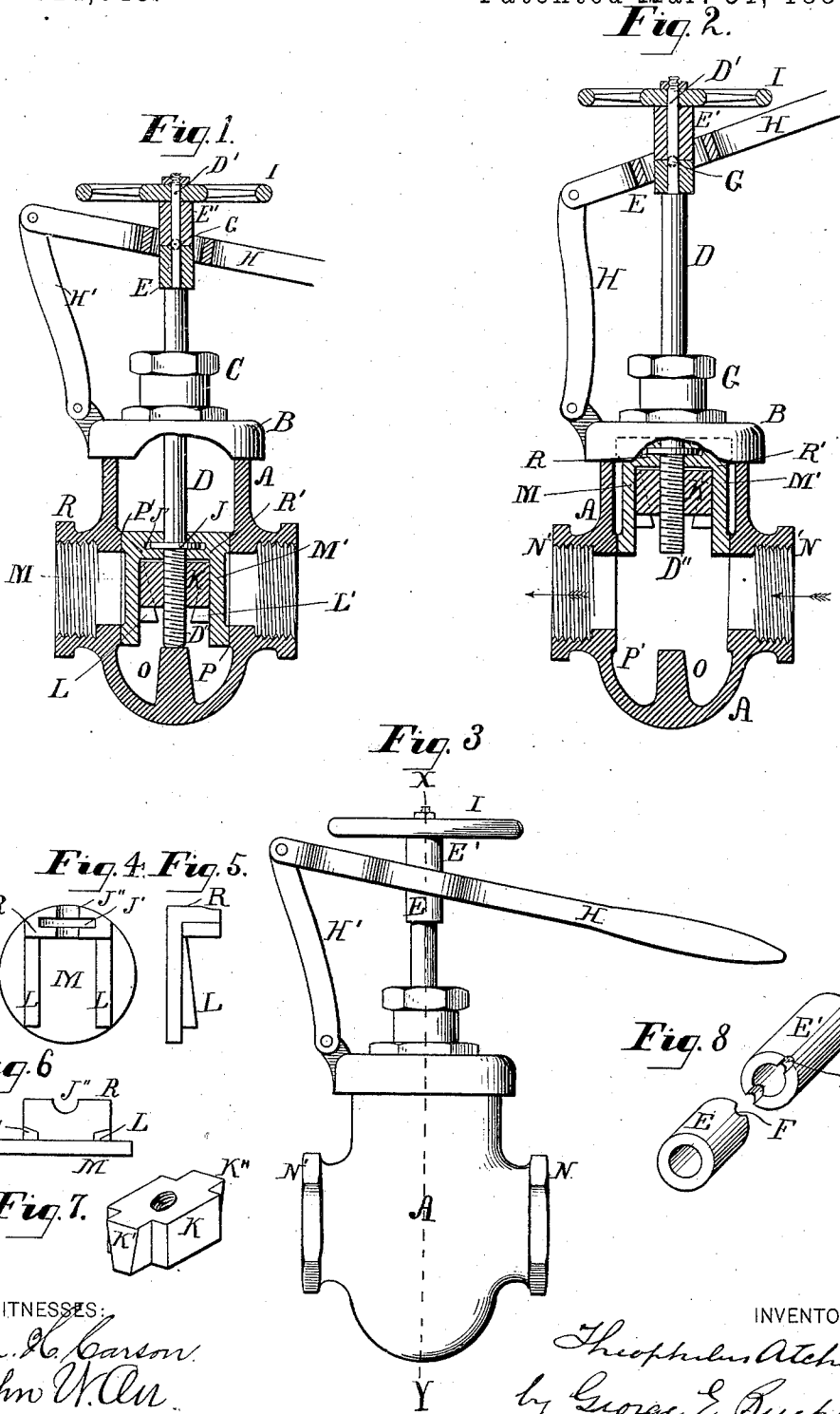


T. ATCHESON.

PAPER PULP DIGESTER VALVE.

No. 314,643.

Patented Mar. 31, 1885.



WITNESSES:
Wm. H. Carson
John W. Allen

INVENTOR
Theophilus Atcheson
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(No Model.)

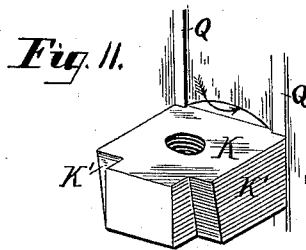
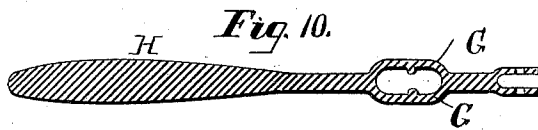
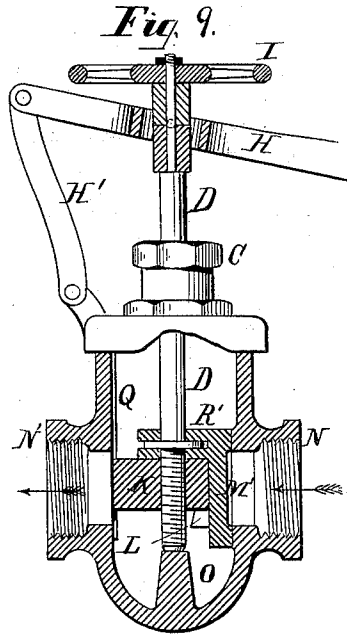
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Theophilus Atcheson
per George E. Buckley
Attor.

UNITED STATES PATENT OFFICE.

THEOPHILUS ATCHESON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
OF ONE-FOURTH TO GEORGE E. BUCKLEY, OF SAME PLACE.

PAPER-PULP-DIGESTER VALVE.

SPECIFICATION forming part of Letters Patent No. 314,643, dated March 31, 1885.

Application filed February 12, 1885. (No model.)

To all whom it may concern:

Be it known that I, THEOPHILUS ATCHESON, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Paper-Pulp-Digester Valves; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

The object of my invention is to produce a straight-way gate-valve for paper-pulp digesters; and my valve may be used generally for application to pipes or tubes conveying liquids and vapors, and especially where the locking of the valve at any point of the opening thereof becomes of importance.

The distinguishing feature of my valve is its capability of being locked or set at any point of the opening thereof by acting upon the disks to insure the lock.

The nature of my invention will fully appear from the following description and claims.

In the drawings, Figure 1 is a vertical longitudinal view of my device upon the line X Y of Fig. 3, showing the valve closed; Fig. 2, a similar view showing the valve open; Fig. 3, an elevation of my device; Fig. 4, a detached back view of one of the disks of the valve; Fig. 5, a side view of the same, looking from the edge of the disk; Fig. 6, a view of the same, looking from the bottom edge thereof; Fig. 7, a perspective view of the wedge-block for locking the valve; Fig. 8, a perspective view of two sections of the sleeve, which surround the upper part of the stem of the valve; Fig. 9, a vertical longitudinal sectional view of my device, showing the application of my invention to a single-gate straight-way valve, where only one valve-disk is employed to close the inlet, and the back of the wedge-block slides in guides set upon the inner face of the valve cylinder or shell upon the outlet side thereof; Fig. 10, a longitudinal cross-sectional view of the lever for opening and closing the valve, showing the inner spuds on the collar, which engage with the sleeve shown in Fig. 8 to raise and lower the valve-disks. Fig. 11 is a detached perspective view of the wedge-block, showing the guides when only one valve-disk is employed.

A is the shell or cylindrical body of the valve; B, the cap thereof, which is screwed upon the shell A in the ordinary way; C, the stuffing-box, through which the valve-stem D passes into the shell or cylinder A.

E E' are two sleeves set upon the small part D' of the stem D, notched at F F' (see Fig. 8) to receive the trunnions or spuds G G (see Fig. 10) of the lever-arm H. These spuds G G are shown in dotted circles in Figs. 1 and 2.

I is a hand-wheel rigidly set on the upper end of stem D to turn said stem, and thereby lock and unlock the valve.

H is an arm jointed or hinged to the cap B and to the heel of lever H, to provide a shifting fulcrum for said lever in the upward and downward movement of the heel thereof.

J is a round collar set rigidly upon the stem D, and engaging in corresponding slots, J' J', in the backs of the valve-disks, whereby as the said collar rises with the upward movement of the stem D the valve-disks will be carried up with it. The lower end, D', of the stem D is screw-threaded and engages in a female screw-threaded hole in the wedge-block K. The two opposite sides of block K are provided with wedges K' K'', which engage with the bevel edges or projections L L', the latter being attached to or cast upon the backs of the two valve-disks M M'. These valve-disks close the inlet N and outlet N'. The direction of the current of fluid or vapor is indicated by arrows. (See Fig. 2.)

O is a stop or rest, upon which the lower end of the valve-stem D impinges when the valve is closed. It will be observed that the turning of valve-stem D by means of the hand-wheel I does not operate to raise or lower disks M M', but moves the wedge-block K upward and downward on the screw-threaded portion D' of the stem. The wedges K' K'' engage with and slide upon the inclines L L', and as the narrow ends of these wedges are the lower ends thereof, a downward movement of the wedges will jam the inclines L L' and lock the disks M M' against the faces opposite to them, respectively, at whatever point of opening the valve may be. The slots J' J' are formed in a block or plate cast upon the back of each disk, M M'. These plates meet in the center, each be-

ing provided with a curved notch, J", (see Figs. 4 and 6,) which notches enable them to clasp closely the stem D.

The operation is as follows: Fig. 1 shows the valve closed. In order to lock or make the valve tight the stem D is screwed down, so as, by means of the wedges K' K", to force the disks M M' tightly against their respective seats P P'. If it is desired to open the valve, I will say to the position shown in Fig. 2, the valve-stem D is turned so as to slightly raise the wedge block K and remove it pressure from the inclines L L'. The valve-faces are thus loosened, and the lever H is raised until the valve reaches the position shown in Fig. 2, when the stem D is again turned so as to force the wedges K' K" against the inclines L L', whereby the valve-disks will be jammed tightly against the inner face of the shell A, and the valve will thus be locked in its then position. The valve may thus be operated and locked at any degree of opening, and through the effectiveness of such locking the valve-disks M M' will be free from any vibration caused by the flow of the current through the valve.

The only radical difference between the valve shown in Fig. 9 and that shown in Figs. 1 and 2 is, that in the one shown in Fig. 9 the valve-disk M is dispensed with, and sole reliance is placed in the single valve-disk M' to close the inlet-port N' of the valve. In this form of valve I extend the back of the valve-block K so far that it will engage with the guides Q Q, Figs. 9 and 11, set or cast upon the inner face of the valve-cylinder A, in which guides it slides evenly in its upward and downward traverse, and bears against the firm wall of the valve-cylinder when it becomes necessary to lock the valve at any point of opening or closing. The wedges K' K" act against the inclines L L' of the valve-disk M', as described above.

The manner of attaching the wheel I and lever-arm H is as follows: The sleeve E is first slipped upon the narrow part D' of the stem D until it rests below against a shoulder or stop on this stem. The lever is then dropped by its collar over the upper part, D', of the stem until its spuds or trunnions G G rest in the half-round notches F F of cylinder E. The sleeve E is then slipped upon the stem until its half-round notches F F envelop the upper halves of the trunnions or spuds G G. The two parts E and E' thus form one sleeve or collar divided around the middle. The wheel I is then set upon the top of the stem and secured thereon rigidly by a nut, whereby it may be employed to turn the stem when it is desired to lock or unlock the valve-disks.

The sleeve E E' and the trunnions or spuds G G do not interfere with the turning of the stem, as these trunnions or spuds project only so far into the sleeve as to insure sufficient grip therein to lift and lower the valve-stem to open and close the valve. The employment of the sleeve E E' in two sections with

notches F F and spuds G G renders it very easy to remove the upper harness when it is desired to remove the stuffing-box head to re-stuff the box or to remove the cap B to get at the interior of the valve.

It is apparent that to a skilled mechanic other forms of locking device for the valve-disk will suggest themselves. Thus, instead of employing the wedges and inclined faces, the block K may be made of a form oval in horizontal cross-section, in which case the turning of the block will result in its periphery impinging against the disks M M' by a longer diameter than when the valve was unlocked, which would lock the disks; but the wedge form is the most certain.

I am well aware that many devices have been heretofore patented for locking the valve-disks when completely closed; but the distinguishing feature of my valve is that it can be moved freely up and down and be locked at will at any desired point. The valve-disks or movable parts do not require to rest below upon any support in order to effect the locking. In my device they hang freely suspended from the stem D at all times until locked, and the whole locking device is embraced in the movable parts.

My wedge-block K is set upon the screw-threaded foot of stem D, and when the stem is turned to lock the valve there is no vertical movement imparted to it. The vertical movement is only used to open and close the valve, and has no effect upon the locking mechanism. This arrangement enables me to lock at any point of opening. When used upon a paper-pulp digester, the valve is set upon the discharge-pipe and can be easily cleared of clogged pulp. The removal of the upper parts and the cap and the taking out of the internal mechanism will leave the valve-cylinder clear and easy of access to the operator. My valve can, however, be applied to many various uses where it is necessary to shut off currents of liquid or vapor.

It will be observed that in unlocking my disks to shift them by the action of the screw-threads D' the wedge-block K is drawn up against the lower side of plates R R', each of which is attached to the back of one of the disks. (See Figs. 1, 2, and 9, and at R, Figs. 4, 5, and 6.) The lift J engages in slots J' in the inner edges of these plates, and a half-round notch, J", in each (see Figs. 4 and 6) clasps the stem D. As the wedge-block is forced up by the screw-threads D' it jams the lower faces of these plates between itself and the stop J, thus holding the valve-disks firmly and steadily against vibration during the movement and when the movement ceases the disks are again locked against the inner face of the valve-shell by a reverse movement of the screw-threads D'.

I have described my device with reference to its being used in such a position that the stem is vertical. Its position may, however, be varied to that of any incline.

What I claim as new is—

1. In a straight-way gate-valve, the combination of the shell A, revolving stem D, screw-threaded at its lower extremity, valve-disks M M', wedges K' K'', incline faces L L', and lift J, whereby the valve-faces can be raised or lowered to any point of the interior of the valve-cylinder by sliding the stem upward and downward and locked thereat by turning said stem, substantially as described.

2. In a straight-way gate-valve, the combination of the shell A, stem D, so adapted as to be capable of being revolved as well as of being shifted upward and downward therein independently of its revolving motion, lift J, attached to said stem, and wedge-block K, operated by the turning of said stem D to jam against the back of valve-disk M and lock the latter at any point of opening of the valve, whereby the valve-disk M' can be raised or lowered by the stem D to any desired point in the interior of the valve-cylinder and locked thereat by turning the stem, substantially as described.

3. In a straight-way gate-valve, the combination of the stem D, adapted to be revolved to lock or unlock the valve, and also to be moved upward and downward to any point to open and close the same independently of the locking mechanism, lift J, engaging with the back of the disk-valve M', wedge-block K, with its wedge K', said block engaging by a female screw-threaded hole with the lower screw-threaded end of stem D, and inclines L' upon the back of said disk, adapted to engage with the wedge K', all combined and operating substantially as and for the purposes described.

4. In a straight-way gate-valve, the combination of the shell A, stem D, having two independent motions—viz., a vertical sliding motion to open and close the valve, and a revolving movement independent of the former motion to lock the valve-disks fixedly against vibration at any point of opening—and a wedge-block upon stem D, adapted by the turning of this stem to jam against the back of valve-disk M', substantially as and for the purposes described, whereby the valve-disk can be shifted to any point of the interior without locking, and can there be locked firmly at will, substantially as described.

5. In a straight-way gate-valve, the combination of shell A, cap B, valve-disk M', to open

and close the valve-opening, stem D, to raise and lower said disk, sectional sleeve E E', provided with notches F F and set upon said stem outside the valve-shell A, and lever-arm H, suitably hinged or jointed to said shell, provided with a collar to embrace said sleeve, with inner spuds, G G, to engage in said notches, all held down by a screw-nut or other suitable device, whereby the stem can be raised and lowered by the lever, and the parts can be easily and quickly removed, substantially as described.

6. In a straight-way gate-valve, the combination of valve-shell A, cap B, valve-disk M', to open and close the valve-opening, stem D, to raise and lower said disk, a loose sleeve or collar claspings said stem outside the valve-shell, provided with suitable mechanism to raise and lower the stem, and hand mechanism I, to turn the stem in said sleeve, said mechanism I and said sleeve being held down upon said stem by a screw-nut or other well-known mechanical means, whereby the stem can be turned independently of upward and downward motion, and can be raised and lowered without turning the same to effect the vertical movement, substantially as described.

7. In a straight-way gate-valve, the combination of valve-shell A, cap B, valve-disk M', to open and close the valve-opening, stem D, to raise and lower said disk, and hand mechanism I, attached to and adapted to turn said stem, said stem being adapted to be turned without vertical movement, and to be raised and lowered by mechanism located above cap B and attached to said stem, without requiring to be turned to effect said vertical movement, substantially as and for the purposes described.

8. In a straight-way gate-valve, the combination of valve-shell A, cap B, valve-disk M', stem D, screw-threaded at D', to raise and lower said disk, block K, plate R', attached to the back of said disk and claspings said stem D over said block, and stop J on said stem, engaging in a notch in said plate R', whereby as the block K is raised by a turn of the stem D it holds the plate R' firmly by jamming it upward against the stop J, and the disk is securely held against vibration while being shifted, substantially as described.

THEOPHILUS ATCHESON.

Witnesses:

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WM. H. CARSON.