

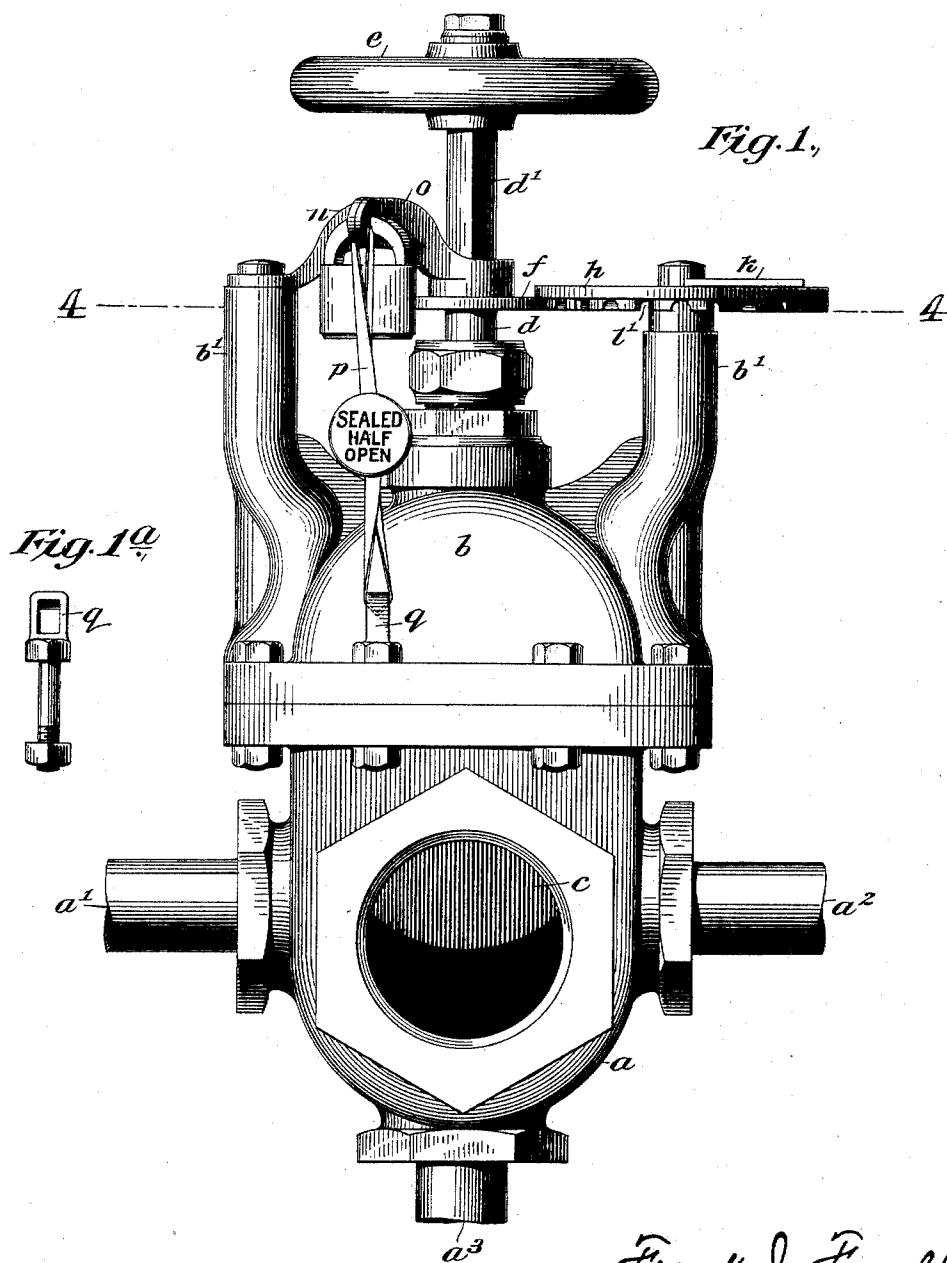
(No Model.)

6 Sheets—Sheet 1.

F. J. FERRELL.
VALVE.

No. 468,242.

Patented Feb. 2, 1892.



Witnesses
C. E. Ashley
J. W. Lloyd.

Frank J. Ferrell
Inventor

By his Attorney
Henry D. Williams

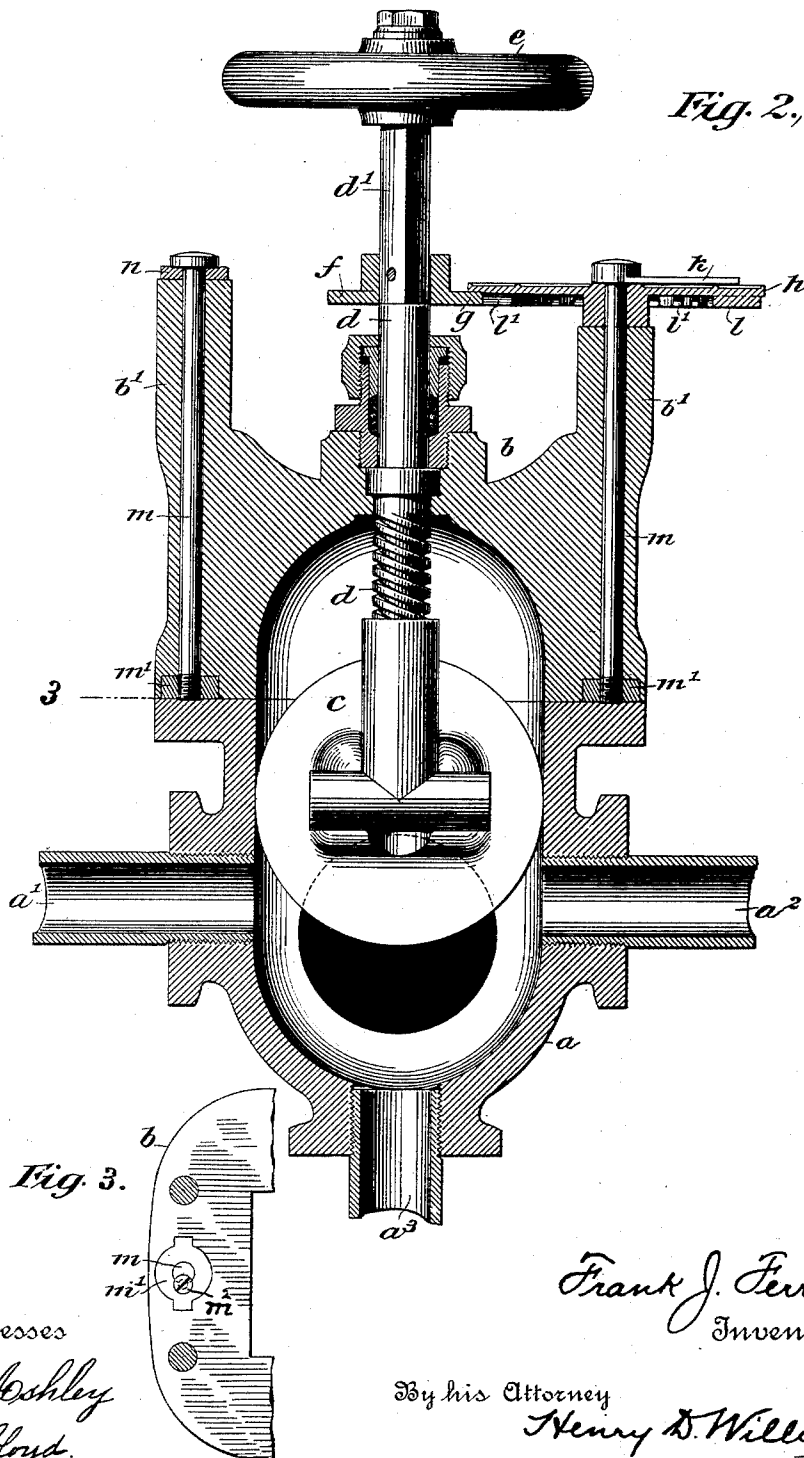
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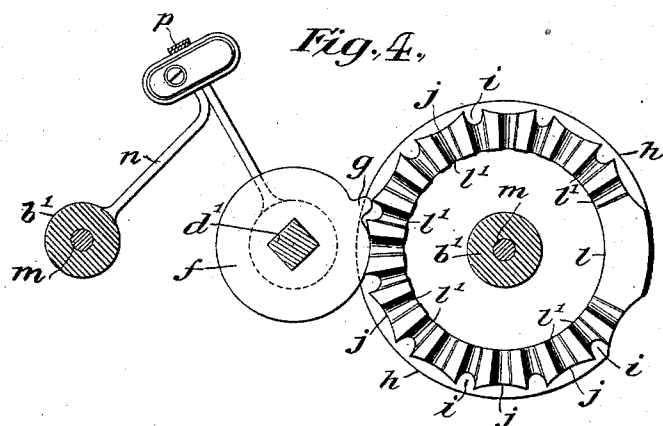
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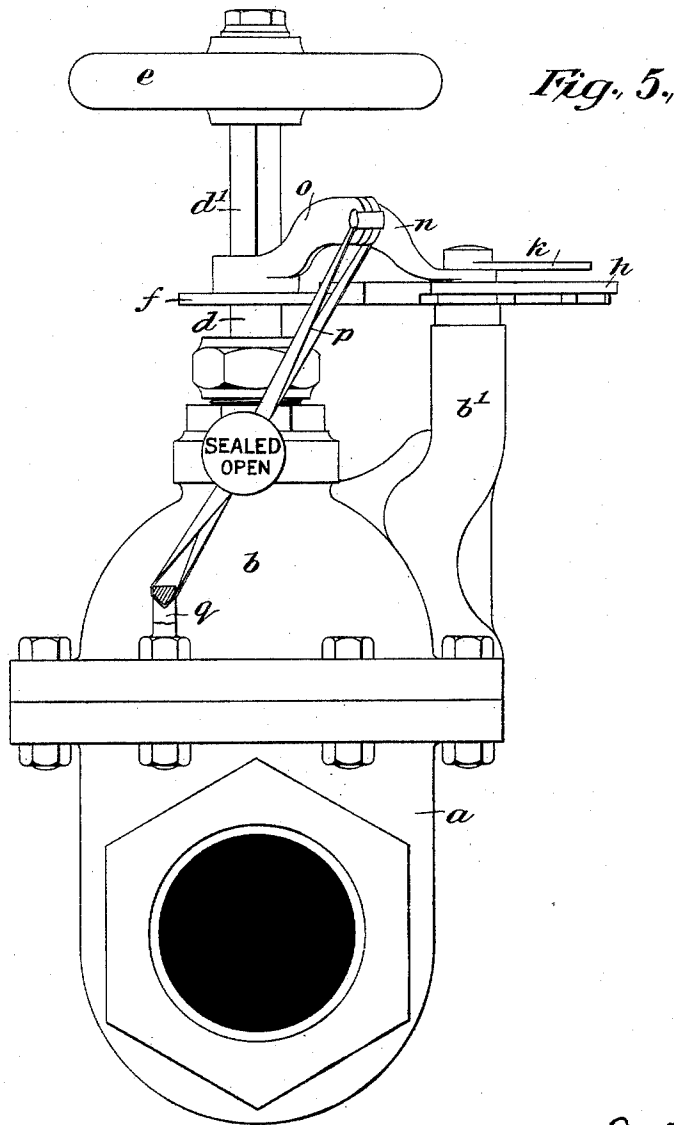
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Frank J. Ferrell

Inventor

Witnesses

C. E. Ashley
H. W. Lloyd.

By his Attorney

Henry B. Williams

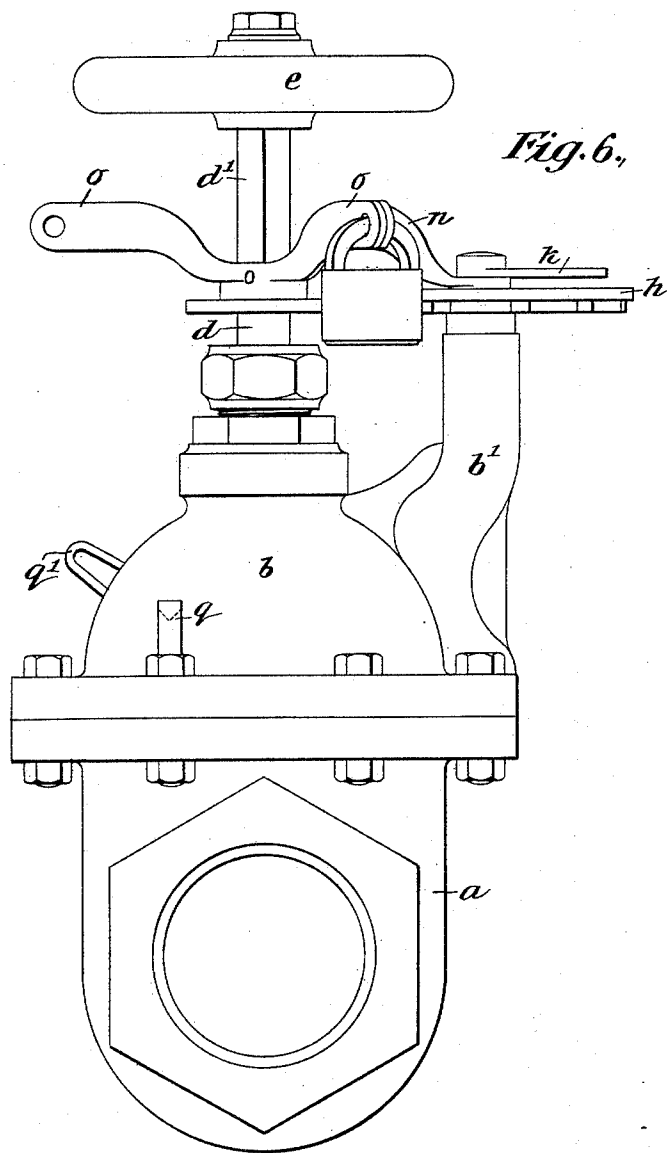
(No Model.)

6 Sheets—Sheet 5.

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Frank J. Ferrell
Inventor

Witnesses
C. E. Ashley
J. W. Lloyd.

By his Attorney
Henry D. Williams

(No Model.)

6 Sheets—Sheet 6.

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Fig. 8.

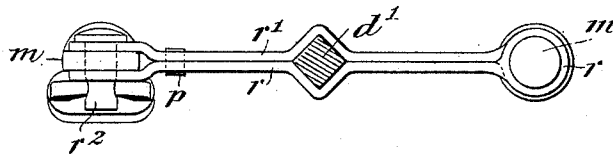
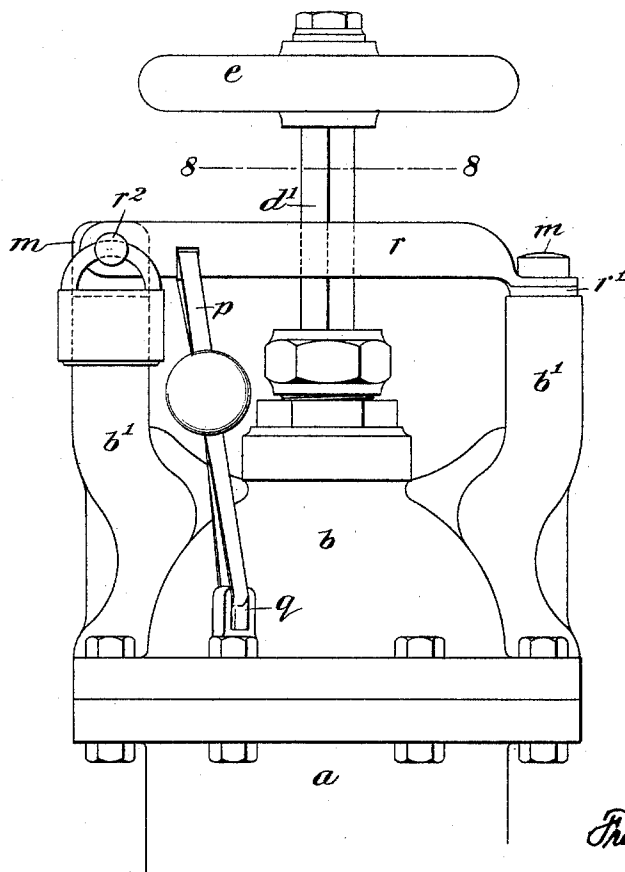


Fig. 7.



Witnesses

C. E. Ashley
Thomas Foley

Frank J. Ferrell
Inventor

By his Attorney

Henry D. Williams

UNITED STATES PATENT OFFICE.

FRANK J. FERRELL, OF NEW YORK, N. Y.

VALVE.

SPECIFICATION forming part of Letters Patent No. 468,242, dated February 2, 1892.

Application filed October 5, 1891. Serial No. 407,685. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. FERRELL, a citizen of the United States, and a resident of New York city, State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification, reference being had to the accompanying drawings, forming part hereof.

This invention relates to valves for checking and controlling the passage of fluids, and has for its object to improve the construction of such valves and the construction and means of attachment of indicating devices for the same and to provide such valves with an improved and effective locking or sealing device for holding the valve in desired position, but which sealing device may be readily severed or disconnected, when necessary, to permit operation of the valve.

In the accompanying drawings, Figure 1 is an elevation of a valve provided with my improvements. Fig. 1^a is a detached view of the knife-edged lug of the sealing device. Fig. 2 is a vertical central section of the valve shown in Fig. 1. Fig. 3 shows a detached horizontal section of the same on the line 3, Fig. 2. Fig. 4 is a horizontal section of the same, taken on the line 4 4, Fig. 1, looking upward. Figs. 5 and 6 are elevations showing modifications in the construction of the locking or sealing device. Fig. 7 is an elevation showing another modification in the construction of the locking or sealing device, and Fig. 8 is a horizontal section of Fig. 7 on the line 8 8 thereof.

In all the drawings the valves are of the gate-valve pattern. The casings are composed of two pieces bolted together—a main part *a*, containing the valve or gate *c*, the ports, and fluid-passages, and a bonnet *b*, supporting and guiding the operating-stem *d* of the valve. The lower portion of the valve-operating stem *d* is screw-threaded and works within a counterpart thread formed in the gate or valve *a*. The middle portion of the valve-operating stem *d* is fitted to rotate only within a stuffing-box of usual construction, or may be otherwise held so as to produce a water or steam tight joint. A portion *d'* of the valve-stem *d*, which extends outside of the stuffing-box, is formed of square cross-section, so that the indicating and sealing and locking de-

vices may be readily connected with the valve-stem to rotate therewith or to prevent rotation thereof. At the extreme outer or upper end of the valve-stem *d* is secured thereon an operating hand-wheel *e*.

In Figs. 1 and 2 I have shown a five-way construction of valves. Three pipes *a'*, *a''*, and *a'''* are tapped into the valve-casing *a* at some place beyond the inlet-port of the valve. As shown in Fig. 2, the inlet-opening is at the back of the valve. The three pipes *a'*, *a''*, and *a'''*, together with the outlet-opening at the front of the valve, make four outlets, all of which are opened to the inlet by opening the valve, and the valve has five ways in all, one inlet and four outlets.

My improved indicating device, as illustrated in Figs. 1, 2, 3, and 4, is of the same general construction as that embodied in my former application filed December 9, 1890, under Serial No. 374,014, comprising a disk *f* upon the valve-stem, said disk having a tooth *g* projecting therefrom, a rotatable indicating-plate *h*, provided with the usual indicating-marks upon its upper surface and provided on its lower surface with grooves *i*, meshing with the tooth *g* on the valve-stem *d*, and the concave faces *j*, engaging with the disk *f* on the valve-stem *d*, to hold the indicating-plate from rotation when the tooth *g* and a groove *i* are not in engagement, and the fixed pointer or index *k* above the indicating-plate *h*, the position of the indicating-plate in relation to the fixed index showing the position or amount of opening of the valve. The parts of the indicating device, as above described, are set forth and claimed in my above-mentioned application and not claimed herein. My present improvements relate to the construction of the grooves and concave faces and adjacent parts. In the practical use of my indicating-valves it often happens that they remain inactive for long periods of time and become coated with dust and dirt; and the classes of valves of which this is most usually true—such as fire-hydrant valves—are required in cases of emergency, as when a fire is imminent or progressing, and it therefore is very essential that the construction of the valve will permit it to be at once operated despite its long period of disuse. If the grooves *i* and concave faces *j* become clogged

with dust so that they will not engage with their counterparts—the tooth *g* and disk *f*—then the operation of the valve will be seriously affected. To prevent any possibility of the clogging of these parts, I form them upon an annular ring *l*, projecting downward from the indicating-plate *h*, and cut-away portions of this annular ring at the middle portions of such concave faces and at the grooves *i*, so as to form openings extending radially through such annular ring and so as to leave in their full dimensions the end portions of each concave face *j* and the projecting points on each side of each groove *i*. In the operation of the valve any clinging dust or dirt will be quickly pushed off from these full portions and pushed through the openings or otherwise removed, so as not to clog or impede the meshing of the parts of the indicating device and the opening or closing of the valve.

The disk *f* is mounted upon the squared portion *d'* of the valve-stem *d*, and is held in place by a pin or otherwise. The indicating-plate *h* is shaped so that the valve-stem may be taken out without removing the indicating-plate. This is provided by continuing upward through the plate *h* the contour of the last concave face *j* that meshes with the disk *f* in the closed position of the valve, so that when the valve is in closed position the valve-stem *d* may be readily lifted out of its bearings in the valve.

The indicating-plate *h* is rotatively mounted upon a rod *m*, and the fixed index *k* is secured to or formed at the upper end of said rod and forms a head to hold the indicating-plate in place. When my entire invention is employed, two of these rods *m* are provided, the one shown at the right in Figs. 2 and 4 supporting the indicating-disk and the one at the left in said figures supporting an arm of the locking and sealing device. These rods *m* are held in the bonnet *b*, a projecting boss *b'* being formed on the bonnet for each rod *m*, extending upward a sufficient distance to provide a support for the devices mounted upon such rods *m*. These rods extend downward to the bottom of such bonnet, and each is provided at its lower end with a nut *m'*, fitting in a recess or socket at the lower face of such bonnet so that its outer face is flush with or is depressed within the lower face of such bonnet, and the nut is thus countersunk within the bonnet. One of these nuts *m'* is shown in Fig. 3, such figure affording an underneath view of a portion of the lower face of the bonnet. The nuts *m'* are shaped so that they will not rotate when within the bonnet, and this is preferably accomplished by wings or projections on the sides of the nuts, as shown in Fig. 3. In assembling the various parts the rods *m* are inserted through the parts shown at their upper ends, then through the holes in the bonnet. The nuts *m'* having been placed in their sockets in the bonnet, the rods *m* are screwed down into them. When the rods are in desired posi-

tion, small screw-pins *m²* are tapped and screwed into the rods and nuts, so as to effectually prevent further rotation of the rods *m*. One of these screws *m²* is shown in Fig. 3. The assemblage of parts is completed by bolting together the bonnet *b* and main part *a* of the casing. The nuts *m'* and screws *m²* are thus effectually concealed and protected and the rods *m* and their attached parts held in place and accidental dislodgement thereof absolutely prevented.

The upper end of the rod *m* (shown at the left of Fig. 2) is provided with a head, and between this head and the boss *b'* is held the arm *n*, which forms a part of the locking and sealing device. The arm *n* is curved upward and at its end is formed a vertically-arranged perforated staple. Another arm *o* is mounted upon the valve-stem *d*, preferably projecting from and forming part of the boss of the disk *f*, and this arm *o* is also curved upward and has formed at its end a vertically-arranged perforated staple. The arm *o* is so constructed that its end will come against the end of the arm *n*, and the staples on the arms *n* and *o* will fit alongside of each other when the valve is in a predetermined position, as in the half-open position shown in Figs. 1 and 2. The valve may be held in such position by means of an ordinary lock alone, as shown in Fig. 6, or by my improved severable sealing device alone, as shown in Fig. 5, or by both the lock and the sealing device, as shown in Fig. 1.

In my improved sealing device a tape *p*, or a cord or other strong but severable connecting-piece, passes through the eyes of the staples at the ends of the arms *n* and *o* and passes over a knife-edged lug *q*, (shown detached and in side elevation in Fig. 1^a), secured to or cast upon the casing of the valve, and its ends are brought together and sealed in a suitable manner, so that the ends cannot be separated without breaking the seal. The knife-edge of the lug *q* is closed, so that the tape cannot be removed therefrom by cutting the tape or breaking the seal. This knife-edge is not sufficiently sharp to cut the tape under ordinary conditions; but in cases of emergency a heavy intentional strain will cause it to cut the tape and thus release the valve, and the valve may then be readily operated, the arm *n* readily turning on the rod *m*, so as to permit the arm *o* and valve-stem *b* to be rotated. When the tape has been thus severed, it is of course impossible to reunite it so as to conceal the break, and the inspector is thus provided with a certain means of knowledge of any operation of the valve. If a lock is also attached, as in Figs. 1 and 4, it is of course necessary to remove the lock before operating the valve. The lock will effectually prevent accidental operation of the valve under heavy strain or tampering with it by those not in charge; but the seal is the effective device to notify the inspector that the valve has been operated.

In Figs. 1 and 1^a the knife-lug *q* is formed upon one of the bolts that hold the bonnet *b* and main part *a* of the casing together, and this is the preferred construction; but it may be formed directly upon the bonnet *b*, as shown in Fig. 6, (lettered *q'*), or formed upon or secured to any convenient part of the casing.

It is often desirable to construct the valve so that it may be locked or sealed in two positions, as in open and closed positions, or even in three or more positions. This is provided by increasing the number of arms *o* on the valve-stem. In Fig. 6 two such arms are shown, one being employed in locking or sealing the valve in tightly-closed position (in which position the valve is shown locked in Fig. 6) and the other being employed to lock or seal the valve in wide-open position. The weight of my improved valve may be reduced and the construction to some extent simplified by mounting the arm *n* upon the same rod *m* that holds the indicating-plate *h*, as shown in Figs. 5 and 6, thereby requiring but one rod *m* for both indicating and locking and sealing devices. For some purposes this construction will be best adapted, while for other purposes the construction shown in the main views of the drawings—that is to say, with two rods *m*, one for the locking or sealing and the other for the indicating device—will be employed, as in the latter construction there is no obstruction above the indicating-disk *h*, and the indication may be read at a glance when the valve is sealed or locked and sealed.

In the modification of the locking and sealing device illustrated in Figs. 7 and 8 two arms *r r'* are fitted one above the other on the right-hand rod *m* and are bent so as to fit side by side and to surround and hold the squared portion *d'* of the valve-stem *d* and to fit one on each side of the left-hand rod *m*, the upper portion of such left-hand rod *m* being flattened to form a staple and having a pin *r*², passing therethrough and through the ends of the arms *r r'*. A lock is secured at the end of such pin *r*². A sealing-tape *p* passes through slots in the arms *r r'* and over a knife-lug *q*. The arms *r r'* are thus locked and sealed and firmly hold the valve in desired position and prevent its being moved therefrom without unlocking the lock and breaking the seal.

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

1. The combination, with a valve, its operating-stem, and its casing, such casing having two parts—a main part containing the valves, ports, and fluid-passages and a bonnet supporting and guiding the operating-stem—of a boss projecting from said bonnet and integral therewith, a rod passing through and projecting out of said bonnet and boss thereon and held at its inner end by a nut countersunk within the bonnet at the juncture of such bon-

net and the main part of said casing, and a rotatable device fitted upon the outer end of such rod and connected with the operating-stem of the valve, substantially as set forth.

2. The combination, with a valve, its operating-stem, and its casing, such casing having two parts—a main part containing the valves, ports, and fluid-passages and a bonnet supporting and guiding the operating-stem—of a boss projecting from said bonnet and integral therewith, a rod passing through and projecting out of said bonnet and boss thereon, a nut on the inner end of said rod, countersunk within the bonnet at the juncture of said bonnet and the main portion of the casing, a pin passing through the nut and rod to hold the rod from rotation, a fixed index formed upon the outer end of said rod, and an indicating-disk rotatively mounted upon the outer end of said rod and meshing with the operating-stem of the valve, substantially as set forth.

3. The combination, with a valve, its operating-stem, and its casing, such casing having two parts—a main part containing the valves, ports, and fluid-passages and a bonnet supporting and guiding the operating-stem—of a boss projecting from said bonnet and integral therewith, a rod passing through and projecting out of said bonnet and boss thereon and held at its inner end by a nut countersunk within the bonnet at the juncture of such bonnet and the main part of said casing, a fixed index formed upon the outer end of said rod and an indicating-disk rotatively mounted upon the outer end of said rod, another boss projecting from such bonnet and integral therewith, a rod passing through said boss and projecting out of said boss and held at its inner end by a nut countersunk within the bonnet at the juncture of such bonnet and the main part of the casing, an arm on the outer end of such rod, an arm secured to and projecting from the valve-operating stem and adapted to meet said arm on the casing at a predetermined position of the valve, and a device for holding together the arms of the casing and of the valve-stem, substantially as set forth.

4. The combination, with a valve and its casing, of the valve-operating stem having a portion thereof projecting outside of the casing of square cross-section, a locking-arm, an operating-wheel, and an indicating device mounted upon such squared portion of the valve-operating stem, substantially as set forth.

5. The combination, with a valve, its casing, and operating stem, of an arm mounted upon the casing, another arm attached to the valve-stem and arranged to meet the arm on the casing when the valve is in predetermined position, a projecting lug upon the valve-casing, having a knife-edge, and a severable holding device passing over such knife-edge and around the arms of the stem and casing to seal the valve in desired position, substantially as set forth.

6. The combination, with a valve, its casing, and a rotary valve-operating stem, of a disk on the valve-stem and a projecting tooth on said disk, a fixed index, a rotatable indicating-plate, an annular rim on the indicating-plate, gearing-grooves, and concave faces formed along the outer periphery of such annular rim, said grooves meshing with the tooth on the valve-stem and said concave faces engaging with the disk on the valve-stem, and said annular rim having grooves formed therein extending inward from said gearing-grooves and from the centers of said concave faces, substantially as set forth.
7. The combination, with a valve, its operating-stem, and its casing, such casing having two parts—the main part *a* and the bonnet *b*—of the boss *b'* upon said bonnet *b*, the rod *m*, passing through the said bonnet and boss, the nut *m'* on the inner end of said rod *m* and countersunk within the bonnet *b* at the juncture of said bonnet and the main part *a* of the casing, the screw-pin *m*², held between the nut *m'* and rod *m*, and rotatable devices mounted upon the outer end of the rod *m*, substantially as shown and described.

8. The combination, with a valve, its operating-stem, and its casing, such casing having two parts—the main part *a* and the bonnet *b*—of the two bosses *b'* upon said bonnet *b*, the two rods *m*, passing through the bonnet, one of said rods *m* projecting out of each boss *b'*, the nuts *m'*, one on each rod *m*, each nut *m'* being countersunk within the bonnet *b* at the juncture of said bonnet *b* and the main part *a* of the casing, and the screw-pins *m*², one held between each rod *m* and its nut *m'*, and an indicating-disk rotatively mounted upon the outer end of one of said rods *m* and meshing with the valve-stem and an arm rotatively mounted upon the outer end of the other of said rods *m* and arranged to fit against an arm on the valve-stem, and devices for holding together said arms on the rod *m* and on the valve-stem, substantially as shown and described.

FRANK J. FERRELL.

Witnesses:

THOMAS FOLEY,
HENRY D. WILLIAMS.