No. 785,854. PATENTED MAR. 28, 1905.

R. W. CADMAN.

PLUG VALVE.

APPLICATION FILED FEB. 4, 1904.

Fig. 1.

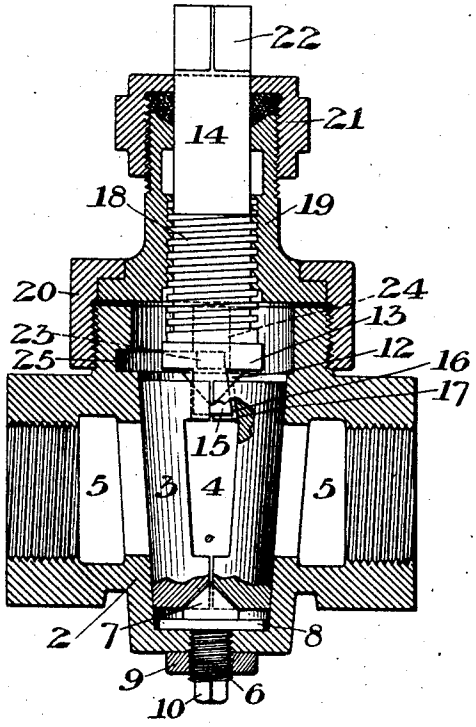


Fig. 2.

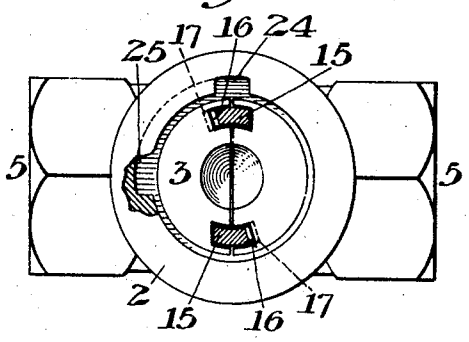


Fig. 3.

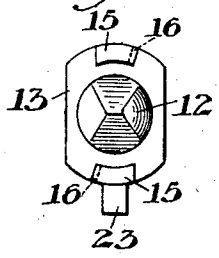
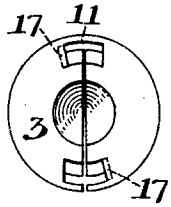


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

RALPH W. CADMAN, OF PITTSBURG, PENNSYLVANIA.

PLUG-VALVE.

SPECIFICATION forming part of Letters Patent No. 785,854, dated March 28, 1905.

Application filed February 4, 1904. Serial No. 191,918.

To all whom it may concern:

Be it known that I, RALPH W. CADMAN, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Plug-Valve, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional side elevation of my improved valve. Fig. 2 is a top plan view, partly broken away. Fig. 3 is a bottom plan view of the separable stem, and Fig. 4 is a top plan view showing a modification of the valve proper.

My invention relates to the class of turning plug-valves wherein a tapering plug is provided with a port arranged to be brought into or out of registery with the side channels of the casing.

The object of my invention is to prevent leaking of the valve and insure tight fitting thereof and at the same time to insure easy turning of the plug.

The invention consists in providing a tapering plug which is split longitudinally, in combination with means for spreading or expanding the parts as the valve is turned to closed position.

It is further designed to provide for lifting of the valve as it is opened and to give lost motion between a screw-threaded valve-stem and the valve, which will take the strain off the threads slightly before the plug is turned.

It further consists in the construction and arrangement of the parts, as hereinafter more fully described and claimed.

In the drawings, 2 represents the valve-casing, which may be of the ordinary form having a tapering bore to receive the tapering plug-valve 3, having the through-port 4 arranged to be brought into registery with the side ports 5 5. The bottom of the casing is provided with a central hole to receive the screw-stem 6 of a conical spreader or expander 7. This expander has an integral disk 8, which fits on the bottom floor of the casing, and an outer nut 9 is screwed over the stem to lock it in place. The stem is provided with an angular wrench portion 10 at its lower end.

The plug proper is split preferably on a central vertical plane, and the split may extend entirely through the valve, as in the form of Fig. 1, or may leave a thin web of metal between the two halves, as shown at 11 in Fig. 4. By the word "split" in the claims I intend to cover either of such constructions, since in either case the two parts can be forced apart in order to pack the valve. At the lower end of the plug is a conical-hole which fits on the expander 7. A similar conical hole in the top of plug receives an expanding cone 12, projecting from the lower face of the cross-bar 13 of the valve-stem 14. This cross-bar is provided with depending lugs 15 at its sides, each having at least one side face 16 beveled or inclined. These lugs project downwardly into recesses in the sides of the split plug, these recesses having beveled faces 17, corresponding to the faces on the lugs.

The intermediate portion of the valve-stem is screw-threaded, as shown at 18, these screw-threads engaging corresponding external threads in the casing-sleeve 19. This sleeve is held by the screw-cap 20, which has external wrench-faces and screws down on the top of the casing. The upper end of the casing-sleeve 19 may be provided with a suitable stuffing-box 21, above which projects the squared or angular portion 22 of the valve-stem. By turning the sleeve 19 and readjusting the nut 20 the position of the stem may be shifted, so that the plug will bind and seat properly when turned to close position. This will also take up wear on the lugs of the stem.

In order to indicate when the valve is open, I preferably form a side lug 23 on one part of the valve-stem, which lug moves down through a vertical groove 24 in the casing as the plug drops into place and then moves horizontally in an arc-shaped groove 25 as the plug is turned. The shoulder at the end of the groove stops the plug in open position and indicates such position to the operator.

In the operation of the valve as the stem is turned to close the valve the screw-threaded engagement of the stem forces the plug downwardly as it turns. This downward forcing causes the top and bottom expanders to exert a spreading tendency on the parts of the plug, thus forcing their tapering sides against the

walls of the casing as the valve is closed. The valve will thus be packed by reason of the lateral pressure exerted on the plug parts in conjunction with the general wedge action, owing to the taper of these parts. In opening the stem will be turned slightly before it begins to turn the plug, owing to the lugs on the stem being of less width than the receiving-slots in the plug. During this first portion of the movement the strain on the screw-threads will be released before the plug begins to turn. As the lugs engage the plug to turn it the inclined faces exert a slight lifting tendency on the valve, which tends to raise it as the valve turns to the open position. This makes the turning of the valve comparatively easy, especially as the strain on the screw-threads is removed before the plug is turned.

The advantages of my invention result from the splitting of the tapered plug in connection with the spreading means, also from the splitting of the tapered plug in combination with the means for forcing the plug inwardly as it turns to closed position, and, further, from the lost motion between the stem and plug and the lifting action on the plug, which make the turning comparatively easy.

The valve is of special advantage as a blow-off valve for locomotives and as a superheated steam-valve, as wear will be taken up and the valve remains tight, owing to its peculiar construction.

Variations may be made in the form and arrangement of the plug, the manner of splitting, the expander, the stem connection, &c., without departing from my invention.

I claim—

1. A plug-valve having a split tapering plug with a passage through it, a bottom expander engaging the plug parts and means for forcing the plug downwardly as it is turned to closed position; substantially as described.

2. A plug-valve having a split tapering plug, a separate stem arranged to turn the plug, means for expanding the plug as it is turned to closed position, and a connection between the stem and plug arranged to give sidewise lost motion and release the jamming pressure before the plug is turned to open position; substantially as described.

3. A plug-valve having a tapering expansible plug, a valve-stem arranged to lift the valve as it is turned to open position, and a lost-motion connection between the stem and plug arranged to allow a slight turn of the stem before it turns the valve toward the open position; substantially as described.

4. A plug-valve having a tapering expansible plug, a stem arranged to turn the plug, an expander for expanding the plug as it is turned to closed position, and a lost-motion connection between the stem and plug arranged to release the jamming pressure before the stem turns the plug toward open position; substantially as described.

5. A plug-valve having a tapering expansible plug with a hole extending therethrough, a stem arranged to turn the plug, and a stationary expander in the casing independent of the stem and arranged to act upon the expansible plug as it is turned to closed position; substantially as described.

6. A plug-valve having a split tapered plug, a bottom expander engaging the plug parts, recesses in the top of the plug, a screw-threaded stem having lugs engaging the plug-slots, this lug and slot connection being arranged to exert a lifting tendency on the plug as it is turned toward open position; substantially as described.

7. A plug-valve having a rotary expansible plug, means for expanding the plug as it is turned to closed position, and a screw-threaded stem having a lost-motion connection with the plug arranged to turn the plug after the jamming pressure is released; substantially as described.

8. A plug-valve having a tapering expansible plug, an outer expander in the casing, a stem having an expanding device engaging the plug, a lug and slot connection between the stem and plug arranged to give lost motion sidewise, and a screw-threaded bearing engaging screw-threads on the stem; substantially as described.

9. A plug-valve having a split tapering plug with a passage through it, a bottom expander engaging the plug parts, a stem arranged to force the plug downwardly as it is turned to closed position, and an expander on said stem arranged to act upon the upper part of the plug; substantially as described.

10. A plug-valve having a rotary expansible plug, means for expanding the plug as it is turned to closed position, a screw-threaded stem having a connection arranged to turn the valve, a cap having screw-threaded engagement with the stem, and means for adjusting the cap by rotary movement to different positions to change the stroke of the plug and cause it to seat properly when in closed position; substantially as described.

In testimony whereof I have hereunto set my hand.

RALPH W. CADMAN.

Witnesses:
JOHN MILLER,
H. M. CORWIN.