

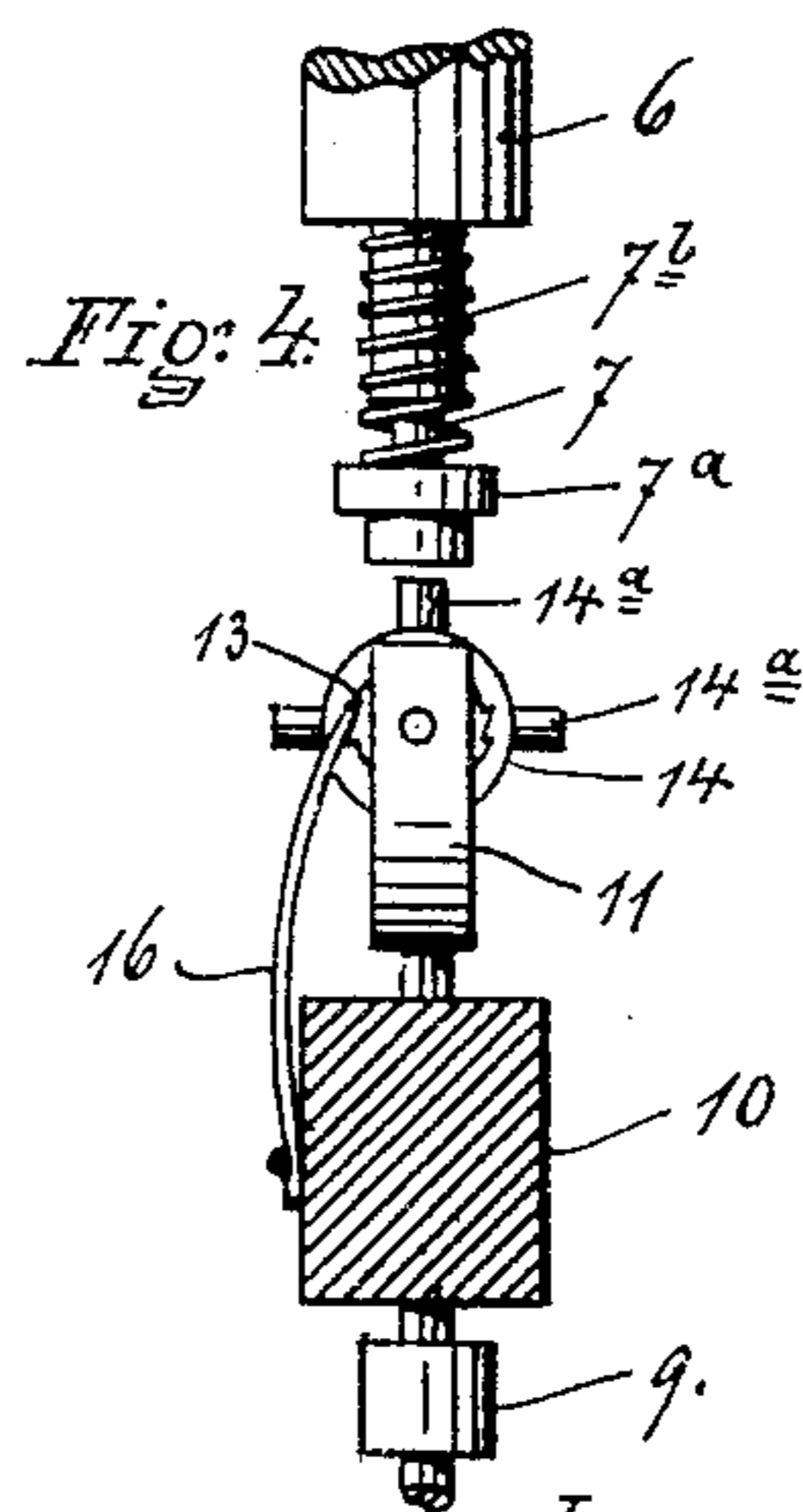
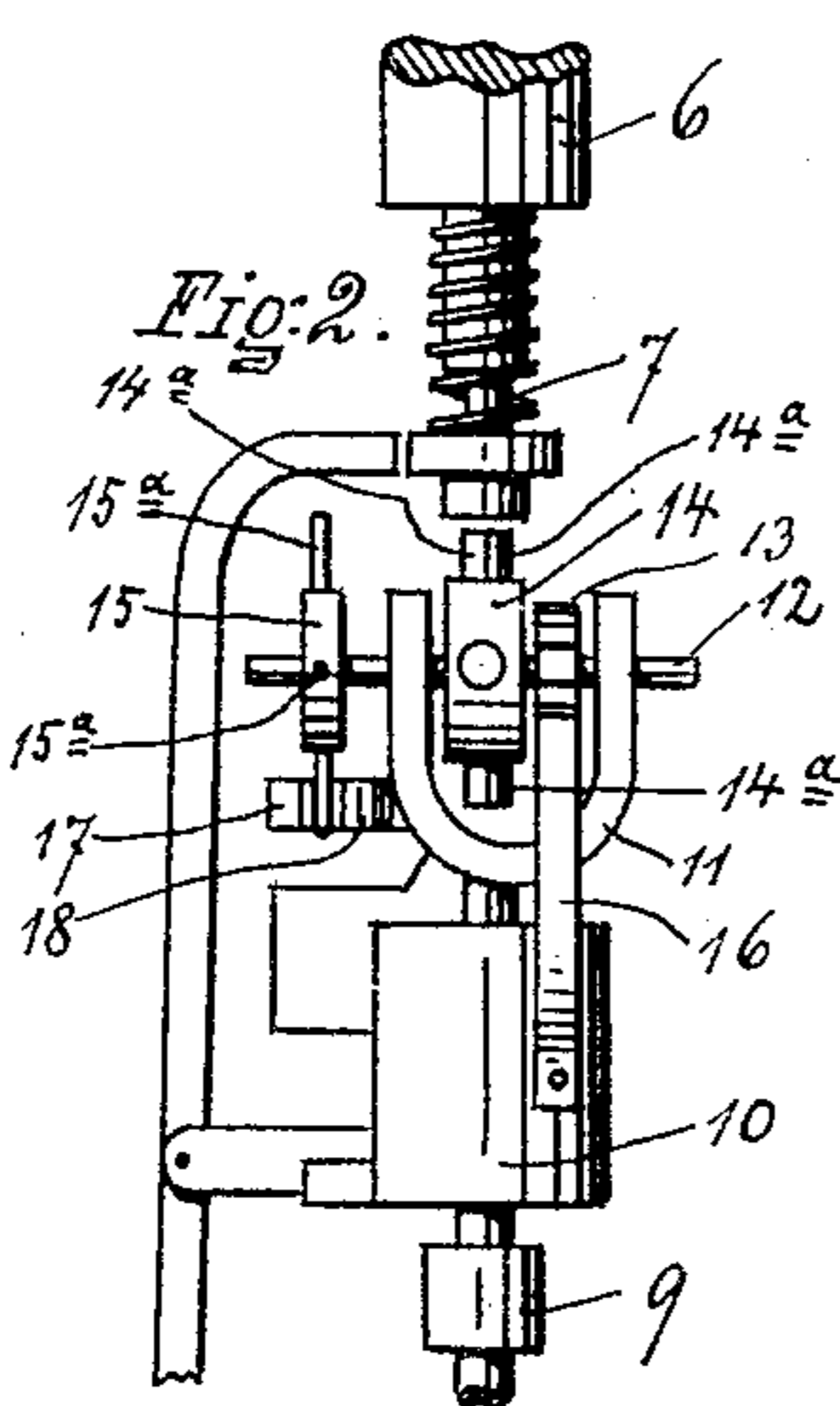
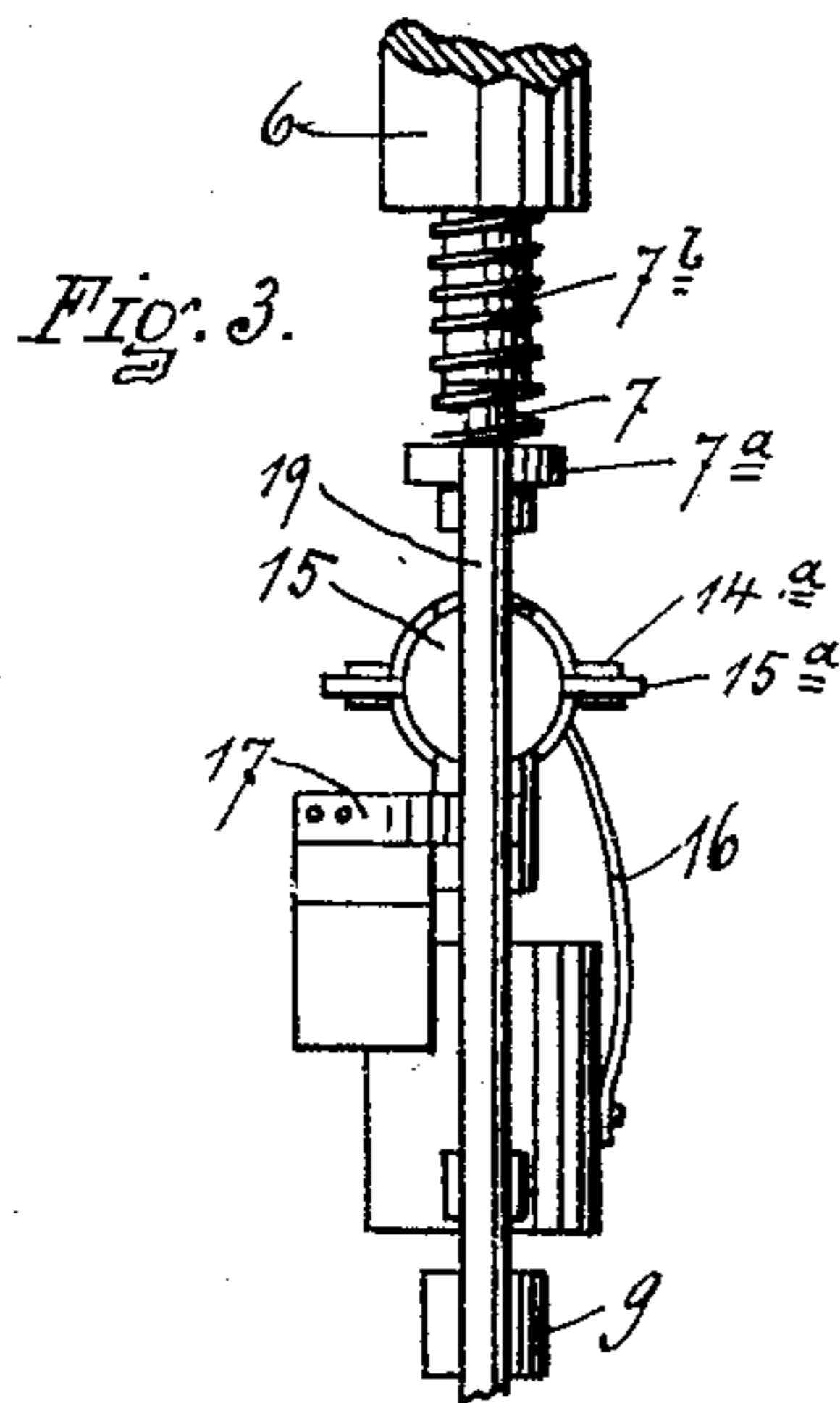
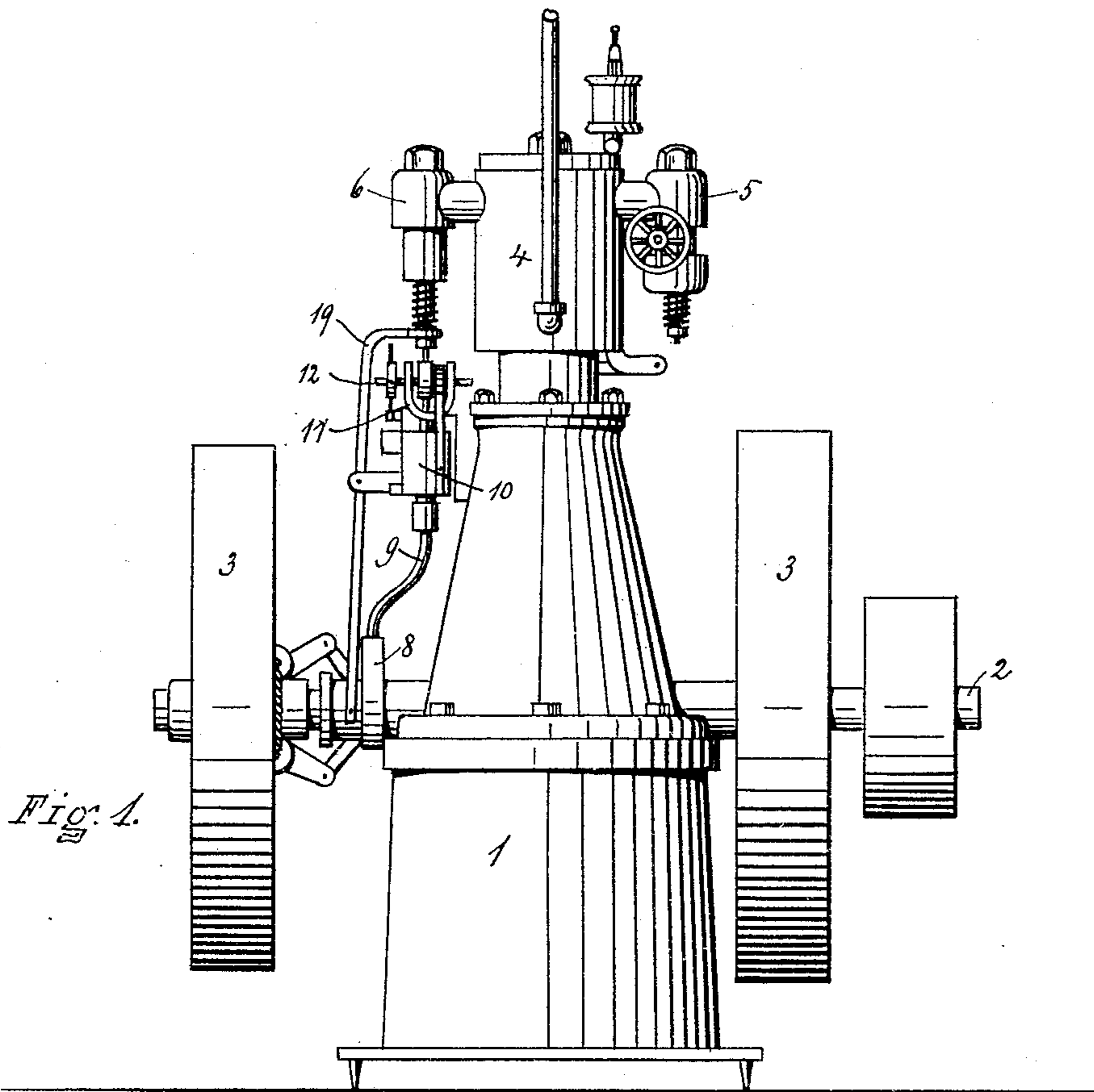
(No Model.)

2 Sheets—Sheet 1.

H. B. MAXWELL.
GAS ENGINE.

No. 583,495.

Patented June 1, 1897.



WITNESSES.

Rich. A. George.
Phoebe A. Tanner.

INVENTOR

HARRY B. MAXWELL
By Kirley, Robinson & Love
ATTORNEYS.

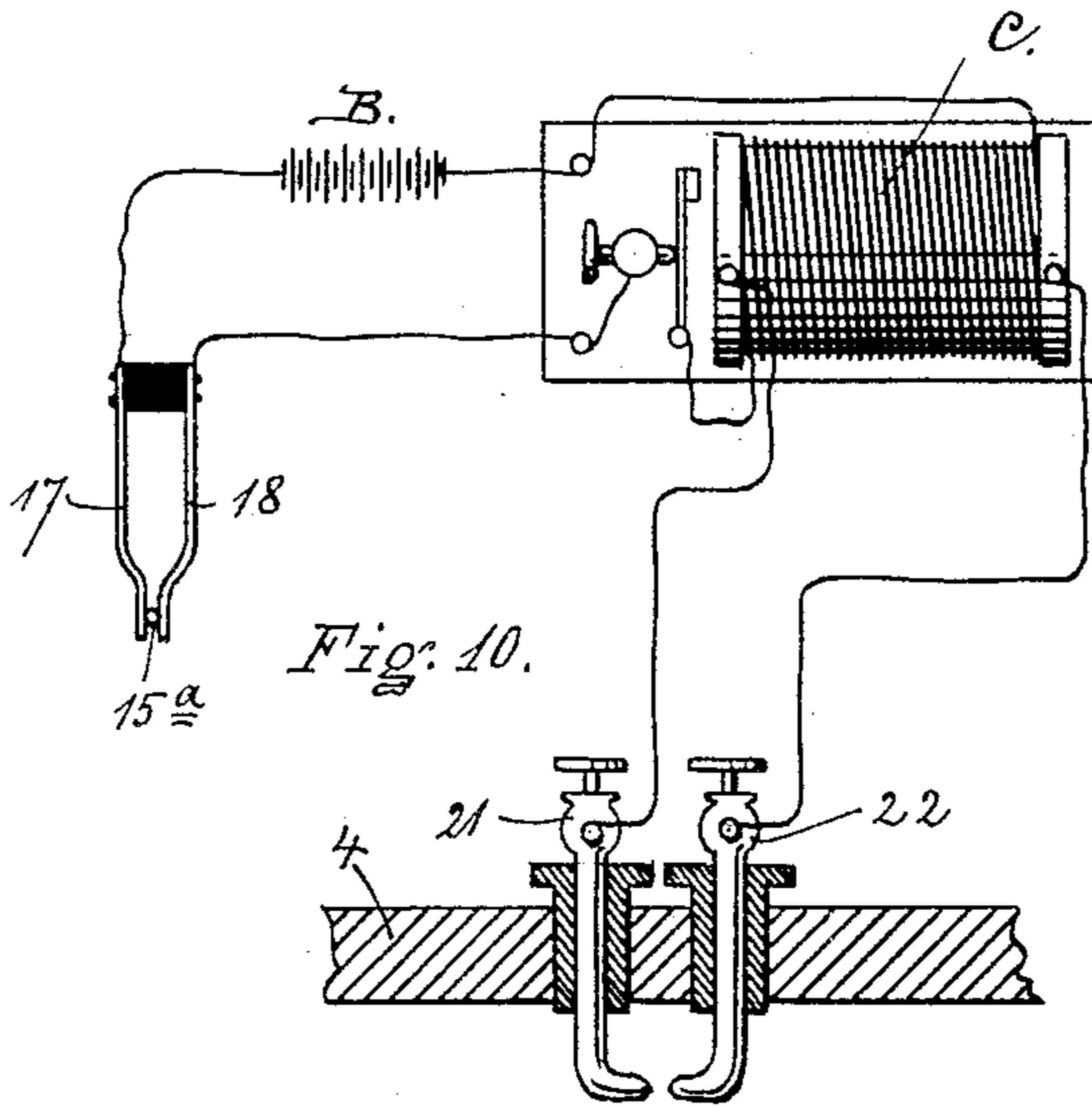
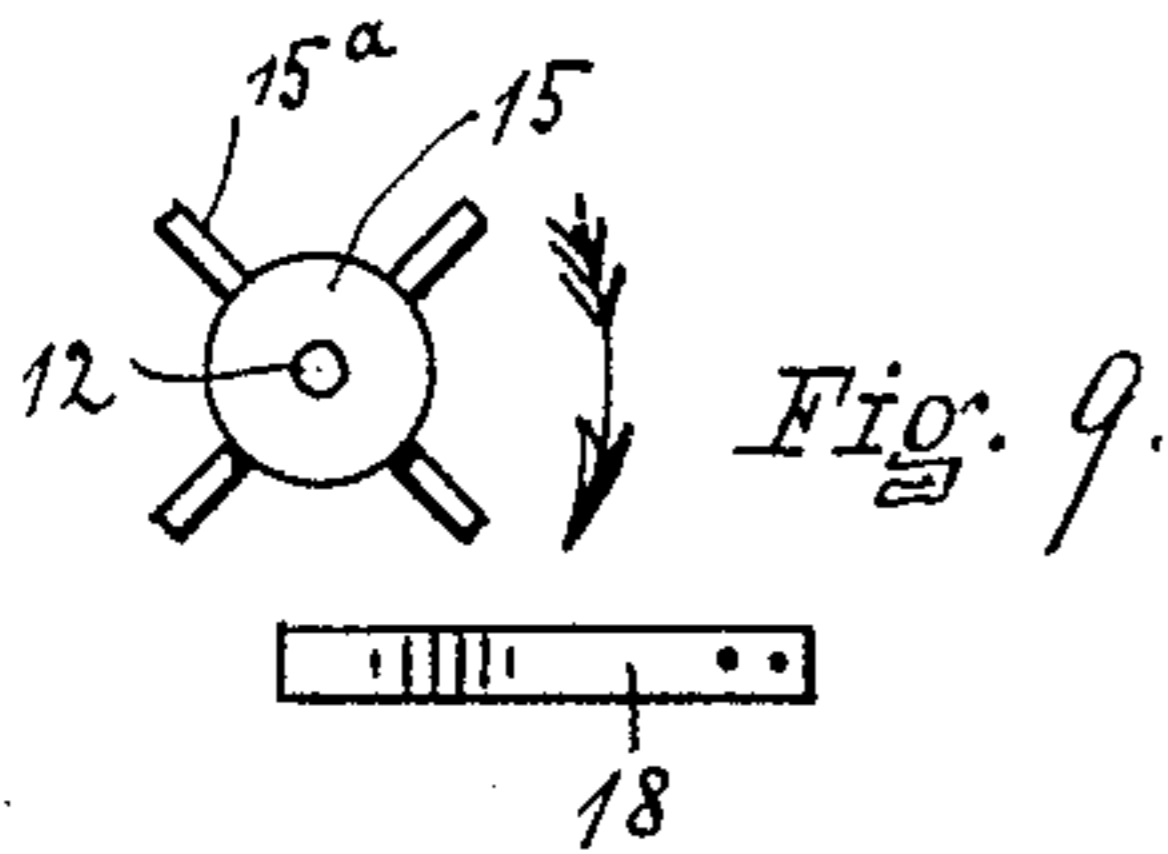
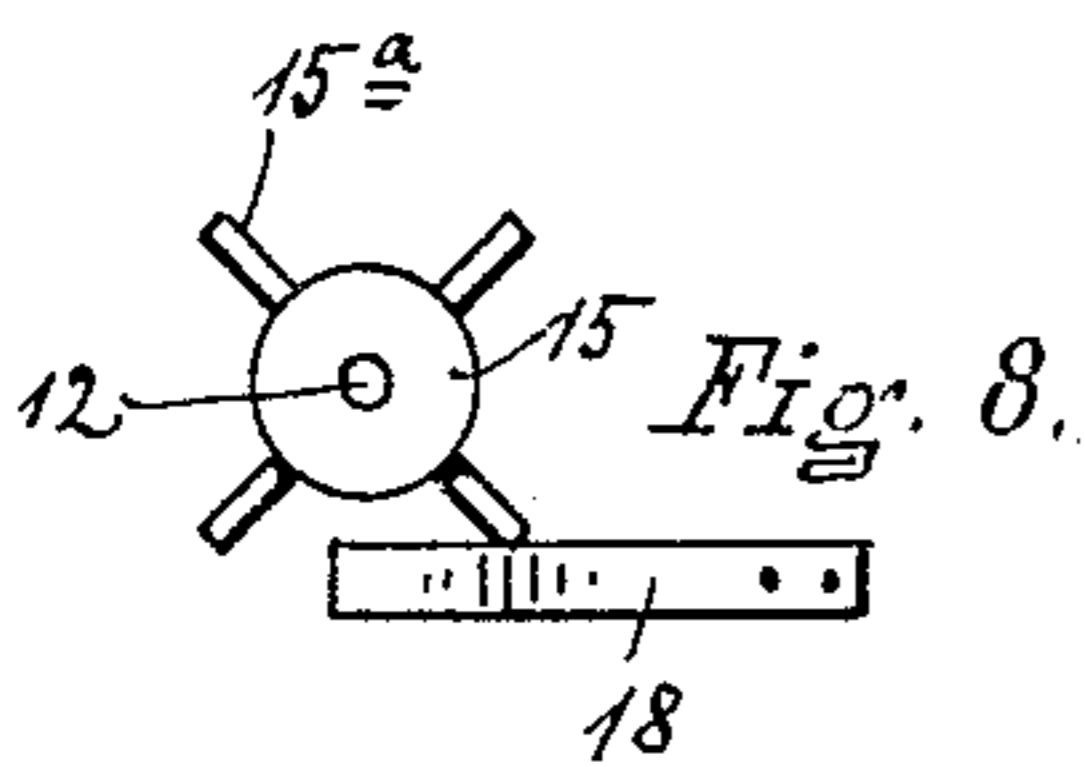
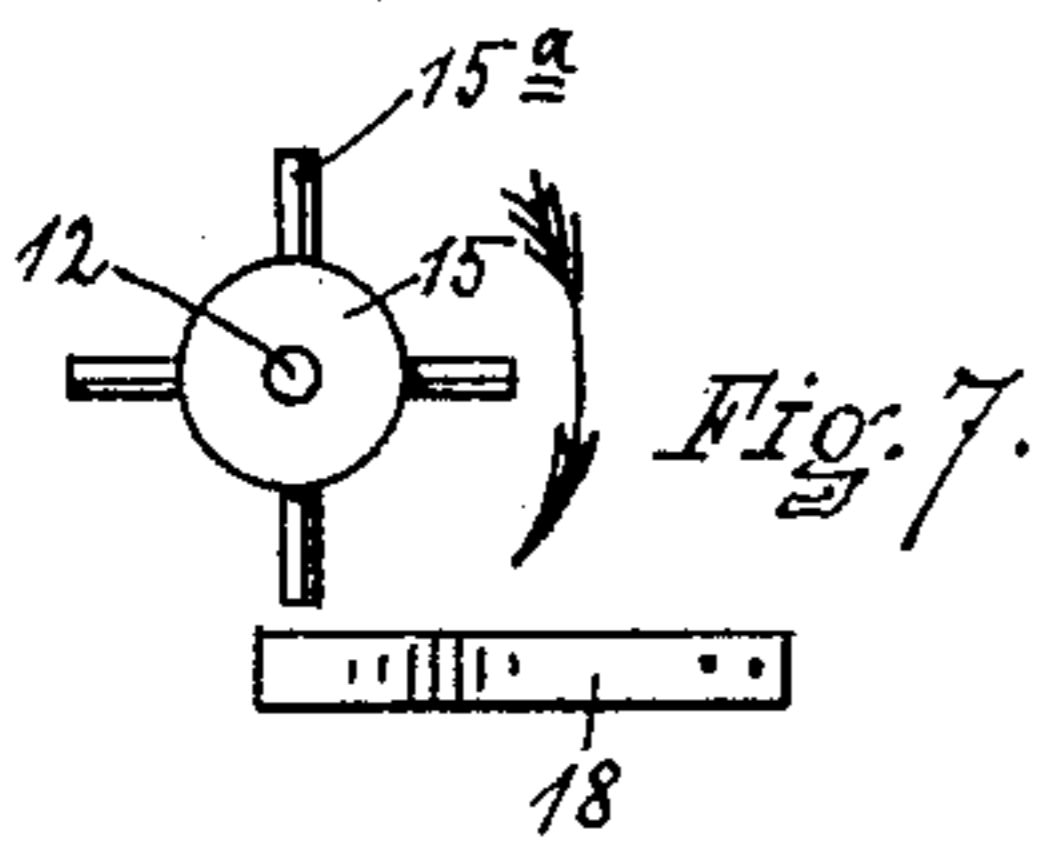
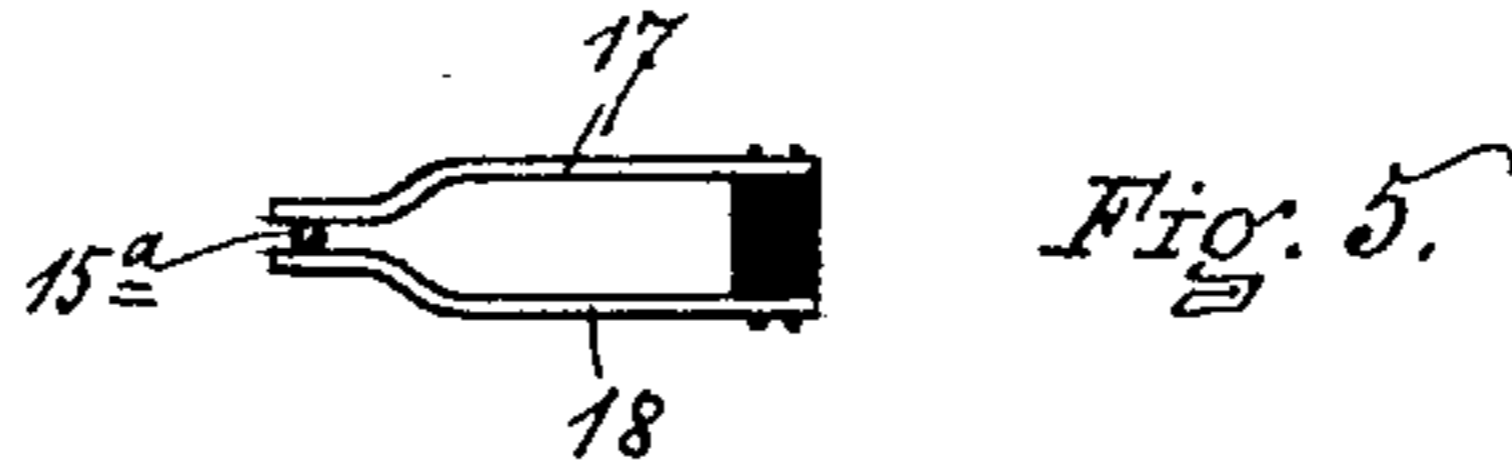
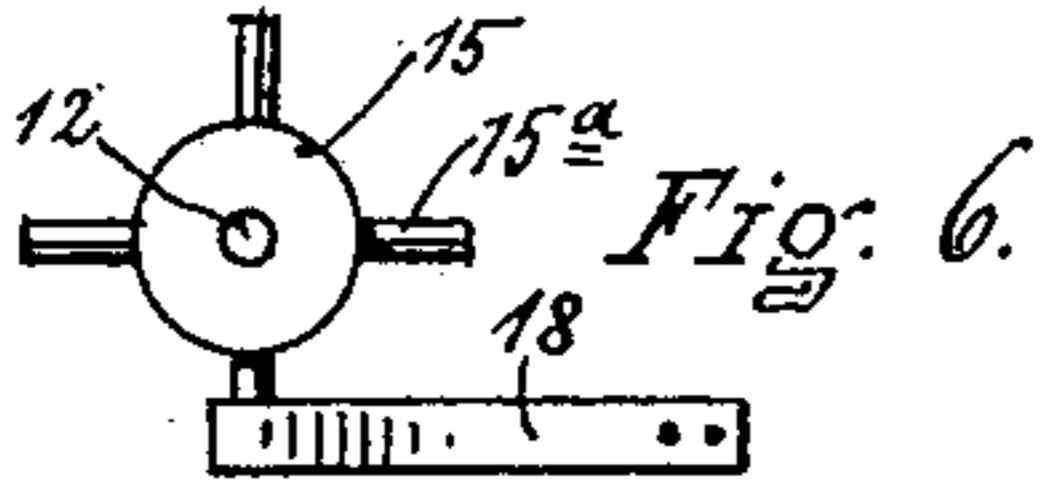
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2 Sheets—Sheet 2.

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WITNESSES.

Rich. A. George.

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INVENTOR

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UNITED STATES PATENT OFFICE.

HARRY B. MAXWELL, OF ROME, NEW YORK.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 583,495, dated June 1, 1897.

Application filed July 13, 1896. Serial No. 598,926. (No model.)

To all whom it may concern:

Be it known that I, HARRY B. MAXWELL, of Rome, in the county of Oneida and State of New York, have invented certain new and
5 useful Improvements in Gas-Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to
10 which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form part of this specification.

My invention relates particularly to a combined mechanism for operating the exhaust-valve of a gas-engine and making and breaking the circuit of the spark induction-coil.

Referring to the drawings, Figure 1 shows a side elevation of a gas-engine including my
15 improvements. Figs. 2 shows in enlarged detail from side elevation the mechanism constituting my improvements. Fig. 3 shows the same mechanism from the left-hand side as shown in Fig. 2. Fig. 4 shows the same mechanism as seen from the right-hand side of Fig.
20 2. Fig. 5 shows details of a pair of electric-circuit springs on a plan view. Fig. 6 shows the same springs on side elevation in connection with the rotary circuit-closing device in one of its positions of operation. Fig. 7 shows
25 the same as Fig. 6 in another position. Fig. 8 shows the same in another succeeding position. Fig. 9 shows the same in another succeeding position. Fig. 10 is a partial diagram and partial sectional view showing the electric circuit employed.

Referring to the reference letters and numbers in a more particular description of the device, 1 indicates the base of the engine; 2,
30 40 the main crank-shaft; 3 3, the fly-wheels; 4, the cylinder and jacket; 5, the inlet-valve; 6, the outlet exhaust-valve. The exhaust-valve 6 is provided with an externally-projecting stem 7, provided with a flange-like
45 head 7^a and having a spring 7^b for holding the valve closed. The valve is opened when the stem 7 is forced upward.

For opening the valve 6 at every other revolution of the crank-shaft 2 the following
50 mechanism is employed: On the crank-shaft is located the eccentric 8, provided with an eccentric-rod 9, operating through the hole or

way in the block 10, secured on the sides to the engine-frame and carrying at its upper end, by means of the fork 11, the shaft 12. 55
On the shaft 12 are secured the ratchet-pinion 13, the valve wheel or drum 14, and the rotary circuit-maker 15. On the block 10 is also secured a spring-pawl 16, the upper end of which engages with the rod-pinion 13. The
60 valve wheel or drum 14 is provided with a series of projections 14^a, which are adapted to successively be brought into position under the lower end of the valve-stem 7. The rotary circuit-maker 15 is provided with a series
65 of projections 15^a, which are adapted to successively take their positions between the ends of the circuit-springs 17 and 18. These springs are insulated from each other, as shown in Fig. 5, and are not adapted to engage
70 each other at their free ends, the circuit being established between them only when one of the projections 15^a occupies a position between the ends of the springs. These springs
75 17 and 18 are secured on the frame or base of the engine 19 as a governor-arm operated by weights on the crank-shaft and adapted to secure the valve 6 in open position.

The circuit-springs 17 and 18 are in circuit with a battery B and a spark induction-coil 80 C, the secondary circuit of which is connected to the insulated binding-posts 21 and 22, extending through the head of the cylinder, and adapted to give the spark between their inner ends. The details of this construction, however, are not of much importance, as several
85 modifications or variations in the mechanism for producing the spark in the cylinder may be employed.

In this class of engines the explosive mixture 90 is drawn into the cylinder by the first downward movement of the piston, the contents is compressed with the upward movement, and at the completion of the compression the explosion takes place, and the power
95 is derived on the succeeding downward movement of the piston. With the next upward movement the dead gases are expelled, and with the next downward movement a new charge is taken in. The arrangement of my
100 mechanism is such that in the upward movement of the eccentric 8 and the connecting parts the projections 14^a on the rotary valve-drum 14 will not register or be in line with

the valve-stem 7. The valve will not be opened on this stroke. As the eccentric draws the fork 11 down, however, the spring 16, engaging with the ratchet-wheel 13, operates to
 5 give a partial rotation to the shaft 12 and brings one of the projections 14^a into line with the valve-stem 7. On the next upward stroke one or the other of the projections 14^a strikes the lower end of the valve-stem 7 and opens
 10 the valve 6. This is the stroke at which the exhaust takes place. On the upward movement the spring-pawl 16, being stationary, is retracted over the face of the ratchet-wheel 13, and on the succeeding downward move-
 15 ment a partial rotation is given, which again throws the projections out of position.

With reference to the rotary circuit-maker 15, in one of its low positions one of the projections 15^a is brought by a rotary movement
 20 of the wheel 15 and the downward movement of the fork 11 into a position between the free ends of the contact-springs 17 and 18, so as to establish an electric circuit through the battery B and spark-coil C. During the time
 25 that this circuit is established the induction-coil is sufficiently charged. On the upward movement of the eccentric or fork 11 the projection 15^a is drawn out from between the ends of the springs 17 and 18 and the circuit
 30 broken. As the fork and the eccentric move down with the next stroke, the shaft 12 is given a partial rotation, which brings the projection into the position shown in Fig. 8, so that when the fork is in low position it does
 35 not establish an electric connection between the springs 17 and 18. Likewise there is no connection when the fork 11 is in its upper position, as shown in Fig. 9; but with the succeeding downward movement the rotary circuit-maker is again brought into the position
 40 shown in Fig. 6, where the circuit is estab-

lished. When the circuit is established between springs 17 and 18 and the current is on, the piston goes to the upper end of the cylinder and the spark is formed between the bind- 45
 ing-posts 21 and 22.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a gas-engine a rotary circuit-maker having projections, an eccentric for operating 50
 the same, a ratchet-wheel connected with the circuit-maker, a stationary spring-pawl operating in connection therewith and springs, substantially as set forth.

2. The combination in a gas-engine with the 55
 cylinder, shaft and eccentric, of the eccentric-rod sliding in a fixed bearing at one end, a rotary shaft mounted on the end of the eccentric-rod and carrying a rotary valve-drum having projections and a rotary circuit-maker 60
 having projections both secured on the said shaft, an exhaust-valve having a stem on which the projections of the rotary valve-drum are adapted to engage, circuit-springs with which the projections on the rotary circuit-maker are adapted to engage, a ratchet- 65
 wheel secured on the shaft with the rotary circuit-maker and the valve-drum and a stationary pawl operating on the ratchet, substantially as set forth. 70

3. The combination in a gas-engine of an eccentric and rod, a rotary circuit-maker having projecting pins mounted thereon, a ratchet-wheel connected therewith, a stationary spring-pawl operating thereon and circuit-springs, substantially as set forth. 75

In witness whereof I have affixed my signature in presence of two witnesses.

HARRY B. MAXWELL.

Witnesses:

HENRY C. MAXWELL,
 ELLA WYHER.