

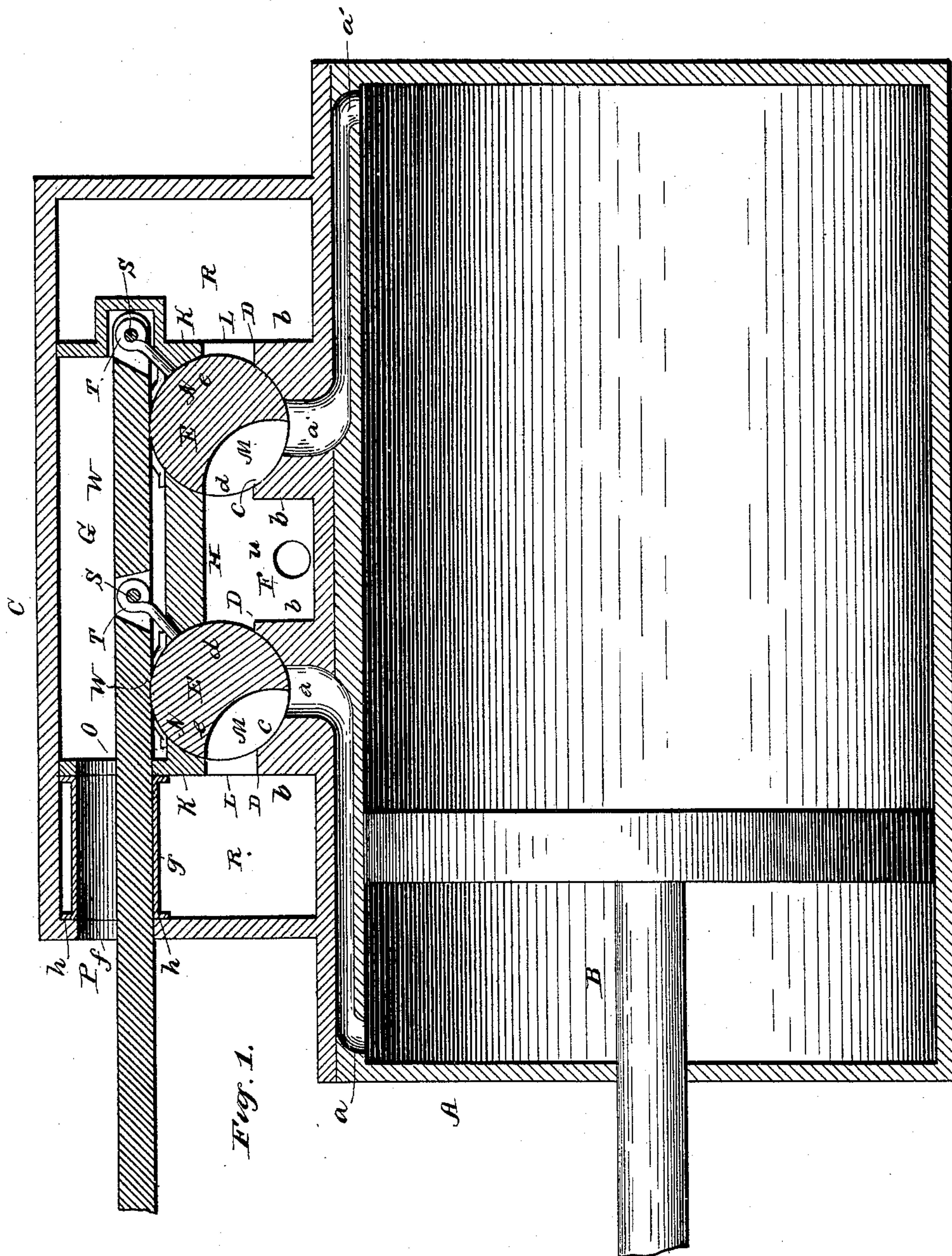
(No Model.)

3 Sheets—Sheet 1.

S. GRANT, Jr.
ROTARY VALVE FOR STEAM ENGINES.

No. 444,066.

Patented Jan. 6, 1891.



ATTEST.

Victor J. Evans.
J. F. Beale.

INVENTOR.

Samuel Grant Jr.

By W. A. Redmond
his attorney.

(No Model.)

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Fig. 2.

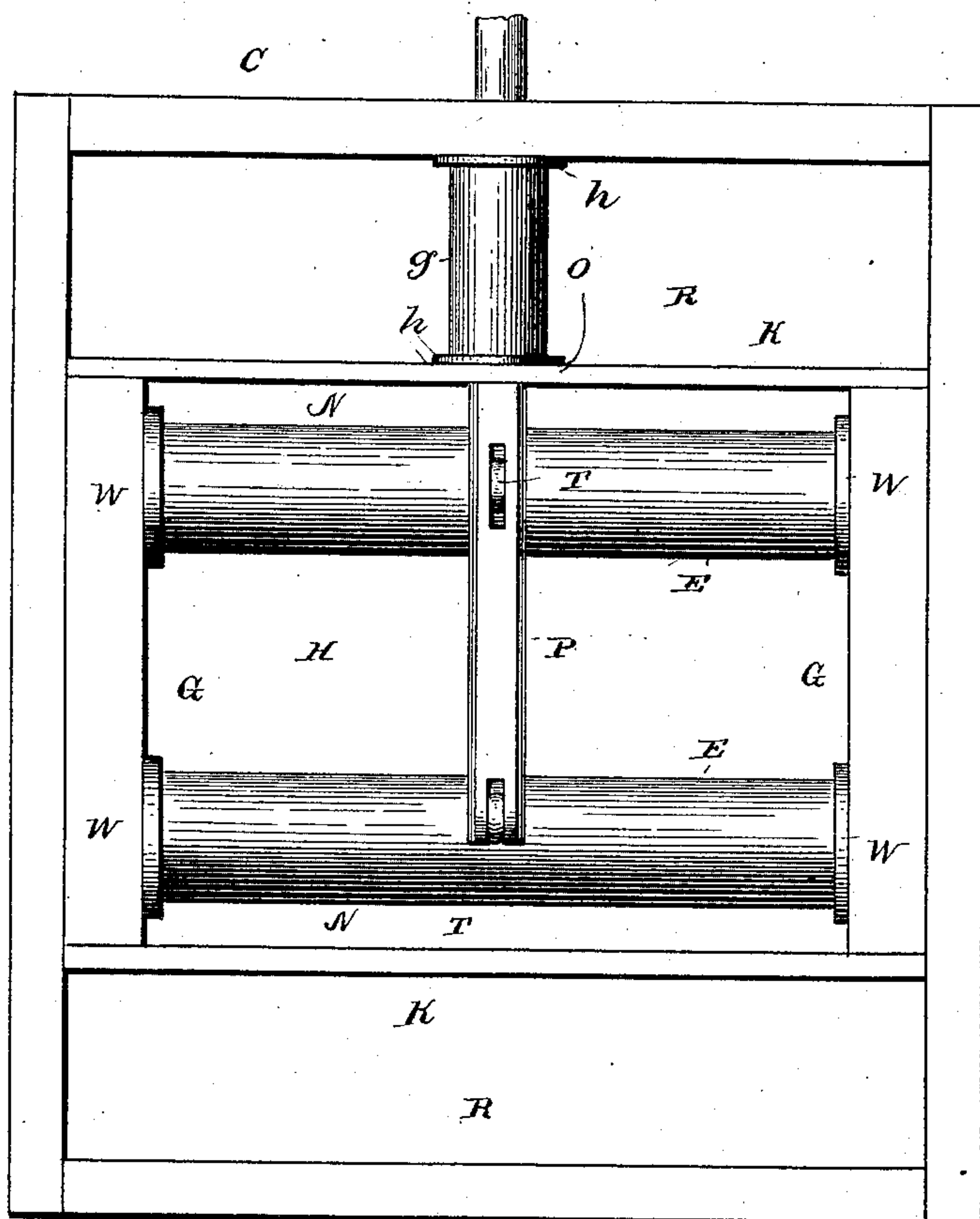
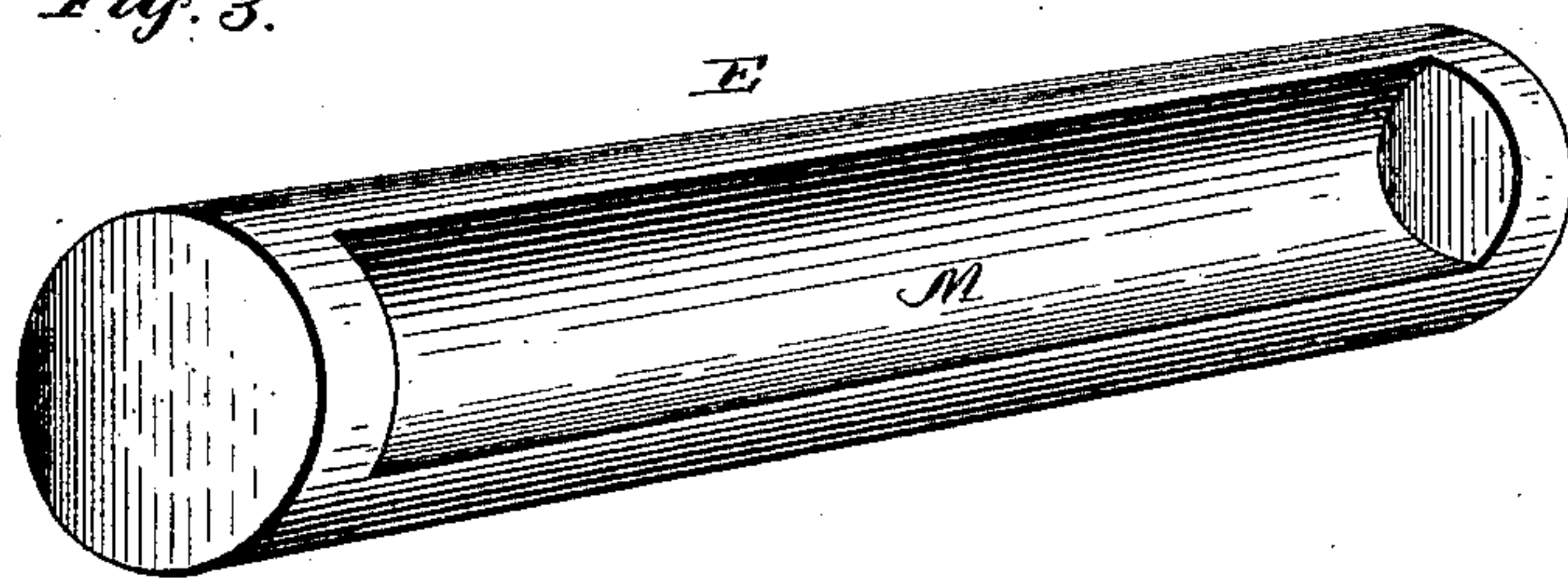


Fig. 3.



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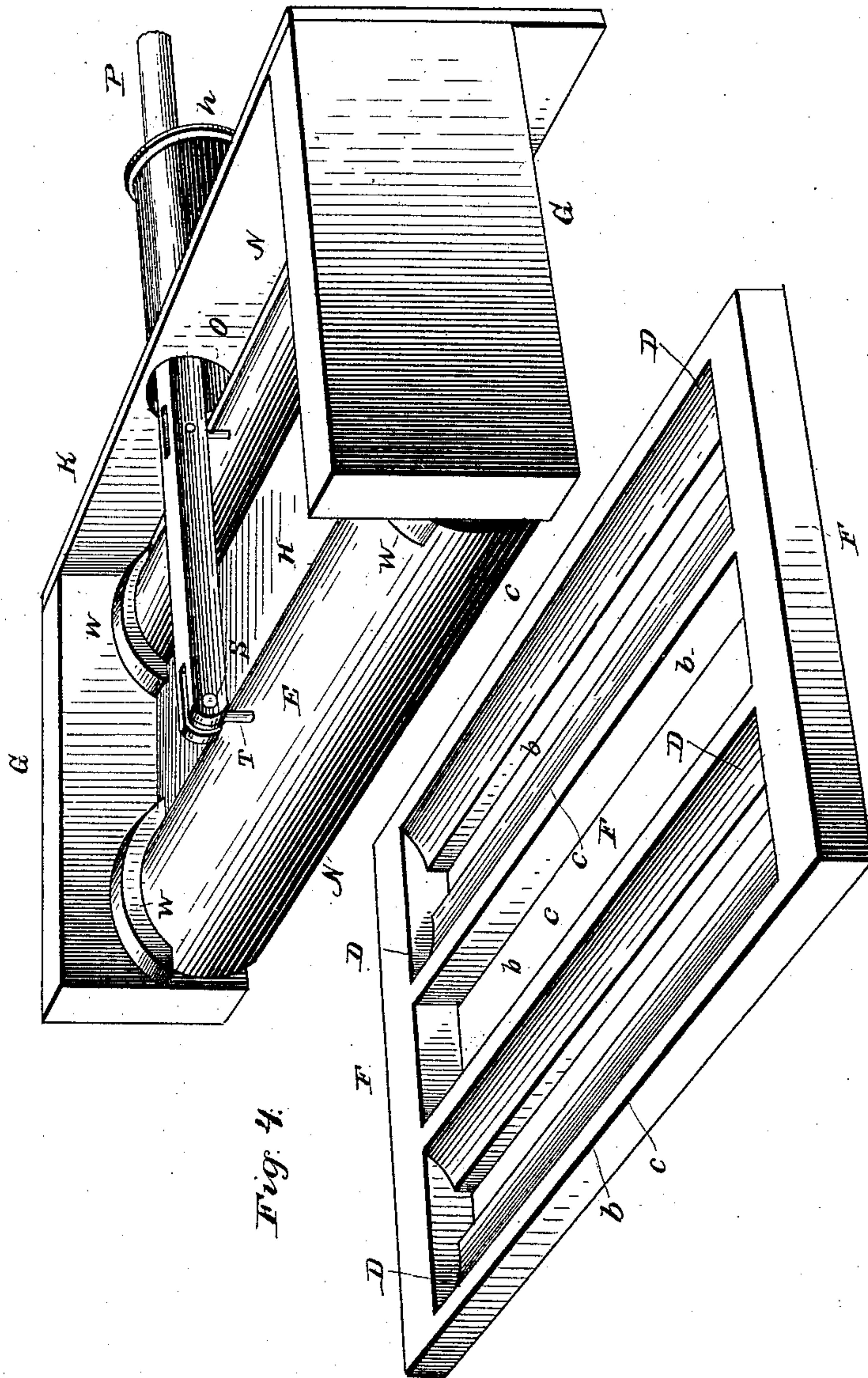


Fig. 4.

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UNITED STATES PATENT OFFICE.

SAMUEL GRANT, JR., OF FORT WORTH, TEXAS.

ROTARY VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 444,066, dated January 6, 1891.

Application filed April 25, 1890. Serial No. 349,469. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL GRANT, JR., a citizen of the United States, residing at Fort Worth, in the county of Tarrant and State of Texas, have invented certain new and useful Improvements in Rotary Valves for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates generally to steam-valves, and particularly to that class of steam-valves commonly known as "rotary valves;" and it has for its object to provide a simple, durable, and comparatively inexpensive valve of the class named adapted to more effectually perform its duties owing to the removal of all steam-pressure from the top or back of the valves, and also the removal of all stuffing or packing boxes from the valve-stem; and it consists in the arrangement of two valves having semicircular-shaped recesses formed longitudinally therein and adapted to be turned on their bearings on the valve-seats in the steam-chest as the steam is admitted to the cylinder and exhausted therefrom; and also in providing a steam-tight sleeve for the valve-stem without the use of packing or stuffing boxes of any sort, as hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a central longitudinal section through a cylinder having my improved valve attached; Fig. 2, a plan view with the top of the steam-chest removed; Fig. 3, a perspective view of one of the valves, and Fig. 4 a perspective view of the valve-seat and valves.

Similar letters refer to similar parts throughout all the views.

A represents a cylinder, and B a portion of a piston-rod and the piston-head of a steam-engine, said cylinder having the ports *a a'* near each end thereof leading to the steam-chest, and through which steam is admitted to and exhausted from the cylinder, as is customary. The steam-chest C is suitably secured to the cylinder and surrounds or covers the valve-seats D, which are either cast with or secured to the cylinder in any desired man-

ner. The valve-seats consist of the cross-pieces *b*, arranged parallel to each other in pairs, the upper contiguous edges of each pair being concaved or rounded out, as at *c*, to receive the valves E proper, the ends of said cross-pieces being joined by the end pieces F, which are cast therewith. Between each pair of cross-pieces the ports *a a'* open, and, according to the position of the valves, receive steam from the chest or exhaust-steam between the valves. The cross-pieces *b* stand or project a short distance above the cylinder, and on top of the same the frame which carries the valves rests. This frame consists of the end pieces G, joined or connected together by the central bar H, arranged about midway the height of the end pieces, the lower side edges of which are concaved or rounded out to fit the valves, as at *d*, to correspond with the valve-seats. At each side the end pieces G are connected by the side pieces K, near the lower edges of which are formed the slots L, through which the steam finds its way to the cylinder through the ports *a a'*. The side pieces K are preferably cast integral with the end pieces G and the bar H, and a strip N is cast with or secured to the inner side thereof, the lower side edge of which is concaved or rounded out, as at *e*, said strip being arranged in line with the central bar H. An opening O is formed in one of the side pieces with its lower edge on a line with or slightly above the upper surface of the strip N, through which the valve-stem P passes. This opening is of greater diameter than the valve-stem, and permits the same to rise and fall in its passage back and forth therein.

The frame for the valves is, as stated above, preferably cast in one piece, and rests on the valve-seats and is secured at about the center of the steam-chest and is held down thereon by the lid of the chest and is also additionally secured by screws or bolts to the end pieces of the seats. It will be seen that by this arrangement a chamber R is formed at each end of the chest which communicates with the boiler or steam-dome by means of pipes. (Not shown.)

The valves E are turned to a true cylinder, and on one side of each of them a semicircu-

lar recess M is formed, which extends for nearly the entire length of the rollers. The valves are placed with their recessed sides downward and rest on the valve-seats, the frame being placed on top thereof with its bar between and fitting on the valves, and the strips N resting on and accurately fitting said valves, thus holding the rollers firmly in place, but permitting them to turn easily when the valve-stem is moved, said stem being connected to the valves by pins S, passing through screw-eyes T, or other suitable short arms secured to the valves diametrically opposite the center of the recesses M in said valves.

To prevent the escape of steam at the ends of the valves, I cast with the frame the semicircular flanges W, which accurately fit over the ends of the valves, making a steam-tight joint at each end thereof and preventing the escape of the steam to the top of the valves within the frame. An opening *f* is formed in one end of the steam-chest corresponding in size and shape to and on a line with the opening O in the side piece K, through which the valve-stem passes. Between the end of the steam-chest and the side piece K a tubular sleeve *g*, having its opening corresponding in size and shape to the openings O and *f*, is inserted and secured at each end to the end of the chest and side piece K, respectively, by screw-bolts passing through its flange *h*. In order to make the joints perfectly steam-tight at the ends of the sleeve, said ends may be let into the chest and side pieces. In order to accommodate the forward throw of the stem, a recess or bonnet *m* is cast with the forward side piece K, as clearly shown in Fig. 1.

U represents an exhaust-opening between the valves.

In operation the steam is admitted to the chambers R and from thence to the cylinder at each end through the ports *a* or *a'*. As shown in Fig. 1, the steam is entering the cylinder through port *a* and exhausting through port *a'*, the steam passing from chamber R through L, semicircular recess M in valve E and port *a* to the cylinder, and exhausting through port *a'*, semicircular recess M in the opposite roller, into the space between the valves and out at exhaust-opening U, the valves being given a quarter-turn at each stroke of the piston.

From the above description it will be seen that I exclude all steam from the tops of the valves, or the space between the lid of the steam-chest and the upper surfaces of the bar H and valves, thus entirely obviating all friction which would be created by the steam-pressure on these parts, if it were admitted thereto. Also, it will be seen that I do away

with all stuffing-boxes for the valve-stem and provide a simple and secure steam-tight sleeve for the stem on its passage through chamber R.

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

1. The combination, in a rotary valve, of the valve-seats arranged in parallel pairs at each side of the valves, the valves having semicircular recesses on one side thereof, and the valve-stem pivotally secured to said rollers, substantially as described.

2. The combination, in a steam lower valve, of the valve-seats arranged in parallel pairs and having their contiguous side edges concaved or rounded out, the valves having semicircular recesses, the frame consisting of the end pieces, the central bar having its lower side edges concaved or rounded out, and the strips having their lower side edges concaved or rounded out, substantially as described.

3. The combination, in a rotary valve, of the valves having semicircular recesses formed in one side thereof, the seats for said valves having their upper side edges rounded out to correspond to said valves, the frame consisting of the end pieces, the slotted side pieces, the central bar having its lower side edges rounded out, the strips having their lower side edges rounded out, and the semicircular flanges cast with said end pieces and adapted to fit over the ends of said valves, substantially as described.

4. The combination, in a steam-valve, of the steam-chest having the chambers at each end, the valve-seats having rounded-out side edges, the valves adapted to fit said seats and having semicircular recesses formed therein, the central cross-bar having its lower edges rounded out to fit said valves, the strips having their lower edges rounded out, the side pieces having slots near their lower edges, the valve-stem loosely connected to said side pieces and the end of the steam-chest, substantially as described.

5. The combination, in a rotary valve, of the valves having semicircular recesses therein, the valve-stem loosely connected to the upper surfaces of said valves, and the steam-tight sleeve through which said stem passes, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL GRANT, JR.

Witnesses:

VICTOR J. EVANS,
THOS. E. WOODS.