

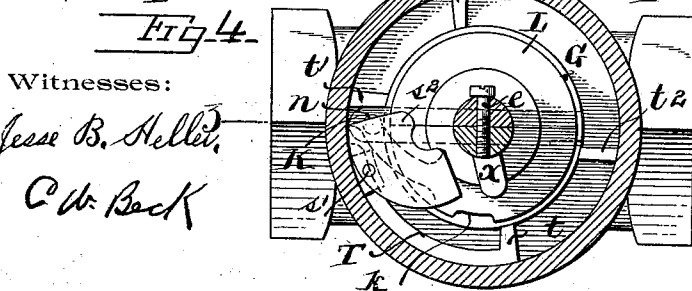
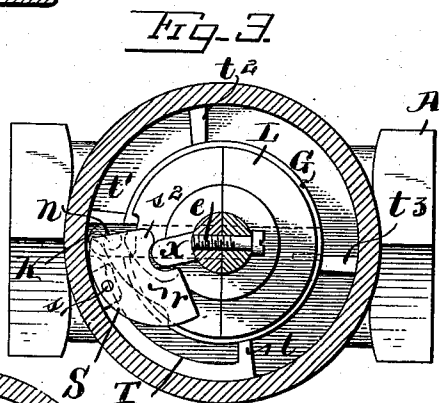
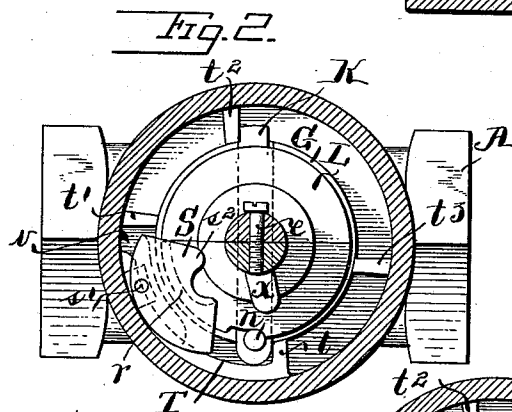
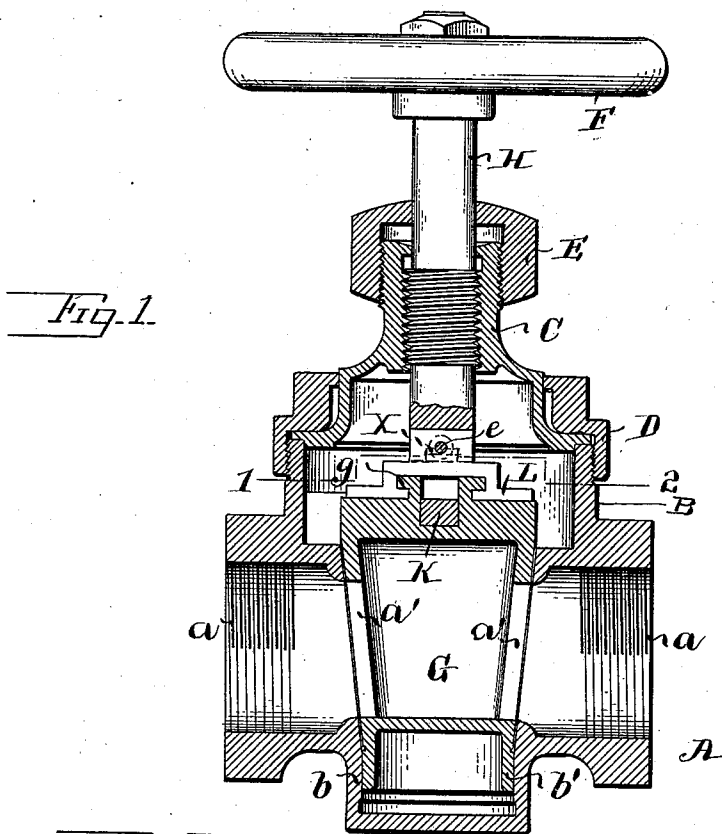
(No Model.)

2 Sheets—Sheet 1.

J. M. COALE.
STRAIGHTWAY VALVE.

No. 543,173.

Patented July 23, 1895.



Witnesses:

Jesse B. Nellis,
C. W. Beck

Inventor.

4 Joseph M. Coale
By M. H. Culver

Attorney.

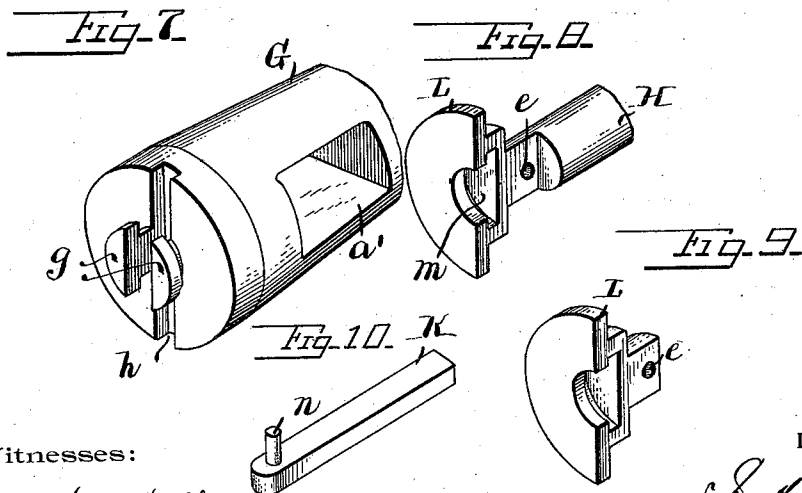
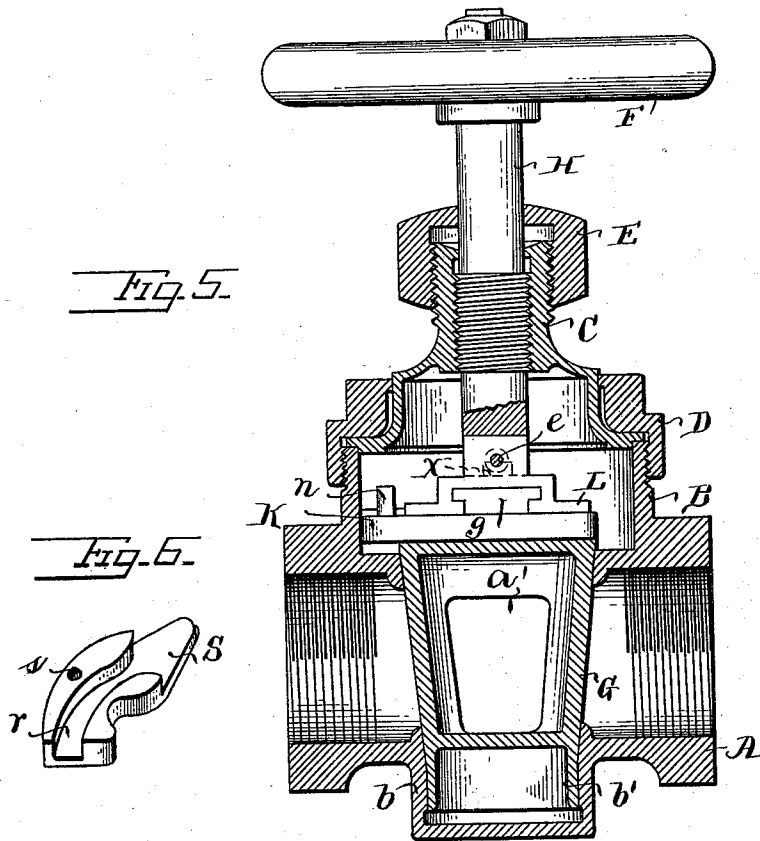
(No Model.)

2 Sheets—Sheet 2.

J. M. COALE.
STRAIGHTWAY VALVE.

No. 543,173.

Patented July 23, 1895.



Witnesses:

Jesse B. Heller,
C. W. Beck

Inventor.

Joseph M. Coale
By *W. H. Hudson*

Attorney.

UNITED STATES PATENT OFFICE.

JOSEPH M. COALE, OF BALTIMORE, MARYLAND.

STRAIGHTWAY VALVE.

SPECIFICATION forming part of Letters Patent No. 543,173, dated July 23, 1895.

Application filed March 23, 1894. Serial No. 504,755. (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 straightway valves; and it has for its object or purpose to provide a valve contained entirely within a casing closed, except at its inlet and outlet ports, and with mechanism operated by the spindle or stem in such manner that the valve shall be raised from its seat without rotation by the initial movement of the stem, and then by a continued movement thereof the valve will be opened to bring its ports in register with the inlet and outlet ports of the casing. A valve having this purpose or object was described in prior patents granted to me, No. 511,510, dated December 26, 1893, and No. 514,180, dated February 6, 1894; but my present invention consists in a novel construction of the top of the shell or casing and of the valve and the valve-spindle; also of the cam mechanism operated by the spindle of the valve and contained within the chamber formed by the annular rim of the casing and above the valve, whereby the valve is raised from its seat at the bottom of the casing by the initial independent rotation of the spindle and then rotated by the subsequent operation of the cam mechanism on the continued rotation of the spindle to bring the valve-ports in register with the inlet and outlet ports of the casing.

In the accompanying drawings, illustrating my invention, Figure 1 is a vertical sectional view of the valve embodying the several features of my present improvements and showing the valve raised from its seat and its ports in line with those of the casing. Fig. 2 is a lateral sectional view through the line 1 2 of Fig. 1, the valve being open as before. Fig. 3 is a like sectional view, but with the valve closed—that is, with its ports not in line with those of the casing—but not screwed down on its seat. Fig. 4 is a like sectional view as Fig. 3, but with the valve fully screwed down onto its seat. Fig. 5 is a vertical sectional

view on the line 3 4 of Fig. 4 with the valve fully resting on its seat. Fig. 6 is a detached elevation of the cam-piece. Fig. 7 is an elevation of the valve and of the collar formed on the head or end thereof. Figs. 8 and 9 are elevations of the divided section of the cap formed on the end of the valve-spindle and surrounding the valve-head collar, and Fig. 10 is an elevation of the cam-operated locking-bar that slides in the groove on the head of the valve.

The shell or casing A is provided with the usual inlet and outlet ports *a a*, adapted to register with the usual ports *a' a'* in the valve G, the casing having a deep hollow base *b*, entirely closed and preferably cylindrical on its interior, adapted to receive and seat the extended cylindrical end *b'* of the valve. The casing is provided on its top with an annular rim B constructed on its interior, as hereinafter described, and within the hollow space formed by this rim the valve-actuating mechanism hereinafter mentioned is located and operates on the stem or spindle thereof. A closing-cap or journal C rests upon the annular rim B of the casing and has a neck end screw-threaded on its exterior to receive screw-nut E and screw-threaded on its interior to register with screw-threads on the valve-stem H. A screw-cap D of appropriate shape secures the closing-cap C to the casing A, the annular rim B whereof is screw-threaded exteriorly for that purpose. The valve-spindle is supplied with an actuating-wheel F or other equivalent device.

The upper or head end of the valve G is provided with a collar *g*, and a groove *h* is milled out diametrically through the head end of the valve (and incidentally through the collar) for the purpose hereinafter mentioned. The lower end of the valve-stem H is provided with an enlarged flat end forming an annular plate L, adapted to rest on the head of the valve, and is made in sections (see Figs. 8 and 9) and recessed at *m* to fit the collar *g* of the valve, the two sections of the stem being fastened by a screw passing through the hole *e*. The collar *g* will turn freely in the recess *m* unless restrained. It is apparent, therefore, that on the initial partial rotation of the valve-spindle H its screw-threads acted upon by those on the interior

of the closing-cap C will cause the valve to rise from its seat, but without rotation.

Mechanism to cause the valve to rotate at the proper time by the continued rotation of the stem is provided as follows: A locking-bar K (see Fig. 10) is adapted to slide freely in the groove *h* of the valve, and it is provided with a pin *n*, adapted to rest in the cam-groove *r* of the cam-piece S, (see Fig. 6,) which is pivoted on the pin *s'*, which enters the hole *s* in the under or grooved side of the cam-piece S. The cylindrical interior of the top of the casing formed by the annular rim B is provided with a rib T, forming a cam-race, terminating in a stop or projection *t* on one end, and, in connection with another stop *t'*, located slightly distant from the end of the rib T to form a recess *w* to receive therein the pin end of the locking-bar K, thus limits the movement or arc of rotation of the locking-bar K, the cam-piece S being pivoted between these stops *t t'* and the pin *n* of the locking-bar K passing into the groove *r* of the cam-piece, as before mentioned, and is thus actuated thereby. Other stops *t²* and *t³* are provided, but are not essential for this purpose, their main function being to guide the valve vertically. This cam-piece S reciprocates in an arc of a circle on the pivot-pin *s'*, its rounded exterior edge conforming to the cylindrical form of the shell and its interior edge being recessed in curved form and to give a projection *s²*, against which the cam-lug *x* may abut to cause it to so reciprocate. This lug is mounted on the valve-spindle just above the divided cap on the end thereof and above the head of the valve. Its location relatively to the other parts is seen more clearly in Figs. 2, 3, and 4.

By reference to Fig. 4 it will be observed that the flat annular end L of the valve-stem has a short cam-groove *k* cut at a point on its periphery, into which the pin *n* of the locking-bar is adapted to pass and enable the valve to be rotated by the valve-stem.

The operation of the device is as follows: In the normal position of the parts with the valve closed and resting on its seat, as shown in Figs. 4 and 5, the spindle H is given a turn to the left, and there being nothing then (in this relation of its parts) to restrain or hinder the collar of the valve from freely rotating within the hollow cap on the end of the spindle the valve is necessarily raised from its seat without rotation by the rise of the spindle within the screw-cap or journal C. Continued rotation, however, of the spindle will bring the cam-lug *x* into register within the curved inner edge of the cam-piece S, as shown in Fig. 3, which will then move in an arc of a circle on its pivot-bearing *s*, and the groove *r* on the under face of this cam-piece (in which groove the pin *n* of the locking-bar is normally situated) will, on any further movement of the spindle, instantly force back the pin *n* of the locking-bar K and, guiding it through its short groove, deliver it at once into

the cam-recess *k* on the peripheral edge of the cam-plate L of the valve-spindle, (see Fig. 2,) the continued movement of which will rotate the valve and bring its parts into full register with those of the casing. A reverse movement of the spindle will bring the parts again into normal position and both close and reseal the valve.

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 containing shell or casing having an annular rim above its ports, a valve mounted in said casing having ports registering with those of the casing, a valve spindle, a cap or journal mounted on said casing, screw threads between the journal and spindle, connecting devices between the spindle and the valve operating to raise the valve but permit of the rotation of the spindle independently of the valve and cam mechanism between the valve and spindle and the rim of the casing, consisting essentially of a horizontally arranged pin or bar adapted to be moved freely in a transverse groove in the head of the valve, devices upon the end of the valve spindle adapted to contact therewith on a further rotation of the spindle, and an eccentrically pivoted cam piece actuated by the final rotation of the spindle and operating to lock the valve thereto and cause it to rotate therewith; substantially as described.

2. The combination with the casing, having inlet and outlet ports, an extended hollow cylindrical base, and an annular rim above the ports; a valve having openings adapted to register with those of the casing, a closing cap or journal secured to the rim of the casing, a valve spindle, screw threads between the journal and spindle, with connecting devices between the spindle and the valve consisting of a collar on the head of the valve and a hollow cap on the end of the spindle adapted primarily to raise the valve while permitting the independent rotation of the spindle, and devices operating to lock the valve to the spindle on the continued rotation of the latter, consisting of a loose horizontal bar adapted to slide freely in a transverse groove in the head of the valve, a pivoted cam adapted to actuate said bar when brought into contact therewith, a lug upon the end of the valve-spindle adapted to actuate the pivoted cam, and a cam recess upon the end of the valve spindle with which the end of the locking bar is arranged to register when actuated by the cam; substantially as described.

3. In combination, forming a straight-way valve, the shell or casing having an annular rim B provided on its interior with rib T, a pin *s'* mounted thereon, stop lugs *t t'* constructed as described to form a recess *w* at one end of the rib, a cam-piece S mounted on said pin; a valve provided with a transverse groove *h*, a locking bar K adapted to slide in said groove and be actuated by the cam piece

5 S, a valve spindle having a projection or lug adapted to actuate the cam piece S and a recess below the same adapted to receive the lug of the locking bar, connecting devices between the valve and its spindle adapted to permit of the rotation of the spindle independently of the valve, a closing cap or journal resting on the annular rim of the casing, and screw threads between the spindle and journal primarily operating independently to raise the valve without rotation, and finally in connection with the cam mechanism described to rotate the valve and bring its ports into register with those of the casing; substantially as described.

10 4. The combination, forming a straight-way valve, of the casing having inlet and outlet ports and an annular rim above said ports forming a chamber for the valve actuating mechanism, a valve mounted on said casing and having ports adapted to register with those of the casing, a closing cap or journal secured to the rim of the casing, a valve spindle, screw threads between the valve spindle and journal, a collar upon the head of the

valve and a transverse groove passing through said head-end and through the collar, a locking bar adapted to slide in said groove and project beyond the end thereof, an enlarged annular end upon the spindle having a hollow interior adapted to fit the collar of the valve, and a recess on its external periphery adapted to receive the lug of the locking bar, a projection upon the spindle above said recess, a rib T and pin s' on the interior of the casing, stop lugs t, t' on each side of said rib arranged to form a recess w between the rib and the lug t' , and a cam piece S adapted to rotate above the said rib and having a recessed inner face and a groove on its under face; said parts being constructed, arranged and operating substantially as described.

In testimony whereof I have hereunto affixed my signature this 28th day of February, A. D. 1894.

JOSEPH M. COALE.

Witnesses:

FRANK W. COALE,
JOS. G. COALE.