Aug. 12, 1924. 1,504,586

E. S. THOMPSON

VALVE ACTUATING MECHANISM

Filed Dec. 1, 1922

Fig. 1.

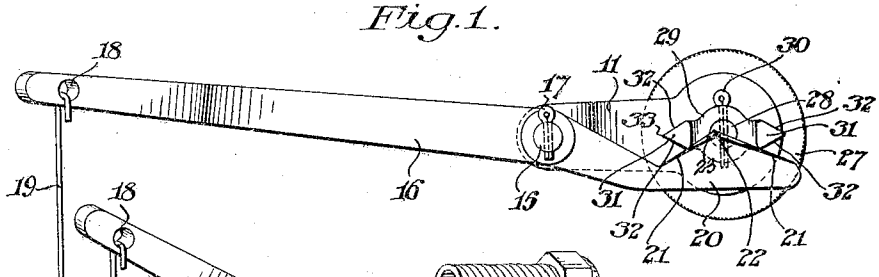


Fig. 2.

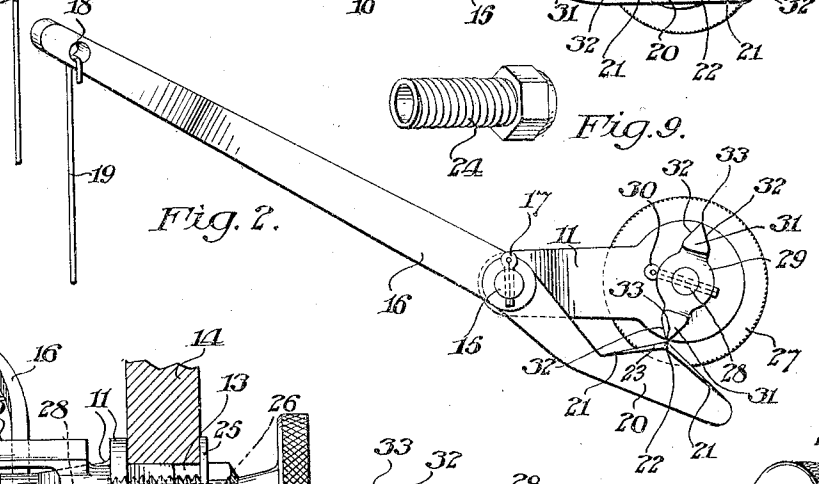


Fig. 9.

Fig. 3.

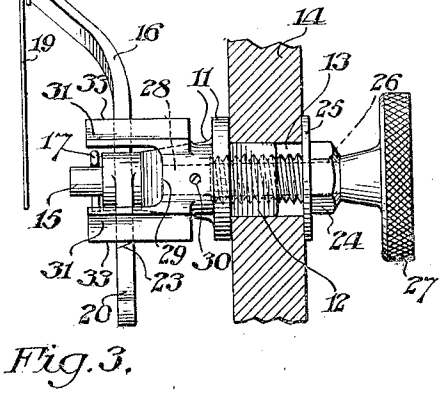


Fig. 7.

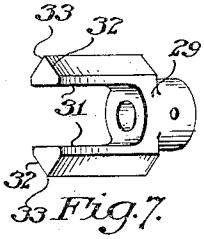


Fig. 8.

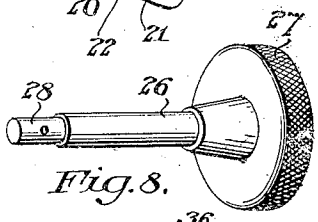


Fig. 4.

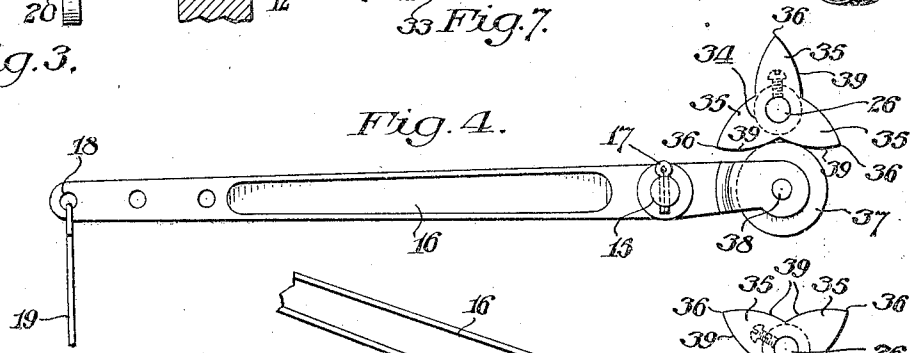


Fig. 5.

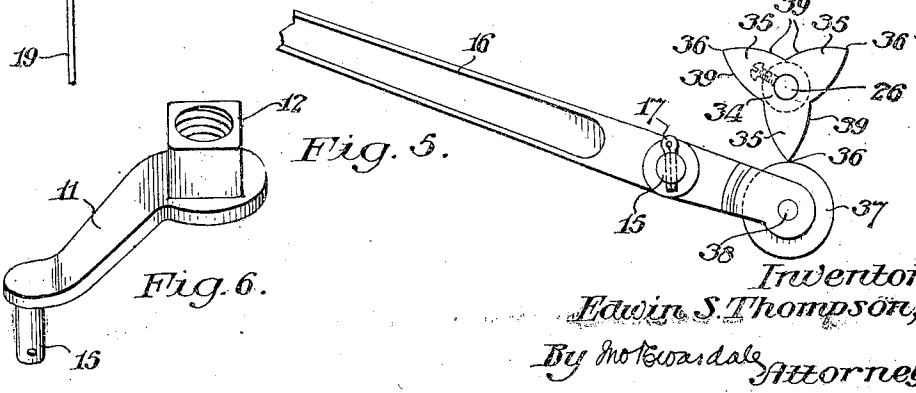


Fig. 6.

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UNITED STATES PATENT OFFICE.

EDWIN S. THOMPSON, OF LANSDOWNE, PENNSYLVANIA.

VALVE-ACTUATING MECHANISM.

Application filed December 1, 1922. Serial No. 604,146.

To all whom it may concern:

Be it known that I, EDWIN S. THOMPSON, a citizen of the United States, residing at Lansdowne, in the county of Delaware, State of Pennsylvania, have invented a new and useful Valve-Actuating Mechanism, of which the following is a specification.

My invention relates to valve actuating mechanism and is especially applicable for actuating the valves of water closet flush tanks.

The object is to provide a mechanism of extreme simplicity, comprising a minimum of parts and connections, and which will be effective for actuating the valve with a minimum of effort on the part of the operator.

Referring to the drawings, which illustrate, merely by way of example, suitable means for effecting my invention;

Fig. 1 is an elevation of mechanism including my invention, showing the valve actuating lever in the position in which the valve is closed.

Fig. 2 is a similar view showing the open position.

Fig. 3 is a transverse elevation of the parts as shown in Fig. 2, the wall of the flush tank being shown in section.

Fig. 4 is an elevation of a modification in the position when the valve is closed.

Fig. 5 is a similar view when the valve is open.

Figs. 6 to 9 are details in perspective of the several elements.

Similar numerals refer to similar parts throughout the several views.

The bracket member 11 is provided at one end with the square lug 12 adapted to fit in a suitable opening 13 in the wall 14 of the tank. At the other end is provided the pin 15 forming the fulcrum support of lever 16. The lever 16 is retained on the pin 15 by suitable means such as a cotter 17. The outer end of lever 16 is provided with means, such as the hole 18 for engagement with the valve rod 19. This lever 16 has an extension 20 on the other side of pivot or fulcrum 15, which is provided with a convex upper engaging margin on the inclined lines 21, meeting at the point 22. This engaging margin is bevelled as indicated at 23 in Fig. 3, so that said margin is approximately similar to knife edges coming to a point at 22. The bracket member 11 is held in position in and against the wall 14 of the tank, by means of the hollow bolt 24 and washer 25; the bolt 24 being threaded into and through the lug 12 and member 11 as shown.

The spindle 26, having the knurled operating handle 27, passes through the hollow bolt 24 and has secured to its end, as at 28, the hub of member 29 by suitable means such as the cotter 30. This member 29 is provided with the projections or fingers 31. These fingers 31 have their outer sides 32 inclined to each other to form a knife edge as at 33.

In operation: In Fig. 1 the parts are shown in the initial or closed valve position, which is the normal position to which the parts come to rest when the handle 27 is released by the operator. In this position the lever 16 is nearly horizontal and the extension 20 rests against the inner sides of the fingers 31 as shown in this figure.

Upon turning the handle 27 a quarter turn in either direction the sharp edge 33 of one finger 31 is moved along the margin line 21 to or past the point 22 of extension 20 of lever 16, and during said operation the outer end of lever 16 is elevated as shown in Fig. 2. It does not matter whether the edge 33 stops short or passes point 22, a reasonable approach thereto will give sufficient actuation to lever 16, and upon release of handle 27, the combined weight of the valve, valve rod 19 and lever 16 will cause the parts to move back to the position shown in Fig. 1.

It will be noted that in view of the knife edge formation of margins 21 and the transverse knife edge formations 33, the engagement between these two formations is always a point engagement and the resulting friction is so slight that the tendency of the parts to remain in open position is reduced to a minimum. It is also to be noted that the point of engagement between 22 and 33 is to one side of the vertical line passing through the axis of spindle 26. Considering these features, and the slight inertia of the moving parts when actuated, it will be seen that it is practically impossible to prevent the parts assuming the initial or closed position, as shown in Fig.

1, immediately upon release of the actuating handle.

It is also to be noted that it is only necessary to give a very slight twist or turn to handle 27, in either direction, to secure an entirely sufficient actuation of the lever 16 to dislodge the valve.

The number of parts is reduced to a minimum, they are substantial in construction and easily assembled and almost impossible to break or put out of order. While I have shown only two actuating arms or fingers 31, in Figs. 1, 2, 3 and 6, I can use more fingers or projections, as shown in Figures 4 and 5.

In the modification shown in Figures 4 and 5, the spindle 26 is provided with a three arm formation 34, each arm 35 has an engaging knife edge portion 36, similar to 33.

The valve lever in this modification, is provided with the roller 37, pivoted at 38, and adapted to engage first the margins 39, and then an edge 36, to cause the actuation of the lever to unseat the valve. In this case a movement of even less than a quarter turn is usually sufficient to actuate the valve, and it will be obvious that the freely rotatable roller will make it practically impossible to find a point of equilibrium in which to retain the parts when released in any but the initial closed position as in Figs. 1 and 4.

What I claim is:—

1. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, and a manually operated completely rotatable member acting directly thereon, said lever and member having coacting convex marginal formations.

2. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, and a manually operated rotatable member acting directly thereon, said lever and member having coacting convex marginal formations, one of said formations comprising an engaging surface having oppositely arranged inclinations rising to and meeting at a substantially middle point.

3. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, and a manually operated rotatable member in operative relationship with the lever by means of cooperating inclined and rotating surfaces, one of said surfaces being bevelled to form a line contact.

4. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, and a manually operated rotatable member in operative relationship with the lever by means of cooperating inclined and rotating surfaces, both of said cooperating contacting surfaces being in knife edge formation, one transverse of the other.

5. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, and a manually operated rotatable member in operative relationship with the lever by means of cooperating inclined and rotating surfaces, both of said cooperating contacting surfaces being in knife edge formation, one transverse of the other so as to form a sliding point contact.

6. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, having one end connected to a valve and the other end provided with a convex engaging marginal formation and a manually operated rotatable member having a plurality of convex formations adapted to have a sliding contact with the engaging formation of the lever.

7. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, having one end connected to a valve and the other end provided with a convex engaging knife edge marginal formation, and a manually operated rotatable member having a plurality of convex formations adapted to have a sliding contact with the engaging formation of the lever.

8. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, and a manually operated rotatable member, said lever connected at one end to the valve and provided at the other end with double inclined contact formations rising to a middle point for cooperating with the rotatable member.

9. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, and a manually operated rotatable member, said lever connected at one end to the valve and provided at the other end with double inclined and bevelled contact formations rising to a middle point for cooperating with the rotatable member.

10. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, connected at one end to the valve and provided at the other end with a convex formation having contact walls inclining downwardly from a middle point and a manually operated rotatable member for operating directly upon the said convex formation.

11. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, and a manually operated rotatable member, said lever connected at one end to the valve and provided at the other end with double inclined contact formations meeting at a middle

point for cooperating with the rotatable member, said rotatable member and lever having line contact formations.

12. In a valve actuating mechanism, the combination of a valve actuating lever fulcrumed between its two ends, one end provided with a convex engaging formation and a rotatable handle operated member acting directly upon said convex formation, the elements being arranged, proportioned and balanced so that a quarter turn in either direction of the rotatable member will actuate the lever to unseat the valve and the lever will return to initial position only upon a full half turn or a release of the handle.

EDWIN S. THOMPSON.