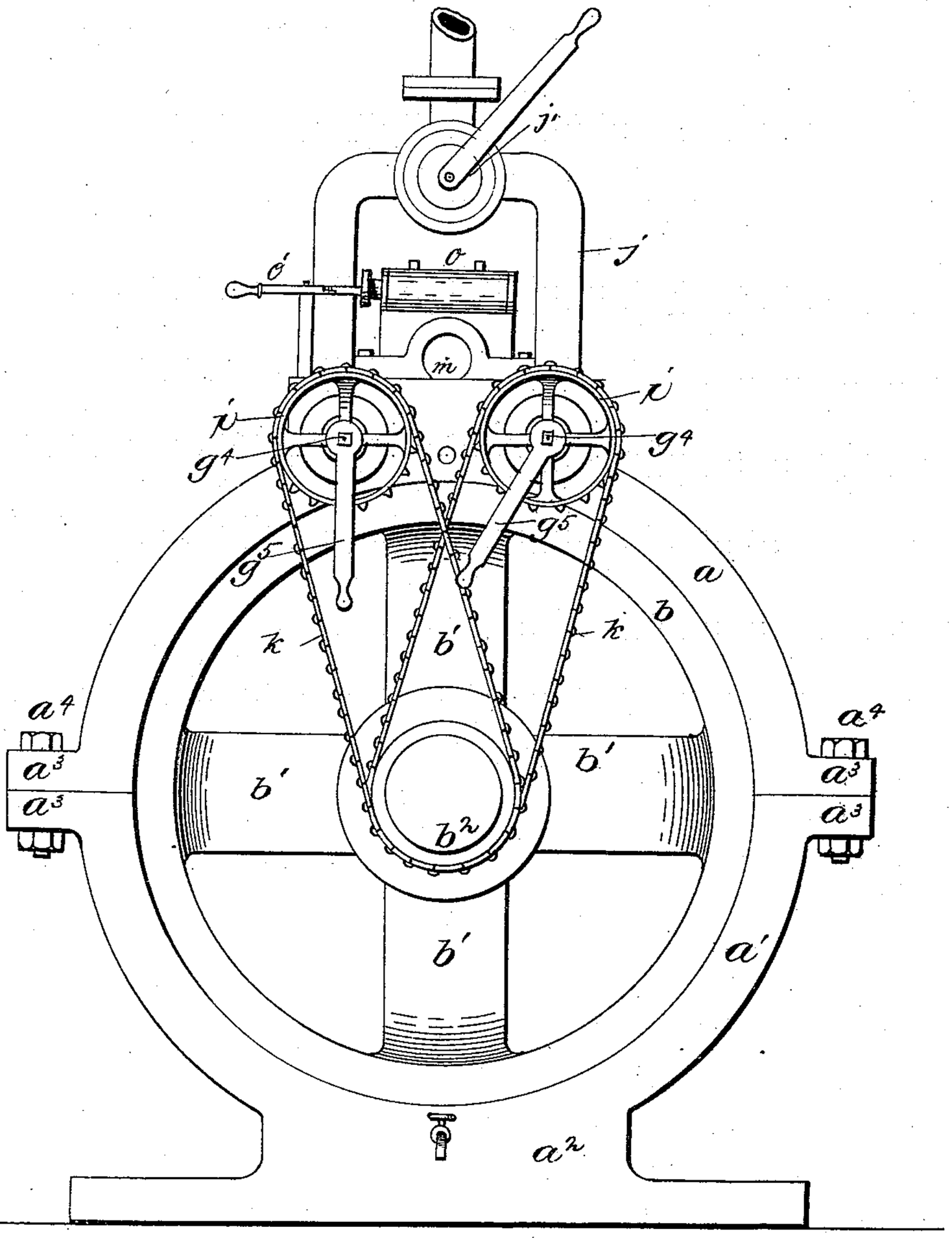
(No Model.) 3 Sheets—Sheet 1.

M. J. MAPES.

ROTARY STEAM ENGINE.

No. 464,162. Patented Dec. 1, 1891.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

M. J. MAPES.

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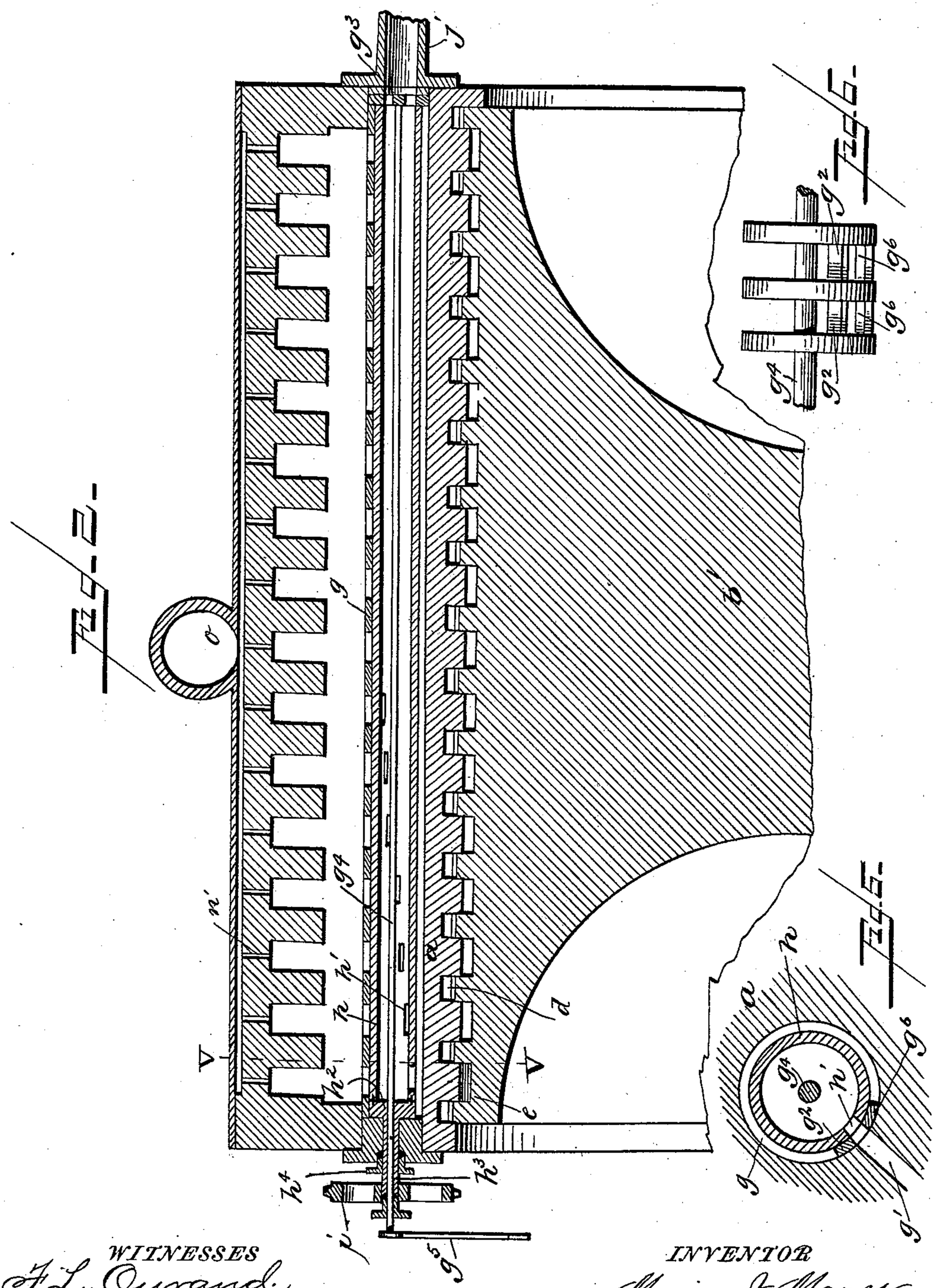

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(No Model.) 3 Sheets—Sheet 3.

M. J. MAPES.

ROTARY STEAM ENGINE.

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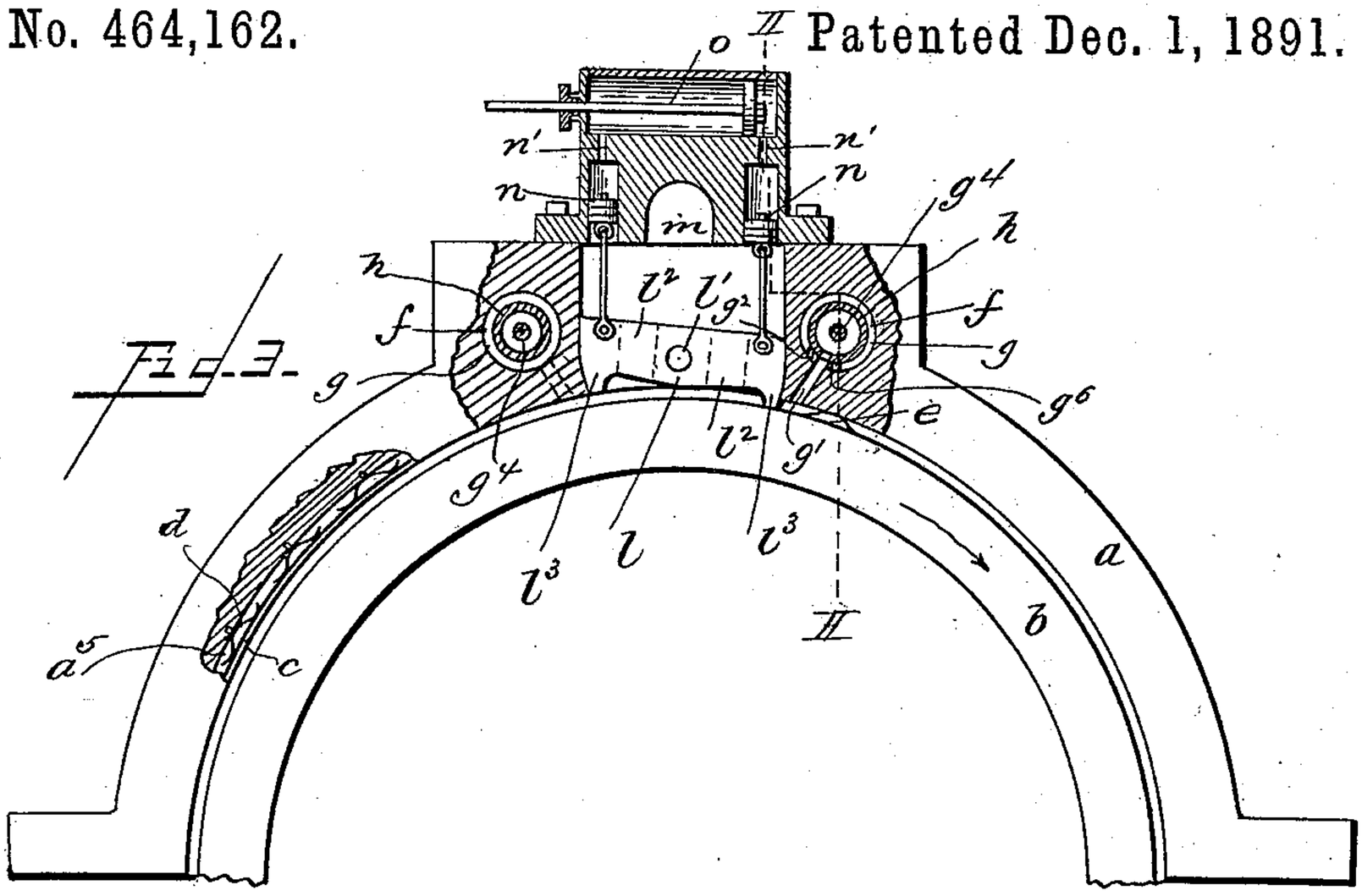

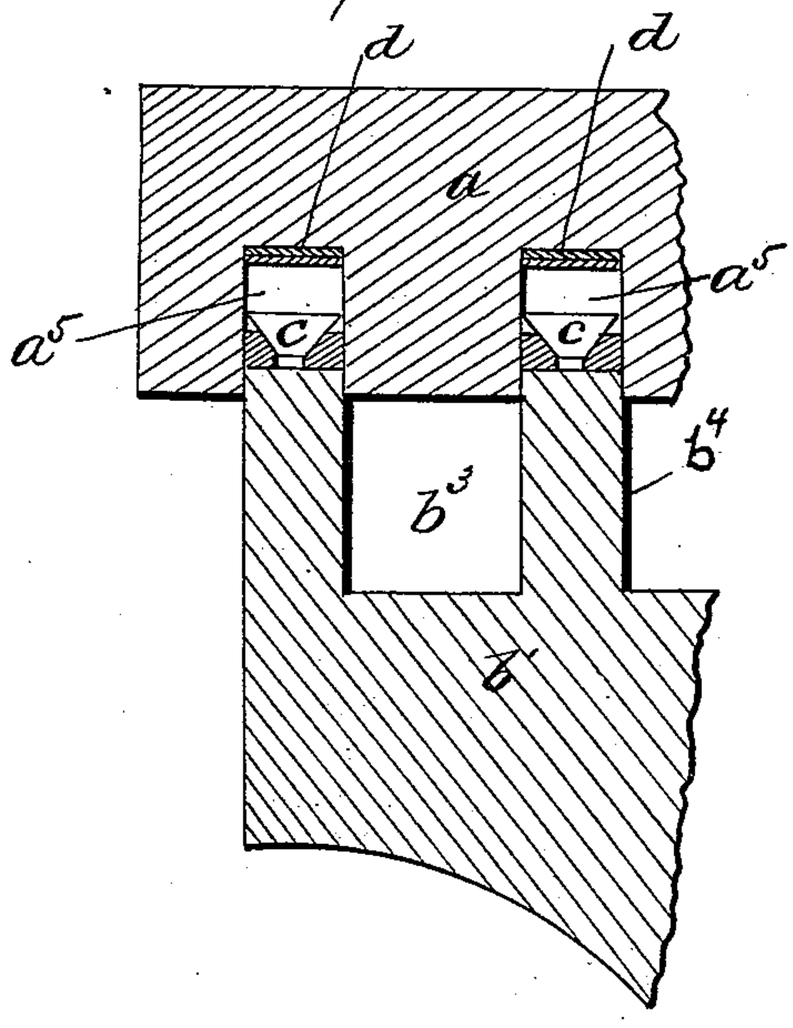

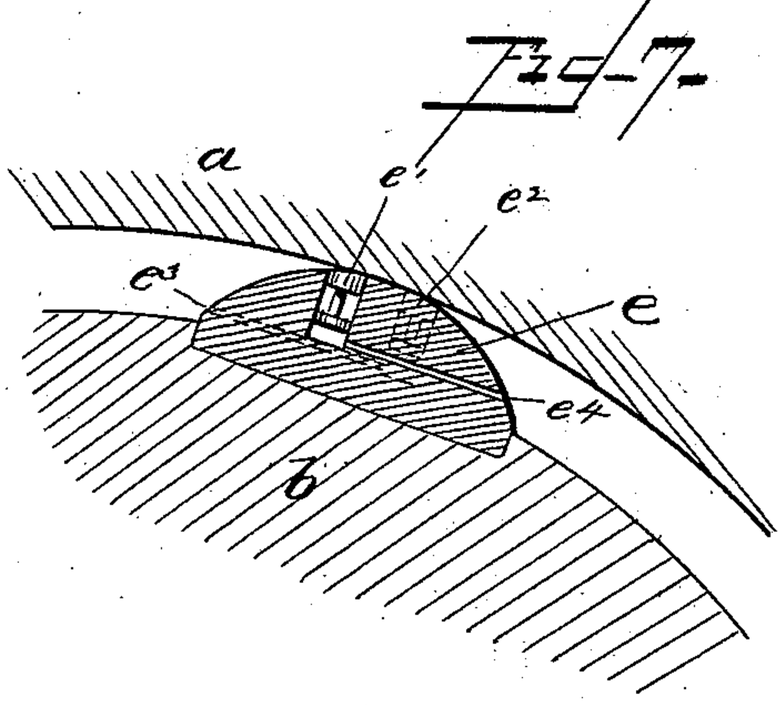

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UNITED STATES PATENT OFFICE.

MARION J. MAPES, OF BATH-ON-THE-HUDSON, NEW YORK.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 464,162, dated December 1, 1891.

Application filed March 14, 1891. Serial No. 385,102. (No model.)

To all whom it may concern:

Be it known that I, MARION J. MAPES, a citizen of the United States, residing at Bath-on-the-Hudson, in the county of Rensselaer and State of New York, have invented a certain new and useful Improvement in Rotary Steam-Engines, of which the following is a full, clear, and exact description.

The object of this invention is to construct a rotary steam-engine in which steam is admitted periodically to a piston to rotate it continuously, the power being taken from the shaft of the piston and the steam-valves being controlled by the rotation of the piston after starting.

In my engine I employ a cylindrical body, herein termed a "piston," arranged in a casing, herein called the "cylinder," the piston and cylinder being provided with alternating grooves and flanges fitting together and forming steam-chambers and the piston being provided with abutments in these steam-chambers, and valves for admitting steam successively into the several chambers or simultaneously into a number of them, an exhaust, and means for controlling the exhaust and the direction of rotation of the piston, as I will proceed now more particularly to point out.

I will describe the principle of my invention first and that best manner I have contemplated applying that principle, and will then particularly point out and distinctly claim the part or improvement which I claim as my invention.

In the accompanying drawings, illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is an end elevation. Fig. 2 is a cross-section, on a larger scale, taken in the plane of line II II, Fig. 3. Fig. 3 is a sectional elevation. Fig. 4 is an enlarged partial section in the same plane as Fig. 2. Fig. 5 is a partial section taken in the plane of line V V, Fig. 2. Fig. 6 is a side elevation of the valve-lining, and Fig. 7 is an enlarged sectional detail of the abutment.

In the form of engine selected to illustrate my invention the cylinder is composed of halves a a', the latter having the pedestal a^2, and both provided with flanges a^3 a^3, by which they may be united, as by bolts a^4. As shown in Figs. 2 and 4, the cylinder has the internal circumferential grooves a^5. The piston is shown as and may be a hollow cylinder b, having spokes or arms b', connecting it with a central shaft b^2, which is supported in suitable bearings. (Not shown.) The periphery of the piston is constructed with grooves b^3, which alternate with the grooves of the cylinder, so that the flanges b^4 of the piston enter the grooves a^5 of the cylinder. There are packings c, pressed outwardly by springs d, arranged in the grooves a^5 to make a steam-tight joint between the piston and its cylinder, so that the grooves b^3 may serve as steam-chambers for operating the piston. Each of these steam-chambers is provided with an abutment e of equal width and height to the chamber, and the several abutments in the several chambers are arranged at equal distances apart, so that the steam-chambers shall receive steam successively. These abutments are provided with pistons e' e^2, having steam-passages e^3 e^4 from opposite ends, by which they are supplied with steam to force out one or the other of them against the cylinder in accordance with the direction of rotation of the cylinder to make a steam-tight joint therewith.

There are two valves f f of like construction, one to run the piston forward and the other to reverse it. Each valve is composed of a lining g, fitted in a suitable opening in the cylinder and opening into the steam-chambers of the piston through the ports g'. As shown in Figs. 5 and 6, the lining g is a tube slotted circumferentially and leaving only a narrow longitudinal web g^2. The lining is provided with a perforated head g^3, to which is made fast a stem g^4, which extends beyond the valve and is provided with a handle g^5, by means of which the lining may be rotated axially. The rotation of the lining is limited by stops g^6, made fast to the cylinder. The valve-plug h is a tube having as many openings h' as there are steam-chambers in the piston and registering with the slots in the lining and with the ports g'. This plug is provided with a head h^2, having a journal h^3, which is supported in a stuffing box or gland h^4, and has on its outer end a sprocket-wheel i. Steam is let into the plug through pipe j, which has the steam-valve j'. The sprocket-

wheels *i* of the two valves are connected by chains *k* with like wheels on the piston-shaft. Obviously steam may be let into one or a number of the steam-chambers at one time by adjusting the lining so that it shall uncover one or a number of the ports *g'*, and thus great facility is afforded for crowding on steam to start or in emergencies. It will be observed, of course, that the web g^2 and the stops g^6, being on opposite sides of the ports *g'*, cut off all steam excepting what may be let out into the ports *g'* through the ports *h'*. So, also, it will be observed that the width of opening of the ports *g'* may be regulated by the web g^2.

Between the valves and in the steam-chambers are arranged the valves *l*. These valves are pivoted at *l'* in the cylinder *a*, and are provided with exhaust-ports l^2, which lead to the exhaust *m*. The opposite ends l^3 of these valves are packed steam-tight in the steam-chambers and are provided with dash-pots *n*, which are in turn connected through port or passage *n'* with an air or steam pump *o*, which is hand-operated through lever *o'*.

As shown in Fig. 3, the parts are set to rotate in the direction of the arrow in said figure. As the abutment *e* takes the steam, the steam is confined in the steam-chamber between the abutment and the valve end l^3 and working expansively drives forward the abutment and brings the abutment in the next adjacent steam-chamber into position to take steam, and so on with the several steam-chambers, the piston being rotated in the meanwhile, and it in turn working the valves until the abutments successively reach the valves *l*, under which they pass and exhaust the expanded steam and then go under the lowered end of the valves l^3 to take live steam again. In the air-pump *o* the air is compressed by moving the piston, and hence the air-pressure in the right-hand dash-pot in this instance is greater than the left-hand dash-pot, and consequently the right-hand dash-pot will hold down that end of the valves *l* and return the valves every time they are lifted.

By rotating the lining *g* of the right-hand valve so as to cause its web g^2 to cover all of the ports *g'* and opening the ports *g'* in the left-hand valve *f* the engine may be reversed. Of course in this reversal the air-pump must also be shifted so as to put the pressure upon the left-hand dash-pot.

I do not describe minutely the details of construction, as they may be greatly varied.

What I claim is—

1. A rotary engine worked by expansion of steam and comprising a rotary piston having a series of steam-chambers, a cylinder in which it rotates, and a valve for supplying steam successively to a greater or less number of such steam-chambers at any given time, substantially as described.

2. A valve composed of a ported lining constructed as a tube slotted circumferentially and having a longitudinal web, means to rotate it, a ported plug arranged inside of said lining, and means to rotate it, combined with a piston to be driven and a cylinder for such piston, substantially as described.

3. A rotary steam-engine having a rotary piston constructed with a series of circumferential steam-chambers, an abutment in each chamber, a cylinder, a steam-inlet valve adapted to supply steam successively to a greater or less number of said steam-chambers, and a steam-outlet valve worked by the abutment and held in position by pressure, substantially as described.

4. A rotary steam-engine having a rotary piston constructed with a series of circumferential steam-chambers, an abutment in each chamber, a cylinder, a steam-inlet valve communicating independently with each of said steam-chambers and adapted to supply steam successively to said chambers or simultaneously to all of them, a steam-outlet valve for each chamber worked by the abutment of its own chamber, and dash-pots for each outlet-valve to hold it in position, substantially as described.

In testimony whereof I have hereunto set my hand this 11th day of March, A. D. 1891.

MARION J. MAPES.

Witnesses:
WM. H. FINCKEL,
E. A. FINCKEL.