No. 825,830. PATENTED JULY 10, 1906.

J. O. HEINZE, JR.

VIBRATING MECHANISM FOR INTERRUPTING CURRENTS IN SPARK COILS.

APPLICATION FILED SEPT. 19, 1905.

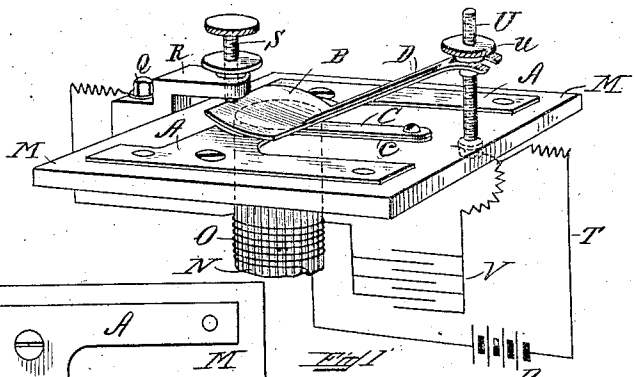

Fig. 1.

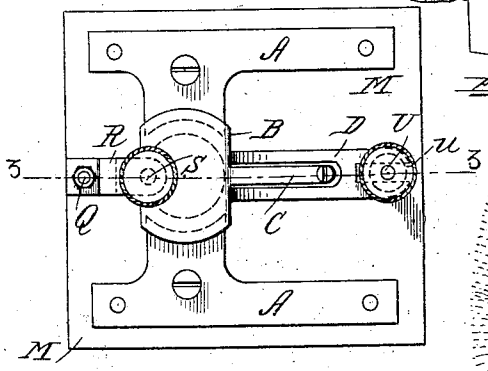

Fig. 2.

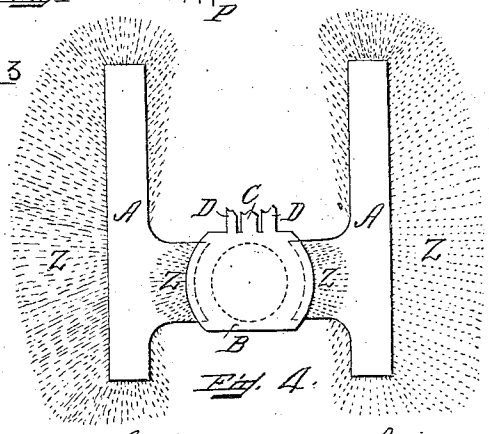

Fig. 4.

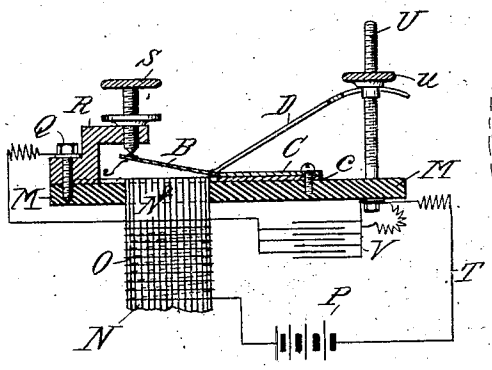

Fig. 3.

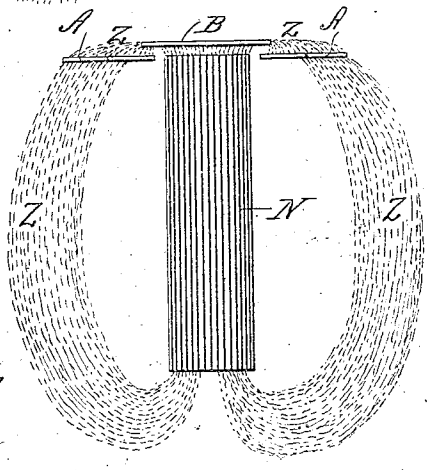

Fig. 5.

Witnesses:
R. S. Remick
[illegible]

Inventor:
John Otto Heinze, Jr.
by his attorney
Charles F. Richardson

UNITED STATES PATENT OFFICE.

JOHN OTTO HEINZE, JR., OF LOWELL, MASSACHUSETTS.

VIBRATING MECHANISM FOR INTERRUPTING CURRENTS IN SPARK-COILS.

No. 825,830. Specification of Letters Patent. Patented July 10, 1906.

Application filed September 19, 1905. Serial No. 279,073.

To all whom it may concern:

Be it known that I, JOHN OTTO HEINZE, Jr., a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Vibrating Mechanism for Interrupting Currents in Spark-Coils, of which the following is a specification.

The principal feature of my invention resides in means whereby I am enabled to increase the strength of the magnetic field of a spark-coil, and thereby greatly increase the number of vibrations of its vibrating mechanism, and hence the number of interruptions of the current of the coil.

The other feature of my invention resides in the vane of the vibrating mechanism. It is light in weight, large in area, and is provided with means to vary its stiffness in order to operate successfully under different magnetic and electrical conditions. This feature of my invention may be used, for example, in connection with the primary wire of an induction-coil. When so used, there may for a given rate of interruption of the current in the primary wire be employed a current weaker than any heretofore used. With a given current in the primary wire my vane permits a greater rate of interruption in the primary circuit. Still further, with a given current in the primary wire and with a greater magnetic field there is consequently not only greater strength in the magnetic field, but also in the electrical current induced in the secondary wire of the induction-coil. Further, with a given strength of magnetic field such a tension may within certain limits be given to the vane that the number of vibrations of the vane, and hence the number of interruptions of the primary circuit desired, may be obtained.

My invention is particularly useful when used in connection with gasolene-engines—such, for example, as are used in automobiles—the reason being that because of the increase of the number of interruptions in the primary circuit over the number usually obtained, due both to a stronger magnetic field and a larger but lighter vane not heretofore employed, the responding sparks resulting and formed in the spark-plug for exploding the gas during each cycle of the engine will be heavy and always sufficient to insure ignition of the explosive mixture.

Figure 1 is a perspective view showing all the features of my invention, a battery and a condenser being represented diagrammatically. Fig. 2 is a plan view. Fig. 3 is a vertical section on line 3 3, Fig. 2, while Figs. 4 and 5 are respectively a plan and an elevation to illustrate the means employed in facilitating the flow of the magnetic lines from one pole to the other, and thereby increase the strength of the magnetic field.

In the drawings illustrating the principal features of my invention a pair of auxiliary soft-iron arms A A are mounted upon a base M, of suitable insulating material, as rubber. Projecting through and secured in a hole cut between these adjacent arms is a core N or bundle of iron wires representing said core of an electromagnet, the winding O of which is connected to a source of electrical energy P, as battery, and to a binding-post Q. This binding-post serves to secure to the insulating-base a contact-post R, which is provided with a contact-screw S. A wire T connects with the other side of battery P and leads to a contact-post U, mounted in the insulating-base, while a condenser V is bridged between the winding O upon the core N of the electromagnet and the wire T.

A vane made, preferably, of thin steel is mounted adjacent to that portion of the core N projecting through the insulating-base. Its form will be readily understood by a reference to the figures of the drawings. It comprises an armature portion B and a tongue C and a tension-arm D, the two latter being integral with the former and extending rearwardly. The vane being moved into position over the core and portions of the auxiliary arms is fixed to the insulating-base, as by passing a screw through the outer end portion of the tongue C, a brass piece *c*, and into the base, the tongue lying substantially flat upon brass piece *c*. Near to the core N the armature B is bent up and out of the plane of the tongue, so as to be in proximity to the adjacent end of the contact-screw S, but not in contact with the core N. The tension-arm D forms an acute angle with the plane of the tongue C, and its outer end portion is forked and engages an adjusting-nut *u* upon the contact-post U.

The operation of my device will now be plain. The contact-screw S and the adjusting-nut *u* are so manipulated that the armature B is brought into spring-contact with the contact-screw, and an electrical circuit is completed from the battery P, through the

winding O, binding-post Q, contact-post R, contact-screw S, armature B, tension-arm D, adjusting-nut *u*, contact-post U, wire T, and back to battery P. The core N becomes energized, attracts the armature B, moves it out of contact with the contact-screw S, against the resistance offered by the tension-arm D; but this breaking of contact breaks the circuit, the core N becomes deënergized, and the armature B springs back into contact with the contact-screw S, thereby again completing the electrical circuit which energizes the core N, and the armature B is again attracted and breaks contact with the contact-screw S; but it is to be observed (see Figs. 4 and 5) that the magnetic lines or circuit Z Z, due to the electrical currents passing through the winding O upon the core N, are greatly aided in their flow from one pole of the magnet to the other pole, by the steel armature B and by the soft-iron auxiliary arms A A, that embody the principal feature of my invention. The strength of the magnetic field, and hence the force of attraction between the electromagnet and the armature or vane, is increased over that in vibrating mechanisms heretofore used, because the auxiliary arms A A become magnets in addition to the electromagnet. The force being greater, plainly the vane will vibrate quicker, and should it be employed, say, in the sparking apparatus of automobile-engines the resulting sparks would be produced in abundance and explosion of the explosive mixture would be a certainty. If for any reason the tension in the vane is insufficient or too great to cause the vane to return to the electrical contact-screw S with the speed desired, additional or less tension may be given thereto by turning one way or the other the adjusting-nut *u* on the contact-post U, which engages the free end portion of the tension-arm D.

While in the above description and figures I have pointed out the preferred form and materials employed in embodying my invention in a working device, I do not limit myself thereto. For example, any suitable magnetic material may be used and one or more auxiliary members of any form arranged so as to facilitate the flow of magnetic lines or circuits from one pole to the other and to aid the electromagnet in its action on the vane will come within the principle of my invention. In short, I desire to claim my invention in the broadest manner legally possible.

What I claim is—

1. In a spark-coil, a vane or armature; an electromagnet; one or more members of magnetic material independent of the electromagnet, and so arranged in relation to the pole of said electromagnet, that one or more magnets are formed in addition to the electromagnet, and thus serve to attract the vane or armature with a force additional to that of the electromagnet.

2. The combination of an electromagnet, a vane or armature; two members, of magnetic material, each of which has an arm adjacent to the pole of the electromagnet, and to the vane or armature.

3. In a vibrating mechanism of a spark-coil, a vane or armature of thin magnetic material; a flexible tongue integral with, and extending rearwardly from, said vane, said tongue being fixed to a base; a flexible arm integral with, and extending rearwardly from, said vane; and means for adjusting the flexible arm, and hence the vane or armature.

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

JOHN OTTO HEINZE, JR.

Witnesses:

WILLIAM A. QUIGLEY,

E. F. UNIAC.