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Patented Sept. 2, 1902.

A. G. RONAN.
REVOLVING ELECTRIC IGNITER.

(Application filed June 5, 1901.)

(No Model.)

Fig. 1.

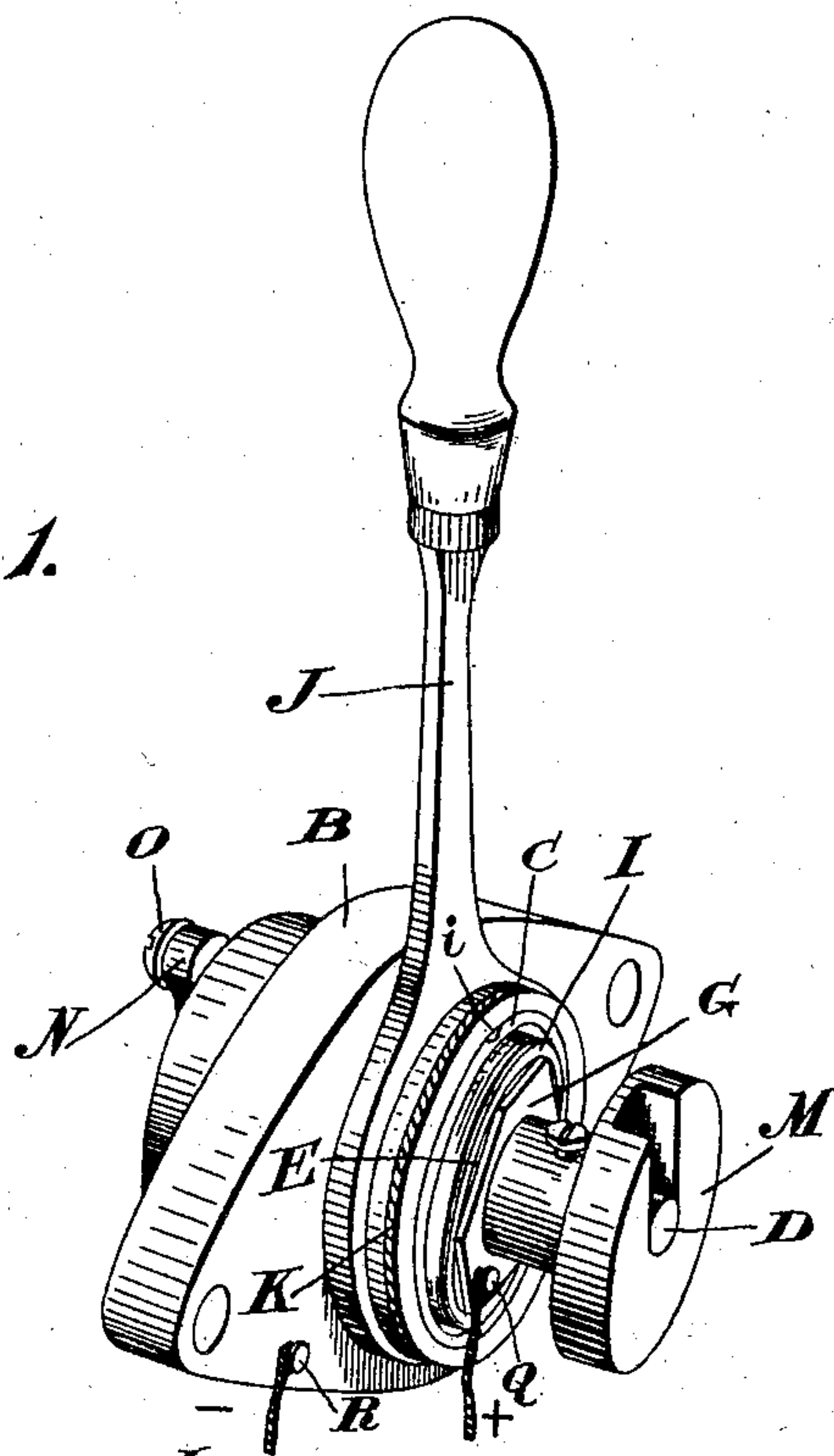


Fig. 2.

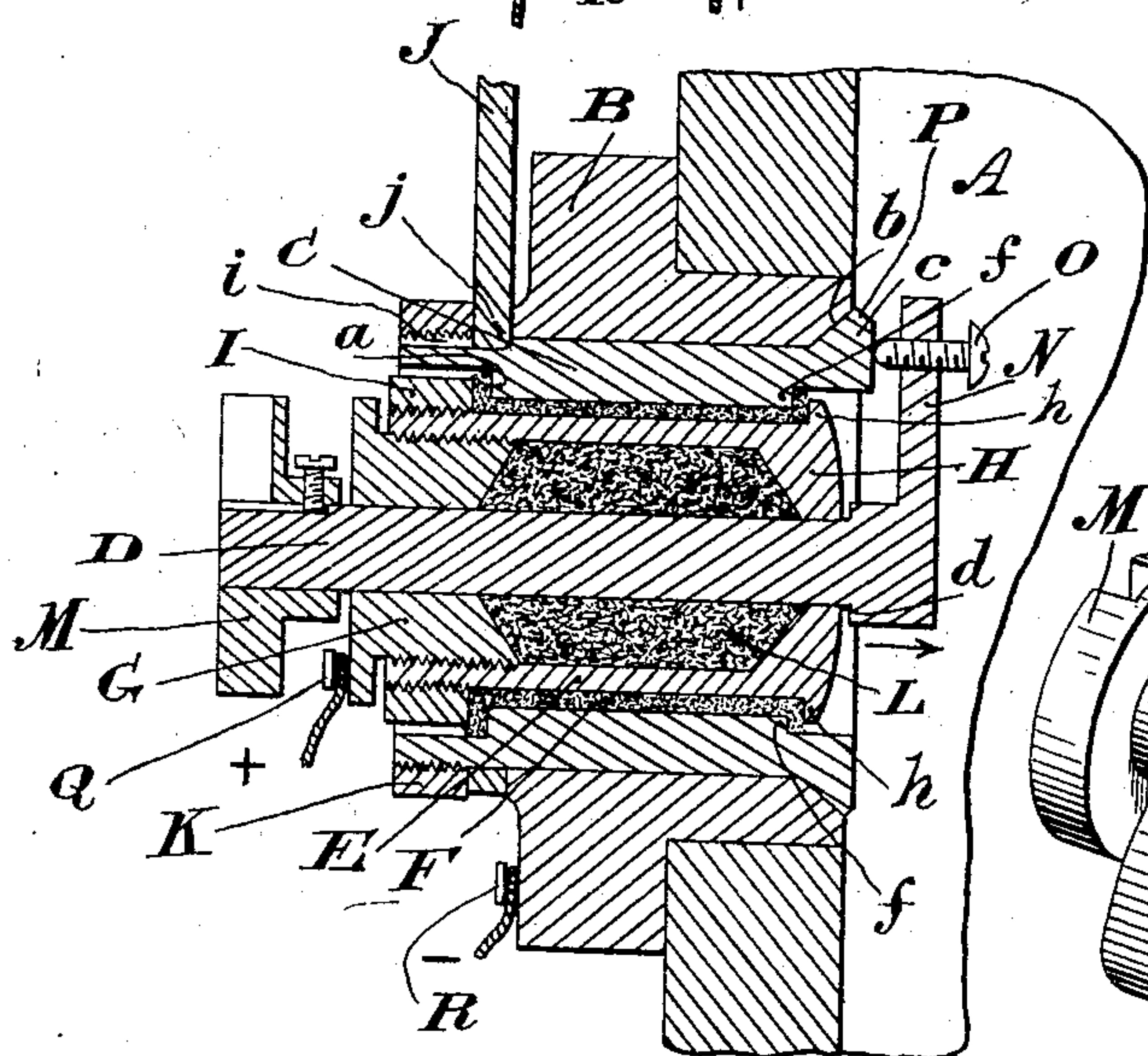
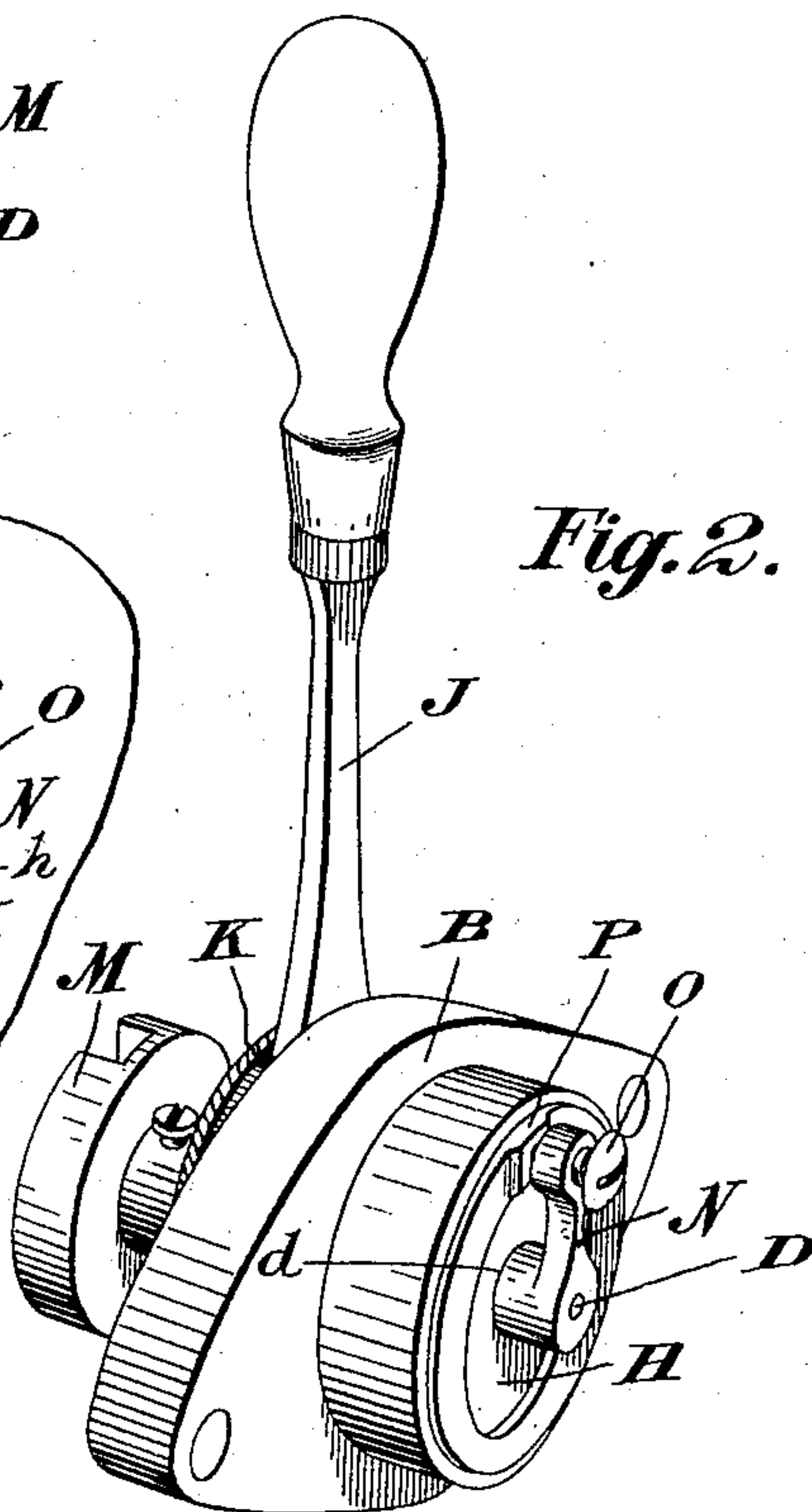


Fig. 3.

Witnesses.

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UNITED STATES PATENT OFFICE.

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REVOLVING ELECTRIC IGNITER.

SPECIFICATION forming part of Letters Patent No. 708,080, dated September 2, 1902.

Application filed June 5, 1901. Serial No. 63,303. (No model.)

To all whom it may concern:

Be it known that I, ANSON GROVES RONAN, mechanic, a subject of the King of Great Britain, residing at the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Revolving Electric Igniters, of which the following is a specification.

My invention relates to improvements in revolving electric igniters; and the object of my invention is to design a revolving electric igniter of the wipe-contact type that will, first, enable me to give the same a lag or a lead, so as to control the speed of the engine; secondly, to obtain the largest possible spark from the igniter to insure complete combustion of the explosive mixture; thirdly, to design an igniter that will use the minimum amount of electric current from the batteries and yet be efficient; fourthly, to so simplify the construction of igniters as to make it unnecessary to use any springs in same, and so consequently prevent any part or parts of the igniter from being affected in their operation in the slightest degree by the heat caused by the explosions, and, fifthly, to further construct the igniter so that the requisite pressure of contact between the positive and negative electrodes of same will be regulated by the explosive force of the explosive mixture; and it consists, essentially, in mounting the revolving electrode within the adjustable or normally stationary electrode and in insulating the revolving electrode from the normally stationary electrode and providing means for moving the said normally stationary electrode so as to give a lag or a lead to the said igniter, and, further, in constructing the said revolving electrode so that the same will have a limited longitudinal movement in its bearing, and other details of construction, as hereinafter more particularly explained.

Figure 1 is a general front perspective view of my igniter. Fig. 2 is a general rear perspective view of my igniter. Fig. 3 is an enlarged vertical section through my igniter.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is the combustion-chamber, and B the outer casing of the igniter, which is suitably secured to said combustion-chamber.

C is the negative electrode. This electrode has movement in the outer casing B.

D is the positive electrode. This electrode is composed of a suitable round rod, which is provided with a suitably-shaped inner end. The said positive electrode has longitudinal movement in its bearing. The said electrode is mounted to revolve in the plug E, which is insulated by insulation F from the negative electrode C.

G is a stuffing-box nut screwed into the plug E. In this nut the outer end of the positive electrode D has bearing. The negative electrode C is made cylindrical in shape and is provided at its inner end with an outwardly-flared annular flange *c*, which turns upon the inner chamfered shoulder *b* of the outer casing B. The surface of contact between the said flange and shoulder is preferably ground, so as to make same fit perfectly tight, and thus prevent any gases escaping from the combustion-chamber A. This construction will be recognized as the ordinary valve-seat. The head H of the plug E is provided with an annular flange *h*, between which and the internal shoulder *f* of the negative electrode C the insulation F is held in place.

I is an internally-threaded ring screwing on the outer end of the plug E and between which and the internal shoulder *a* of the negative electrode C the packing F is further held in place.

J is a lever fitted over the outer end of the negative electrode C and keyed thereto by its stud *j*, fitting in the keyway *i* of the said electrode. The lever J is kept in place by the internally-threaded ring K screwing over the outer end of the negative electrode C and being jammed against said lever.

L is any suitable packing surrounding the positive electrode D and held within the plug E. The plug E and the nut G, together with the packing L, make what is known as a "stuffing-box." It will of course be understood that I may use any kind of stuffing-box in my igniter. By means of this stuffing-box it will be understood that no gases can escape from the combustion-chamber by way of the bearing of the positive electrode. The packing L is of course of any suitable kind. The positive electrode D is revolved by any suitable mechanism, such as a crank-operated wheel

M, suitably keyed to the outer end of said positive electrode, so as to allow of a limited longitudinal movement to said positive electrode. In the inner end N of the positive electrode D is an adjustable device, such as an ordinary screw O, which when the said positive electrode is revolving wipes against the contact-point P of the negative electrode, causing the electric spark, as understood.

Q is the binding-post for the positive electrode, and R the binding-post for the negative electrode. It will of course be understood that the requisite wires can be connected to the igniter in any suitable way. It is well known that the positive electrode is affected much more by the electric current than the negative electrode. So, therefore, I preferably make the electrode D the positive one, as its contact-point can be so quickly and cheaply replaced. It will of course be understood that I may change the polarity of the said electrodes, if I wish. The contact-point P of the negative electrode C preferably forms part thereof and is of sufficient size to insure a large and powerful spark being created within the combustion-chamber. It will be readily understood that I can make the contact-point P separate from the negative electrode C and secure same thereto in any suitable manner, and I do not confine myself to particularly making the contact-point of the positive electrode the adjustable one, as my igniter, being so easily gotten at, can be provided with a suitable adjustable contact-point for the negative electrode, and I claim my igniter with any suitable contact-point for the electrodes. By means of the wipe-contact between the two electrodes it will be understood that the surface of the contact of the said electrodes will always be clean. By means of the lever J it will be understood that I can give the negative electrode C a lag, so that its contact-point P will be in such position that during the starting of the engine the ignition of the explosive mixture will take place after the dead-center of the piston has been passed, so as to prevent the engine from moving backward. In order to increase the speed of the engine, the negative electrode will be given a lead, so that the contact between the points O and P will take place before the dead-center of the piston, so as to allow sufficient time for complete combustion of the explosive charge in the combustion-chamber. I do not confine myself to using the lever J for the purpose of moving the negative electrode C, but may use any suitable means for this purpose. The said means may be either operated by hand or else automatically operated.

As the contact-point O escapes the contact-point P a spark is caused. Hence an explosion takes place within the combustion-chamber A, and the inner end N of the positive electrode receives part of same, so that the said electrode is moved outwardly, and its annular shoulder *d* will be forced against the head H of the plug E, so that when the

contact-point O is brought into contact with the contact-point P it slides up the side of said contact-point P until it reaches the flat surface of same. The positive electrode D is simultaneously moved in the direction indicated by arrow to allow the contact-point O to scrape across the contact-point P with the requisite pressure against same. The explosive charge is under great pressure just before it is fired, so it will be understood that the requisite pressure between the electrodes will be assured. By means of the longitudinal play allowed the positive electrode D it will be understood that the force of the explosive mixture will regulate the pressure of the contact-point O against the contact-point P, thus doing away with springs entirely, which have heretofore been used for this purpose. When the screw O becomes worn, the same is easily and cheaply replaced by a new one.

It must be understood that although I preferably use a bearing of the stuffing-box type for the revolving electrode I do not confine myself to using the same, as I may use any suitable bearing for this purpose.

I do not confine myself to the details of construction herein shown and described, which may be altered in many ways without departing from the spirit of my invention.

What I claim as my invention is—

1. In a revolving electric igniter, the combination with an electrode centrally mounted within an adjustable electrode from which it is insulated, and designed to turn therein, of said adjustable electrode, the same adjustable about its axis with reference to the other electrode.

2. In a revolving electric igniter, the combination with an electrode mounted centrally within an adjustable electrode from which it is insulated, and designed to turn therein, the said revolving electrode having a limited longitudinal movement, and means for limiting longitudinal movement of same, of said adjustable electrode, the same adjustable about its axis with reference to the other electrode, and means for adjusting said adjustable electrode, the first-mentioned electrode being revolved and making a wipe contact with said adjustable electrode.

3. In a revolving electric igniter, the combination with an electrode centrally mounted within an adjustable electrode from which it is insulated, and designed to turn therein, the said revolving electrode having a limited longitudinal movement, an adjustable contact-point carried by the inner end of said revolving electrode, and stops on said revolving electrode for limiting longitudinal movement of same, of said adjustable electrode, the same adjustable about its axis with reference to the other electrode, and means for adjusting said adjustable electrode, the first-mentioned electrode being revolved and making a wipe contact with said adjustable electrode.

4. In a revolving electric igniter, the com-

5 bination with an electrode centrally mounted within an adjustable electrode from which it is insulated, and designed to turn therein, the said revolving electrode having a limited longitudinal movement, an adjustable contact-point carried by the inner end of said revolving electrode, and stops on said revolving electrode for limiting longitudinal movement of same, of said adjustable electrode, a contact-point on the inner end of same and projecting outwardly from same, the said adjustable electrode adjustable about its axis with reference to the other electrode, and means for adjusting said adjustable electrode, the first-mentioned electrode being revolved so that its contact-point will make a wipe contact with said contact-point of said adjustable electrode.

20 5. In a revolving electric igniter, the combination with an electrode centrally mounted within an adjustable electrode from which it is insulated, and designed to turn therein, the said revolving electrode having a limited longitudinal movement, an adjustable contact-point carried by the inner end of said revolving electrode, and stops on said revolving electrode for limiting longitudinal movement of same, of said adjustable electrode, a contact-point on the inner end of same and projecting outwardly from same, the said adjustable electrode adjustable about its axis with reference to the other electrode, and a lever on the outer end of said adjustable electrode for adjusting same, the first-mentioned electrode being revolved so that its contact-point will make a wipe contact with said contact-point of said adjustable electrode.

35 6. In a revolving electric igniter, the combination with an electrode mounted centrally

to revolve within an adjustable electrode 40 from which it is insulated, and a contact-point carried by the inner end of said revolving electrode, of said adjustable electrode, the same essentially quickly adjustable with reference to the revolving electrode, and means 45 for adjusting said adjustable electrode.

7. In a revolving electric igniter, the combination with an electrode mounted centrally to revolve within an adjustable electrode from which it is insulated, and an adjustable contact-point carried by the inner end of said revolving electrode, of said adjustable electrode, and a contact-point on the inner end of same and projecting outwardly therefrom, the said adjustable electrode essentially quickly adjustable with reference to the revolving electrode, and means for adjusting said adjustable electrode. 55

8. In a revolving electric igniter, the combination with an electrode mounted centrally 60 to revolve within an adjustable electrode from which it is insulated, and an adjustable contact-point carried by the inner end of said revolving electrode, of said adjustable electrode, and a contact-point on the inner end of same and projecting outwardly therefrom, the said adjustable electrode essentially quickly adjustable with reference to the revolving electrode, and an arm on the outer end of said adjustable electrode for adjusting same. 70

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ANSON GROVES RONAN.

Witnesses:

EGERTON R. CASE,
T. F. GERRY.