the funnel upon the casing serves to open and close the valve.

5. A re-filling valve comprising a casing, a funnel loosely hung thereon and communicating with the interior thereof, a valve stem carried by the funnel and provided with an air escape passage, a valve carried by said valve stem, and means for causing the turning of the funnel upon the casing to open and close the valve.

6. A re-filling valve comprising a casing, a funnel loosely hung thereon and having threaded engagement therewith, and communicating with the interior thereof, a valve stem carried by said funnel and provided with an air escape passage, and a valve carried by said stem and adapted to be opened and closed by the turning of the funnel upon the casing.

7. A re-filling valve comprising the casing A, the funnel G loosely hung upon said casing, and having threaded engagement therewith, a valve stem secured at one end in the hub of the funnel G and extending longitudinally through the casing A, and a valve J carried by said stem adjacent the end of the casing A and operating to control the passage through the latter.

8. A re-filling valve comprising the casing A, the funnel G loosely hung thereon and having threaded engagement therewith, the tubular valve stem I secured at one end in the funnel G, and extending longitudinally through the casing A and provided with the opening *f*, and the valve J carried by the tubular stem I beyond the opening *f* and operating to control the passage through said casing.

9. A re-filling valve comprising the cas-

ing A, provided near one end with the internal rib or plate *g*, the funnel G loosely hung upon the opposite end of said casing and having threaded engagement therewith, the tubular valve stem I secured at one end in the hub of the funnel G and extending longitudinally through the casing A and provided with the opening *f* guarded by the plate *g*, and the valve J carried by the stem I beyond the opening *f* in the latter and operating to control the passage through the casing.

10. A refilling valve for tanks comprising a supporting member attached to the side of the tank, a funnel revolubly hung upon said supporting member near the outer end thereof and having a screw-thread engagement therewith, a water supply passage communicating with said funnel and terminating within the tank in a port at the inner end of said supporting member, and a valve for governing said port connected with said funnel, whereby the turning of the funnel upon said supporting member serves to open and close the valve.

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