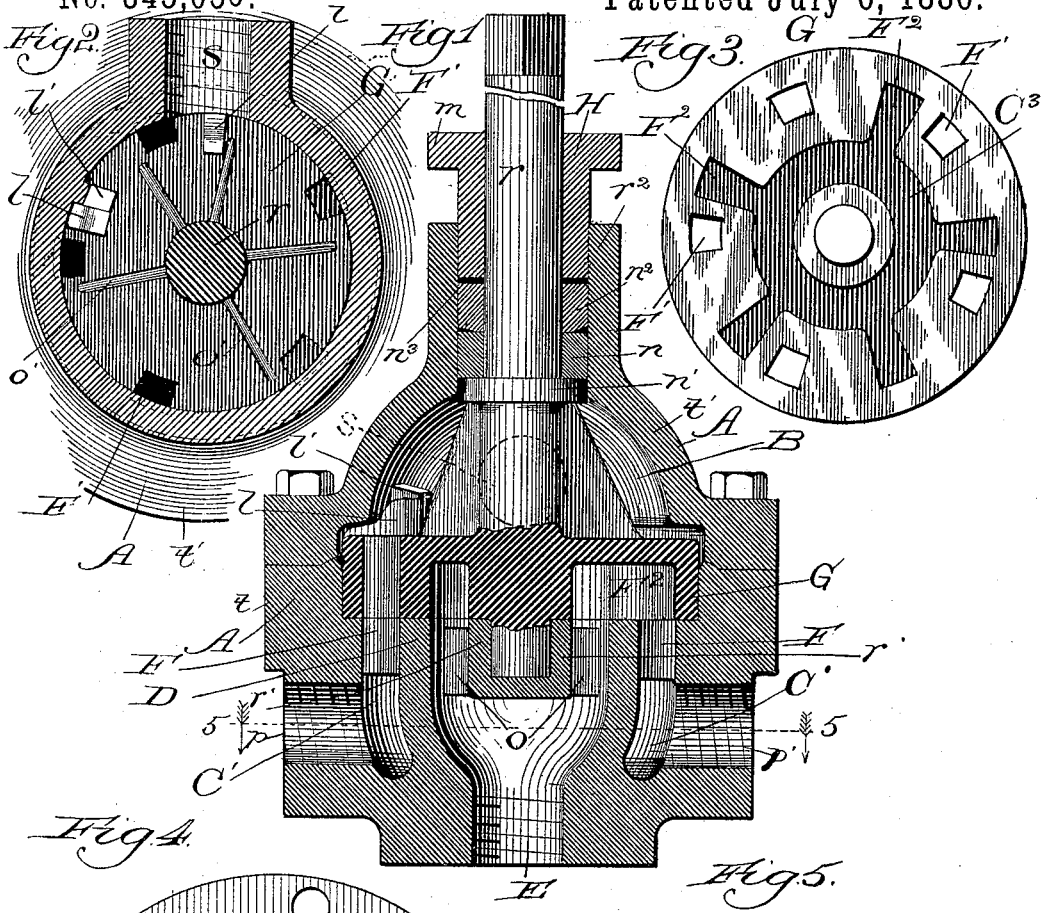
(No Model.)

F. HENNEBOEHLE.

VALVE.

No. 345,056. Patented July 6, 1886.



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FRANK HENNEBOEHLE, OF SOUTH CHICAGO, ILLINOIS.

VALVE.

SPECIFICATION forming part of Letters Patent No. 345,056, dated July 6, 1886.

Application filed September 14, 1885. Serial No. 177,026. (No model.)

To all whom it may concern:

Be it known that I, FRANK HENNEBOEHLE, a subject of the Emperor of Germany, residing at South Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Valves; and I hereby declare the following to be a full, clear, and exact description of the same.

My present invention relates to an improvement upon the valve for which Letters Patent of the United States, No. 323,144, were granted to me on the 28th day of July, 1885.

Reference to my aforesaid patent will show that the device therein described and claimed affords a single valve, of which two are necessary to actuate a piston in both directions.

It is my object to provide a double valve embodying the essential principles of operation of my said former device, but constructed differently to render it capable of being used to answer the purpose of two of the same.

My invention therefore consists in the general construction of the device, and also in certain details of construction and combinations of parts, all as hereinafter more fully set forth.

Referring to the drawings, Figure 1 is a vertical central section of my improvement; Fig. 2, a top plan view of the valve; Fig. 3, a bottom plan view of the same; Fig. 4, a plan view of the valve-seat, and Fig. 5 a sectional plan view of the same, taken on the line 5 5 of Fig. 1.

As in my aforesaid patent, for convenience in explaining the working of my present improvement, the description of its operation is confined to its supposed connection with a cylinder containing a piston head and rod reciprocated by hydraulic pressure, though the device is as perfectly operative as a steam or air pressure valve.

A is the shell, formed in two parts, t and t', the upper part, t', containing the valve-chamber B, provided with the discharge-outlet s toward one side, communicating with the chamber B, and with an opening in its upper side surrounded by a wall, r^2, forming an extension, and through which passes the stem r.

D is the valve-seat, cast with the part t of the shell, provided with a central opening, affording the inlet E, to communicate with the water-supply, and extending through the valve-seat, from which radial braces o project inward to support the seat r' of the stem r. The lower portion of the shell contains two chambers, C and C', which are separated from each other by walls q and q', and communicate, respectively, with conduits p and p', to be connected with a cylinder at opposite sides of the piston contained therein. Openings F, preferably of the form shown, extend into the chambers C and C' from the top of the valve-seat, leaving spaces between them of predetermined dimensions.

G is the valve, comprising a disk cast with the stem r, which is strengthened in its position by means of braces o'. Openings F' are provided in the valve to extend through it, and are similar in form, and to coincide with the openings F in the valve-seat, but preferably fewer by one than the latter, for a purpose hereinafter set forth. Between the openings F' are chambers F^2, extending radially from a central chamber, C^3, in the valve. The stem is provided with a flange, n', and is held in its position upon the valve-seat by means of a loose collar, n, a loose collar, n^2, upon the collar n, and beveled, as shown, on its under surface, to produce the least possible frictional contact, a lead ring, n^3, surmounting the collar n^2, to be flattened out by the pressure from above and prevent leakage, the collars and rings surrounding the stem within the extension r^2, and a bushing, H, which is fastened in position, to prevent the pressure from displacing the valve, by means of screw-bolts (not shown) extending through its flange m downward into the extension r^2. Of the parts surrounding the stem only the lead ring affords a packing by its spreading with the pressure brought to bear upon it.

The collars n and n^2 serve the purpose of holding the stem true and guiding it, and of permitting the valve to be turned with ease whenever the flange n' shall stick, as it frequently may do, from rust or other cause, to the collar n. When this sticking occurs, the beveled surface of the collar n^2 will permit the stem and collar n to turn together without great resistance, owing to the comparative lack of friction due to the beveled surface of the collar n^2.

The valve is operated by turning it at the stem by means of a suitable handle or crank applied to the upper end of the same, lugs *l* being provided on the upper surface of the valve portion G, to abut on their adjacent sides alternately against a lug, *l'*, properly located for the purpose on the inside of the part *t'* of the shell A, and thus prevent turning too far.

To start the device, the inlet E is connected with the water-supply, the valve being in a position to prevent ingress of water to either conduit *p* or *p'*, or through the outlet *s*. In other words, the device is closed, which is effected by turning the stem *r* sufficiently far to bring the lugs *l* equidistant from the lug *l'*, means, in the form of a line of indication, being provided to show its attainment of such position, in which the openings F' and chambers F^2 in the valve or cover are closed by the spaces between the openings F, leading into the chambers C and C' in the valve-seat, and the openings F in the valve seat are covered by the spaces between the openings F' and chambers F^2 in the valve. Thus no water can escape into the conduits *p* or *p'* or pass through the valve, which is secured upon its seat to resist the force of pressure. By turning the valve in one direction from the position thus described as far as the adjacent lug *l* will permit three of the chambers F^2 in the valve will be brought coincident with three openings F, whereby the water can enter the latter by way of the chambers F^2, and escape through a chamber—say C'—into a conduit, *p'*, and thus reach the cylinder on one side of the piston. By turning the valve in the opposite direction till stopped by the other lug *l*, three of the five openings F' will coincide with the same openings F previously covered by the chambers F^2, allowing the water forced into the cylinder to return and escape through these openings F' in the valve into the outlet *s*, while three of the five chambers F^2 will have been caused to coincide with three of the six openings F in the valve-seat communicating with chambers C, and thus permit water to enter the cylinder in the opposite side of the piston by way of the conduit *p*, thus forcing the water on the other side thereof out in the manner already described. The working of the piston is continued by operating the valve, as required, in the same manner, it being understood that by turning the valve to its full limit in one direction the contents of the piston-cylinder are allowed to escape, and at the same time the cylinder is replenished from its opposite end, and that by turning the valve one-half the distance the openings F' and chambers F^2 therein are caused to be out of coincidence with openings F in the valve-seat, thus preventing any water from entering or leaving the cylinder by way of the conduits *p* or *p'*, or from passing through the openings F', and by way of the chamber B into the discharge-outlet *s*. Though, to save space, it is ordinarily preferred to provide openings F' and chambers F^2 one less in number than the openings F, whereby one is continually borrowed from each preceding set, or has to do double duty, it is obvious that the arrangement could be such as to produce proper operation of the device by providing the same number of each, and any number of openings F and F' and chambers F^2, more or less than the number shown, may be provided.

It will be noticed that in my present device the inlet and discharge openings are reversed from the position shown and described in my aforesaid patent, this arrangement enabling me to avoid the construction whereby a counter-pressure is exerted against the under side of the valve to overcome the effect of the weight of the water on the top of the same, thus simplifying the construction and obviating any deleterious effect of the pressure by changing its direction.

What I claim as new, and desire to secure by Letters Patent, is—

1. A valve comprising, in combination, a shell, A, having an inlet, E, an outlet, *s*, and an extension, r^2, an annular valve-seat, D, within the shell having openings F, and separated chambers C and C', communicating with the said openings, conduits *p* and *p'*, communicating with the chambers C and C', a valve, G, upon the valve-seat provided with openings F, and intervening chambers, F', on its under side, and a flanged stem, *r*, upon the valve extending through the extension r^2, and surrounded by a collar, *n*, a collar, n^2, beveled on its under side, a lead ring, n^3, and a bushing, H, fastened to the shell, the whole being constructed and arranged to operate substantially as described.

2. In a valve provided with an extension, r^2, the combination, with the stem provided with a flange, *n'*, and the valve portion, of the collar *n*, a collar, n^2, beveled on its under side, a lead ring, n^3, and a bushing, H, secured to the shell of the valve, substantially as and for the purpose set forth.

FRANK HENNEBOEHLE.

In presence of—
MASON BROSS,
WM. SADLER.