

No. 894,775.

PATENTED JULY 28, 1908.

C. R. GREUTER.

SPARKING DEVICE FOR EXPLOSIVE ENGINES.

APPLICATION FILED APR. 25, 1907.

2 SHEETS—SHEET 1.

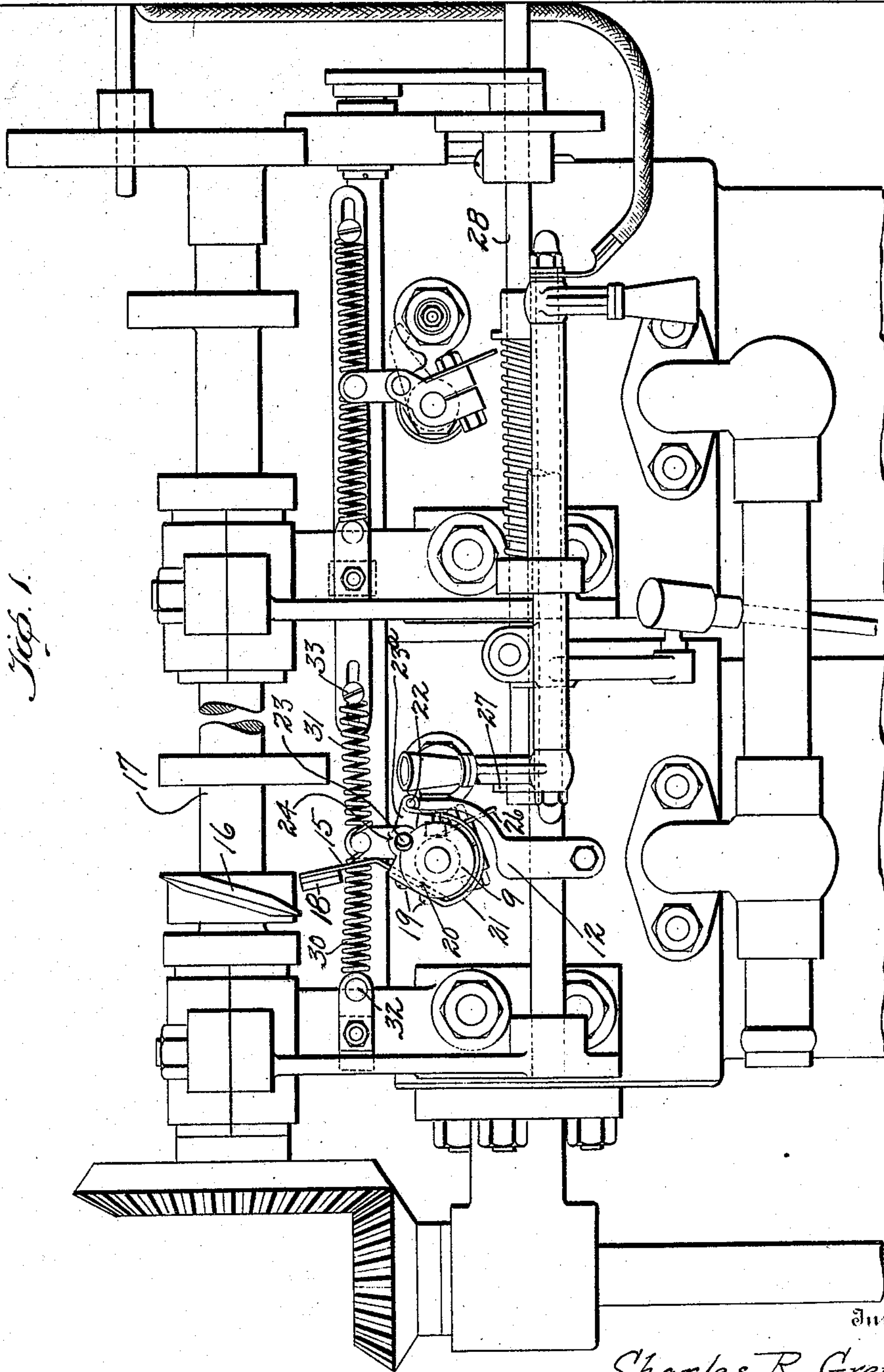


Fig. 1.

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Attorney

Witnesses

*[Signature]*  
S. P. K. Haupter.

By

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2 SHEETS—SHEET 2.

Fig. 2.

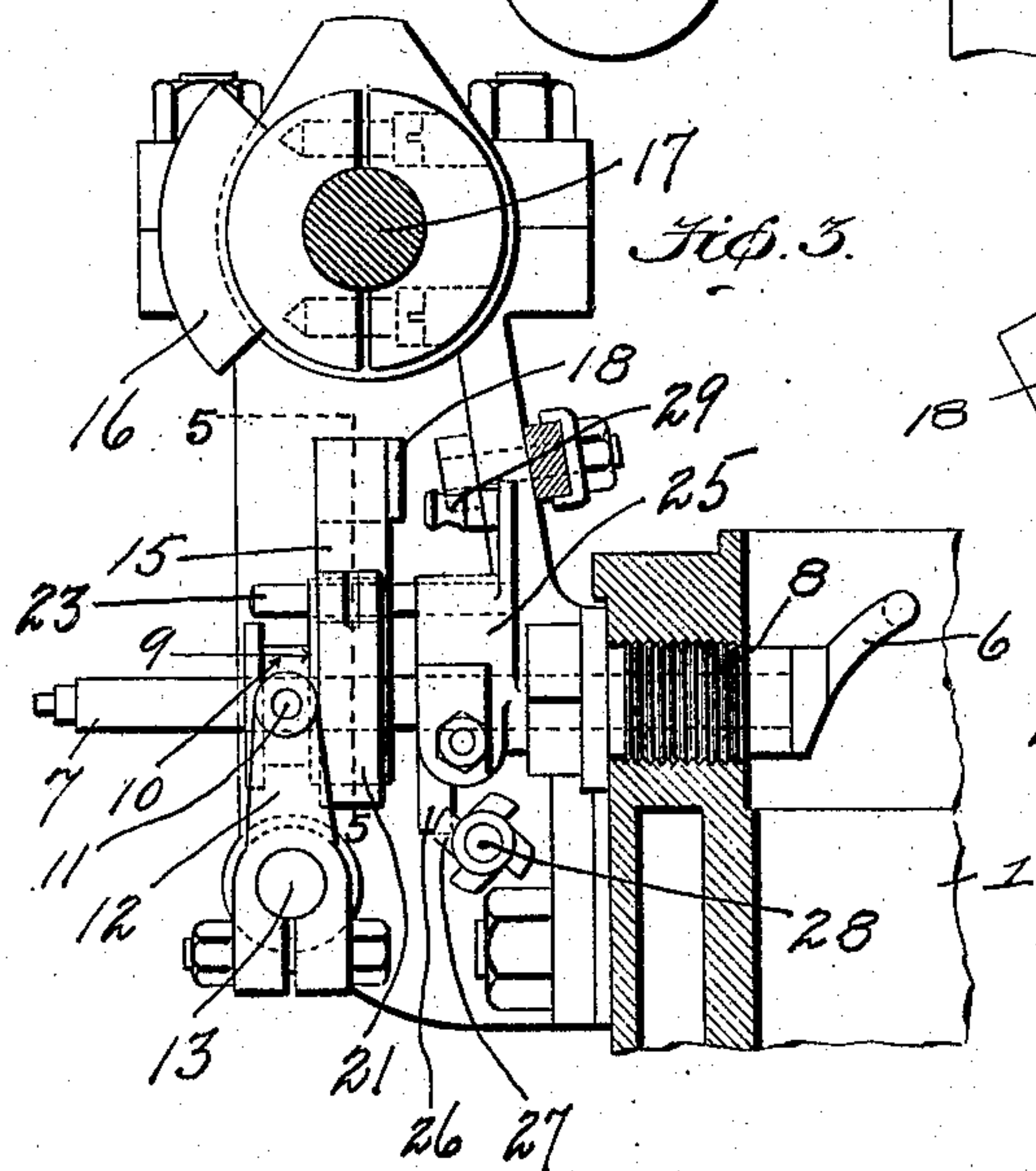
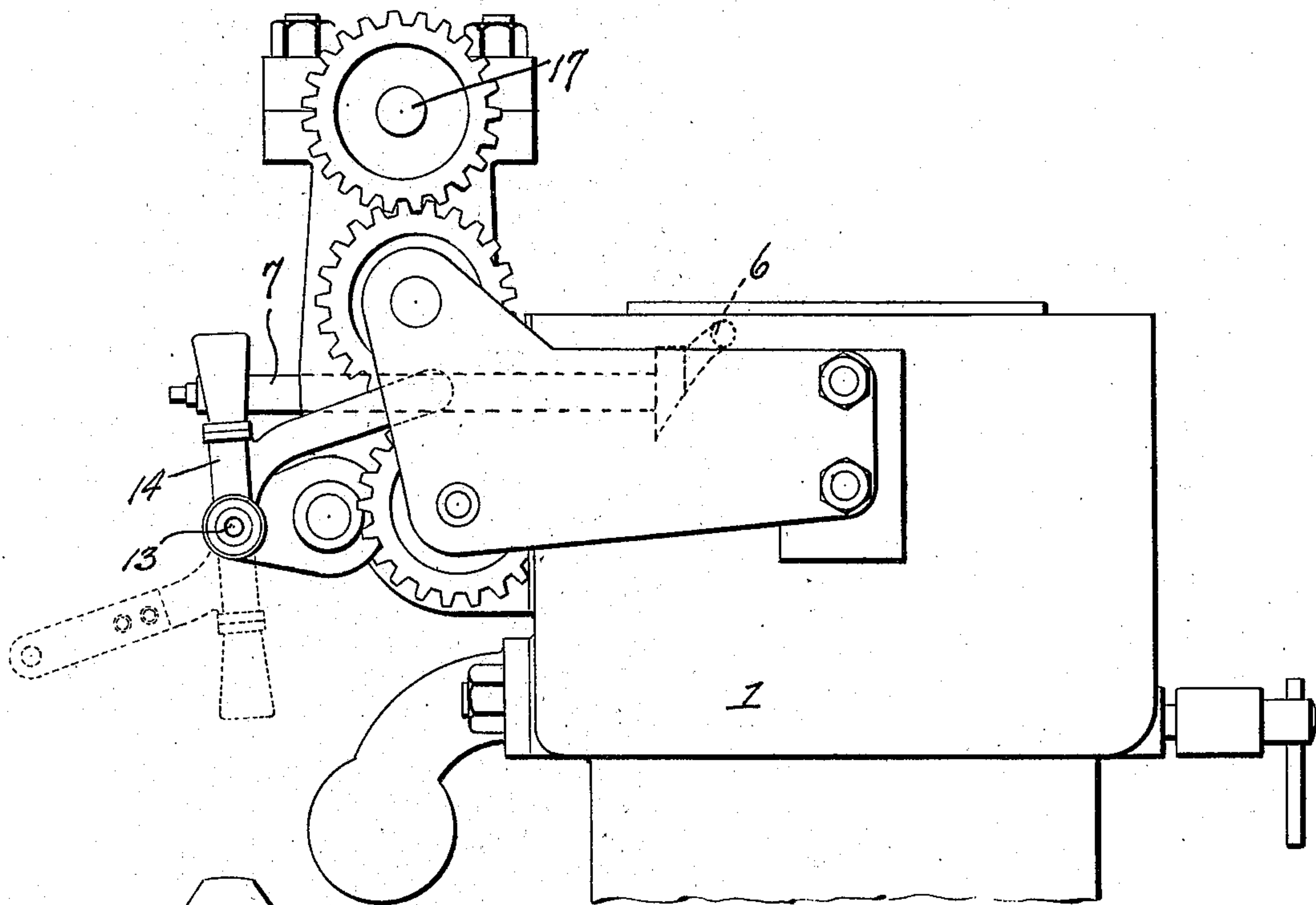
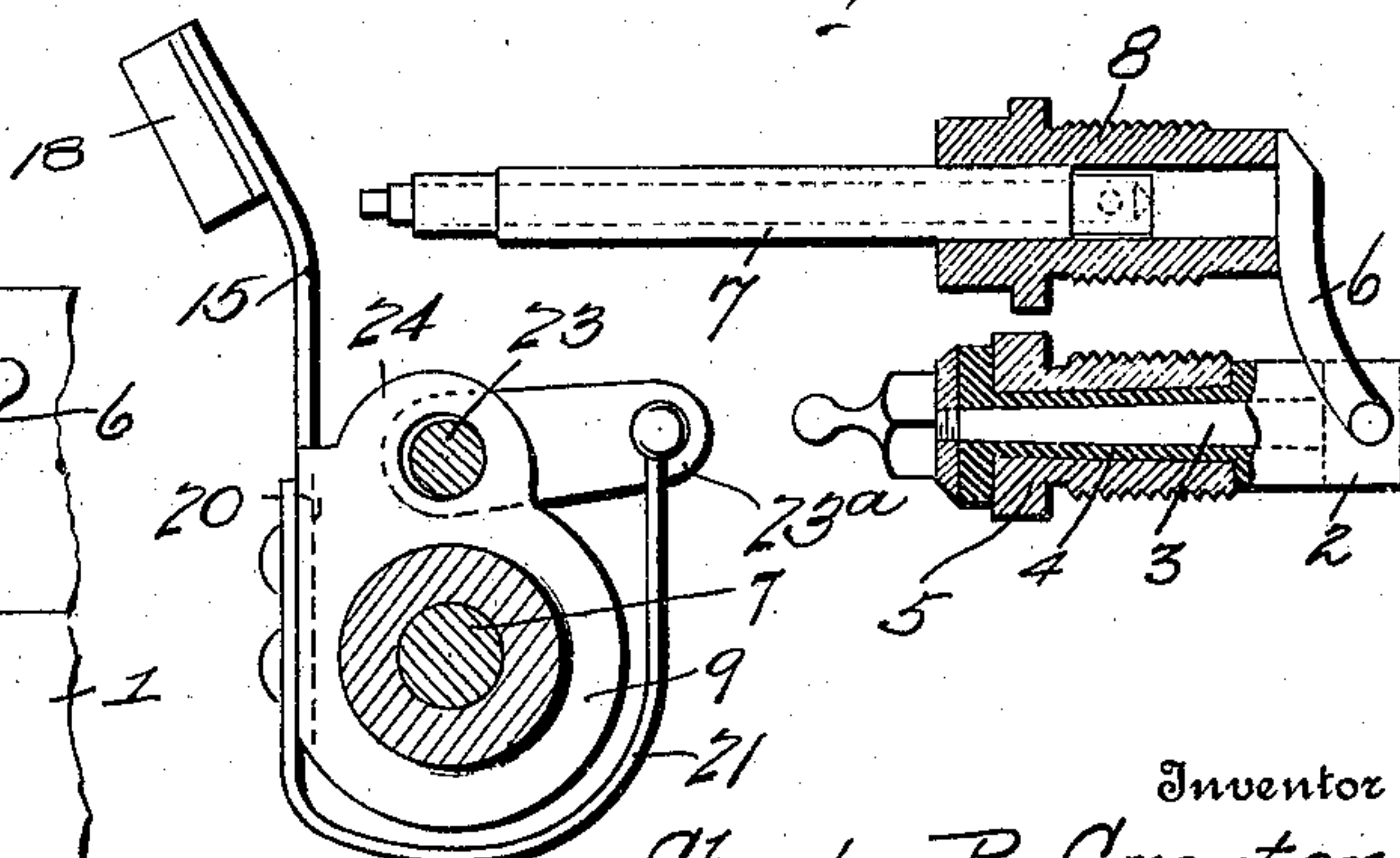


Fig. 4.



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# UNITED STATES PATENT OFFICE.

CHARLES R. GREUTER, OF WILKES-BARRE, PENNSYLVANIA, ASSIGNOR TO MATHESON MOTOR CAR COMPANY, OF WILKES-BARRE, PENNSYLVANIA, A CORPORATION.

## SPARKING DEVICE FOR EXPLOSIVE-ENGINES.

No. 894,775.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed April 25, 1907. Serial No. 370,276.

*To all whom it may concern:*

Be it known that I, CHARLES R. GREUTER, a citizen of the United States of America, residing at Wilkes-Barre, Pennsylvania, have invented new and useful Improvements in Sparking Devices for Explosive-Engines, of which the following is a specification.

This invention relates to sparking devices for explosive engines, particularly of the type which produce a spark by the making and breaking of the electric circuit in contradistinction to the jump spark class of sparkers.

To this end the invention contemplates certain novel and practical improvements in a make and break sparking device involving what is known in the art as a hammer action, and having in view, as a special object, the provision of means for relieving the main presser spring from strain, while at the same time keeping the mechanism in perfect time, and continuing to do so until the wear is equal to the play provided for between certain parts of the device. Also the invention has in view an improved means whereby the time of contact between the two electrodes, may be advanced or retarded.

Other objects will readily appear to those familiar with the art as the nature of the invention is better understood.

In the accompanying drawings, showing a preferable embodiment of the invention, Figure 1 is a side elevation of the cylinder head portion of an internal combustion engine, showing the same equipped with a make and break sparking device constructed in accordance with the present invention. Fig. 2 is an end view showing the general relation of parts cooperating with the sparking device. Fig. 3 is a sectional elevation of the upper part of the cylinder and the attached sparking devices. Fig. 4 is a detail sectional view showing more clearly the mounting and relation of the fixed and movable electrodes, (the sparking hammer and anvil). Fig. 5 is a detail sectional view on the line 5—5 of Fig. 3.

Like reference characters designate corresponding parts in the several figures of the invention.

In the embodiment of the invention shown in the drawings, the numeral 1 designates the cylinder of an internal combustion motor, within the upper end of which is located a fixed insulated electrode 2 having a stem

portion 3 arranged in the usual manner within an insulating sleeve 4 and carried by the bushing or plug 5 fitted in the cylinder wall. The outer end of the stem portion 3 of the fixed electrode 2 is designed to have a suitable wire connection therewith which extends to one pole of a battery or other source of electrical energy, the other pole of which battery is connected to a part of the cylinder, the whole being arranged in the manner well known in this art.

The movable electrode consists of an arm 6 fixed on the inner end of a rock shaft 7 extending through a suitable bushing 8 located in the wall of the cylinder, and carrying upon its outer end portion a loose operating collar 9 capable of an independent sliding and limited rotative movement on the said electrode rock shaft 7.

The loose operating collar or hammer 9 is provided at one side thereof with a grooved hub portion 10 loosely engaged by the stud or pin 11 carried at one end of a swinging shifter arm 12 mounted on a suitably supported adjusting shaft 13 which latter has fitted thereto at a convenient point, a controlling handle 14 to provide means whereby the operating collar or hammer 9 may be shifted longitudinally upon the shaft 7 and thereby shift the position of the main presser spring 15 with relation to the operating cam 16 on the cam shaft 17, which latter is geared or otherwise operatively connected in the well known manner with the crank shaft of the engine and is usually timed so as to be rotated at the ratio of one revolution to two of the crank, as is usual in explosive engines of the four cycle type.

It will also be understood that in a multiple cylinder engine the cam shaft 17 carries a plurality of operating cams 16, each of which cooperates with a sparking device, but as this is well understood in the art, a description of one sparking device and its operating means will suffice to give a proper understanding of the invention.

The main presser spring 15 consists of a short stiff spring provided at its cam engaged end with a wear block or head 18, over which wipes the operative portion of the cam 16, and the free end of the said spring or spring arm 15 is secured fast by means of the screws or equivalent fastenings 19 on the flat supporting side 20 provided at one side of the body portion of the operating collar or hammer 9.



In conjunction with the main presser spring 15, a distinctive feature of the present invention resides in the employment of a relief spring 21 encircling the collar or hammer 9 and secured fast at one end thereto, preferably by means of the fastenings 19. The spring 21 is of U form and the movable end thereof, as at 22, is pivotally connected to one end of a connecting link 23<sup>a</sup>, the short end of which link loosely receives a coupling pin or anvil 23 projecting through the perforated keeper ears 24 formed on the operating collar 9. The holes through the ears 24 are larger than the diameter of the pin or anvil 23 so as to permit of a limited rotary play for the collar or hammer 9 independent of the fast shaft collar 25 secured fast on the shaft 7 between the collar or hammer 9 and the cylinder head. The said collar 25 is provided at one side of the shaft with a strike projection 26 adapted to be engaged by a tappet 27 on a suitably operated longitudinally movable starting shaft 28, to which latter part, however, no claim is made herein. The upper end of the collar 25 above the rock shaft is provided with a holding pin 29 to which are connected one end of the oppositely arranged equalizing springs 30 and 31 having fixed points of attachment on the engine frame respectively at 32 and 33.

From the foregoing it will be understood that the object of longitudinally shifting the collar or hammer 9, as well as the presser spring 15, is to retard or advance the time of contact with the latter and the cam 16, whereby the time of contact of the two electrodes, relative to the position of the piston within the cylinder, may be regulated as desired. It will also be obvious that when the cam 16 engages the spring 15 and swings the same to the right, (according to the position shown in Fig. 1), the movable electrode is carried against the fixed electrode, which movement will take place under the increasing tension of the spring 15, the throw of the cam 16 being such that the spring 15 will not run off of the cam until after contact between the electrodes has been made, thus flexing more or less the spring or spring arm 15 before it leaves the cam. When this takes place, the spring 30 will sharply contract the arm so that its momentum carries it past the vertical, whereupon the spring 31 asserts itself with the result that the movable electrode will continue to vibrate with greatly diminishing frequency and through a greatly diminishing arc, till the action of the springs is equalized, and during the continuance of the vibrating movement the spark will be maintained. It will also be noted that the relief spring 21 permits of a latitude of adjustment and takes the strain off of the spring 15. As the result, the mechanism can be set so that the electrode 6

will engage electrode 2 a little in advance of the time that it would otherwise be permitted, and the relief spring will leave the presser spring and yet keep the mechanism in perfect time and continue to do so until the wear is equal to the play between the fast and loose collars.

I claim:

1. A sparking device comprising a fixed and a movable electrode, a resilient spring connected to the movable electrode, oppositely disposed yielding members acting to hold the movable electrode normally out of contact with the fixed electrode, a cam located in operative relation to said spring, and means for shifting said spring to vary the time of contact of the cam therewith.

2. In a sparking device, the combination with fixed and movable electrodes, a collar rigidly connected with the movable electrode, oppositely disposed yielding members between which said collar is held whereby said movable electrode is held out of contact with the fixed electrode, a spring member operatively connected with said collar, a cam located in operative relation to said spring member, and means for shifting said spring member to vary the time of contact of the cam therefor.

3. In a sparking device, the combination with fixed and movable electrodes, of a rock shaft carrying the movable electrode, a fixed shaft collar mounted on the rock shaft and having yielding spring connections with the engine, a coupling pin, a loose operating collar mounted on the rock shaft, and loosely receiving the coupling pin so as to have a limited play thereon, a cam engaged main presser spring carried by the loose collar and a relief spring also carried by the loose collar and having a self-adjusting connection with the coupling pin.

4. In a sparking device, the combination with the fixed and movable electrodes, a fast collar on the shaft having yielding spring connections with the engine and provided with a laterally projecting coupling pin, a loose operating collar longitudinally shiftable on the shaft and loosely receiving said pin so as to have a limited play thereon, a main cam engaged presser spring carried by the loose collar, a relief spring encircling the loose collar and connected at one end thereto, the other end of said spring having a loose link connection with said coupling pin, and means for shifting the loose collar.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 11th day of April 1907.

CHARLES R. GREUTER.

Witnesses:

C. W. MATHESON,

MAUD F. MATHESON.