(No Model.)

2 Sheets—Sheet 1.

B. W. SMITH.

ROTARY VALVE.

No. 535,737. Patented Mar. 12, 1895.

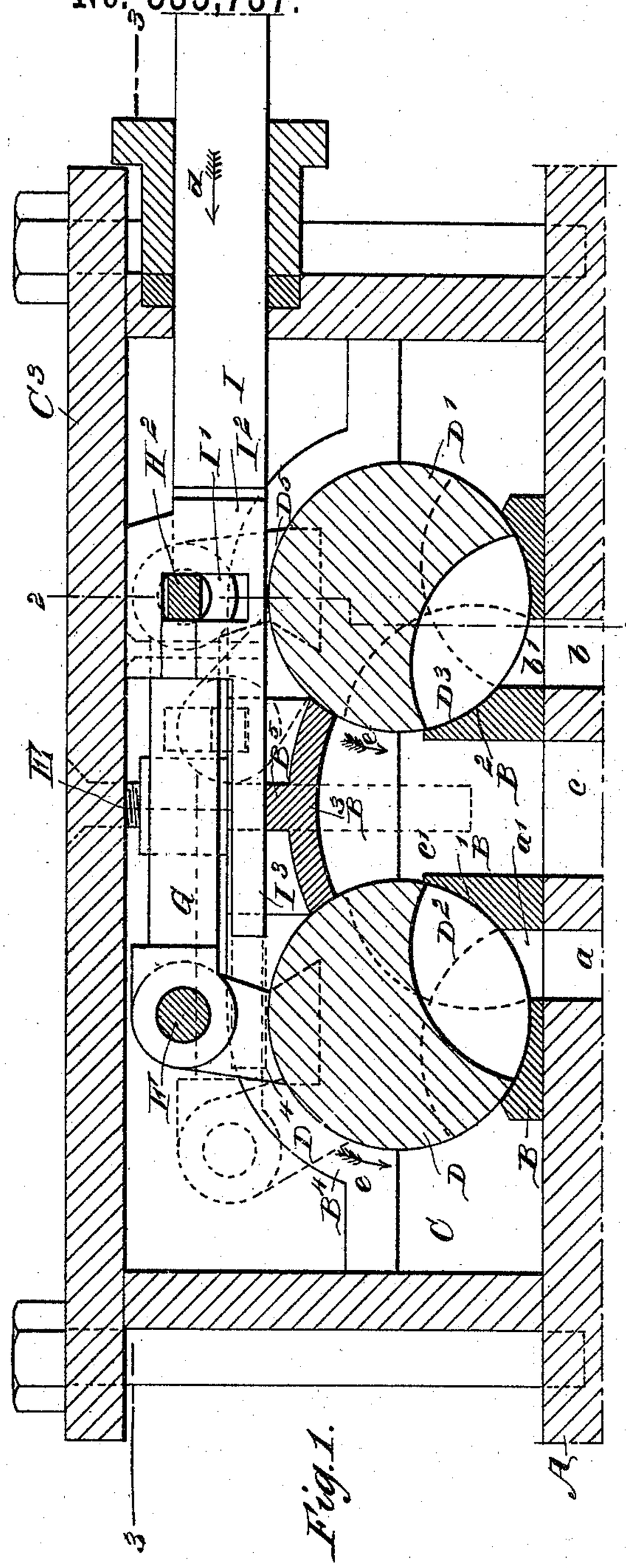

Fig. 1.

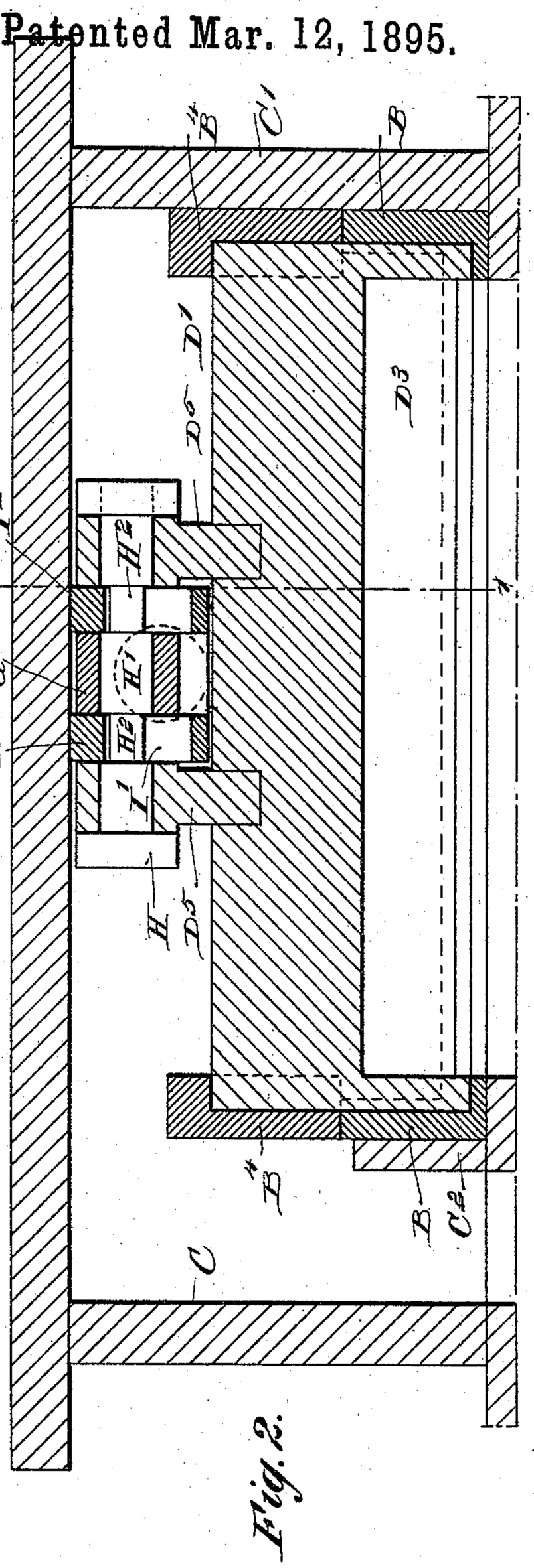

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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ROTARY VALVE.

No. 535,737. Patented Mar. 12, 1895.

Fig. 3.

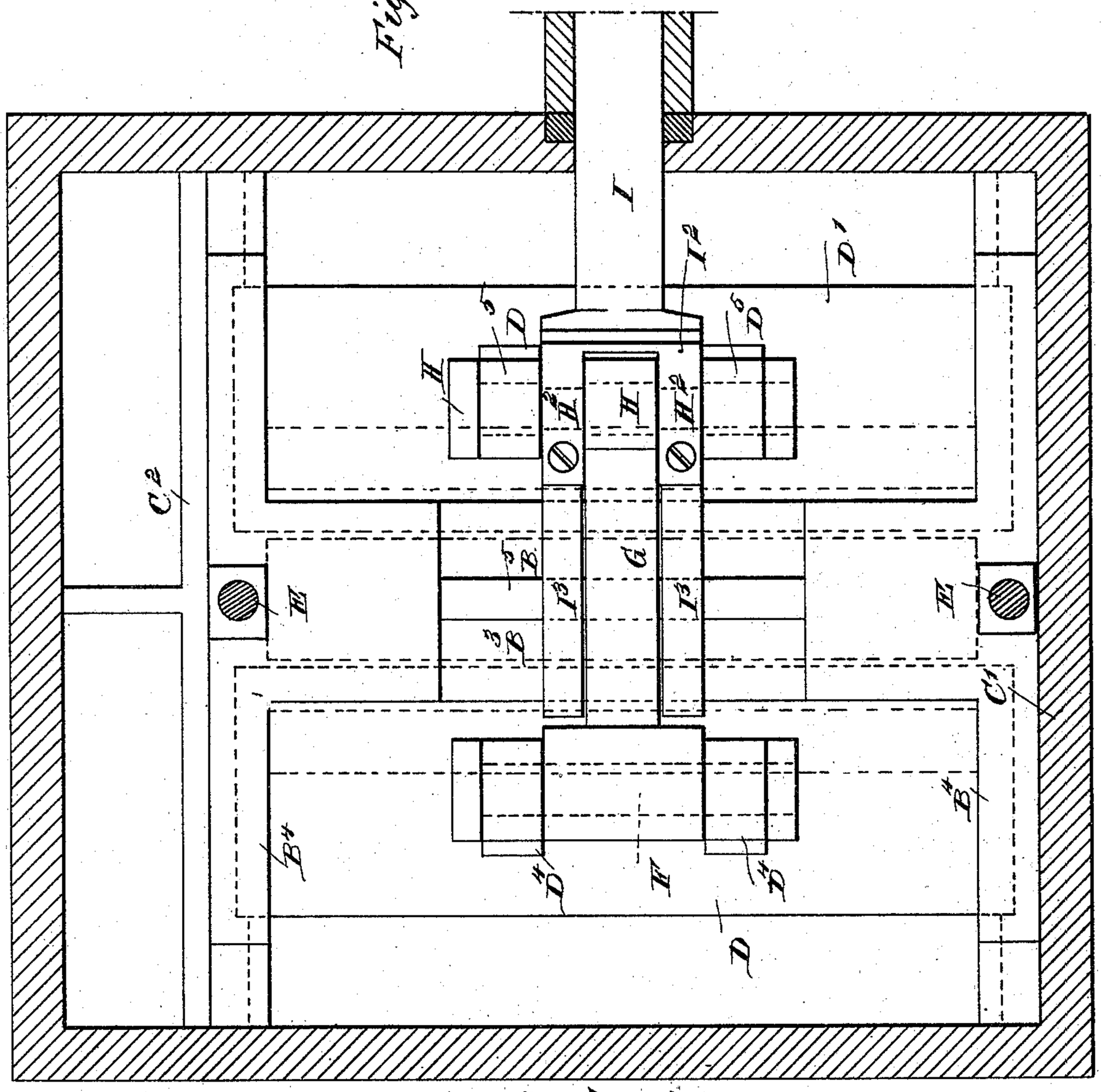


Fig. 4.

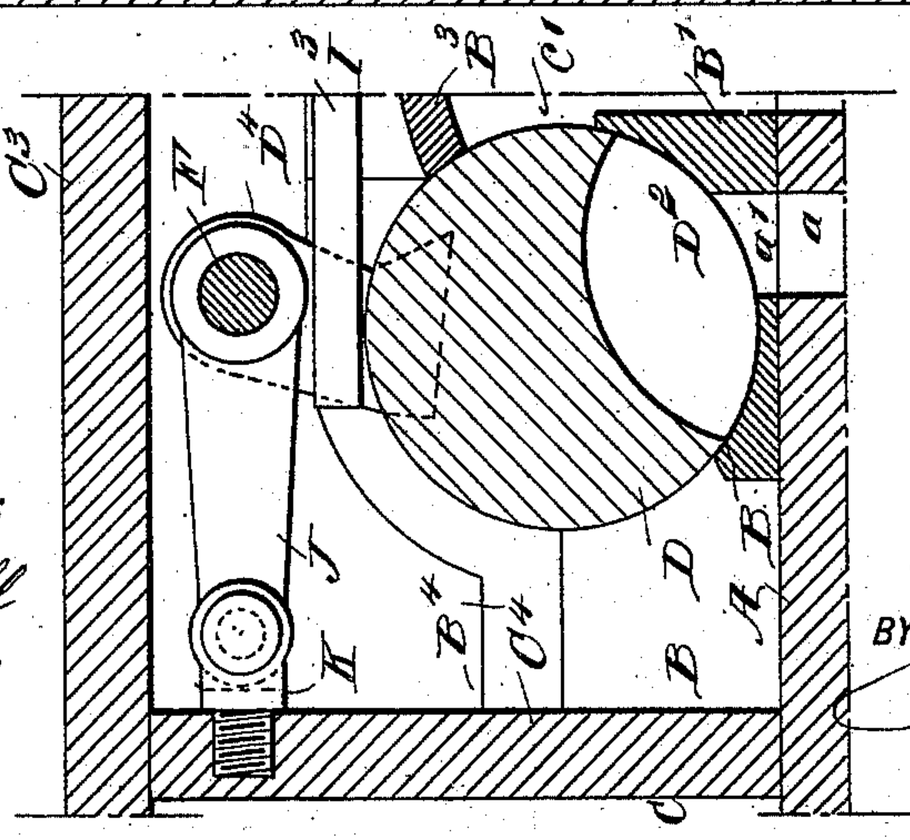
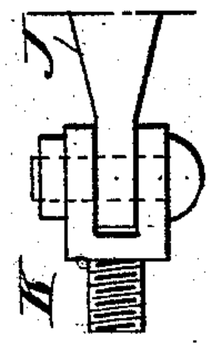


Fig. 5.



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UNITED STATES PATENT OFFICE.

BRAINERD WASHINGTON SMITH, OF DELPHOS, ASSIGNOR TO HIMSELF, AND JOHNSON BUTLER FLANDERS, OF TOLEDO, OHIO.

ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 535,737, dated March 12, 1895.

Application filed May 1, 1894. Serial No. 509,638. (No model.)

To all whom it may concern:

Be it known that I, BRAINERD WASHINGTON SMITH, of Delphos, in the county of Allen and State of Ohio, have invented a new and Improved Rotary Valve, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved valve, which is simple and durable in construction, very effective in operation, quick acting, and arranged to require but little power to operate it and without strain on the valve gear.

The invention consists in certain parts and details, and combinations of the same, as will be hereinafter more fully described and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the improvement, on the line 1—1 of Fig. 2. Fig. 2 is a transverse section of the same, on the line 2—2 of Fig. 1. Fig. 3 is a sectional plan view of the same, on the line 3—3 of Fig. 1. Fig. 4 is a sectional side elevation of a device for locking one of the valves in place in case of accident; and Fig. 5 is a plan view of a link for the device shown in Fig. 4.

The cylinder A is provided with the usual inlet ports *a* and *b* and the exhaust port *c*, of which the ports *a* and *b* connect with ports *a'*, *b'*, respectively, leading to valve seats B', B^2 respectively, set in the steam chest C, as plainly shown in Figs. 1 and 4, the said valve seats B' and B^2 being segmental and adapted to receive the cylindrical valves D and D' respectively, having their ends journaled in the sides of the valve body B, and in the cap B^4 thereof. The exhaust port *c* opens into a chamber *c'* formed between the segmental valve seats B' B^2, and between the two valves D, D', the top of the chamber being closed by a transversely-extending bridge B^3, forming part of the cap B^4, and having its side edges bearing on the peripheral surfaces of the cylindrical valves D and D'.

The cap B^4 is secured to the sides of the segmental valve seat by suitable screws E, which extend upward and pass through the cover of the steam chest C, as plainly shown in Fig. 1, to permit the operator to readily remove the cap B^4 on removing the steam chest cover. One side of the segmental valve seat rests against one side C' of the steam chest C, and the other side of the said valve seat abuts on a longitudinally extending rib C^2, forming part of the steam chest C, as will be readily understood by reference to Figs. 2 and 3.

The valves D and D' are formed in their peripheries with cavities or recesses D^2 and D^3 respectively, arranged in such a manner that when the valves are rocked in their bearings, then the said cavities alternately connect the interior of the steam chest C with the corresponding cylinder port *a* or *b*, and the said ports with the steam chamber *c'*. See dotted lines Fig. 1. In order to impart a rocking motion to the said cylindrical valves D and D', the following device is provided: On the top of the valves D and D' are secured upwardly extending lugs D^4 and D^5 respectively, of which the lugs D^4 carry a transversely-extending pin F, on which is pivoted a link G, engaging at its forward end the rounded portion H' of a pin H, carried in the lugs D^5 of the valve D'. The pin H is formed with the squared portions H^2 fitting in vertically-extending recesses I' arranged in the head I^2 of the valve stem I, extending through stuffing boxes in the inner end of the steam chest, to connect with the usual valve gear of the engine, for imparting a forward and backward sliding motion to the said stem to rock the valves D and D' in their seats. The head I^2 abuts with its top surface against the under side of the steam chest cover C^3, and from the said head extend rearwardly, the arms I^3, traveling on top of the transversely-extending rib B^5 forming part of the bridge B^3.

Now, when the several parts are in the position illustrated in Fig. 1, then both valves D and D' are closed, and when a sliding motion is given to the valve stem I, in the direction of the arrow *d*, then both valves D and D' are rocked in the direction of the arrows *e*, whereby the cavity D^2 connects the ports *a'*, *a*, with the exhaust chamber *c'*, and the cavity D^3 in the valve D' connects the ports *b' b* with the interior of the steam chest C, so that live steam can pass through the

said cavity D^3 and ports b' b to the inner end of the cylinder, to act on the piston therein, so as to move the latter on its outward stroke. Steam in front of the cylinder can pass through the ports a a' and cavity D^2 to the exhaust chamber c' and exhaust port c, to finally pass to the outer air in the usual manner. Now, when the piston nears the end of its outer stroke, then the valve gear will move the valve stem I in the inverse direction of the arrow d, whereby the valves D and D′ are rocked or turned in the inverse direction of the arrow e, and the cavity D^2 then connects the interior of the steam chest C with the ports a' a, while the other cavity D^3 then connects the ports b' b with the exhaust chamber c'. When this takes place, live steam passes through the valve D and ports a' a to the outer end of the cylinder, to force the piston on its inward stroke. Exhaust in front of the piston now passes through the ports b b', and cavity D^3 to the exhaust chamber c' and port c, to the outer air.

In case of the breaking of the outer cylinder head, the valve D is locked in place in a closed position, as illustrated in Fig. 4, so that this end of the cylinder does not take steam. In order to hold the valve D in a closed position I remove the connecting link G, and connect the pin F with a link J engaging a stud K screwing into the outer end C^4 of the steam chest C. The cavity D^2 now extends in the valve seat B′ over the port a', but does not open into the interior of the steam chest nor into the exhaust chamber c'. The other valve D′ only is now actuated by the valve gear, so that the inner end of the cylinder is the only one supplied with live steam.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A valve mechanism comprising two segmental valve seats held in the steam chest and provided with ports leading to the cylinder ports, cylindrical valves mounted to turn in the seats and each having a cavity adapted to connect the interior of the steam chest with the corresponding cylinder port and the latter with the exhaust chamber, lugs projecting from the said valves, a link connecting the two lugs with each other, and a valve stem connecting with one of the lugs, the said valve stem being provided with a head having vertically disposed slots engaging square portions of the pin in one of the lugs, substantially as shown and described.

2. A valve mechanism comprising two segmental valve seats held in the steam chest and provided with ports leading to the cylinder ports, cylindrical valves mounted to turn in the seats and each having a cavity adapted to connect the interior of the steam chest with the corresponding cylinder port and the latter with the exhaust chamber, lugs projecting from the said valves, a link connecting the two lugs with each other, and a valve stem separate and independent of the link and pivotally connecting with one of the lugs, the said valve stem being provided with a head adapted to engage with its top surface the under face of the steam chest cover, the said head being also provided with rearward extensions traveling on a rib forming part of the bridge for the said valve body, substantially as shown and described.

3. A valve mechanism comprising a segmental valve seat held in the steam chest, a cylindrical valve mounted thereon, a lug projecting from the valve, a link connected with the lug and a stud attached to the steam chest and with which said link is adapted to be connected to lock the valve, substantially as described.

BRAINERD WASHINGTON SMITH.

Witnesses:
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JAMES E. WICKHAM.