

S. W. HOAG, Sr.
STRAIGHT WAY VALVE.

No. 301,367.

Patented July 1, 1884.

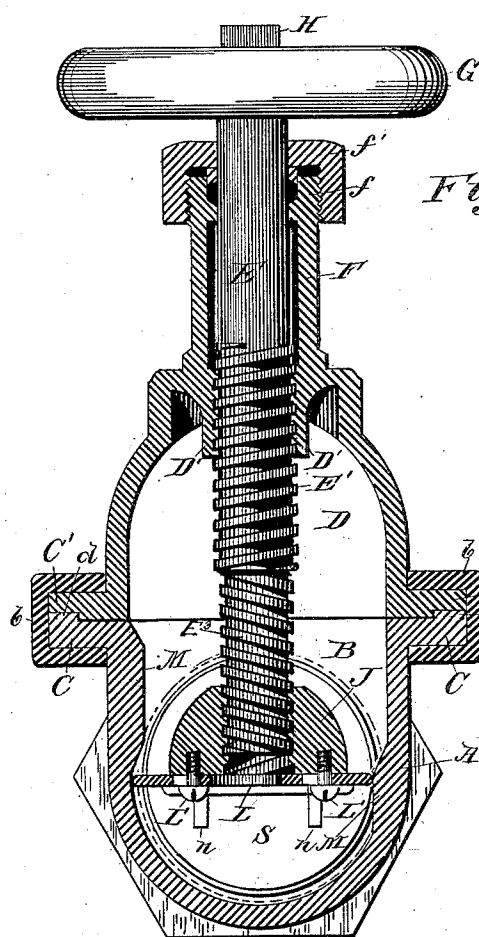


Fig. 1.

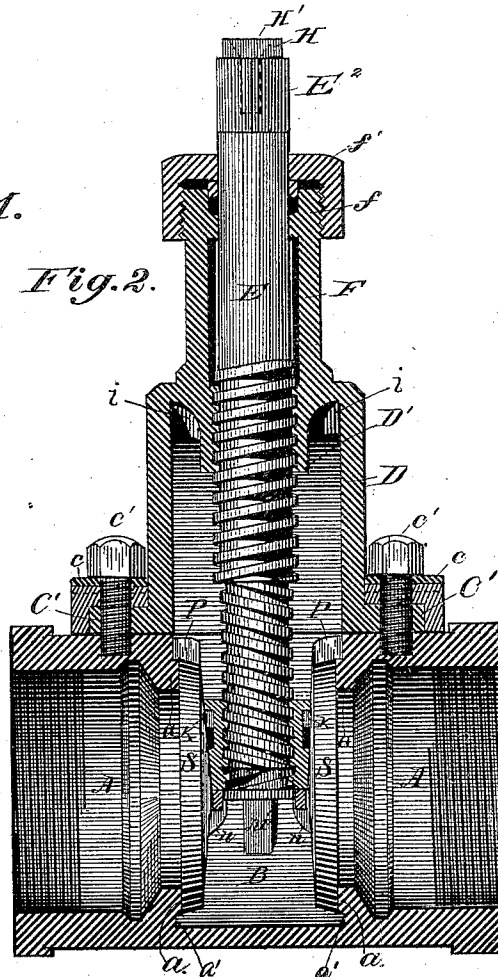
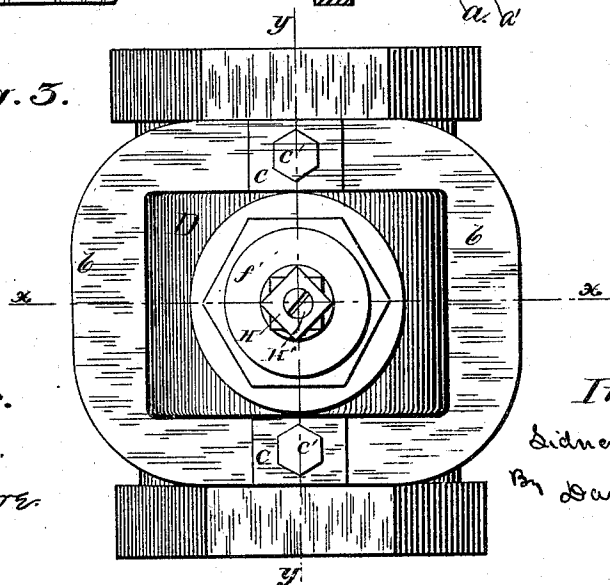


Fig. 2.

Fig. 3.



Witnesses.
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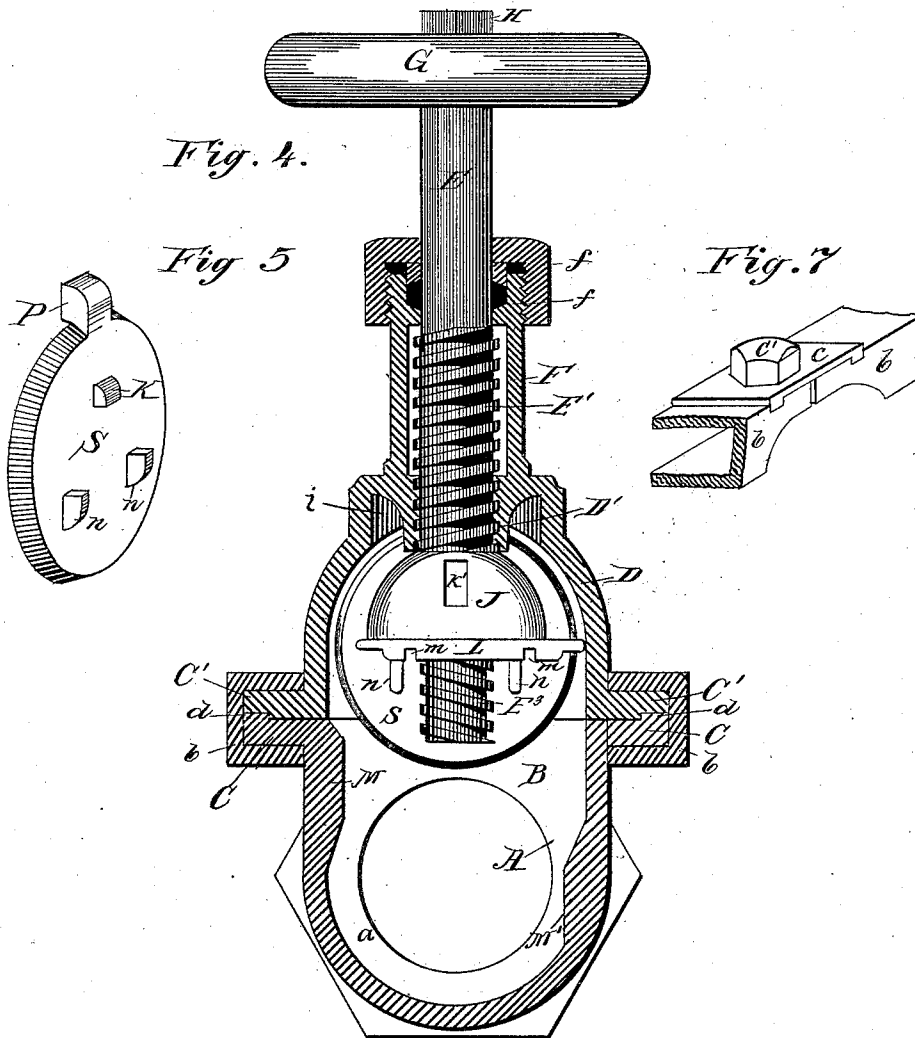
(No Model.)

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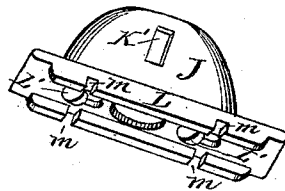
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Aufsteigen
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UNITED STATES PATENT OFFICE.

SIDNEY W. HOAG, SR., OF NEW YORK, N. Y.

STRAIGHT-WAY VALVE.

SPECIFICATION forming part of Letters Patent No. 301,367, dated July 1, 1884.

Application filed November 5, 1883. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY W. HOAG, Sr., of the city, county, and State of New York, have invented a new and useful Improvement in Straight-Way Valves; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to the class of valves known as "straight-way valves," and which are adapted for use with steam, gases, and all manner of liquids. In such a valve it is of importance that the valve-seats shall be adapted to stand not only the required pressure of steam, but the expansive force of heat; that the valve-faces, as in other slide-valves, shall move perfectly in line with their seats to clean them and prevent uneven wear; that the valves, after being fitted perfectly each to its seat, shall be subjected to no further grinding in the seat, and that consequently the power employed to force them tightly upon their seats shall not be applied until the valves are at rest, and shall be withdrawn before they are moved, and that the device by which this power is applied shall be immovable in spite of any jarring or concussion to which the valve may be subjected, necessitating a positive locking of the device and valves together to unite them solidly as one throughout the movement of the valves, to be unlocked only when, the valves being seated, the application of power to force them home is required.

The object of my invention is to provide, in a very compact solid form, a straight-way valve having a short stem, and which shall meet fully all of said requirements, and in which the valve plates or disks, when closed, shall be firmly carried and held against their seats by a wedge-shaped block interposed between them, all as hereinafter fully described.

In the accompanying drawings, Figure 1 is a central vertical section in line *x x* of Fig. 3, through the valve-stem and parallel with the valve-disks, showing the valve closed. Fig. 2 is a similar section at right angles to the first, in line *y y* of Fig. 3, the operative hand-wheel being removed; Fig. 3, a top view of the valve with the hand-wheel removed, as in Fig. 2; Fig. 4, a transverse vertical section

showing the valve fully opened and with the wedge-block and the device for locking it to the valves in elevation. Fig. 5 is a perspective view of one of the valve-disks detached, illustrating its locking and lifting lugs and guide-flange. Fig. 6 is a perspective view of the wedge-block detached, showing its under side and illustrating the attachment of the locking-plate thereto. Fig. 7 is a perspective view of the adjacent ends of the clamp upon the flanges uniting the body and bonnet of the valve, illustrating the key for locking the clamps together.

A is the body of the valve-casing, having a straight opening or water-way through it, and *a a* are parallel valve-seats formed therein transversely to the opening. Each of the valve-seats is encircled by an outer recess, *a'*, formed within the casing, leaving the seat to stand out in relief, as shown in Fig. 2, so as to be readily freed from any particles of matter which might otherwise lodge thereon.

S S are the two circular valve-disks, fitted to cover, with a steam-tight joint, the valve-seats *a a*. An opening is formed in the top of the body A of the casing, extending longitudinally either way far enough to embrace the recesses encircling the valve-seats *a a*, and of a width equal to the diameter of the recesses. The parallel sides of the chamber B, inclosed between the valve-seats, extend each in a right line inward from the edge of the opening until they intersect the curve of the bottom of the chamber, whose diameter corresponds to the interval between said sides. (See Figs. 1 and 4.) A wide flange, C, is formed to encircle said opening in the body A of the valve, the upper surface of the flange being tangential to the outer periphery of the valve-body. This flange serves to greatly strengthen and reinforce the valve-body, so that it is better adapted to resist the strain imposed thereon in forcing the valves against their seats after they are closed, as well as the strain due to the expansion and contraction of the metal when subjected to steam heat and pressure. It constitutes likewise a seat for the counter-part flange C' of the bonnet or dome D of the valve, through which the valve-screw works. The inner sides of this bonnet are made to form an extension or continuation of the sides of the valve-chamber B, an accurate registry

of the two being secured by means of an offset or shoulder, *d*, upon the one flange, *C*, adapted to fit a corresponding recess in the opposite flange, *C'*. The inner end of the valve-stem *E* is threaded in opposite directions—one portion to the right and the other to the left. The outer threaded portion, *E'*, of the screw works through an annular nut or threaded collar, *D'*, projecting into the bonnet *D* at the outer end, the stem *E* being prolonged to extend out through a cylindrical extension, *F*, of the bonnet, which affords an outer annular bearing, *f*, for the stem, and is closed by a suitable stuffing-box, *f'*. The outwardly-projecting end of the valve-stem *E* is squared to engage a central rectangular opening formed in a hand-wheel, *G*, to fit thereon. The wheel, when fitted on the stem, is held and confined by means of a square plate, *H*, corresponding in size with the end of the stem, and which is pivoted thereto by means of a central pivot-screw, *H'*, so that when rotated upon said screw the corners of the plate shall overlap the edges of the opening in the wheel, as illustrated in Fig. 3. The inner left-hand portion, *E''*, of the valve-screw is led through a threaded aperture in a wedge-shaped block, *J*, interposed between the valve-disks *S S*, to bear against their opposite rear faces. These faces are each inclined or beveled upon an angle the counterpart of that of the corresponding face of the block, so that when the block is forced inward between the disks it shall operate to force them outward against their seats with an even pressure. The opposite inclined faces of the wedge-block and disks are made at a very acute angle, presenting a long taper, so that when forced home they will remain immovably in position independently of the bearing of the screw thereon, without working loose under the influence of any jarring or concussion to which the valve may be subjected. The disks are connected to the block, so as to move therewith, by means of a pin or lug, *K*, projecting from the rear face of each disk into a recess, *K'*, in the block, the recesses being so extended in line parallel with the stem as to allow a slight movement of the block independently of the disks. This lost motion of the block is prevented when the valve-disks are not in registry with their seats, and the block and disks are securely locked together, when required, by means of a movable transverse plate, *L*, fitted upon the under side of the block and held in place by wide-headed pins or screws *L L*, (see Fig. 6,) led through longitudinal slots in the plate. These pins permit a longitudinal or endwise movement of the plate upon the block, while their wide heads, overlapping the edges of the slots, serve to hold the plate firmly against the block. The plate projects far enough beyond the block at each end to bear against the sides of the central chamber, *B*. (See Figs. 1 and 5.) Ribs *M M'* are formed upon the sides of the chamber, (see Figs. 1 and 4,) the one, *M*, above, and the other, *M'*, be-

low, a common plane coincident with that which is occupied by the plate *L* when the disks are brought into position opposite their seats, and the lower end of the upper rib, *M*, and the upper end of the lower rib, *M'*, are so beveled, both at the same angle of inclination, (see Figs. 1 and 5,) as that when, in the movement of the block up or down, the ends of the locking-plate are carried over these inclined surfaces the plate is thereby forced endwise over the face of the block to the one side when moving in one direction and to the other when the movement is reversed. The endwise movement of the plate *L* over the bottom of the block, as the block is drawn outward to open the valve, causes an engagement of the lateral edges of the plate with lugs or offsets *n n*, formed on the disks, (see Figs. 4, 5, and 6,) and thereby locks and prevents any movement of the wedge-block *J* independently of the disks. (See Fig. 4.) After the valve-disks have been returned to their seats in the inward movement of the block to close the valve, the sliding plate *L* will be forced over by contact with the rib *M'*, so as to bring notches *m m* on its edges into register with the lugs *n n* upon the disks, and the notches, clearing the lugs, will allow a continued downward movement of the wedge-block independent of the disks, so that it may operate as a wedge between and against the two disks, to force them against their seats in closing. The movement of the disks over their seats to close the valve is arrested so soon as they are properly in register therewith by means of a flange or lip, *P*, formed on the periphery of each disk and adapted to fit into the recess *a'*, encircling the seat, and to engage the projection formed by the latter. It is made to bear also with an even face against the inner face of the bonnet, so that during the entire movement of the disk to and from the valve-seat this flange will form a guide for the disk, to steady it and maintain uniformly its parallelism with its seat. After the wedge-block *J*, with its attached valve-disks *S S* and locking-plate *L*, has been properly inserted into the valve-chamber *B*, between the valve-seats *a a*, and the flange *C* of the bonnet, through which the valve-screw actuating the block is led, has been secured in place upon the flange *C* of the valve-body, the two flanges are clamped together and made fast with a firm, solid, steam-tight joint by means of two clamps, *b b*, adapted to embrace the edges of the flanges and to cover jointly the entire length thereof. These clamps, when driven home upon the flanges, are secured by means of plates *c c*, overlapping the contiguous edges of the two clamps with an interlocking joint, (see Fig. 7,) and which are held in position by screws *c' c'*, passing centrally through them and into the body of the valve, as shown in Fig. 2, or by other equivalent fastening device.

In the operation of my improved valve the first movement of the valve-screw *E* to open the valve will, as the upper thread, *E'*, turns in

its fixed seat, cause the lower thread, E, to turn in the block J, which, by reason of the disengagement of the recesses *m m* on the locking-plate L with the lugs *n n* on the disks, will move out independently of the disks far enough to relieve them wholly of the pressure of the wedge-surfaces thereon. This being accomplished in a short movement of the block, its further outward movement, by carrying the end of the locking-plate over the inclined end of the upper cam-rib, M, on the side of the valve-chamber, will operate to force the plate endwise over the bottom of the block until its notches *m m* will be thrown out of register with the lugs *n n* on the valve-disks, and thus prevent the wedge-block J from acting upon the disks until they are properly returned to their seats, the wedge-block and the valve-disks being locked together by means of the screw between them, which passes through the plate and block when the orifice in the plate comes into registry with the orifice in the wedge-block, which registry takes place when the plate passes over the cam-rib M in the upward movement of the valve, as shown in Fig. 5, and when so locked moved in unison by the screw and the exact parallelism of the disks with each other and with the faces of their seats being maintained by the interposed block J and by the bearing of the guide and stop flanges P P against the inner face of the bonnet. As the upper portion, E', of the valve-screw turns in its fixed seat, carrying the valve-stem outward, the simultaneous rotation of its lower portion, E, within the block J will cause the latter to work up upon the screw, so that the disks S S will be drawn out with a speed double that of the outward movement of the stem. As the outward movement of the stem required to open the valve fully is thus reduced, the stem may be correspondingly shortened. The length or depth of the bonnet within which the valve-disks are raised is also reduced to a minimum by forming a recess, *i*, on each side of the threaded seat through which the valve-stem screws, into which the periphery of each disk may pass when the valve is thrown wide open.

I claim as my invention—

1. In a straight-way valve, the combination, with valve-disks connected to a supporting-block by an attachment permitting an independent movement of the disks and block, and a valve-stem and screw actuating the block to produce a slight movement of the disks to and from their seats in line parallel therewith, of a locking device adapted to lock the disks and block immovably together during the

sliding movement of the valves and release them when in register with their seats, substantially in the manner and for the purpose herein set forth.

2. The combination, with the sliding disks in a straight-way valve, and with a threaded valve-stem for operating the same, of a tapering or wedge-shaped block or nut interposed between the disks to bear against inclined surfaces thereon, and connected thereto by an attachment permitting a slight independent movement of the block and disks, substantially in the manner and for the purpose herein set forth.

3. The combination, in a straight-way valve, with a valve-seat having a projecting rim, of a valve-disk moving over the same, having a lug or flange upon its periphery adapted to overlap the projecting rim of the valve-seat, substantially in the manner and for the purpose herein set forth.

4. The combination, with the casing inclosing the valve-chamber in a straight-way valve, its valve-stem, and valve-disks, of a lip or flange upon the periphery of each disk, adapted to bear against and slide upon the side of the casing parallel with the face of the valve-seat, substantially in the manner and for the purpose herein set forth.

5. The combination, in a straight-way valve, with its valve stem or screw, its valve-disks, and its valve-seats, of a projecting stop lip or flange upon the periphery of each disk, adapted to overlap and engage the rim of the valve-seat when the disk is superimposed thereon, substantially in the manner and for the purpose herein set forth.

6. The combination, in a straight-way valve, with its valve-chamber and bonnet, of a reinforcing flange formed upon said valve-chamber tangential thereto, and recessed to receive and partially embrace a counterpart flange upon the bonnet, substantially in the manner and for the purpose herein set forth.

7. The combination of the valve-chamber having a surrounding flange and the bonnet having a similar surrounding flange with clamps which surround the said flanges, whereby a tight joint is formed, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SIDNEY W. HOAG, SR.

Witnesses:

A. B. MOORE,
A. W. STEIGER.