(No Model.)

J. O'DONNELL.

ROTARY VALVE.

No. 383,976. Patented June 5, 1888.

Fig: 1.

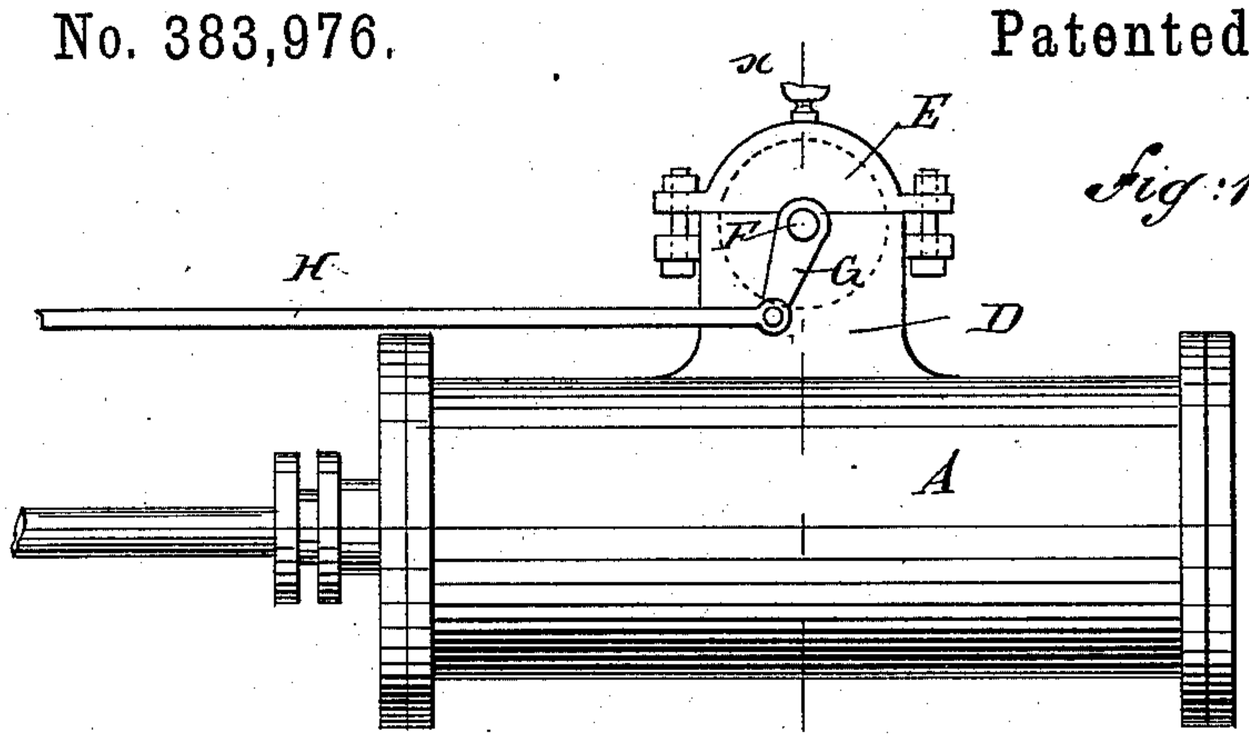


Fig: 2.

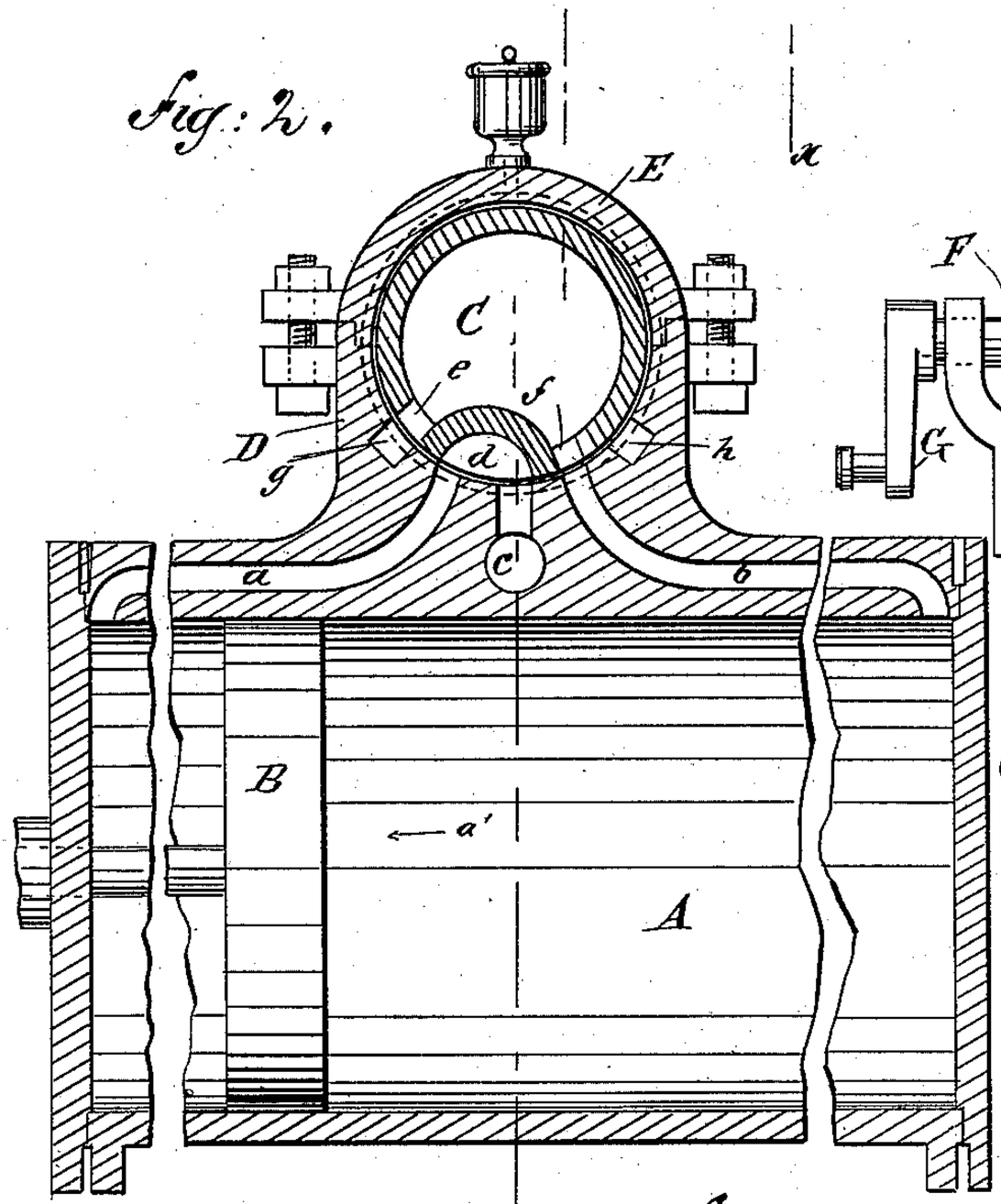


Fig: 3.

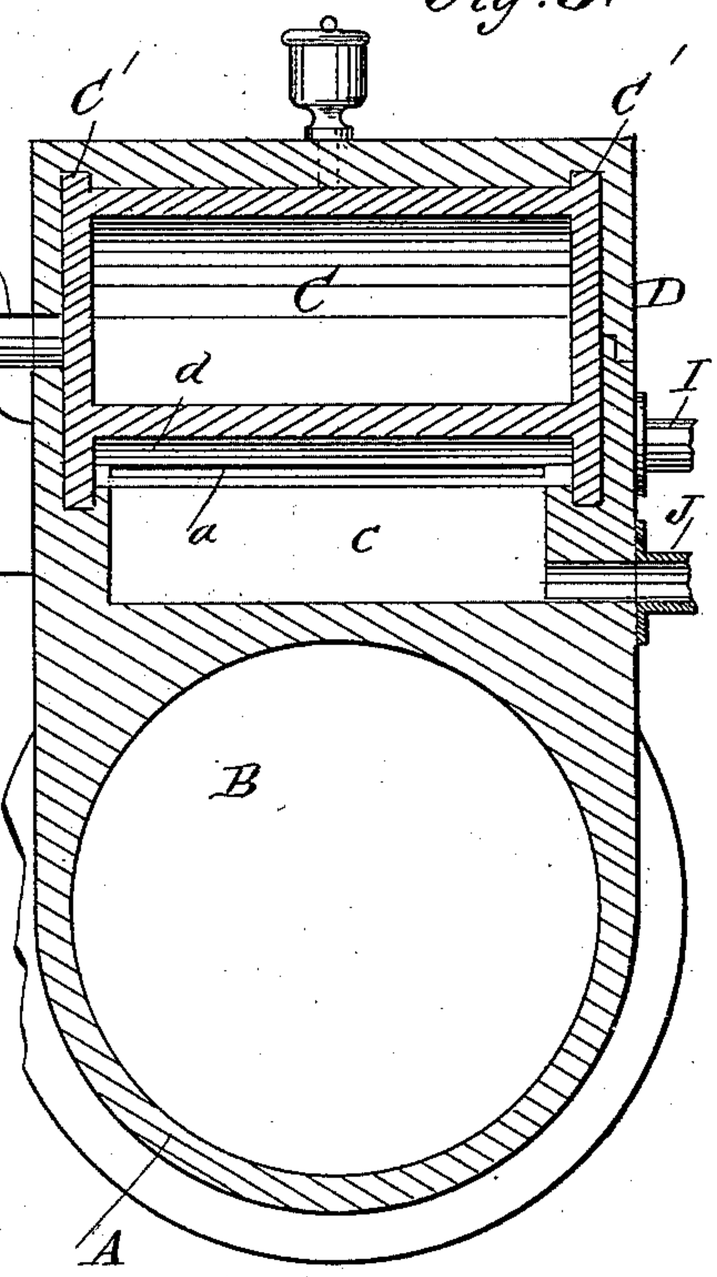
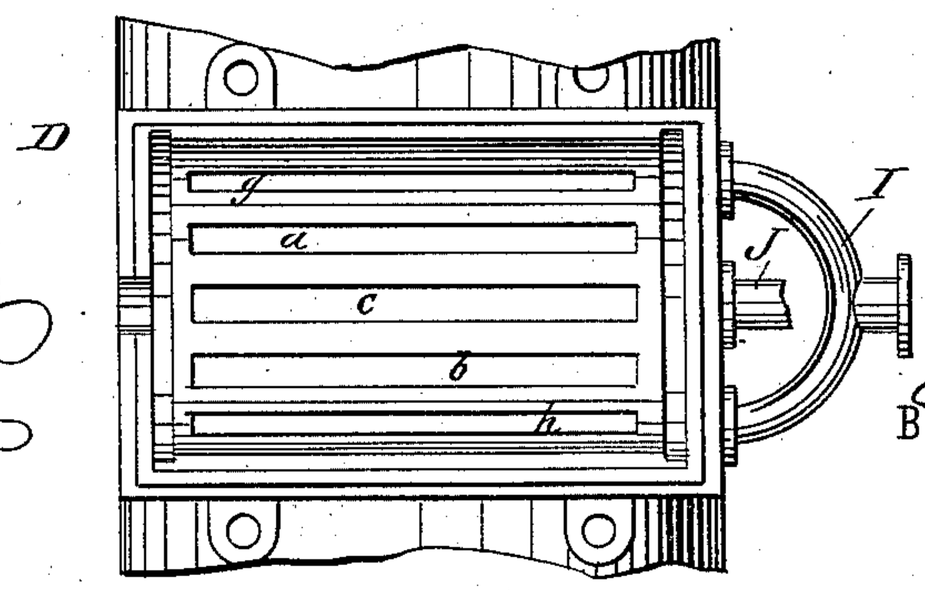


Fig: 4



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UNITED STATES PATENT OFFICE.

JAMES O'DONNELL, OF SAN FRANCISCO, CALIFORNIA.

ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 383,976, dated June 5, 1888.

Application filed November 29, 1887. Serial No. 256,410. (No model.)

To all whom it may concern:

Be it known that I, JAMES O'DONNELL, of San Francisco, in the county of San Francisco and State of California, have invented a new and Improved Rotary Valve, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved valve-gear for steam-engines, which is simple and durable in construction, perfectly balanced, and dispenses with the usual steam-chest.

The invention consists of a cylindrical oscillating valve provided with two ports connecting alternately the steam-supply with the ports leading to the cylinder, said valve being also provided with an external cavity in its rim connecting the exhaust-port alternately with the ports leading to the cylinder.

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

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 figures.

Figure 1 is a side elevation of a cylinder provided with my improvement. Fig. 2 is a longitudinal sectional elevation of the same. Fig. 3 is a vertical cross-section of the same on the line *x x* of Fig. 1, and Fig. 4 is a plan view of the valve-chest with the cover removed.

In the steam-cylinder A operates the piston B, connected in the usual manner with the main driving-shaft of the engine. The cylinder A is provided with the steam-inlet ports *a* and *b*, and the exhaust-port *c*, leading to the valve-chest D, provided with a removable cover E, fastened in any suitable manner on the fixed part of the valve-chest B. In the valve-chest D is held to oscillate a cylindrical valve, C, provided on each end with flanges C′, engaging similar grooves formed in the valve-chest D, so as to prevent an endwise motion of said valve C. One end of the valve C is provided with a central spindle, F, projecting outward and carrying a crank-arm, G, pivotally connected with the eccentric-rod H, connected in the usual manner with the eccentric on the main driving-shaft of the engine.

The valve C is provided in its rim with an external transverse cavity, *d*, arranged in such a manner that when the valve oscillates it connects the exhaust-port *c* alternately with the ports *a* and *b* of the cylinder. On each side of the cavity *d* are formed the transverse ports *e* and *f* in the rim of the valve C, and the ports *e* and *f* alternately connect the steam-inlet ports *a* and *b* with the channels *h* and *g*, formed in the valve-chest *d*, and connected with the steam-supply pipe I, which is branched for this purpose, as shown in Fig. 4. The exhaust-port *c* connects with the steam-exhaust pipe J.

It will be noticed that the ports *e f d* are located in the lower side of the valve and that the ports *g a c b h* are all placed below the median line of the casing E. The ports are placed below the central horizontal line, so that as the bottom of the valve and seat wear away and let the valve lower down the ports will all be below the space that will be formed between the upper part of the valve and its casing, and hence no steam can escape. Heretofore the inlet-valve ports in a similar valve have been on or above the median line, and hence escape of steam would eventually ensue.

The operation is as follows: An oscillating motion is imparted to the valve C from the main driving-shaft of the engine by the eccentric, the eccentric-rod H, and the crank-arm G. When the engine is in the position shown in Fig. 2, then the steam enters through the channel *g* and the port *e* into the interior of the valve C, and passes out of the same through the ports *f* and *b* into the cylinder A, thus propelling the piston B in the direction of the arrow *a′*. The steam in front of the piston B is exhausted through the port *a* and the cavity *d* into the exhaust-port *c*, and out through the exhaust-pipe J. When the piston B nears the end of its inward stroke, the eccentric reverses the position of the valve C, so that the port *f* connects with the channel *h* and the exhaust-port *c* connects with the port *b*. The port *e* in the valve C connects with the steam-inlet port *a*, while the channel *g* is closed by the rim of the valve C. The steam from the inlet-pipe I passes through the channel *h* and the port *f* into the valve C, and out of the same through the port *e* and the port *a* into the

front end of the cylinder A, thereby sending the piston B on its outward stroke in the inverse direction of the arrow *a'*. The exhaust now takes place through the port *b*, the cavity *d*, and the exhaust-port *c*.

It will be seen that by the simplicity of the oscillating valve C, I am enabled to lead the steam directly from the inlet-pipe into the cylinder without the use of a steam-chest, and it will also be seen that I can conveniently reverse the engine without shutting the throttle-valve of the steam-supply by changing the position of the valve C in the valve-chest D.

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

The combination, with the valve casing or chest E, having ports *g h a c b* in its bottom, and the cylinder A, to which the ports *a b* lead, of the tubular valve C, having a transverse cavity, *d*, in its under side connecting the port *c* with port *a* or *b* and ports *e f* at opposite sides of the cavity *d*, below the median line of the valve, and connecting ports *b g* or *a h*, substantially as set forth.

JAMES O'DONNELL.

Witnesses:
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