

No. 706,731.

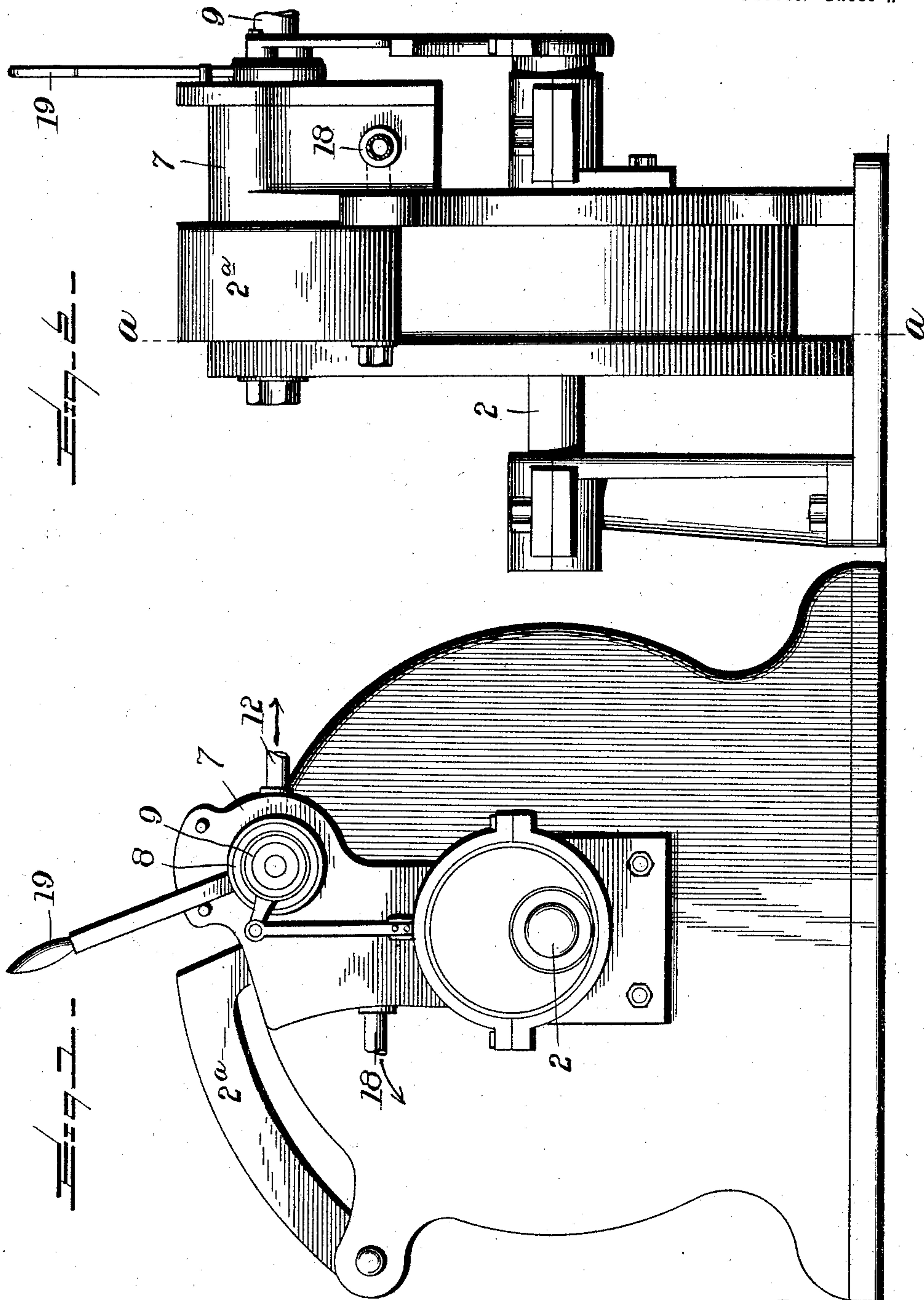
Patented Aug. 12, 1902.

J. N. EDWARDS.
ROTARY ENGINE.

(Application filed June 17, 1901.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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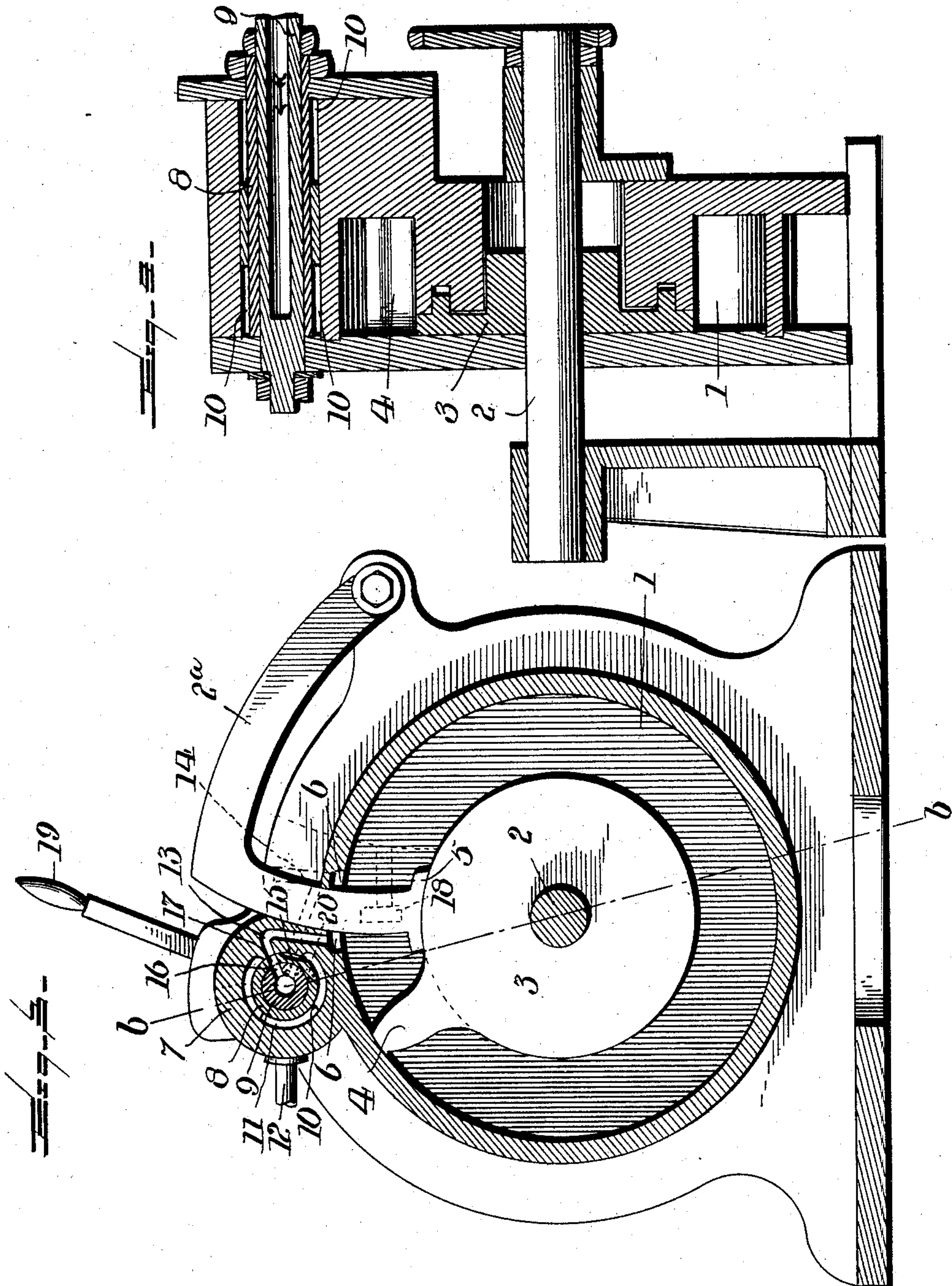
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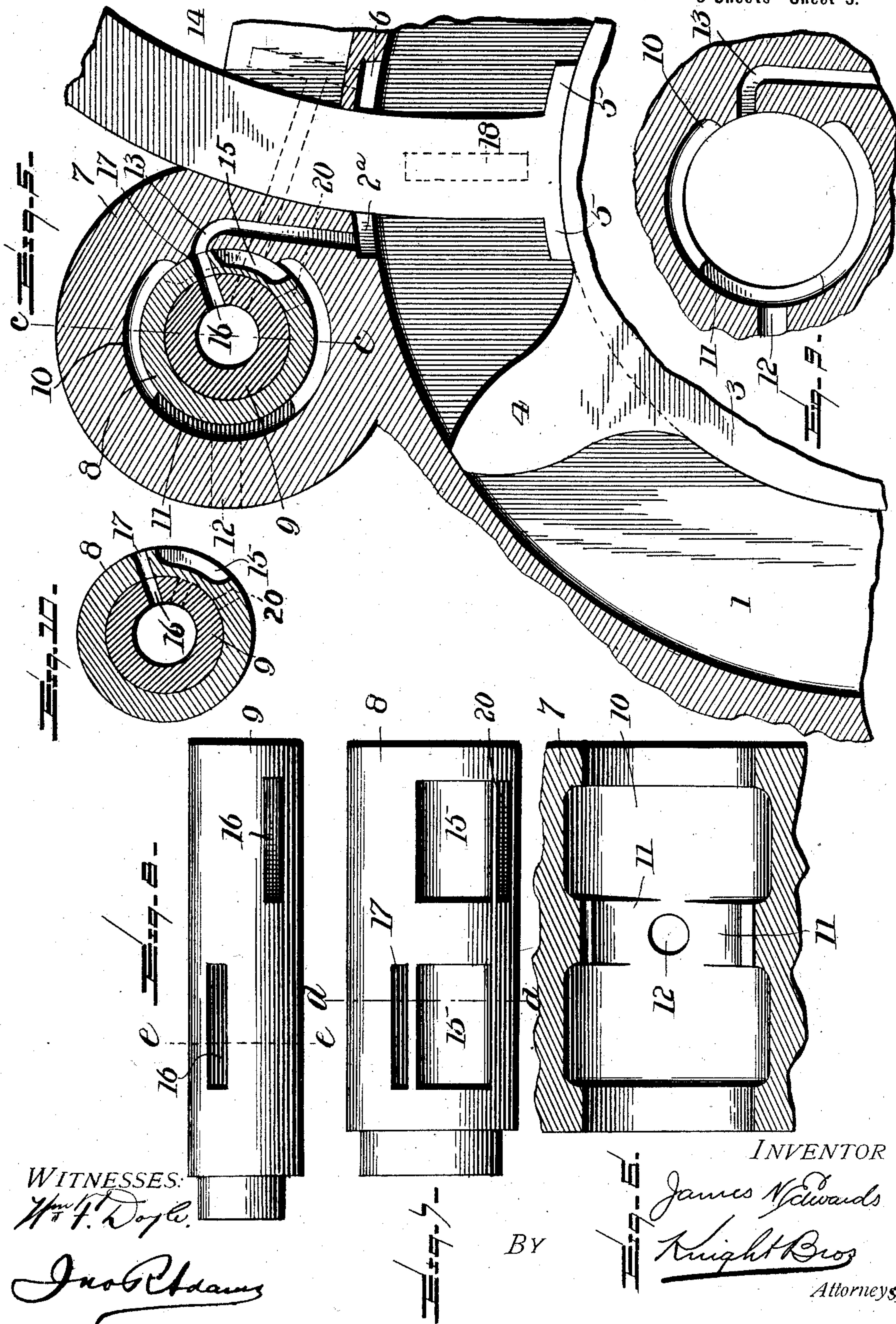
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3 Sheets—Sheet 3.



UNITED STATES PATENT OFFICE.

JAMES N. EDWARDS, OF MACON, MISSOURI.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 706,731, dated August 12, 1902.

Application filed June 17, 1901. Serial No. 64,912. (No model.)

To all whom it may concern:

Be it known that I, JAMES N. EDWARDS, a citizen of the United States, and a resident of Macon, in the county of Macon and State of Missouri, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to certain new and useful improvements in expansion rotary engines; and it consists of the parts and combination of parts, as will be more fully hereinafter set out.

In the drawings, Figure 1 is a rear elevation of an engine embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section on the line *a a*, Fig. 2. Fig. 4 is a vertical transverse section on the line *b b*, Fig. 3. Fig. 5 is a detail sectional view showing the valve mechanism. Fig. 6 is a cross-section of the valve-chamber on the line *c c*, Fig. 5. Fig. 7 is a side elevation of the outer sleeve or reversing-valve. Fig. 8 is a similar view of the inner sleeve or supply-valve. Fig. 9 is a cross-section through the valve-chamber. Fig. 10 is a cross-sectional view of the outer sleeve at *d d*, Fig. 7, and of the inner sleeve or supply-valve at *e e*, Fig. 8.

1 represents the cylinder, suitably mounted, through which the shaft 2 passes.

3 is the piston, having the piston-head 4, said piston being mounted upon the shaft 2, while the piston-head has a close steam fit within the cylinder 1, as will be seen in the drawings.

2^a is a swinging abutment depending within the cylinder 1 and provided with the flanges 5 upon its lower end, the lower end of said swinging abutment being shaped to have a steam-tight fit upon the periphery of the piston 3. The cylinder is provided with a notch 6, within which the lower end of the swinging abutment-lever and the flanges 5 are adapted to fit snugly on the limit of the extreme upward stroke of said compression.

7 is the valve-chamber, within which is secured the outer sleeve 8 and the inner sleeve 9, around which is an exhaust-chamber 10.

11 is a connecting-chamber in the rear of the exhaust-chamber, which leads through the exhaust 12 to the outside atmosphere.

13 is the inlet steam-port to the cylinder,

and 14 is the outlet or exhaust from the cylinder 1.

The outer sleeve 8 is provided with a chamber 15, adapted to receive exhaust, while the inner sleeve 9 is provided with steam-ports 16, adapted to register with the steam-ports 17 in the outer sleeve, according to the relative position of the sleeves and the direction of movement of the engine. The inner sleeve serves as the live-steam chamber or supply.

18 is the main exhaust from the cylinder 1, formed in one side thereof, over which the swinging abutment slides with a steam-tight joint.

19 is the reversing-lever secured to the valve mechanism.

The operation of the machine is as follows: Live steam being supplied to the inner sleeve and the parts being in position as shown in Fig. 3, the steam passes from said sleeve through the port 16 into the port 13, from which it passes into the cylinder in front of the lower end of the swinging abutment 2, where it expands, thus forcing the piston-head 4 around, and thereby revolving the shaft. When the piston-head 4 in its revolution arrives immediately behind the lower end of the swinging abutment 2^a, it strikes one of the flanges 5, which rides upwardly upon the piston-head until the flanges are seated within the notch 6, formed in the inner periphery of the cylinder, whereupon said piston-head is free to pass from under the swinging abutment. While the compression-lever is in its elevated position the main exhaust from the cylinder takes place through the port 18 in the side of the cylinder. Any further exhaust that may be necessary to the successful operation of the main engine will take place through the exhaust-port 14, thence through the exhaust-ports in the valve-casing, as clearly shown in Fig. 5. If it is desired to reverse the engine, the lever is thrown to one side, thus bringing the other port, 20, in the outer sleeve to register with the port 14, whereupon the live steam is directed against the opposite side of the piston-head and the revolution of the shaft thus reversed. In this position the port 13 is utilized as an exhaust-port, as described in connection with the port 14.

The exhaust-port 18 is positioned as shown

in order to give a short free exhaust when the piston is making a number of full revolutions.

The impact of the steam from the live-steam-supply sleeve upon one of the flanges 5 5, secured to the lower edge of the swinging abutment 2^a, forces said abutment down onto the piston 3, thus obviating the necessity of springs to do this work.

The swinging abutment is hung upon a 10 stud which is secured to a boss that is cast integral with the frame, said stud acting as a pivot upon which the swinging abutment moves up and down, while the inner end of the swinging abutment works in the cylinder 15 and is circular from the center of the stud.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In an engine of the character described, 20 the combination with the cylinder, a revoluble piston mounted therein, a swinging abutment pivoted outside of the cylinder and working in said cylinder and adapted to cooperate with the piston, a valve-chamber and 25 an inlet and an outlet port connecting said chamber and cylinder.

2. In an engine of the character described, the combination with the cylinder, a piston and swinging abutment pivoted outside of 30 and extending into said cylinder, of combined inlet and outlet ports in the path of the swinging abutment, the steam-chamber having two outlet-ports and a sleeve revolubly mounted on said steam-chamber, ports in the 35 sleeve adapted to register with the ports in the steam-chamber, whereby the engine may be reversed.

3. In an engine of the character described, the combination with the steam-chamber, an 40 inlet-port and two outlet-ports leading therefrom, a sleeve revolubly mounted on said steam-chamber, ports formed through said sleeve adapted to respectively register with the respective ports in said chamber accord- 45 ing to the position of the valve, an exhaust-passage formed in the periphery of the sleeve between said ports, and an exhaust-port connected with said exhaust-passage leading to the outside atmosphere.

50 4. In an engine of the character described,

the combination with the cylinder, a revoluble piston mounted therein, inlet and outlet ports formed in the periphery of the cylinder, of a swinging abutment pivoted outside of, 55 but working in, the cylinder and lips or flanges projecting from said abutment adapted to close said ports at the extreme limit of the upper stroke of the swinging abutment and a main exhaust-port in the cylinder 60 adapted to be opened and closed by the swinging abutment as it moves upward and downward.

5. In an engine of the character described, the combination with the cylinder, a revoluble piston therein, inlet and outlet ports 65 formed in the periphery of the cylinder and a swinging abutment, flanges formed on the inner ends of the same adapted to close said ports, of a steam-chamber, two ports leading therefrom, a sleeve revolubly mounted on the 70 steam-chamber, two ports formed through the sleeve and an exhaust-passage formed in the periphery of the sleeve between said ports and an exhaust-port connected with said exhaust-passage. 75

6. In an engine of the character described, the combination with the cylinder, a revoluble piston therein, a piston-head integral therewith and having a steam-tight fit with said cylinder, a main exhaust through one 80 side of the cylinder in the path of the piston-head, inlet and outlet ports formed in the periphery of the cylinder, and a swinging abutment adapted to close the main exhaust-port when in its lowermost position, flanges or lips 85 formed on said abutment adapted to close the inlet and outlet ports when the abutment is in its uppermost position, of a steam-chamber, a sleeve revolubly mounted thereon, two ports formed through the sleeve and an ex- 90 haust-passage formed in the periphery of the sleeve between said ports and an exhaust-port connected with said exhaust-passage leading to the outside atmosphere.

The foregoing specification signed this 13th 95 day of June, 1901.

JAMES N. EDWARDS.

In presence of—

N. M. MOODY, Jr.,

I. W. GILSTRAP.