No. 809,262. PATENTED JAN. 2, 1906.

R. O. HOOD.

CONTACT DEVICE FOR INDUCTION APPARATUS.

APPLICATION FILED APR. 11, 1905.

Fig. 1.

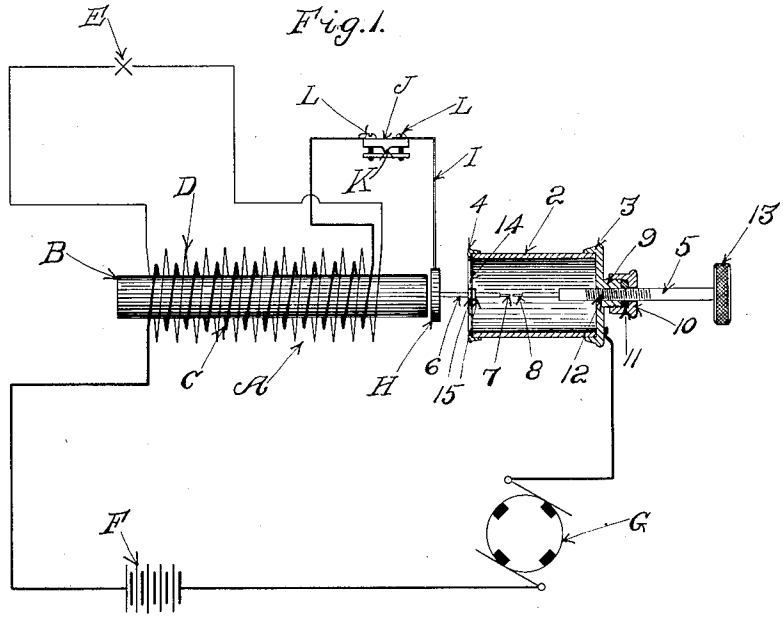
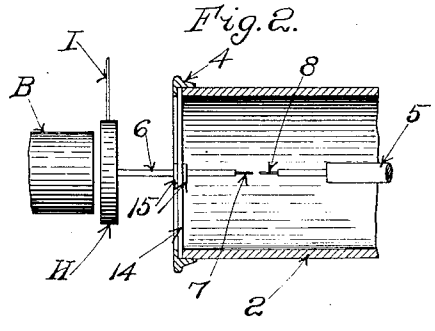



Fig. 2.




Witnesses:

J. Henry Parker

Alice H. Morrison

Inventor:

Ralph O. Hood,

by Macleod, Calver, Cushman & Dike.

Attorneys.

# UNITED STATES PATENT OFFICE.

RALPH O. HOOD, OF DANVERS, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO WARREN D. KING, OF PEABODY, MASSACHUSETTS.

## CONTACT DEVICE FOR INDUCTION APPARATUS.

No. 809,262. Specification of Letters Patent. Patented Jan. 2, 1906.

Application filed April 11, 1905. Serial No. 254,921.

*To all whom it may concern:*

Be it known that I, RALPH O. HOOD, a citizen of the United States, residing at Danvers, county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Contact Devices for Induction Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention is an improvement in induction apparatus, particularly of that class which is used for the ignition of the explosive mixture in explosion-engines and the like, and is especially adapted for use in automobiles, where reliability of the sparking apparatus is very important.

My invention has for its object to produce a contact device for induction apparatus which shall be more durable and reliable than those heretofore used and the operation of which may be easily observed. It also embraces certain novel features of construction.

The invention will be fully understood from the following description, taken in connection with the accompanying drawings, and the novel features thereof are pointed out and clearly defined in the claims at the close of this specification.

In the drawings, Figure 1 is a view, partly in section, of a device embodying my invention, the wiring and certain other parts being indicated diagrammatically for convenience. Fig. 2 is a view, somewhat enlarged, of the armature and connected parts.

Referring to the drawings, an induction-coil of ordinary construction is indicated at A. At its center is a core B, composed of a bundle of strips of soft iron. About this core B is placed the primary coil C, composed of a few turns of coarse wire, and outside of the primary coil C is a secondary coil D, composed of a relatively large number of turns of relatively fine wire. In this secondary circuit is located the spark-plug or other sparking arrangement, which I have indicated by a cross E. In the primary circuit is placed a battery F or other convenient and suitable source of electrical energy. There is also placed in this circuit a make-and-break device of some convenient form—as, for instance, a commutator G—which breaks the current of the primary circuit at suitable intervals, determined by the speed at which the commutator G or other make-and-break device is moved.

In this class of machines it is desirable that the sparks which pass between the points of the sparking device be very much more frequent than the breaks in the primary circuit which can be produced by the commutator G or other make-and-break device in order that instant ignition of the explosive material in the cylinder be produced. Accordingly I place in the primary circuit my improved contact device, which I will now describe.

At the end of the induction-coil A and opposite to the end of the core B, I support an armature H upon a convenient bent spring I, fastened to a rocking plate J on the top of the induction-coil A or in any other convenient situation upon the machine. By means of this rocking plate J, which is pivoted at K, and the two adjusting-screws L, I am enabled to regulate the tension of the spring I. The armature H is alternately attracted and repelled by the core B under the influence of the breaks or fluctations in the current in the primary circuit, and these movements of the armature take place with great frequency.

Supported by a convenient bracket upon the induction-coil A or the frame of the machine is an inclosing tube or casing 2, held in collars or end pieces 3 and 4. The casing or tube 2 is made from glass or other transparent material in order that the operator may readily see the condition of the parts within the said tube 2. The collars or end pieces 3 and 4 make air-tight joints with the tube 2, and I use shellac or some other suitable substance to insure that there shall be no leakage of air into the interior of the casing or tube at these points.

Within the tube 2 I place two contact-points 5 and 6, provided with platinum tips 7 and 8. The contact-point 6 is fast to the armature H and vibrates with it as it is alternately attracted and repelled by the action of the core B. The other contact-point 5

passes through a stuffing-box 9, provided with a cap 10 and packing 11, the said contact-point 5 being screw-threaded and engaging corresponding threads in the interior of the stuffing-box, as shown at 12. A handle 13 is also provided upon the exterior end of the contact-point 5, by means of which the contact-point may be rotated about its longitudinal axis and withdrawn or inserted farther within the interior of the tube 2 for the purpose of adjustment. By this means I am enabled to adjust very precisely the distance between the platinum tips 7 and 8 of the contact-points 5 and 6, which is a matter of considerable importance in the operation of a contact device of this kind.

The contact-point 6, attached to the armature H, passes through a closure or diaphragm 14, which closes the end of the tube 2, being securely held to the tube 2 by the collar or end piece 4. I make an air-tight joint between the diaphragm 14 and the end piece 4 and tube 2 by the use of shellac or other convenient material, as before described.

On each side of the diaphragm 14 and about the stem of the movable contact-point 6 I place a nut 15, by means of which a tight joint between the diaphragm 14 and the said movable contact-point is produced.

The closure or diaphragm 14 is made of thin sheet-rubber or other flexible and elastic material, so that it accommodates itself to the movements of the contact-point 6, these movements being very slight; but it is obvious that the same result may be obtained by the use of a substantially inflexible closure, through which the contact-point 6 passes, so long as a substantially air-tight joint is made between the closure and the contact-point.

It will be seen from the foregoing description that the platinum tips 7 and 8 of the contact-points 5 and 6 are inclosed within a substantial, air-tight space, but are entirely visible to the operator from the outside. By this means the oxidation of the tips is greatly lessened and is made practically nothing, thus prolonging very materially the life of the tips and greatly increasing the reliability of the apparatus, since the oxygen in the air originally in the closure or chamber is very quickly consumed by the action of the sparks and is not replaced from the outer atmosphere, the amount of the oxygen in the air originally within the chamber not being sufficient to injure materially the points. The casing also serves to protect the contact-points from the weather and from dust.

In the practical operation of my device I do not find it necessary that the inclosure for the points be absolutely air-tight so long as the free passage of air to the interior is largely prevented. By the use of the rubber diaphragm or closure 14 I find that the contact-point 6, carried by the armature H, is given sufficient freedom of movement, but that the movement of the contact-point and its supporting-armature is not perceptibly impeded by the diaphragm, while at the same time affording the requisite protection from the air.

My construction also makes it convenient to inspect the condition of the contact-points if they become worn and to replace or repair them. I also find it very easy to replace the diaphragm 14 should it become worn or punctured.

What I claim is—

1. In a contact device for induction apparatus, the combination of a casing, a flexible closure therefor forming therewith a substantially air-tight chamber and contact-points, one of which passes through the said flexible closure.

2. In a contact device for induction apparatus, the combination of a casing, a closure therefor forming therewith a substantially air-tight chamber, and contact-points one of which passes through the said closure.

3. In a contact device for sparking apparatus, the combination of a casing, a flexible closure therefor forming therewith a substantially air-tight chamber, a fixed contact-point, and a movable contact-point passing through the said flexible closure.

4. In a contact device for sparking apparatus, the combination of a casing, a flexible closure therefor forming therewith a substantially air-tight chamber, a movable contact-point passing through the said flexible closure and operatively connected therewith whereby a substantially air-tight joint between the said movable contact-point and the said closure is effected without impeding the movement of the said movable contact-point.

5. In a contact device for sparking apparatus, the combination of a casing, a flexible closure therefor forming therewith a substantially air-tight chamber, a fixed contact-point, a movable contact-point passing through the said flexible closure and adjusting means for the said fixed contact-point.

6. In a contact device for sparking apparatus, the combination of a tube closed at one end, a flexible closure for the other end thereof forming therewith a substantially air-tight chamber, a fixed contact-point and a movable contact-point passing through the said flexible closure.

7. In a contact device for sparking apparatus, the combination of a transparent tube closed at one end, a flexible closure for the other end thereof forming therewith a sub-

stantially air-tight chamber, a fixed contact-point and a movable contact-point passing through the said flexible closure.

8. In a device of the character specified, the combination with an induction-coil and a core therefor, of a contact device comprising a casing, a flexible closure therefor, a fixed contact-point having an armature for the said core and a movable contact-point mounted upon the said armature and passing through the said flexible closure and forming therewith a substantially air-tight joint.

In testimony whereof I affix my signature in presence of two witnesses.

RALPH O. HOOD.

Witnesses:

GEORGE P. DIKE,

J. HENRY PARKER.