No. 754,547. PATENTED MAR. 15, 1904.

J. DESMOND.

THROTTLE VALVE.

APPLICATION FILED AUG. 14, 1903.

NO MODEL.

Fig. 1.

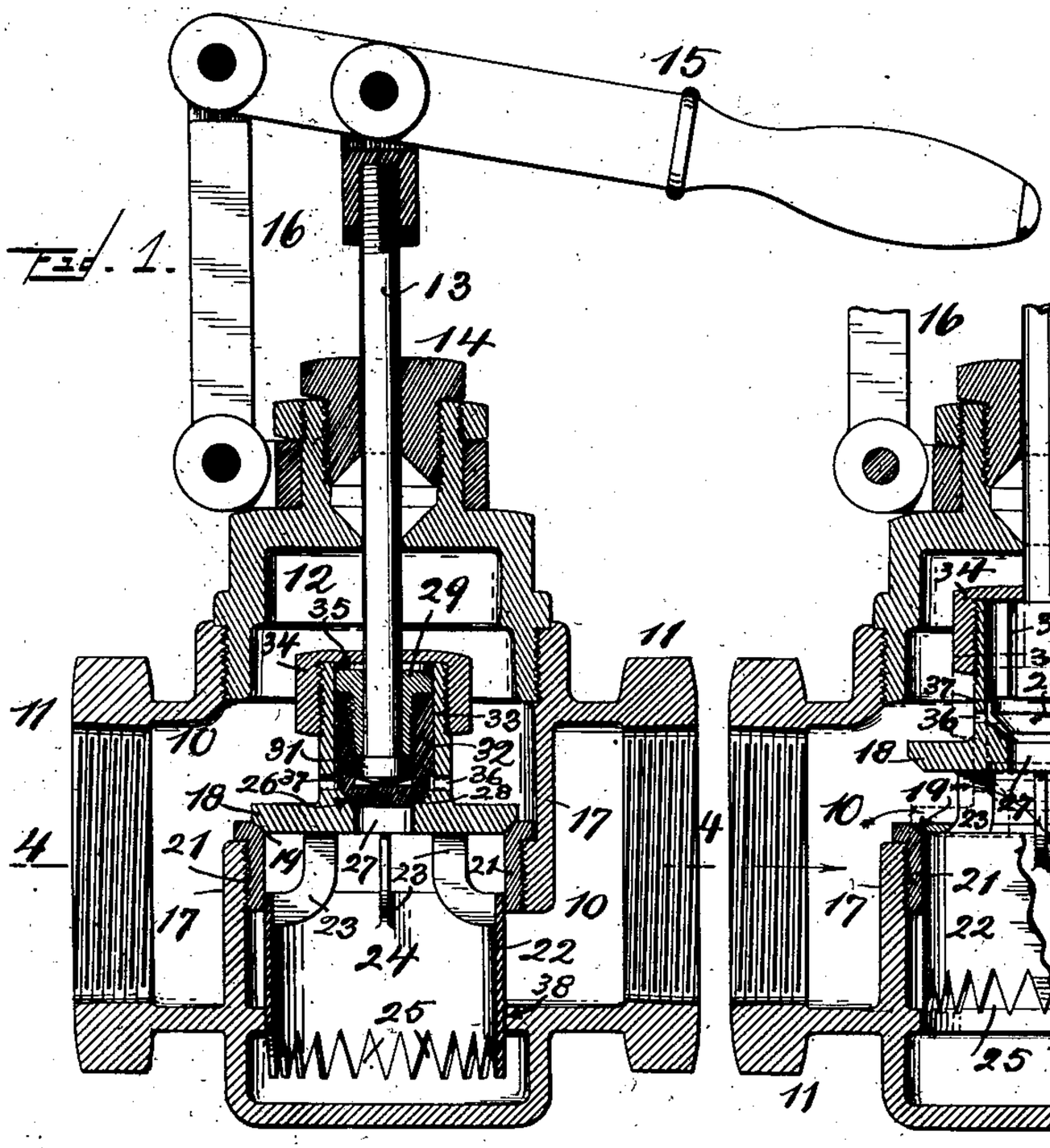


Fig. 2.

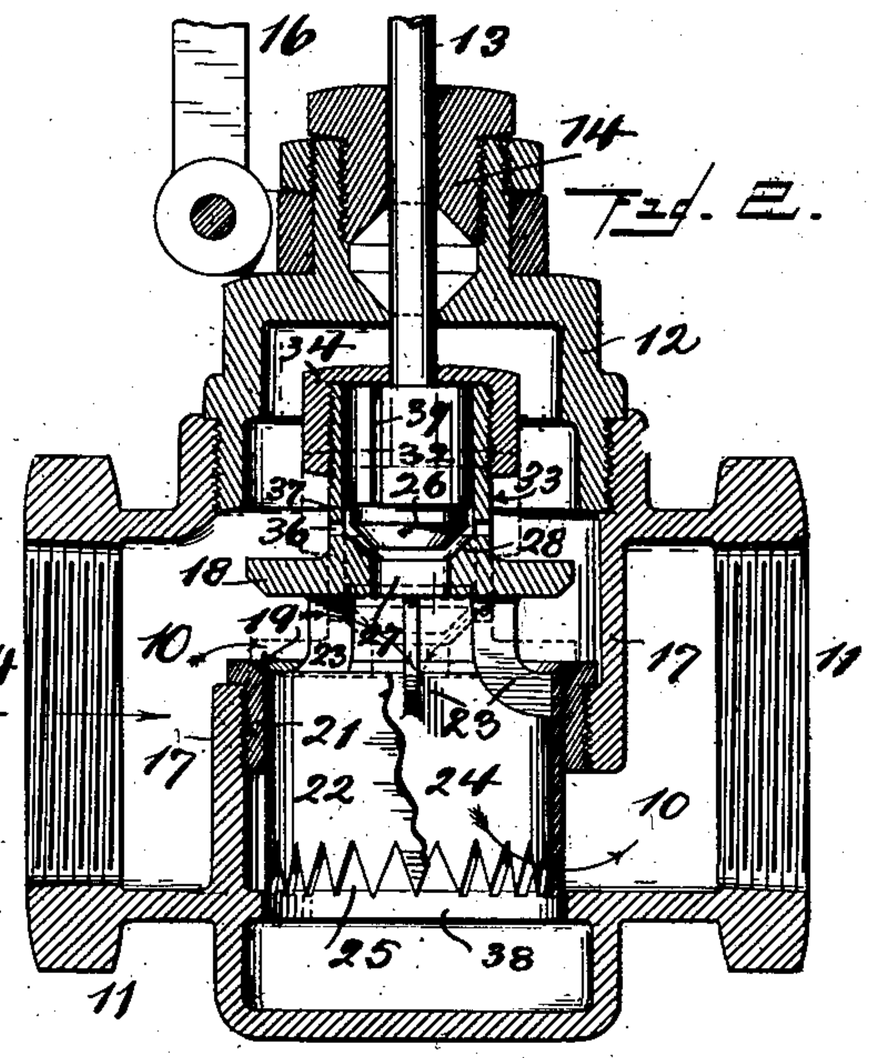


Fig. 3.

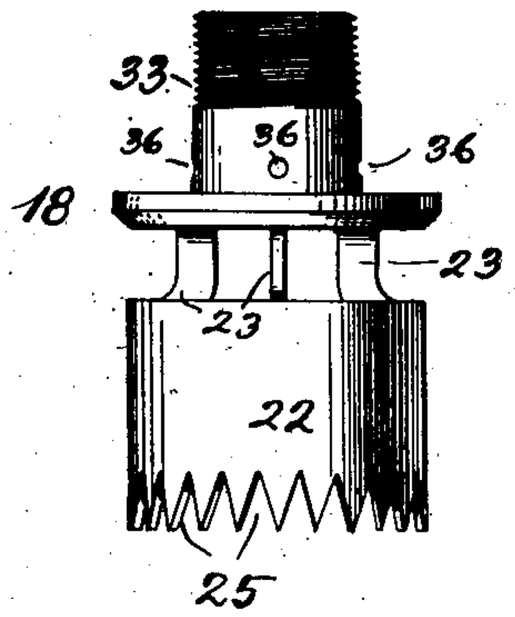
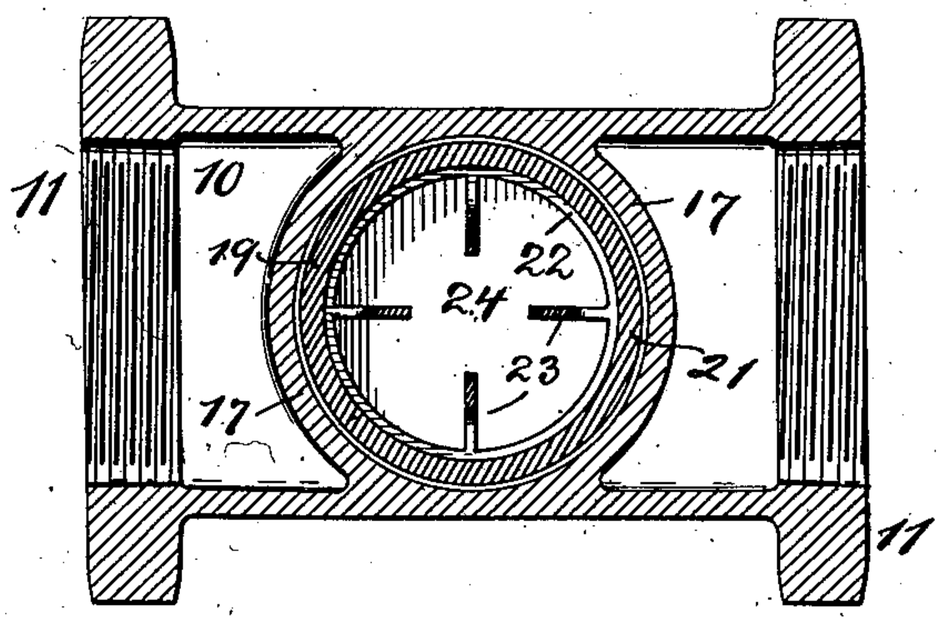


Fig. 4.



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No. 754,547. Patented March 15, 1904.

UNITED STATES PATENT OFFICE.

JOHN DESMOND, OF CINCINNATI, OHIO, ASSIGNOR TO THE WILLIAM POWELL CO., OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

THROTTLE-VALVE.

SPECIFICATION forming part of Letters Patent No. 754,547, dated March 15, 1904.

Application filed August 14, 1903. Serial No. 169,418. (No model.)

To all whom it may concern:

Be it known that I, JOHN DESMOND, a citizen of the United States, residing in the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Throttle-Valves; and I do declare the following to be a clear, full, and exact description thereof, attention being called to the accompanying drawings, with the reference characters marked thereon, which form also a part of this specification.

This invention relates to improvements in throttle-valves of the kind where the valve operates with a sliding movement to and from its seat, the operation being usually by means of a lever-handle.

The leading object of this invention is to so nearly balance this valve by the steam-pressure as to render its operation and control convenient and delicate, permitting also a quick manipulation, if necessary, and prevent all possibilities which would hinder a free and ready movement and easy lift.

Another object is to prevent wear by the eroding and abradive action of the steam, which cuts the metal when such steam at the time the valve is nearly closed rushes through the contracted space in a thin stream or sheet.

The invention consists, therefore, of the particular construction whereby these objects are attained, and to which are added such features of construction which tend to improve the manufacture of the valve in general.

In the following specification, and particularly pointed out in the claims following, is found a full description of the invention, together with its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the valve, showing the same with all parts in their normal—that is, closed—position. Fig. 2 in a similar view shows the same open. Fig. 3 shows the valve proper in side elevation. Fig. 4 is a top view and horizontal section on line 4 4 of Fig. 1.

In the drawings, 10 indicates the usual valve-housing, having customary attaching-nipples 11 11 at each end. At the side it is provided with an opening to permit insertion of the internal parts and access to them thereafter. This opening is closed by a cap 12, which latter contains also the opening through which the valve-stem 13 passes. A customary stuffing-box 14 is provided to prevent leakage where the stem passes through. 15 is the operating-handle connected to the upper end of the valve-stem and pivotally attached by means of a link 16. The interior of the valve-housing is divided in the usual way by partitions 17 17, communication between the divided parts being by a passage through these partitions controlled by a valve 18. This valve is fitted against a seat 19, which by preference is contained in an independent ring secured detachably for renewal to parts of partitions 17. This ring or (if none is used) the corresponding parts of the dividing-partition are of considerable thickness or height, as shown at 21, to afford substantial support and guidance to a cylinder 22, connected so as to form a part of valve 18 and to partake in the movement of the same. This cylinder is open at both ends to permit ingress above and egress below of the steam and for which purpose the connection to valve 18 is by arms 23, which do not interfere with the passage of the steam. This cylinder, in conjunction with adjacent parts of the valve-housing surrounding it, forms a chamber 24, which since it is capable of moving with the valve and for purposes of designating its function I call a "movable" valve-chamber. The lower edge of this cylinder is cut out, as shown at 25, for purposes to be presently explained. The connection of this valve to its operating-stem 13 is not a direct one; but it is by an intermediate or auxiliary valve 26, which valve permits a preliminary admisson of steam to chamber 24, and the construction is such that in operating valve 18 the auxiliary valve is also operated, the operation of this latter, however, slightly preceding the operation of the main valve. In detail this construction is as follows: Valve 18 has an opening 27 connecting with chamber 24 and around which opening a valve-seat 28 is formed for valve 26. This valve consists substantially of two hollow plugs, one,

29, seated on stem 13 and held thereon by a shoulder 31. It is externally screw-threaded and receives the internally-threaded plug 32, which has valve 26 on its lower end and is screwed onto plug 29 against the lower enlarged end of the valve-stem. The auxiliary valve is thus firmly held to the valve-stem. It is held in position for the purpose of guiding it to and from its seat 28 by a housing 33, forming an upward extension of valve 18 and surrounding opening 27 therein. The other—that is, upper—end of this housing is also open to permit insertion of valve 26 and the lower end of the valve-stem, after which, by means of a nut 34, the connection of valve 18 to the valve-stem is accomplished, with auxiliary valve 26 intermediate the two. In order to permit this latter to open, its length or height is such as not to entirely fill the space of housing 33, but to leave a certain clearance below nut 34, as shown at 35. A number of openings forming steam-ports 36 permits communication of the steam side of valve-housing 10 with the interior of chamber 24, subject to control by valve 26. The diameter of this latter opposite the inner end of these ports is somewhat reduced, as shown at 37, to facilitate a quick entrance and passage of steam and distributes the same over the entire area of opening 27.

With the parts thus described their operation is as follows: The first effect of action on handle 15 for the purpose of opening valve 18 is the lifting of auxiliary valve 26, (see dotted lines in Fig. 2,) admitting steam to chamber 24, which being instantly filled by steam causes valve 18 to become balanced, since there is now steam below it as well as on top of it. Further action on handle 15 now causes also valve 18 to leave its seat and become open, which manipulation may be performed free and easy and without any perceptible lifting effort. At the beginning of such opening or immediately before closing and while the opening between the valve and its seat is yet very limited and narrow the action of the contracted and thin stream or sheet of steam forcing its passage through between valve and seat is very severe on them, causing extreme erosion by abrading the metal and cutting into the same. This is avoided by preventing flow of steam while the opening between valve and its seat is yet narrow and deferring such until the valve is well clear of its seat and fairly open, thus preventing the cutting action of the steam on this latter. This is accomplished by the length of cylinder 22, which is such as to prevent escape of steam at its lower end until valve 18 has been raised to a proper height above its seat. Even then the flow of steam is started only gradually, which is due to the serrated cutouts 25 around the lower edge of cylinder 24, and whereby steam is permitted to escape first only through the narrowest part of these cuts, the escape and passage increasing in volume as these gradually-widening cuts are gradually raised above a lip 38, which otherwise closes the lower part of the valve-housing.

There should be communication outwardly from clearance-space 35 to prevent interference by obstruction or vacuum with the operation of auxiliary valve 26. This may be had by an opening in nut 34 and above the upper end of said valve, or a groove 39 may be cut in its side. The same series of actions take place, only in reversed order, when the valve is closed—that is, the lower edge of cylinder 22 intercepts the passage of steam first and before valve 18 has approached its seat and reduced the space between the two so close as to cause the serious effects sought to be obviated.

Having described my invention, I claim as new—

1. In a throttle-valve, the combination of a valve-housing, a main valve therein, a cylinder open at both ends connected so as to move with this valve and forming with adjacent parts of the valve-housing a movable valve-chamber which is normally closed, an auxiliary valve permitting access of steam to this valve-chamber, a valve-stem to manipulate this auxiliary valve and operative connection between it and the main valve whereby by extended manipulation of the auxiliary valve the main valve is also opened.

2. In a throttle-valve, the combination of a valve-housing, a valve, a seat for the same formed by internal parts of the valve-housing, a cylinder open at both ends connected to this valve in a manner to move with the same and fitted against the interior parts of the valve-housing forming in conjunction with them a normally closed, sliding valve-chamber and means to raise the valve off of its seat, and to charge sliding valve-chamber with steam without and before continued manipulation permits such steam to pass out.

3. In a throttle-valve, the combination of a valve-housing, a valve, a seat for the same being formed by internal parts of the valve-housing, said parts being extended below such seat, a cylinder open at its lower end fitted steam-tight into this downwardly-extended part of the valve-seat and attached to the valve in a manner to leave a space between this latter and its open upper end to permit ingress of steam thereat, an internal annular lip fitted around the lower end of this cylinder, which end in the normal or closed position of the valve extends below this lip and means to raise the valve off of its seat.

4. In a throttle-valve the combination of a valve-housing, a valve, a seat formed for the same by internal parts of the valve-housing, which parts are extended below such seat, a cylinder open at both ends fitted into this downwardly-extended part of the valve-housing, arms whereby this cylinder is attached to the under side of the valve and means whereby

both are simultaneously manipulated to permit steam to pass into and through this cylinder.

5. In a throttle-valve, the combination of a valve-housing a main valve therein, a cylinder open at both ends connected so as to move with this valve and forming with adjacent parts of the valve-housing a movable valve-chamber and normally closed by these adjacent parts of the valve-chamber, an opening in this main valve, an auxiliary valve controlling passage through this opening with the movable valve-chamber mentioned, a housing formed in the upper part of the main valve and into which this auxiliary valve is fitted, ports in the housing to admit steam to it, means to manipulate this auxiliary valve and operative connection between it and the main valve whereby this latter may be opened only after the auxiliary valve is open.

6. In a throttle-valve, the combination of a valve-housing a main valve therein, a cylinder open at both ends connected so as to move with this valve and forming with adjacent parts of the valve-housing a movable valve-chamber, an opening in this main valve, an auxiliary valve controlling passage through this opening and into the sliding valve-chamber mentioned, a housing formed on the upper part of the main valve and into which this auxiliary valve is fitted, ports in this housing to admit steam to it, a valve-stem connected to this auxiliary valve, a nut above this latter and fitted to the upper end of the open housing to confine the auxiliary valve therein, thereby connecting also both valves to the valve-stem, there being a clearance-space between this nut and the auxiliary valve permitting for this latter a limited independent movement within its housing and means to manipulate the valve-stem to effect a preliminary admission of steam to the movable valve-chamber to balance the main valve before its opening.

7. In a throttle-valve, the combination of a valve-housing, a main valve therein, a cylinder connected so as to move with this valve and forming with adjacent parts of the valve-housing a movable valve-chamber, a valve-stem having an enlarged end, two plugs having complementary screw-threads fitted onto this valve-stem and which when engaged inclose between them the enlarged end of this latter, the outer or lower one of these plugs forming also a valve, an opening in the main valve which this valve is fitted to close, means to manipulate the valve-stem to open this valve and operative connection between the two valves whereby the main valve is opened by the other valve after this latter has been opened by the valve-stem.

8. In a throttle-valve, the combination of a valve-housing, a valve, a seat for the same being formed by internal parts of the valve-housing, said parts being extended below such seat, a cylinder open at its lower end fitted steam-tight into this downwardly-extended part of the valve-seat and attached to the valve in a manner to leave a space between this latter and its open upper end to permit ingress of steam thereat, an internal annular lip 38 fitted around the lower part of this cylinder, serrations 25 around the lower edge of this latter which edge extends below the lip mentioned and means to raise the valve and its appended cylinder.

In testimony whereof I hereunto set my signature in the presence of two witnesses.

JOHN DESMOND.

Witnesses:
JAMES POWELL,
C. SPENGEL.