

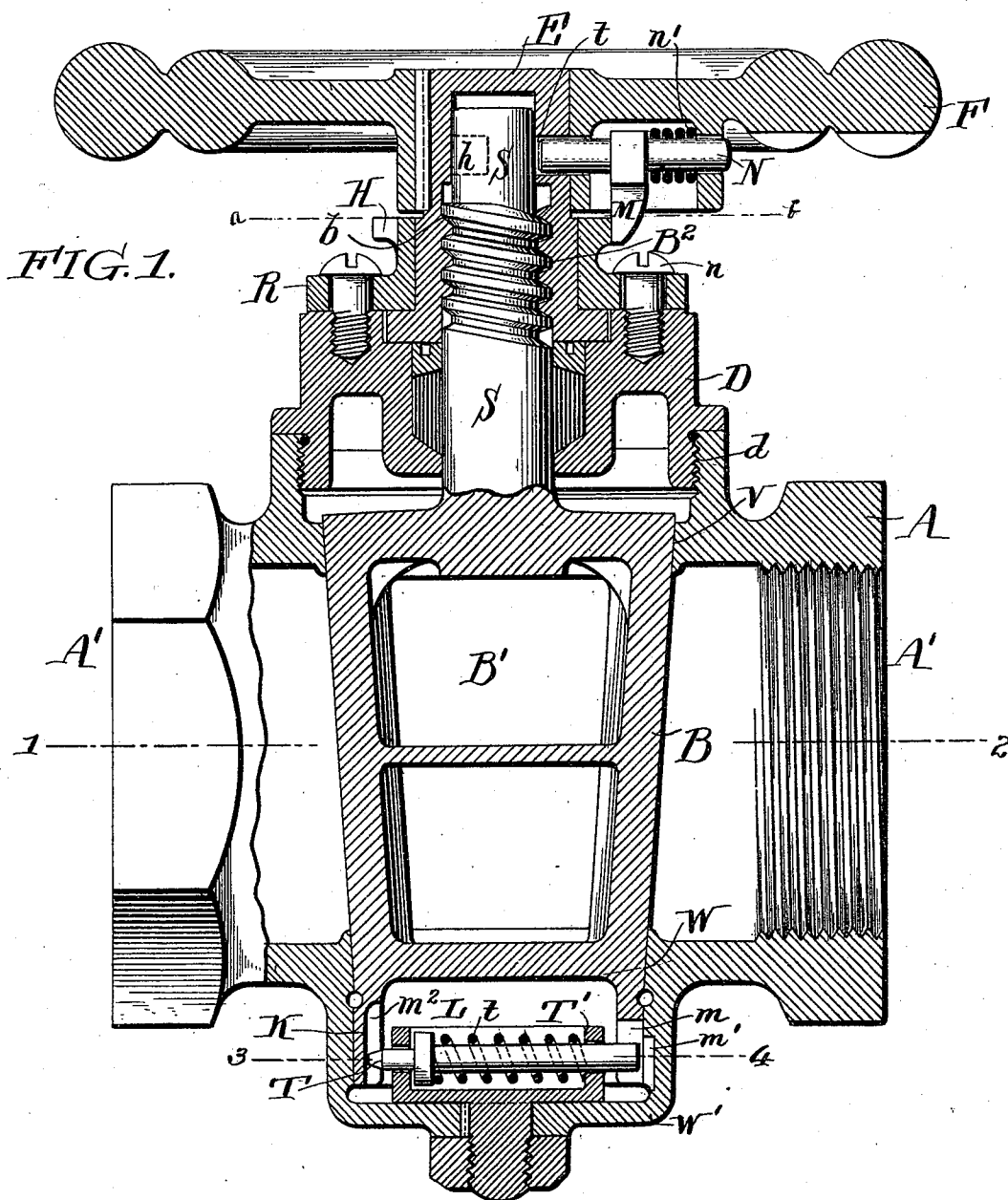
(No Model.)

2 Sheets—Sheet 1.

J. M. COALE.
STRAIGHTWAY VALVE.

No. 511,510.

Patented Dec. 26, 1893.



WITNESSES:

Henry Denny
Chas. Beck

INVENTOR:

Joseph M. Coale
By *Wm. H. Stinson*

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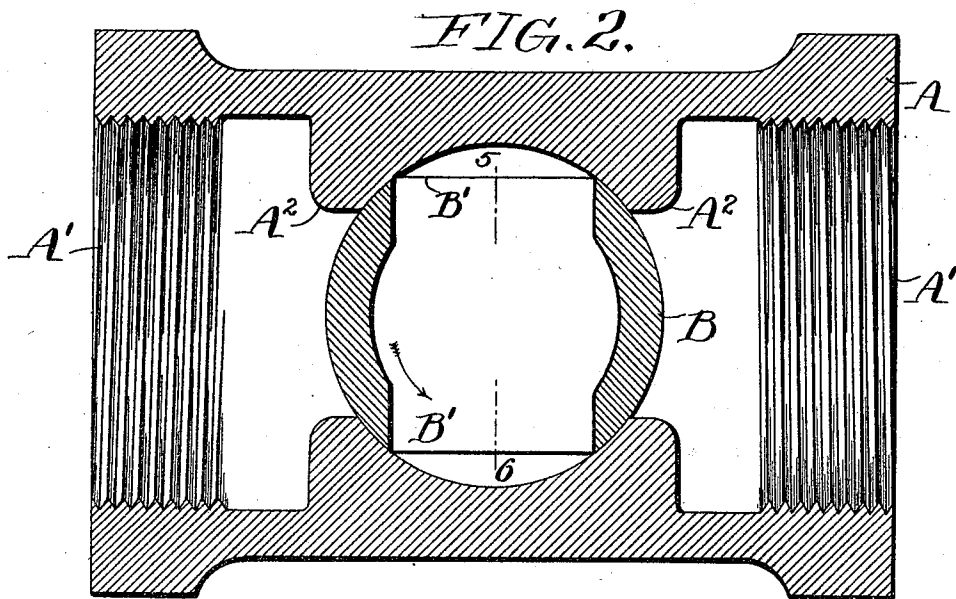


FIG. 3.

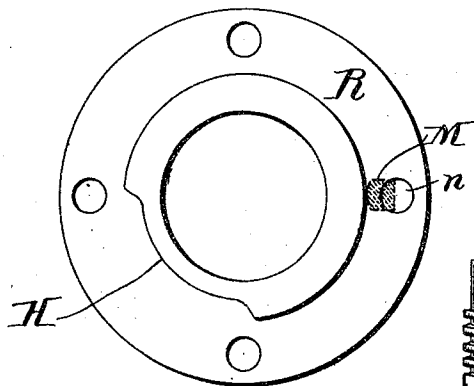


FIG. 4.

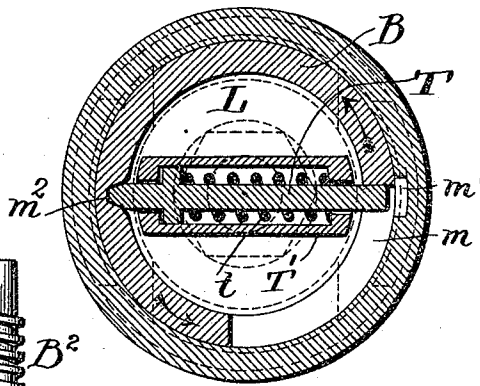
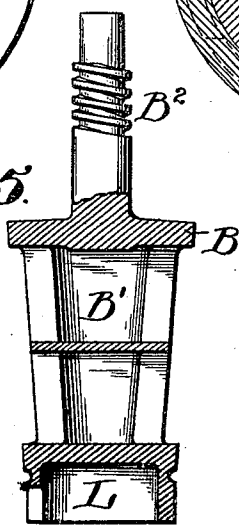


FIG. 5.



WITNESSES:

Henry D. May
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INVENTOR:

Joseph M. Coale
per *W. A. Steadman*

UNITED STATES PATENT OFFICE.

JOSEPH M. COALE, OF BALTIMORE, MARYLAND.

STRAIGHTWAY-VALVE.

SPECIFICATION forming part of Letters Patent No. 511,510, dated December 26, 1893.

Application filed December 20, 1892. Serial No. 455,775. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. COALE, a citizen of the United States, residing in the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Straightway-Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to straight-way valves, and has for its object to provide a valve which will not grind on its seat and will open gradually, and in which the function of the stem or spindle which carries the valve shall be, first by its rotation to raise the valve from its seat without rotation of the valve, and afterward, and by a continuous movement of the stem or spindle, to rotate the valve and gradually bring its ports into register with the openings in the valve case; and for these purposes my invention consists of a casing or shell provided with opposite inlet and outlet openings, and suitable central openings at top and bottom to receive a by-pass valve carried by a suitable vertical spindle, a fixed journal, and a loose sleeve in which said spindle is mounted, a cam ring between said sleeve and housing, a spring-controlled pin mounted in said sleeve, and a recess in the spindle adapted to engage the pin on the rotation of the spindle; and finally a spring controlled rod mounted in the base of the lower central opening of the main casing and adapted to engage with the recess in a cam surface provided therein and operating to regulate or limit the throw of the valve; and in sub-combinations of these several features as hereinafter described and pointed out in the several claims.

In the drawings illustrating my invention, in which similar letters of reference refer to like parts in the several views, Figure 1 is a vertical sectional view of a valve embodying the several features of my invention. Fig. 2 is a lateral section through the line 1—2 of Fig. 1. Fig. 3 is a plan view of the cam ring, on the line *a—b* of Fig. 1. Fig. 4 is a lateral section through the line 3—4 of Fig. 1. Fig. 5 is a vertical sectional view on a reduced scale through the line 5—6 of Fig. 2.

The main casing A is provided with inlet and outlet openings A' A', terminating in inner ends making openings A² A², of smaller diameter; and with top and bottom central openings V, W in which is fitted a valve B preferably of the form of the frustum of a cone to adapt it to open gradually relatively to the inner vertical openings A² in the casing with which the cone shaped openings B' B' of the valve register when the stem or spindle S is rotated. Such stem or spindle S is made preferably integral with the valve B and is screw-threaded at B². Upon the casing A is mounted a journal D, screw-threaded at *d*, to adapt it to be readily secured to the casing A by corresponding screw threads in the latter. The spindle S is mounted within this journal D and also in a loose sleeve E which is keyed to the wheel F. A part of the spindle within this journal is smoothly cylindrical, while its upper portion within the sleeve is screw-threaded. A cam ring R is placed between the journal D and the sleeve E in such manner that it annularly surrounds the sleeve E and is screwed to the journal D by screws *n*, or it may be provided with a downwardly projecting screw threaded flange. The interior portion of the sleeve E is adapted in size to fit the spindle S, and the lower portion of the sleeve is screw-threaded to correspond with screw-threads B² on the spindle S. A recess *h* is provided in the upper end of the spindle S corresponding in size and position to a recess *t* in the upper part of the sleeve E; and corresponding with both in size and position, is a pin N carrying a projection M extending downward to and abutting against the upper peripheral edge of the cam ring R for the purpose hereinafter mentioned. Said pin N is mounted in a recess in the under part of the wheel F; and between the projection M and the surface of the recess in the wheel, is provided a push spring *n'*, so that the tendency of the pin N is to press at all times against the periphery of the spindle S, and also the tendency of the projection M is at all times to press against the upper peripheral edge of the cam ring R. Said cam ring is shown in plan view in Fig. 3 and has a cam surface H on its upper peripheral edge. It will therefore be observed

that when the spindle S is rotated the spring n' will force the pin N into the recess h of the spindle when permitted to do so by the projection M passing upon the cam surface H of the cam-ring R. This is accomplished by about a quarter turn of the wheel.

The bottom central opening W of the valve casing is of considerable depth terminating in a base w' , and the lower end of the valve B is provided with an annular extension K, so that when fitted within the opening W of the casing, there is formed a chamber L, in which is placed a holder T' for a spring rod T controlled by spring t within the holder which is secured to the base W'. The tendency of the point of the rod is outward, and its normal position is within the curved recess m^2 on the inner face of the wall of the valve extension K. A recess m' is provided on the inner surface of the wall of the opening W to allow the end of the rod to recede when forced out of the curved recess m^2 . A portion m of the annular extension K of the valve is cut away, about a quarter section, to allow the end of the spring rod to be moved therein. The length of this opening m regulates or limits the length of turn or opening of the valve.

The operation of the device is as follows: The sleeve being loose, and the valve being held by the point of the rod T in the curved recess m^2 in the valve, a quarter turn of the wheel to which the sleeve is keyed, will raise the screw threaded spindle, until by such partial rotation the projection M will pass onto the cam surface H of the ring R and allow the spring pin N to enter the recess h in the spindle S, thus keying the latter to the sleeve and wheel. Until such action takes place, it is manifest that the first movement of the sleeve and wheel is to raise the spindle and valve and without rotation of them, whereas a continued movement of the sleeve and wheel, after the pin N shall have entered the recess h in the spindle, will be to force the point of the rod T out of the curved recess m^2 , and to rotate the valve, the limit of rotation being governed by the length of the opening m , which is so proportioned relatively to the width of the opening B' of the valve as to bring said conical opening B' into full register with the openings A² in the valve casing.

The conical shape of the valve and the corresponding conical shape of the opening B' therein will result in a gradual opening of the valve, by reason of the openings A² of the valve casing being vertically straight. It will also be observed that a valve and casing so constructed is a close fitting device by reason of the valve being first raised from its seat without rotation before being rotated to open the valve, and this action avoiding the constant grinding and wear of the parts usual in such valves. A further advantage of this construction is the ease and rapidity of opening and closing, a quarter turn being suffi-

cient to close the valve and a three quarter turn to bring it fully down to its seat.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination, forming a straight-way valve, the shell or casing, the valve and its spindle, a loose sleeve embracing the upper end of the spindle, screw threads between the spindle and sleeve, and means whereby the valve may be prevented from rotating on the initial rotation of the sleeve, and means whereby it may be rotated on the continued rotation of the sleeve; substantially as described.

2. The combination with the containing shell A and its valve B, each having openings registering with the other, of a spindle S carrying said valve, a loose sleeve E embracing the upper end of the spindle, screw threads between the spindle and sleeve, a journal D secured to the casing and operating to maintain the sleeve in proper relation to the spindle, means to prevent rotation of the spindle on the initial rotation of the actuating sleeve, and means whereby the valve may be rotated on the continued rotation of the sleeve; substantially as described.

3. The combination of the containing shell and its valve with openings registering with those of the casing, means to limit the rotation of the valve, the spindle carrying said valve having screw threads on its upper end, a loose sleeve with interior screw threads corresponding to those on the spindle, whereby the valve may be raised from its seat without rotation, a journal inclosing the cylindrical portion of the spindle between said sleeve and the valve casing, and a cam ring R between the sleeve and journal and means for rotating the sleeve, the spring-controlled pin N adapted to enter the recesses t and h in the sleeve and spindle respectively; and a projection M adapted to bear against the periphery of the cam ring R; substantially as described.

4. The combination of the valve casing A having inner opposite openings A² and conical shaped valve, a spindle carrying the same, a screw-threaded sleeve embracing the upper end of the spindle and means to retain the valve without rotation on the initial rotation of the sleeve consisting of a spring controlled pin T adapted to enter a recess in an annular extension K of the valve; substantially as described.

5. The combination with the casing A, having a hollow annular extended base W forming a chamber L², a recess m' in the wall thereof, a spring controlled rod T maintained in said chamber, the screw threaded spindle S, the actuating sleeve E, the valve B carried by said spindle provided with an annular extension K and recess m^2 therein, means to limit the rotation of the valve consisting of a circular recess m in the said end K thereof; said rod T being adapted at one end to enter the recess m^2 and at the other end to enter

the recesses *m* and *m'* when brought into register therewith, respectively, substantially as described.

6. The combination with the shell or casing
5 of the valve, its spindle S, the journal D mounted on the casing, a loose sleeve screw-threaded on its interior and actuating wheel F, a spring controlled rod N, a projection M carried thereby, and a cam ring R between
10 the sleeve and the journal whereby the spindle and its valve may be raised within the

sleeve by the initial rotation thereof and afterward rotated by the continued rotation thereof; substantially as described.

In testimony whereof I have hereunto af- 15
fixed my signature this 17th day of December, A D. 1892.

JOSEPH M. COALE.

Witnesses:

GEO. M. DAVIS,
JOS. G. COALE.