

No. 630,624.

Patented Aug. 8, 1899.

C. H. MORSE, JR. & F. G. HOBART.

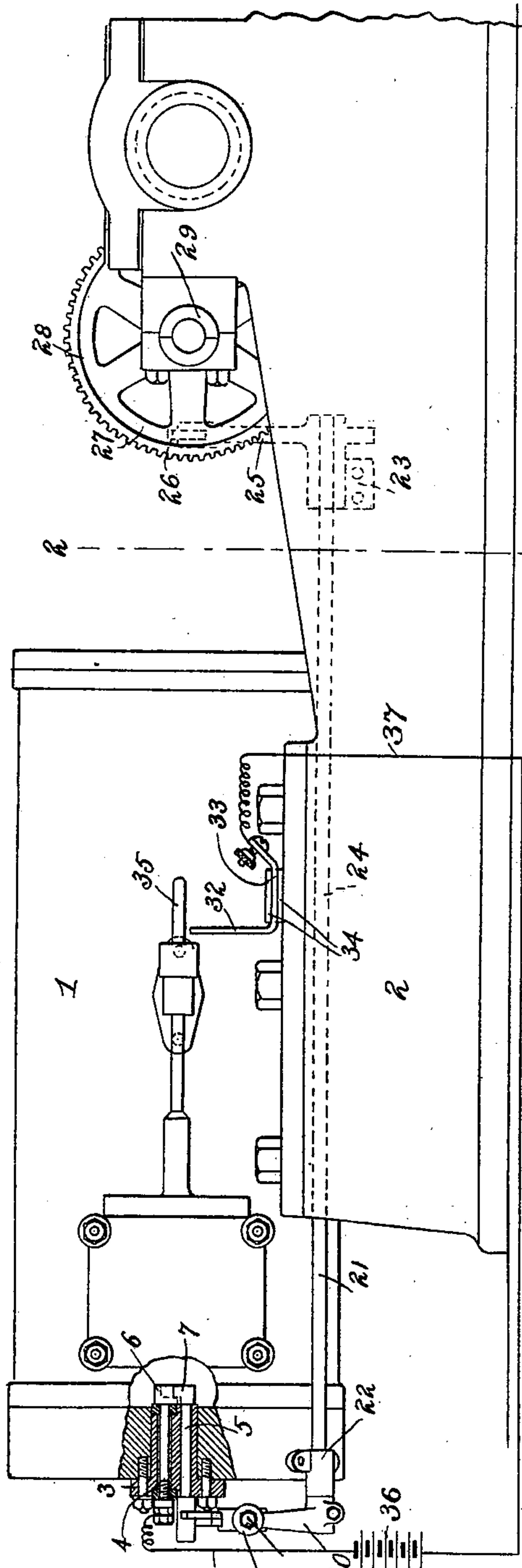
GAS ENGINE IGNITER.

(Application filed Feb. 6, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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Fig. 2

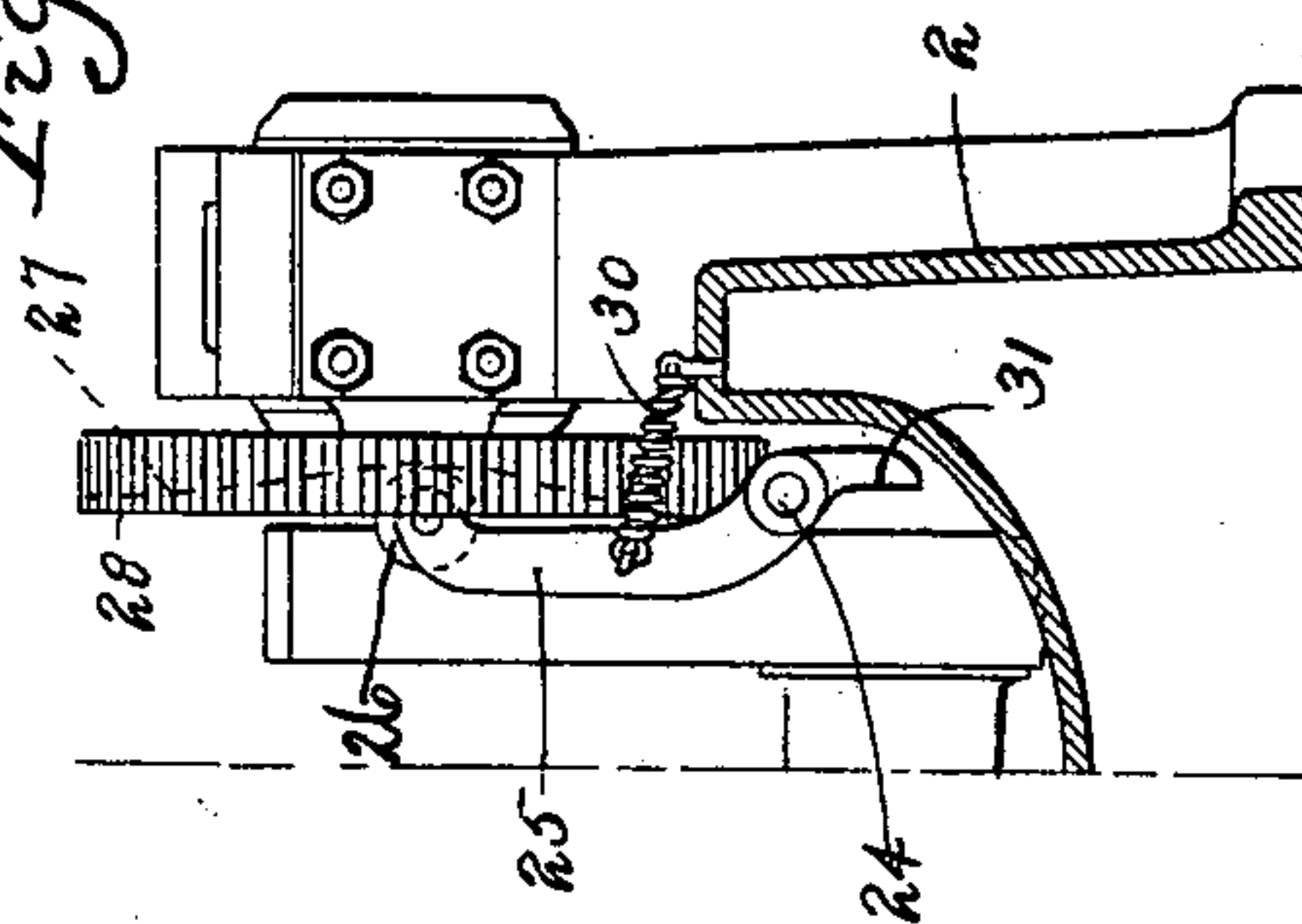
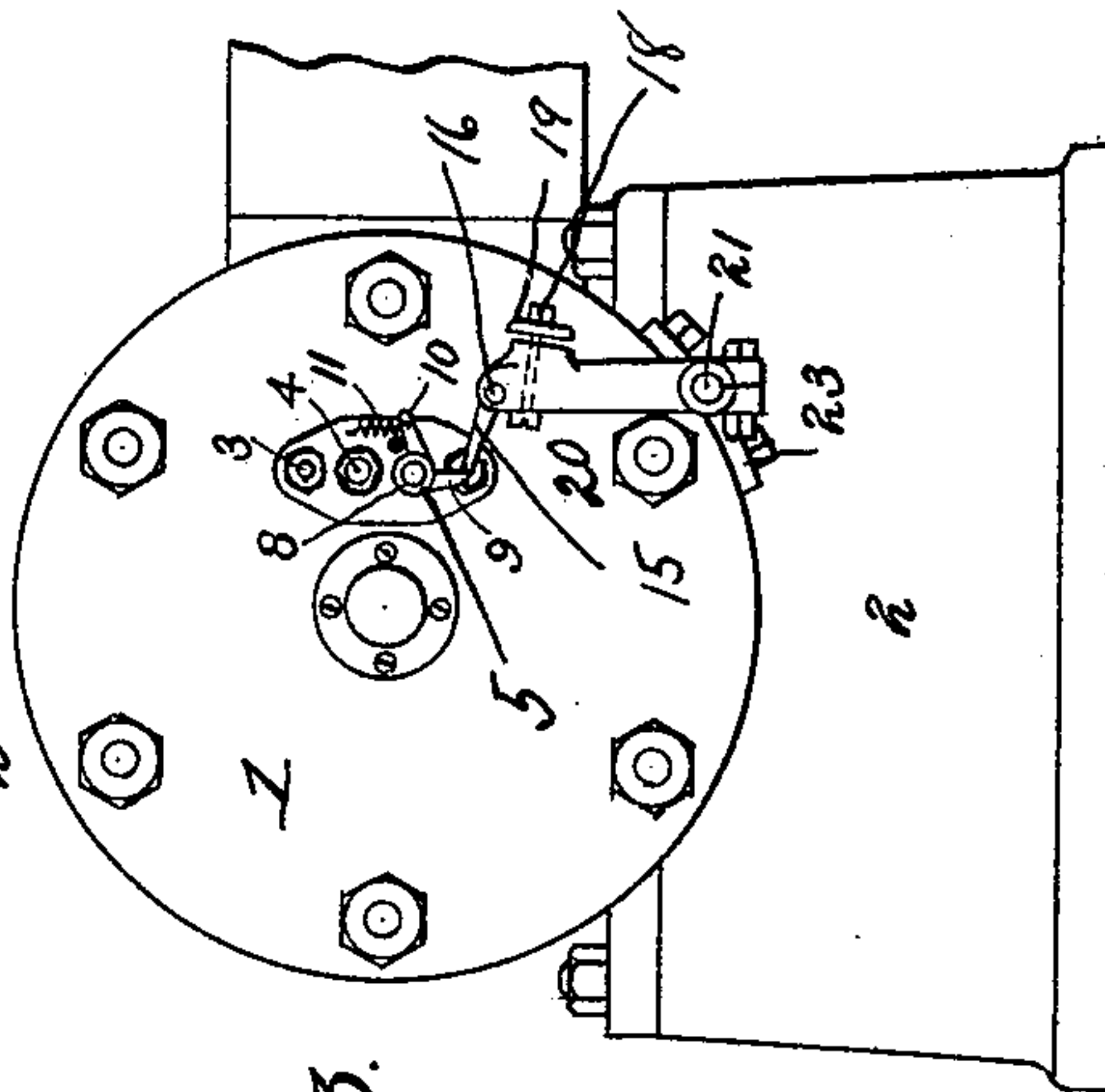


Fig. 3.



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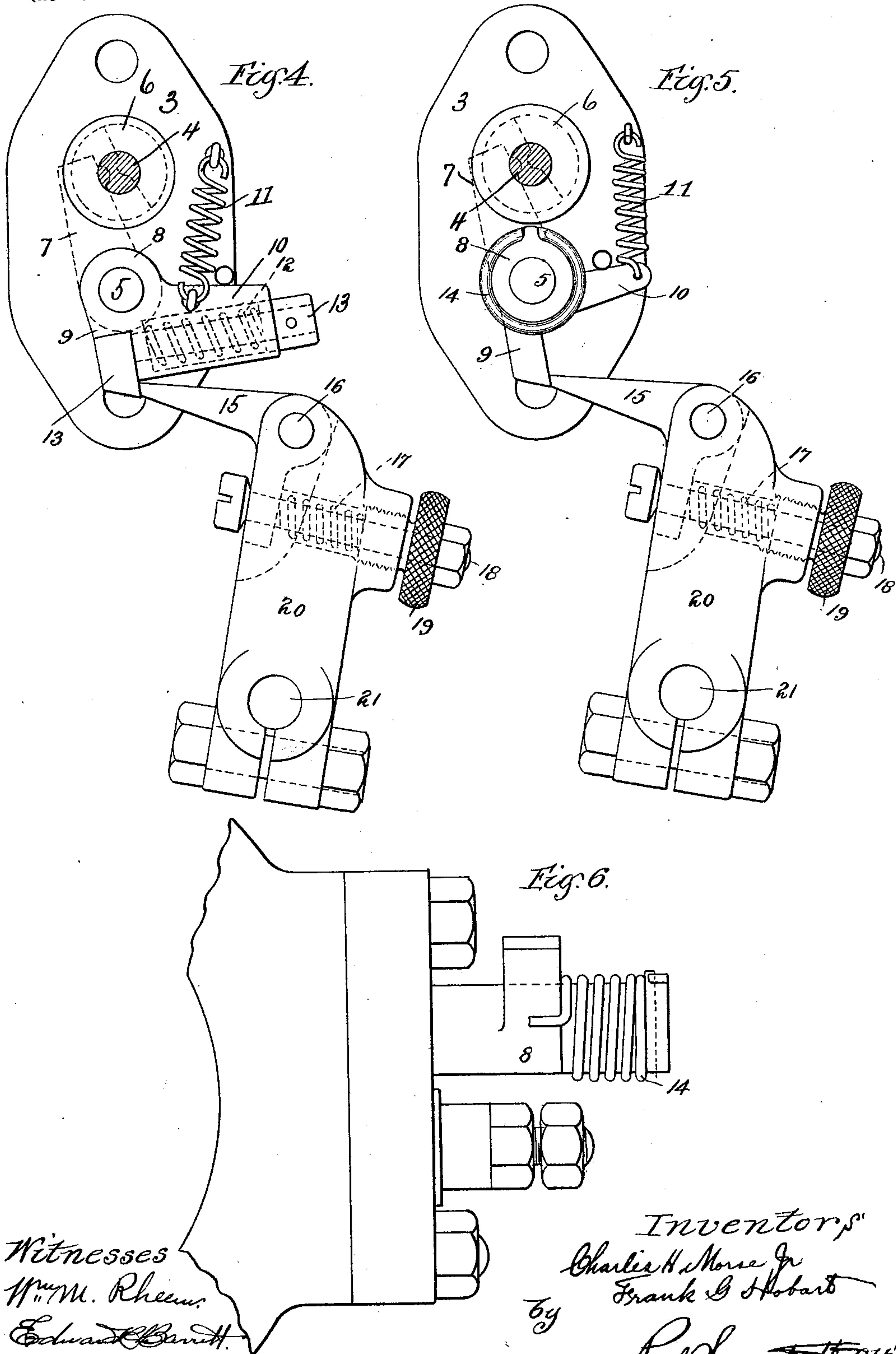
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UNITED STATES PATENT OFFICE.

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GAS-ENGINE IGNITER.

SPECIFICATION forming part of Letters Patent No. 630,624, dated August 8, 1899.

Application filed February 6, 1899. Serial No. 704,662. (No model.)

To all whom it may concern:

Be it known that we, CHARLES H. MORSE, Jr., residing in Chicago, Cook county, Illinois, and FRANK G. HOBART, residing in Beloit, Rock county, Wisconsin, citizens of the United States, have invented certain new and useful Improvements in Gas-Engine Igniters, of which the following, taken in connection with the accompanying drawings, is a specification.

One of the objects of our invention is the construction of an igniter in which the motion of the actuating parts of the igniter is taken from the counter-shaft of the engine through the medium of a rocker-shaft, preferably arranged within the bed of the engine, so as to be protected from external injury or interference, by which construction the revolving cam-shaft, mounted upon brackets or bearings outside of the frame and liable to derangement from external injury, ordinarily employed is entirely done away with.

Another object of our invention is the combination, with a rocker-arm, such as we have above referred to, of an igniter, comprising a movable electrode and a fixed electrode within the cylinder, a shaft carrying the fixed electrode, an arm carrying the movable electrode at its outer end, an oscillating shaft carrying said arm on its inner end, a projecting finger flexibly connected to the movable electrode-shaft mounted upon the outer end of said oscillating shaft, spring mechanism to hold the electrodes apart, an adjustable trigger mounted in position to engage said finger, and a spring to hold said trigger in operative position.

A further object of our invention is the provision of an igniter mounted upon the end of the cylinder and a means for actuating the same, comprising a rocker-shaft and lever upon one end thereof constructed to engage a cam upon the counter-shaft gear, and a stop for restricting the outward movement of said lever, whereby it is prevented from falling into the path of the other moving parts of the engine and causing damage.

The above, as well as such other objects as may hereinafter appear, are attained by means of a construction which we have illus-

trated in preferred form in the accompanying drawings, in which—

Figure 1 is a partial side elevation of an engine to which our invention has been applied. Fig. 2 is a half-sectional view taken on the line 2 2 of Fig. 1. Fig. 3 is an end view of the cylinder, showing an arrangement of the parts which are mounted thereon. Fig. 4 is a detail illustrating the electrodes, with their connected finger and trigger mechanism, drawn on a larger scale. Fig. 5 is another arrangement of the same, and Fig. 6 is a partial plan view of the construction shown in Fig. 5.

Referring now more particularly to Figs. 1, 2, and 3, it will be seen that upon the end of the cylinder 1, which is supported upon a bed 2, we have arranged a removable bushing 3, carrying a fixed electrode-shaft 4 and a movable electrode-shaft 5, upon the inner ends of which respectively are mounted a fixed electrode 6 and a movable electrode 7. Upon the outer end of the movable electrode-shaft 5 is arranged a collar 8, having a finger 9 projecting downwardly, (see Fig. 3,) and an arm 10 projecting laterally, the finger being designed to receive actuation from a mechanism which we will shortly describe, and the arm 10, having attached at its outer end a spring 11, provided for the purpose of holding the electrodes 6 and 7 out of contact, as shown in Fig. 5. The collar 8 has a slight rotative motion relative to the shaft 5, but is flexibly connected thereto by means of a spring 14, which may be arranged also as shown in Fig. 4, in which the spring 12 is mounted around a longitudinally-movable part 13, which really forms the outer projection or point of the finger 9, while in Fig. 5 the spring referred to, which we have here marked 14, is arranged around the outside of the collar 8, as shown clearly in Fig. 6, and has one end in engagement with the collar and the other secured to the shaft 5. The object of this flexible connection between the finger 9 and the shaft 5 is to prevent any damage to the parts which would result from further movement of the finger 9 after the electrodes were brought into contact. To engage the finger 9 and operate the same, we provide a trigger

15, carried upon a pivot 16 and held in operative position by a spring 17, and a screw-bolt 18, provided with an adjusting-nut 19, all of which are mounted upon the outer end
 5 of a rocker-arm 20, which is carried upon one end of a rocker-shaft 21. The rocker-shaft 21 is supported by brackets 22 and 23 in position to pass within the bed 2, as shown by dotted lines at 24, in which position it will be
 10 better protected from external injury or interference than it would be if mounted in brackets upon the outside of the bed, as is the common practice with the rotating cam-shafts ordinarily used. The use of a rocker arm
 15 and shaft in place of a rotating cam and shaft also serves to minimize the danger to persons working around the engine.

Upon the end of the rocker-shaft which is opposite to the rocker-arm we mount a cam-
 20 lever 25, arranged with a wheel 26 in its outer end, constructed to bear against the face of a side cam 27, formed on the gear 28, which is carried by the counter-shaft 29. The cam 27 is indicated in dotted lines in Fig. 2. To hold
 25 the lever 25 in contact with the cam 27, we provide a spring 30, arranged as shown in Fig. 2, and to limit the outward movement of the upper end of the lever 25 and in case of the breakage of the spring 30. To prevent
 30 damage to the machinery from falling of the lever 25 outwardly into the path of the connecting-rod or other moving part of the engine, we provide a stop 31, arranged to strike against the bed in case the lever should be
 35 thrown outward beyond the range of motion of the cam-face.

In order to save current and prolong the life of the battery as long as possible, we provide a circuit-breaking device or switch
 40 32, mounted upon the frame at 33 between two insulating-plates 34, as shown in Fig. 1, in such position as to make contact with the valve-rod 35 whenever the valves are operated preparatory to producing an explosion. By
 45 this mechanism it is obvious considerable current will be saved, especially when the engine is running under a light load, as no current will flow except when the rod 35 is in contact with the bracket 32, even although the elec-
 50 trodes themselves are in contact. A battery 36 is connected by a wire 37 with the circuit-breaking device 32 and by a wire 38 with the insulated shaft 4 of the fixed electrode.

The operation of our invention may be
 55 briefly described as follows: When the piston has about completed its compressing-stroke, the cam 27 will have reached a position in which the lever 25 will have been forced practically to its extreme outermost position and
 60 the shaft 21 and arm 20 oscillated toward the left until the igniter-points are brought into contact. As it is difficult to get the cams 27 so adjusted relatively to the lever 25 as to stop the outward movement of the lever 25
 65 just at the time the contact-points touch, the finger 9 is provided with a spring connection between it and the oscillating shaft 5, by

means of which the excess movement of the arm 25 and the rocker arm and shaft 20 will be absorbed by the yielding of the arm 9 with-
 70 out any damage to the contact-points. As soon as the trigger 15 passes the extremity of the arm 9 the spring 11 will return the parts to the position shown in the drawings, thus breaking the contact and causing a
 75 spark. As the movement of the cam 27 permits the arm 25 and the rocker-shaft, rocker-arm, and trigger mounted thereon to return to the position at the extreme right of their movement the trigger 15 will be permitted to
 80 pass the finger 9, because of the compression of the spring 17. The point at which the trigger will leave the finger and create the spark can be readily adjusted by the rotation of the milled nut 19, it being possible to set the de-
 85 vice with great accuracy and facility, so as to throw the spark at any desired position, either just before, just at, or just after the termination of the compressing-stroke.

Having thus described our invention, what
 90 we claim as new, and desire to secure by Letters Patent, is—

1. A gas-engine igniter comprising a fixed and a movable electrode, a shaft carrying said movable electrode, a projecting finger
 95 rotatably mounted on the outer end of said shaft, means for actuating said finger, and two springs coöperating with the finger, one forming a means for yieldingly transmitting the force of the actuating means to the shaft
 100 and the other normally holding the electrodes apart.

2. A gas-engine igniter comprising a fixed and a movable electrode, a shaft carrying said movable electrode, a projecting finger
 105 rotatably mounted on the outer end of said shaft, a trigger for imparting movement to said finger, mechanism connected with the engine for operating said trigger, and two springs coöperating with the finger, one forming
 110 a means for yieldingly transmitting the force of the trigger to the shaft and the other normally holding the electrode apart.

3. A gas-engine igniter comprising a fixed and a movable electrode, a shaft carrying
 115 said movable electrode, a projecting finger rotatably mounted on the outer end of said shaft, a spring-pressed trigger for imparting movement to said finger, mechanism connected with the engine for operating said
 120 trigger, and two springs coöperating with the finger, one for forming a means for yieldingly transmitting the force of the trigger to the shaft and the other normally holding the electrode apart.

4. A gas-engine igniter comprising a fixed and a movable electrode, a shaft carrying
 125 said movable electrode, a projecting finger rotatably mounted on the outer end of said shaft, a trigger for imparting movement to
 130 said finger, mechanism connected with the engine for operating said trigger, and two springs coöperating with the finger, one forming a means for yieldingly transmitting the

force of the trigger to the shaft and the other normally holding the electrode apart, and means for adjusting the position of the trigger relative to the finger.

5 5. The combination with a gas-engine and the movable parts thereof, of an igniter therefor, a cam, a lever coöperating with said cam in the actuation of the igniter, said lever being disposed in proximity to the said movable
o parts of the engine, means for holding the lever in engagement with the cam, and a stop for limiting the outward movement of the lever whereby to prevent damage to the movable parts in case said holding means become
5 disarranged so as to permit the lever to be thrown abnormally outward.

6. In a gas-engine, the combination of a counter-shaft gear, a cam on the side of said gear, a lever arranged in position to be actu-

ated by said cam, a fixed electrode, a movable 20 electrode, and means whereby said movable electrode may be actuated by the motion imparted to said lever, by said cam.

7. In a gas-engine, the combination of a counter-shaft gear, a cam on the side of said 25 gear, a lever arranged in position to be actuated by said cam, a rocker-shaft having said lever mounted upon one of its ends, a rocker-arm upon the other end of said shaft, a fixed electrode, a movable electrode, and means 30 whereby said movable electrode may be actuated by the motion imparted to said rocker arm, shaft and lever, by said cam.

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