(No Model.)

E. LUNKENHEIMER.

STRAIGHT WAY VALVE.

No. 426,539. Patented Apr. 29, 1890.

Fig. 1.

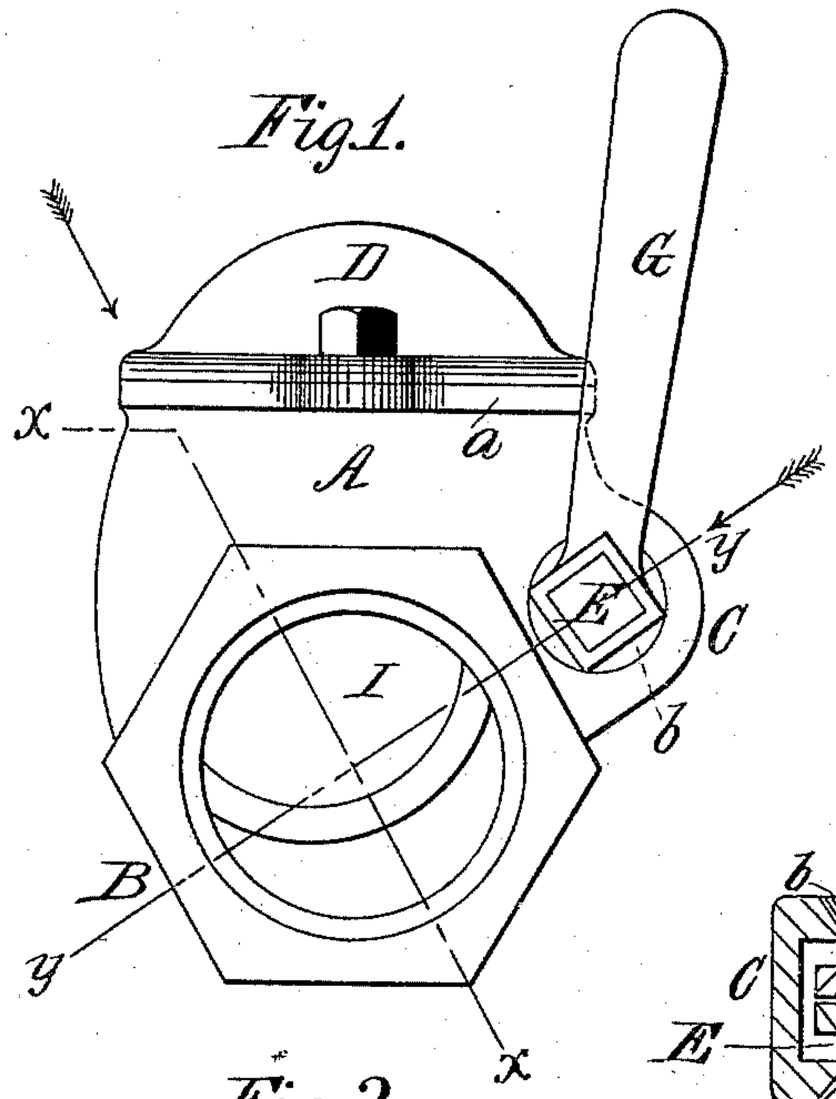


Fig. 2.

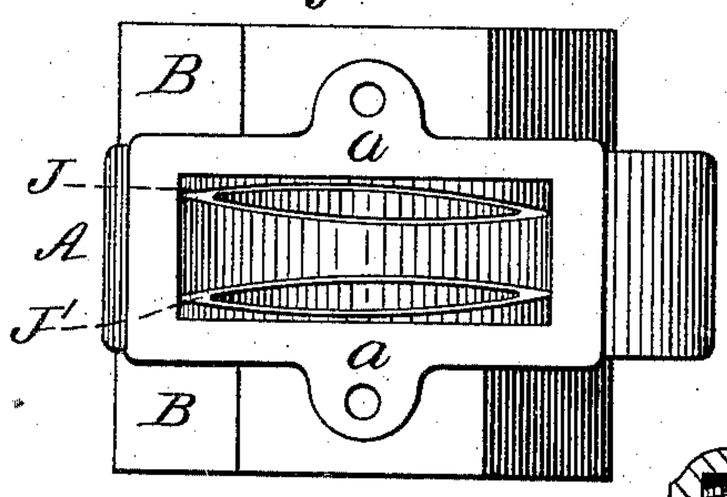


Fig. 3.

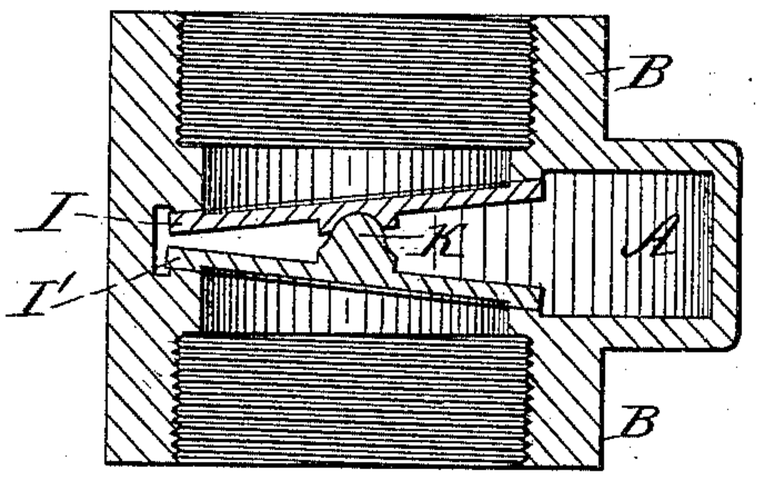


Fig. 4.

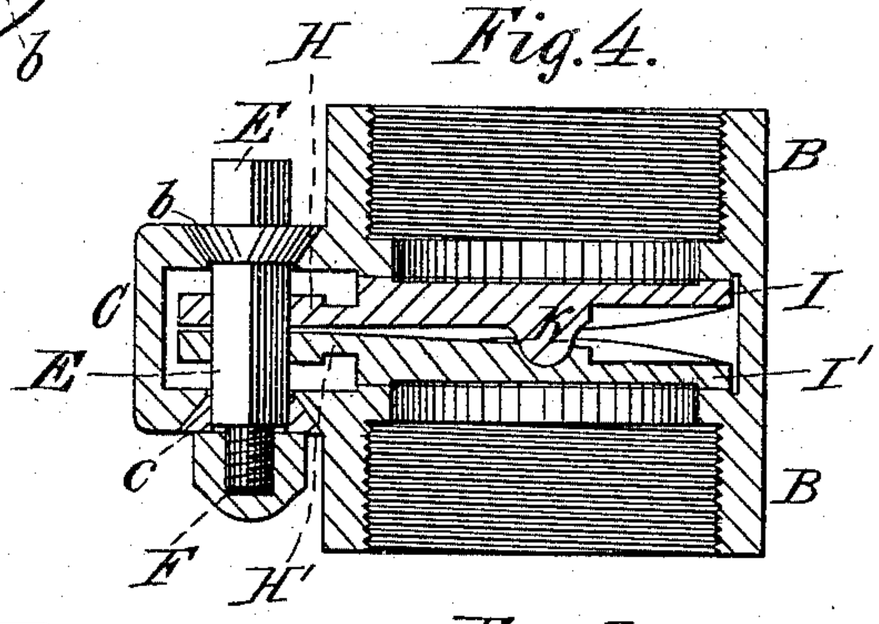


Fig. 5.

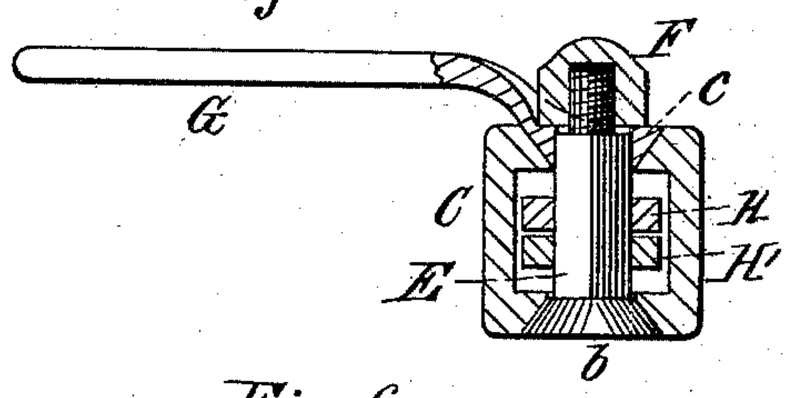


Fig. 6.

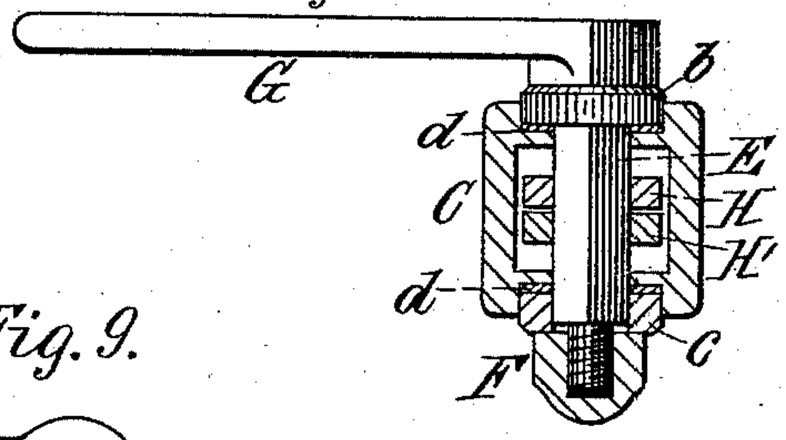


Fig. 7.

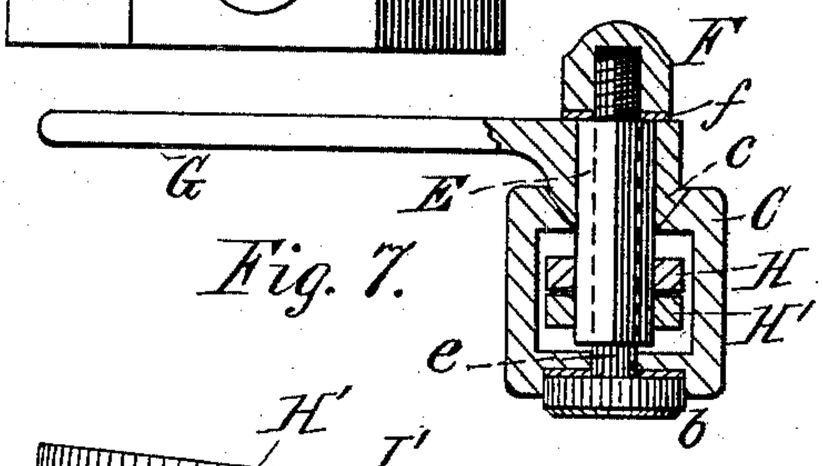


Fig. 8.

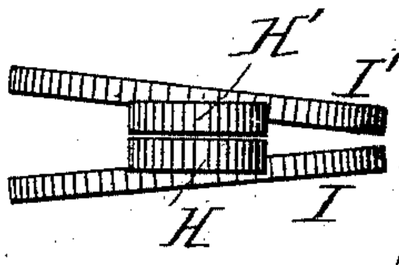
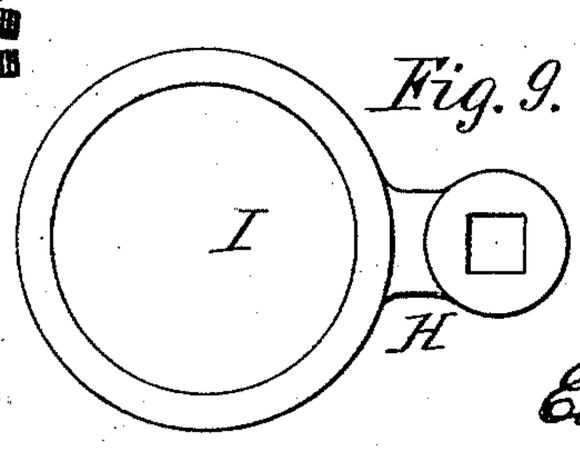


Fig. 9.



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UNITED STATES PATENT OFFICE.

EDMUND LUNKENHEIMER, OF CINCINNATI, OHIO, ASSIGNOR TO THE LUNKENHEIMER BRASS MANUFACTURING COMPANY, OF SAME PLACE.

STRAIGHT-WAY VALVE.

SPECIFICATION forming part of Letters Patent No. 426,539, dated April 29, 1890.

Application filed December 6, 1889. Serial No. 332,779. (No model.)

To all whom it may concern:

Be it known that I, EDMUND LUNKENHEIMER, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Straight-Way Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of straight-way valves known as "oscillating valves," having oscillating or vibrating disks which open and close a straight-way passage through the valve-shell; and it has for its object the improved construction of such valves, whereby they are simplified and rendered more efficient in operation.

The novelty of my invention will be hereinafter set forth, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved valve partly open. Fig. 2 is a top plan view of the valve shell or casing with the cap removed to show the interior. Fig. 3 is a sectional view through the dotted line *x x* of Fig. 1, looking in the direction of the arrow at right angles to said line, with the valve closed. Fig. 4 is a sectional view through the dotted line *y y* of Fig. 1, looking in the direction of the other arrow, with the valve closed. Fig. 5 is a detail view of the valve stem or spindle, disks, and handle, showing a modification of some of the parts. Fig. 6 is a detail of another modification of the valve-stem and associated parts. Fig. 7 is another detail, showing another modification of the same parts. Fig. 8 represents an end elevation of the two carriers and disks. Fig. 9 is a plan view of one of the disks and its carrier.

The same letters of reference are used to indicate identical parts in all the figures.

The shell of the valve is cast in one piece, and consists of a chamber A, the interiorly-threaded pipe-connections B B, and the tubular portion C. The pipe-connections B and B are in line with each other to form a straight unobstructed opening through the shell, as is usual in this class of valves. The open end of the chamber A, opposite the pipe-connections B, has an exterior flange *a* surrounding it, to which is bolted or screwed the removable cap D, having a corresponding flange with intervening packing, if desired, the interior of the cap D and chamber A affording room into which to swing the valve-disks out of line with the pipe-connections B B to open the valve, as hereinafter explained, and the removal of the cap giving ready access to the interior of the valve-shell.

Journaled in the tubular portion C of the shell is the valve-spindle E. This spindle is preferably square or of other polygonal shape in cross-section, and is provided at one end (the upper end in Fig. 4) with an integral frusto-conoidal collar *b*, which fits into a countersunk bore in the side of the tubular extension C. Slipped over the opposite end of the spindle E is a second frusto-conoidal collar *c*, whose central aperture fits the polygonal sides of the spindle, so that the collar is locked to it in turning. This collar *c* fits in a countersunk bore in the side of the extension C, and upon the threaded projecting end of the spindle E is screwed a clamping-nut F. By tightening up this nut or loosening it the collars *b c* may be made to turn with greater or less friction in their countersunk bores in the extension C. The opposite projecting squared end of the spindle E is adapted to receive a handle G, by which the spindle may be turned.

Fitting on and turning with the spindle E are two arms or carriers H H′, carrying disks I I′, arranged to be swung into line with the pipe-connections B B and to snugly fit against inclined seats J J′ on the valve-shell. The arms H H′ have a slight tilting play on the spindle E, and the disks I I′ are inclined relatively to each other, as shown, and have a ball-and-socket bearing interposed between them at K, so that as they are swung to their seats J J′ they can adjust themselves thereto and be wedged against them to effect a tight joint. The disks are swung to and from their seats to close and open the valve by turning the handle G, and by means of the adjustable frictional bearings of the spindle E in the extension C of the shell the handle G can be made to turn with any degree of resistance desired and the valve maintained at any degree of opening without the employment of

auxiliary devices for that purpose. By loosening the nut F the frictional bearings may be so adjusted that the handle G may be turned and the disks I I′ swung to and from their seats very easily, while by tightening up the nut the bearings may be so adjusted that considerable force will be required to turn the handle and open and close the valve, and when the handle is turned to any point and released it will be firmly held there and the valve maintained at that degree of opening against all ordinary shocks and jars.

I am aware that it is not new to construct a straight-way valve with a shell cast in one piece and composed of pipe-connections in line with each other, a laterally-extending chamber, and a tubular portion in which is journaled a valve-spindle which actuates an oscillating carrier having a disk arranged to be wedged against an inclined seat in the shell to close the passage through the pipe-connections; nor is it new to provide a valve having such a carrier with two disks, having ball-and-socket bearings interposed between the disks and carrier, and inclined seats against which said disks are wedged by turning the valve-spindle to close the valve, all of which constructions are illustrated in patents heretofore granted to me; but I believe the valve which forms the subject-matter of my present invention is the first of that character in which the two disks were independently supported on the valve-spindle by separate carriers, and in that respect it is an improvement upon those above referred to, for by such construction I am enabled to make a double disk-valve much more compact and of less weight of metal, and consequently much cheaper, as well as to increase its simplicity and the efficiency of its operation. So far as I am aware, also, the valve forming the subject-matter of my present invention is the first to employ adjustable frictional bearings for the valve-spindle, whereby the resistance offered to the turning of the valve-stem may be varied and the bearings be so adjusted as to firmly hold the disks at any point to which they may be moved by the turning of the handle. Such being the case, I do not wish to be limited to the particular form and arrangements of the parts constituting the frictional bearings for the spindle, for these may be largely varied, and in Figs. 5, 6, and 7 of the accompanying drawings I have illustrated some modifications in the construction and arrangement of these parts. In Fig. 5 the handle G and collar *c* are shown as cast in one piece, and the spindle E at the opposite end is cut off flush with the surface of the washer *b*. In Fig. 6 the handle G, collar *b*, and spindle E are all shown as cast in a single piece, while the collar *c* is loose, as in Fig. 4. In Fig. 6 also the collars *b c* are flat instead of frusto-conoidal, as in Fig. 4, and they have interposed between them and their seats in the shell C soft-metal washers *d*. The handle G might of course be cast solid with the spindle E and collar *b* in the construction shown in Fig. 4, as it is in Fig. 6.

The above are the several forms of frictional bearings which I prefer, and it will be noticed that in each of them the spindle E has integral with it a collar *b*, which may be caused to bear more or less tightly against its seat on the shell C by means of a clamping-nut applied to the opposite end of the spindle and bearing against the opposite side of the shell; but my invention in its broader scope is not limited to any of these constructions, nor to a construction in which the spindle E has a friction-collar integral with it, and in Fig. 7 I have illustrated a construction in which neither of the collars *b c* is integral with the spindle E. In this figure the collar *b*, instead of being integral with the spindle E, forms the flat head of a bolt *e*, which passes through the spindle E and has a threaded end projecting beyond the opposite end of the spindle.

The handle G and collar *e* are cast in one piece and are slipped over the end of the spindle E, as in Fig. 5, and the clamping-nut F is applied to the threaded end of the bolt *e*. This projecting end of the bolt *e* has a flat side or cut-away portion, and a D-washer *f* is fitted on it and interposed between the nut F and handle G to prevent the movements of the latter in opening and closing the valve being communicated to the nut F. By tightening up and loosening the nut F the collar or bolt-head *b* and the collar *c* will be caused to bear with greater or less friction on their seats in the shell C, and the same result will be accomplished as in the constructions shown in Figs. 4, 5, and 6. A soft-metal washer is interposed between the collar or bolt-head *b* and its seat in the shell C, as in Fig. 6. This feature of my invention, the adjustable frictional bearings for varying the degree of resistance against which the rocking spindle turns, is applicable to valves having a single oscillating disk and to valves having two oscillating disks supported on a single carrier, as well as to the valve herein described.

My improved valve is particularly adapted for use as a liquid-valve as distinguished from a steam-valve, though it is also valuable as a valve for steam or gas. For liquids it is always desirable and generally necessary that the valve employed be a straight-way valve of some sort, and ordinary stop-cocks and gate-valves have heretofore been generally used for this purpose. The gate-valves are much more expensive than my improved valve, and the stop-cocks do not prove efficient or durable excepting in smaller sizes. Again, in the gate-valves which have heretofore been generally used for large-sized liquid-valves the valve is usually opened and closed by revolving a hand-wheel on the valve-stem, and in such cases the degree of opening of the valve is not always easily ascertained, while in my improved valve the position of

the handle always shows at a glance the degree of opening of the valve.

Having thus fully described my invention, I claim—

1. In a straight-way valve, the combination of the shell, the spindle, and the two oscillating disks, each independently supported on the spindle by its own carrier, substantially as and for the purpose described.

2. In a straight-way valve, the combination of the shell having two inclined seats, the spindle, and the two oscillating disks, each independently supported on the spindle by its own carrier, substantially as and for the purpose described.

3. In a straight-way valve, the combination of the shell, the spindle, and the two oscillating disks having a ball-and-socket bearing between them and each independently supported on the spindle by its own carrier, substantially as and for the purpose described.

4. In a straight-way valve, the combination of the shell having two inclined seats, the spindle, and the two oscillating disks having a ball-and-socket bearing between them and each independently supported on the spindle by its own carrier, substantially as and for the purpose described.

5. In a straight-way valve, the combination of the shell cast in one piece and composed of the chamber A, the pipe-connections B B, and the tubular portion C, the spindle E, journaled in the tubular portion C, and the oscillating disks I I′, independently supported on the spindle E by the carriers H H′, substantially as and for the purpose described.

6. In a straight-way valve, the combination of the shell cast in one piece and composed of the chamber A, pipe-connections B B, and the tubular portion C, and provided with the two inclined seats J J′, the spindle E, journaled in the tubular portion C, and the oscillating disks I I′, having the ball-and-socket bearing K between them and independently supported on the spindle E by the carriers H H′, substantially as and for the purpose described.

7. In a straight-way valve, the combination of the shell, the rocking spindle journaled in adjustable frictional bearings therein, and the two oscillating disks independently supported on said spindle by separate carriers, substantially as and for the purpose described.

8. In a straight-way valve, the combination of the shell having two inclined seats, the rocking spindle journaled in adjustable frictional bearings controlled by a clamping-nut, and the two oscillating disks having a ball-and-socket bearing between them and independently supported on said spindle by separate carriers, substantially as and for the purpose described.

9. In a straight-way valve, the combination of the shell, the rocking spindle E, journaled therein, with the collar *b* at one end bearing on one side of the shell and the collar *c* at its other end bearing on the opposite side of the shell, the clamping-nut F, for binding the collars *b c* to their bearings, and an oscillating disk, as I, operated by the spindle E to open and close the valve, substantially as and for the purpose described.

10. In a straight-way valve, the combination of the shell cast in one piece and composed of the chamber A, pipe-connections B B, and tubular portion C, the rocking spindle E, journaled in the tubular portion C, with its integral collar *b* at one end having its bearing on one side of the shell and its loose collar *c* at the other end having its bearing on the opposite side of the shell, the clamping-nut F, for binding the collars *b c* to their bearings, and the two oscillating disks I I′, independently supported on the spindle E by separate carriers, substantially as and for the purpose described.

11. In a straight-way valve, the combination of the shell cast in one piece and composed of the chamber A, pipe-connections B B, and the tubular portion C, and provided with the two inclined seats J J′, the rocking spindle E, journaled in the tubular portion C, with its integral collar *b* at one end having its bearing on one side of the shell and its loose collar *c* at the other end having its bearing on the opposite side of the shell, the clamping-nut F, for binding the collars *b c* to their bearings, the handle G, for turning the spindle, and the two oscillating disks I I′, having the ball-and-socket bearing K between them and independently supported on the spindle E by separate carriers, substantially as and for the purpose described.

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