(No Model.)

J. POWELL.

STRAIGHTWAY VALVE.

No. 534,004. Patented Feb. 12, 1895.

FIG. 1.

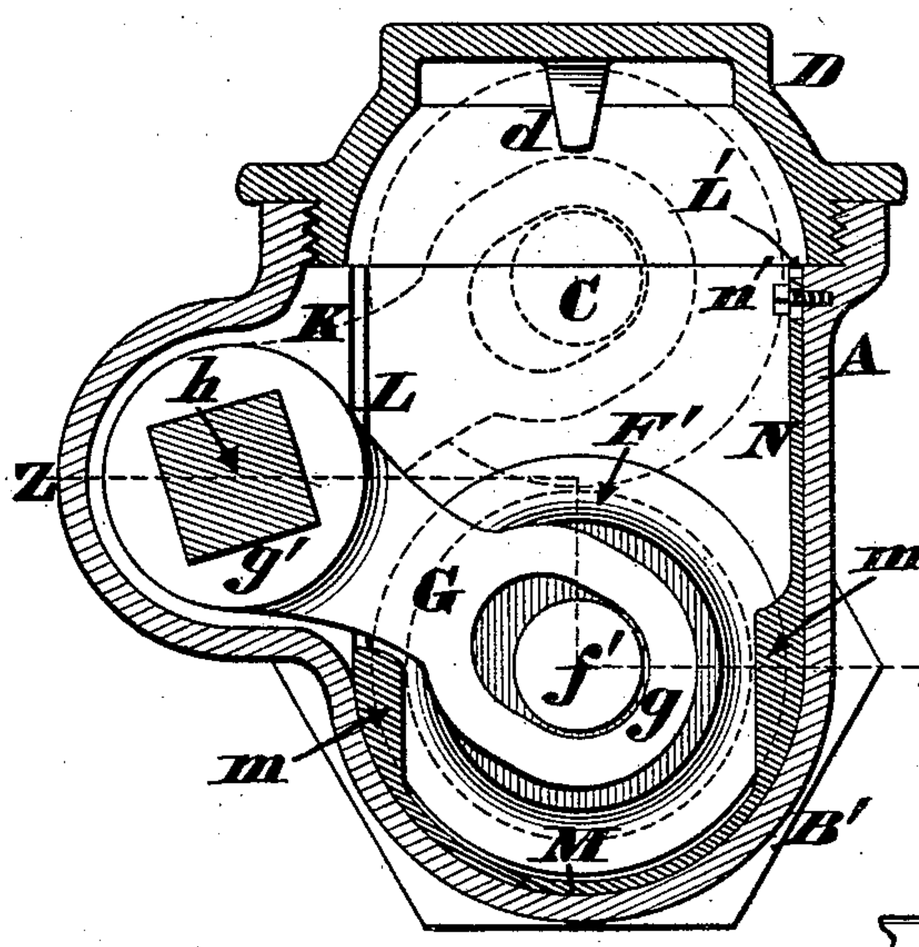


FIG. 2.

FIG. 3.

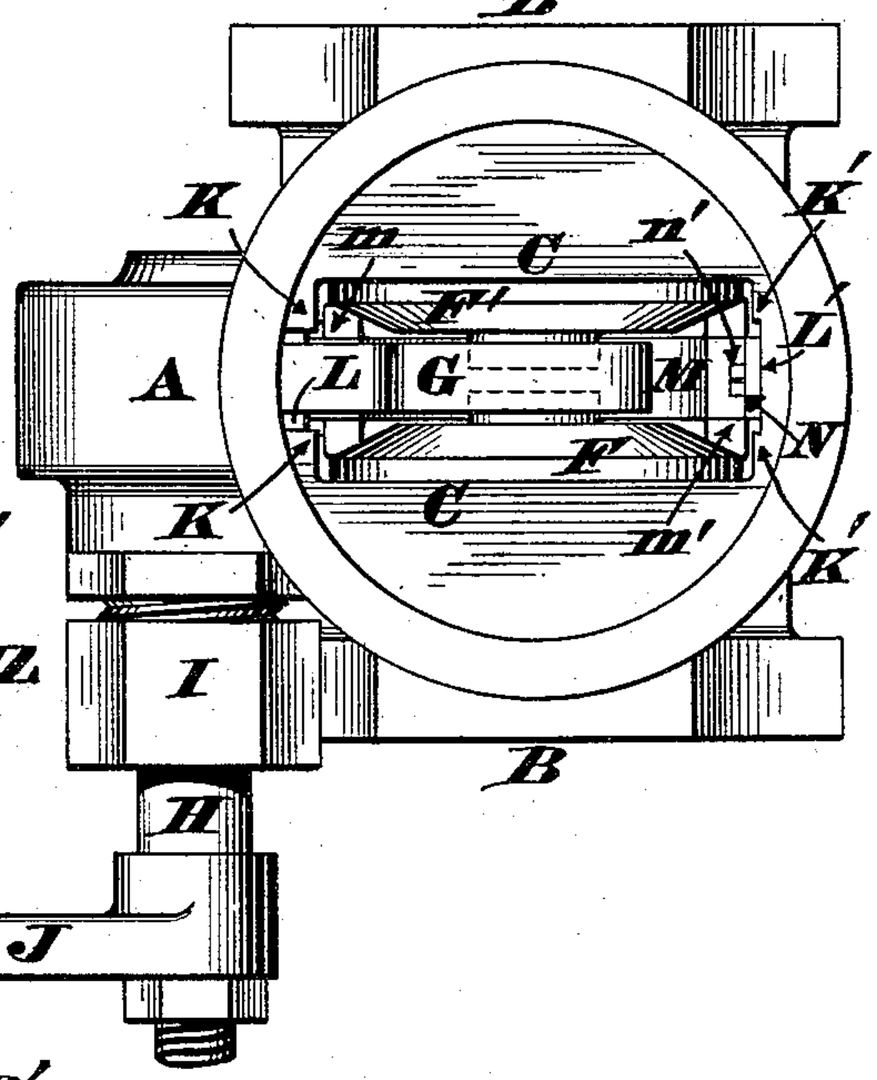
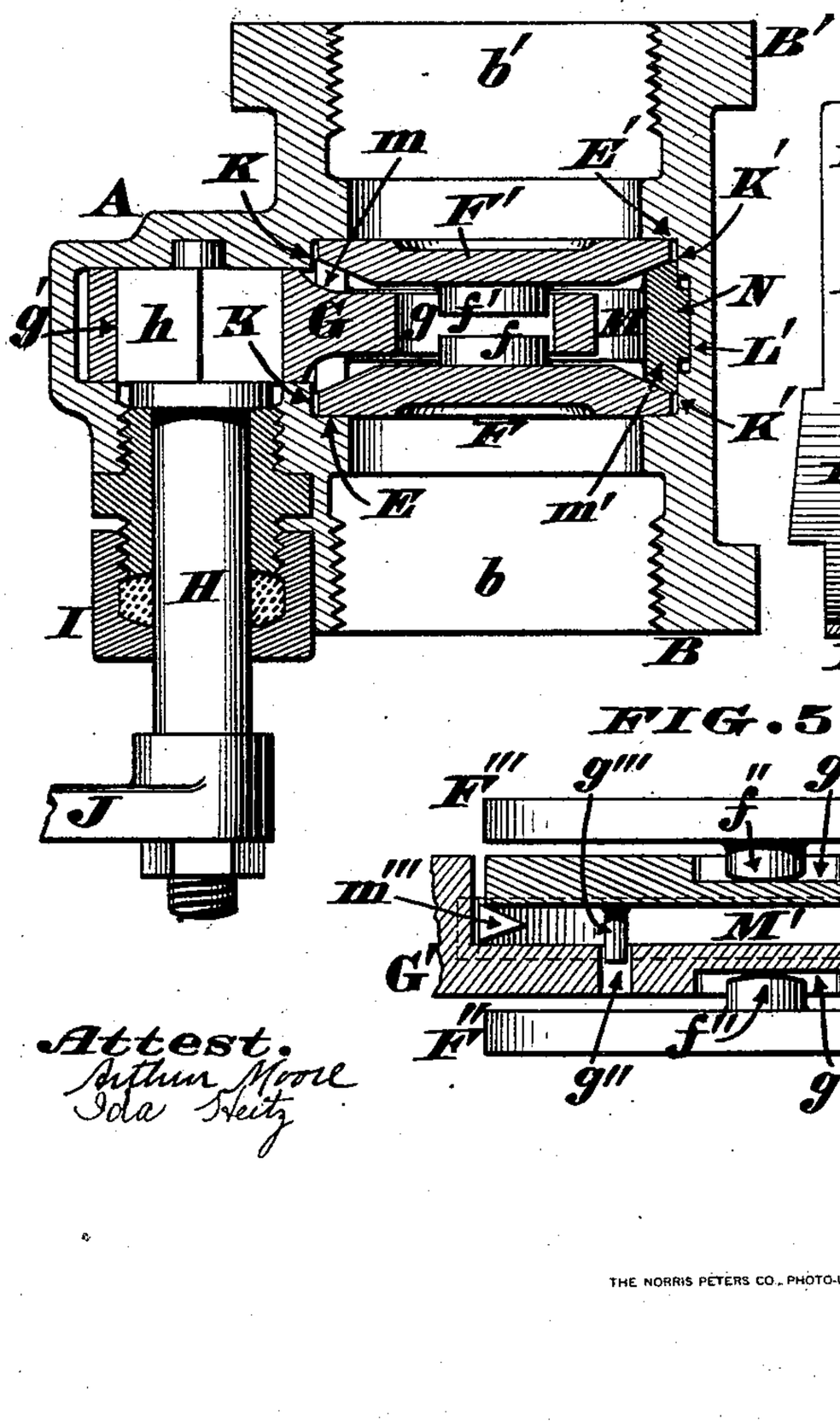


FIG. 4.



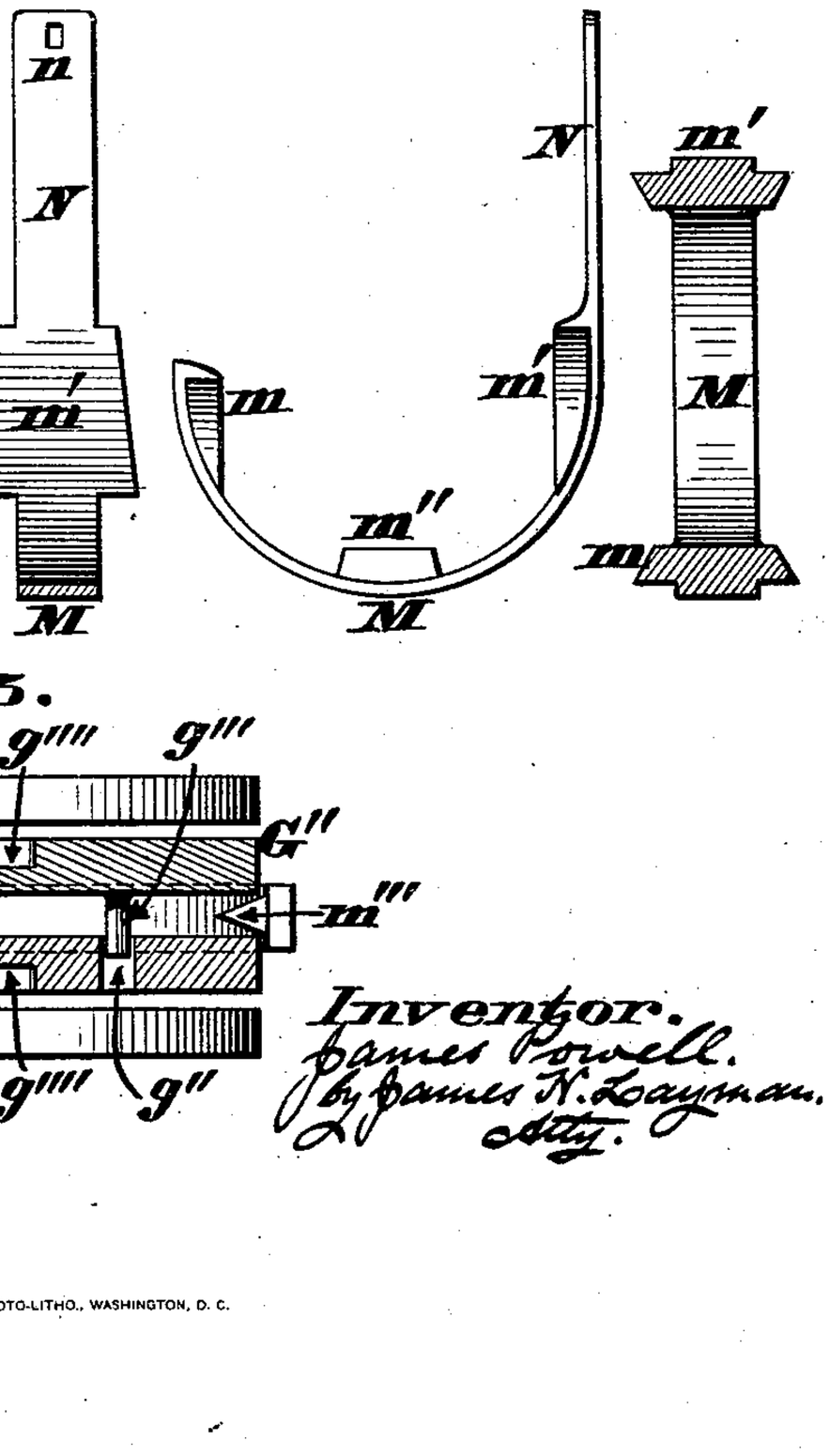


FIG. 5.

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UNITED STATES PATENT OFFICE.

JAMES POWELL, OF AVONDALE, OHIO.

STRAIGHTWAY VALVE.

SPECIFICATION forming part of Letters Patent No. 534,004, dated February 12, 1895.

Application filed May 21, 1894. Serial No. 511,923. (No model.)

To all whom it may concern:

Be it known that I, JAMES POWELL, a citizen of the United States, residing at Avondale, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Straightway Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form part of this specification.

This invention relates to those straight-way valves which include a pair of disks loosely coupled to a vibrating lever operated by a rock-shaft having an external handle, and my improvement comprises a novel combination of devices which compels such disks to be held very firmly against their seats when the valve is closed.

It has been customary, heretofore, in valves having disks operated by a swinging lever and rock-shaft, to construct the sides or walls of the shell or casing with a curve or bulge, corresponding to the radial sweep of the lever and its accompanying valve-disks, in the act of opening or closing the valve, said curvature being determined by the length of traverse and the distance between the axis of the rock shaft and the opposite edges of the valve disk. This construction necessitates considerable space within the shell or casing, thereby rendering it bulky and unsightly, and adding materially to the cost of manufacture.

In my improved construction, I dispense entirely with this objectionable bulge or curve, and make the walls parallel with each other, thus reducing the size and weight of the valve-body, or shell, and adding very much to the appearance of the same. Furthermore, this improved construction compels the valve disks to be held firmly against the shell, when closed, while, at the same time, they can be readily moved from a closed to a wide-open position with very little friction. This result is attained by an improved and novel construction of the actuating lever which carries the valve disks; said improvement consisting of a longitudinal slot or groove in the lever which groove receives the studs or pivots of the valve-disks, in order that said pivots may traverse said groove in the act of opening and closing the valve.

Another important feature of my improved construction is the rotating effect produced on the valve-disks in the act of opening and closing the same, thus more effectually causing the closest contact of the surfaces of the disks and their respective seats and insuring a perfectly tight joint.

In Letters Patent No. 409,334, issued August 20, 1889, I have shown and described a peculiar form of expansion-plate for closing a pair of disk-valves carried by a vertically-acting stem; but by a slight modification of this plate I enable it to operate with a pair of valves loosely coupled to a vibrating lever. Consequently, the utility of said device is greatly enhanced, without deviating from the spirit of my invention, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a vertical section of a straight-way valve embodying my present improvements, said section being taken in the plane of the vibrating lever, and the water-way closed. Fig. 2 is a horizontal section of the valve taken at the line Z—Z of the preceding illustration. Fig. 3 is a plan of the valve, the cap being detached from the shell or casing. Fig. 4 is an illustration including a vertical section, a side elevation, and a horizontal section of the expansion plate. Fig. 5 is a sectionized plan of a modification of the invention.

The shell or casing A of the cock may be of any desired size, shape and material, and is provided with the customary pipe-ends B, B′, traversed by straight water-ways *b*, *b′*, which latter are axially in line with each other. Situated between these pipe connections is a valve chamber C closed at top by a readily-detachable cap D, from whose under side a stop *d* projects, for a purpose that will presently appear.

E, E′, are annular seats near the bottom of chamber C, and F, F′, are the disk-valves adapted to close against said seats, the inner, or non-effective faces of said valves, being provided with short pivots *f*, *f′*, adapted to travel freely within a longitudinal slot *g* of lever G. The free end of said lever vibrates up and down within the chamber C, which movement is effected by providing the other end of the lever with an eye *g′* through which

is passed the square *h*, of a rock-shaft H, which latter, after passing through a stuffing-box I, has an external handle J attached to it.

Chamber C has guides K, K′, that confine the valves F, F′, to a proper path, and, in addition to these guides, said chamber has grooves L, L′, the latter being designed for the reception of a bodily-detachable expansion-plate, the peculiar features of which are more clearly seen in Fig. 4. Reference to this illustration shows that said plate has, at bottom, a semi-annular portion, or half ring M, of the same curvature as the bottom of chamber C, and that a vertical-tongue N projects from one end of said half-ring. *n* is a perforation near the top of this tongue to receive a screw *n′*, wherewith the expansion plate is secured in the shell, so as to have a limited movement therein, to compensate for expansion, or inaccurate fitting.

m, *m′*, are wedges at the ends of the half-ring M, which wedges are wider in front and at bottom than at rear and top. *m″* is another wedge that may be located at the center of said ring, if desired, but the omission of this third wedge from Fig. 1 shows that its use is not imperative.

In fitting up this valve, the expansion plate must first be applied to the shell, which is readily done by dropping said plate down within the grooves L, L′, and causing the tongue N, to enter the groove L′, after which act, said plate is loosely held in place by the screw *n′*, as seen in Figs. 1 and 3. The pivots *f*, *f′*, of valves F, F′, are then inserted within the slot *g* of lever G, and the latter is passed down within the chest C, care being taken to bring its eye *g′* to such a position as to admit the square *h*, of rock shaft H. As soon as this connection is made, the free end of the lever, with its coupled valves, is allowed to drop down within the valve-chamber C, and when the cap D and stuffing-box I are secured in place, the valve is at once ready to be applied to a set of pipes for conveying steam or fluids.

Now, by referring to Fig. 2 it will be noticed that the pivots *f*, *f′*, of the valves are not in contact with each other, and therefore, each valve is capable of being independently seated, which seating is effected by the inclined bearings *m*, *m′*, wedging against the backs of said disks F, F′. Consequently, these independently-seating valves effectually close the channels *b*, *b′*, of the shell, and thus prevent the passage of water, steam or other fluid.

To open the valve, it is necessary only to operate the handle J in such a manner as to swing the lever G up to the position indicated by dotted lines in Fig. 1, and as soon as the free end of said lever strikes the stop *d*, the disks F, F′, will clear the water-ways *b*, *b′*, the valves being confined to a proper path by their peripheries bearing against the guides K, K′.

In the modification of my invention, seen in Fig. 5, the lever-proper, G, is reduced in thickness near its free end, and has perforations *g″*—to admit pins *g‴*, that project laterally from a counter-lever G″. *g⁗* are longitudinal grooves in these levers G′, G″, to receive the pivots *f″* of the valves F″ F‴. M′ is a half-ring having wedges *m‴* that force the levers apart when they are swung down to close the valves. In this construction it will be necessary to afford a slight lateral-play of the lever G′, on the rock shaft, to enable said lever to be shifted by the wedges.

In my patent, previously referred to, the expansion plate has inclined bearings both above and below the center of the fluid ways, but in the present case I dispense with one set of wedges and arrange said expansion plate with single inclined-bearings or wedges on opposite sides of the water or fluid-way. By this arrangement the essential feature of my old invention is made available in a new form of valve having a very great range of utility.

I claim as my invention—

1. The combination, in a straight-way valve, of a shell having a pair of channels; a chamber provided with a pair of guides and two opposing valve-seats; a vibrating lever whose free end swings within said chamber, and is grooved or slotted longitudinally; and a pair of valves loosely coupled to said lever; the arrangement of these devices being such as to confine said valves to a rectilineal path when the free end of said lever describes an arc of a circle, substantially as herein described, and for the purpose stated.

2. The combination, in a straight-way valve, of the shell A, having a pair of channels *b*, *b′*; a chamber C, provided with a pair of guides K, K′, two valve-seats E, E′, and a detachable expansion-plate M, having wedges *m*, *m′*; a vibrating lever G, whose free end swings within said chamber C, and is grooved or slotted longitudinally at *g*; and a pair of valves F, F′, having pivots *f*, *f′*, that traverse said slot; the arrangement of these devices being such as to confine said valves to a rectilineal path, within said guides K, K′, when the free end of said lever describes an arc of a circle, all as herein described, and set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES POWELL.

Witnesses:
JAMES H. LAYMAN,
ARTHUR MOORE.