No. 751,574. PATENTED FEB. 9, 1904.

C. H. THORDARSON.

ELECTRIC SPARK PRODUCING APPARATUS.

APPLICATION FILED MAR. 10, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

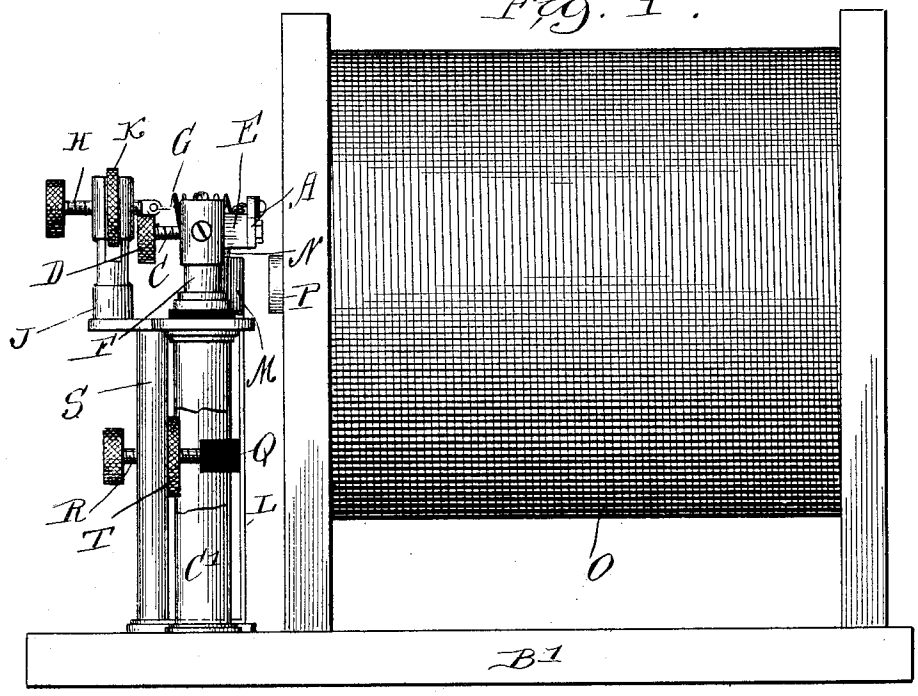
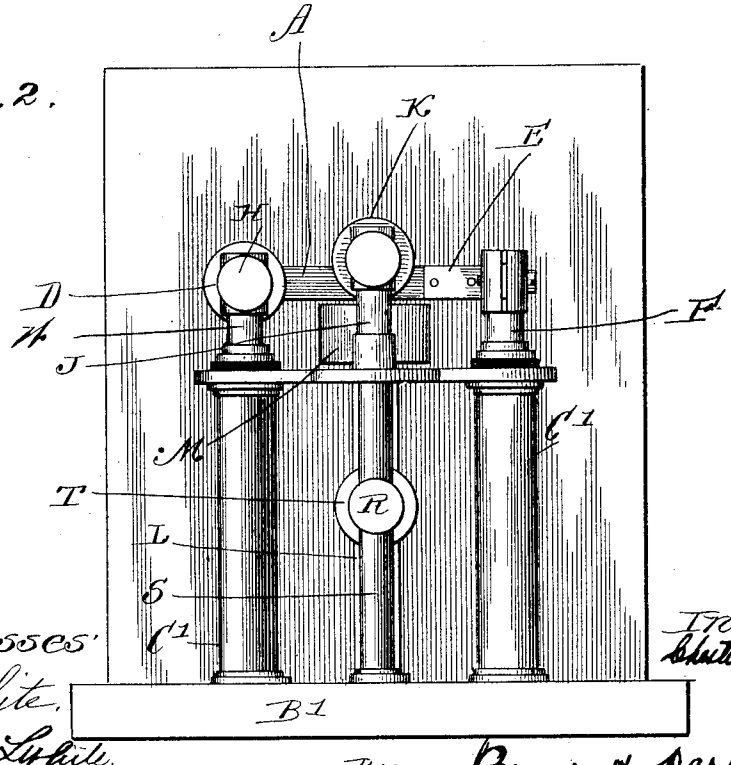


Fig. 2.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

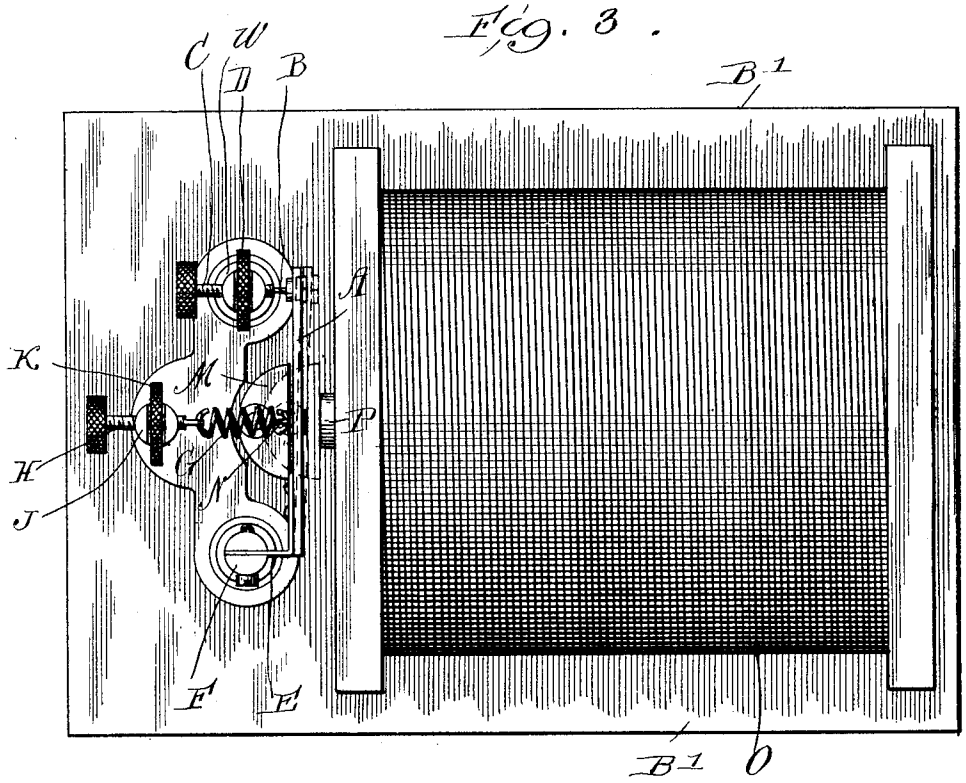
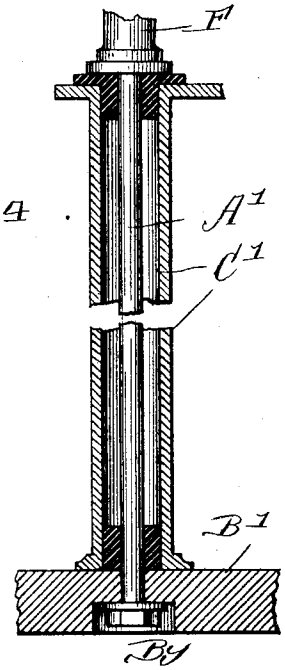


Fig. 4.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 751,574. Patented February 9, 1904.

UNITED STATES PATENT OFFICE.

CHESTER H. THORDARSON, OF CHICAGO, ILLINOIS.

ELECTRIC-SPARK-PRODUCING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 751,574, dated February 9, 1904.

Application filed March 10, 1903. Serial No. 147,198. (No model.)

To all whom it may concern:

Be it known that I, CHESTER H. THORDARSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Electric-Spark-Producing Apparatus, of which the following is a specification.

This invention relates to electric-spark-producing apparatus, and particularly to the circuit make-and-break devices employed in connection with such apparatus.

The object of the invention is to provide a construction of make-and-break device which is simple and efficient, wherein the breaking of the circuit is accomplished under the influence of a sharp hammer-blow, and wherein provision is made for nice and accurate adjustments.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference-signs appearing thereon, Figure 1 is a view in side elevation of an induction-coil, such as is employed in electric-spark-producing apparatus, and showing also in side elevation, partly broken out, a circuit make-and-break device embodying the principles of my invention. Fig. 2 is an end view of the construction shown in Fig. 1. Fig. 3 is a top plan view. Fig. 4 is a broken detail view in section on the line 4 4, Fig. 2.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

In electrical apparatus generally requiring interruptions of the circuit, and especially in spark-producing and similar apparatus where the circuit is required to be made and broken rapidly and with high frequency, it is desirable in order to secure the best results that the break of the circuit be accomplished quickly and sharply. It is also desirable to provide nice and accurate adjustments in order that the rapidity or frequency of make and break within a given time may be varied. It is among the special purposes of my present invention to accomplish these desirable objects, and in carrying out my invention I propose to provide means whereby the break of the circuit is accomplished under the influence of a sharp quick hammer-blow imparted to the movable member of the circuit make-and-break device. I also propose to provide means whereby nice and accurate adjustments of the parts may be effected.

In the accompanying drawings, reference-signs A and B designate, respectively, the circuit-terminal contacts, between which the circuit is completed and broken. In the particular form shown, but to which my invention is not to be limited or restricted, the contact B is stationary, while the member A is movable. The stationary member B of the make-and-break contact may be adjustable in any suitable manner toward and from the corresponding and coöperating part of the movable member—as, for instance, by mounting the same upon a screw C, tapped through a suitable support and adapted to be locked or held in adjusted position in any convenient manner—as, for instance, by set-nut D. The movable member A is in the particular form shown, but to which my invention is not to be limited or restricted, in the form of a bar supported at one end in such manner as to enable or permit its free end to vibrate toward and from the member B. At its free end the bar or member A carries a contact, with which the member B coöperates. In the particular form shown the bar A is secured to one end of an angular metal plate E, the other end of such plate being clamped in or carried by a supporting-standard F. As above indicated, however, my invention is not to be limited or restricted to the exact details shown and above described, the essential feature being relatively movable and adjustable contacts. Suitably connected to the movable member A of the make-and-break contacts is a retractile G, arranged to exert its tension upon such movable member in a direction to normally but yieldingly hold said member A in contact with the coöperating member B. The tension of the retractile may be adjustable in any suitable or convenient manner—as, for instance, by connecting

one end thereof to an adjusting-screw H, tapped through a supporting-standard J and held in adjusted position by set-nut K. Suitably supported at one end is a spring-plate L, carrying at its free end a weight M, which is provided with a stud N, arranged to engage the movable member A and to move the same out of contact with the coöperating member B and against the tension of retractile G. The weight M is arranged to form the movable armature of an electromagnet O, the core P of such magnet serving to attract said armature when said magnet is energized and against the tension of retractile G, as well as the retracting influence of spring-plate L. If desired, the position to which the weighted armature and its supporting spring-plate L are retracted when the circuit of the magnet O is broken may be adjusted in any convenient manner—as, for instance, by providing an adjustable back-stop for such spring-plate. Such a stop is shown at Q, said stop being carried by an adjusting set-screw R, tapped through a supporting-standard S and locked in adjusted position by a set-nut T. The supporting-standards F and W, the former carrying or supporting the member A and the latter supporting the member B of the contact make-and-break device, may be of any suitable or convenient construction and arrangement. I have shown a simple arrangement wherein these standards are carried by rods A′, suitably mounted in a base B′, preferably of wood or other insulating material, and extending through but insulated from cylindrical sleeves C′. These rods may form parts of the circuit, the leading-wires being attached thereto, as will be readily understood.

Where the device is employed in electric-spark-producing apparatus the primary coils of magnet O are included in the circuit which is to be made or broken.

The operation of the device will be readily understood from the foregoing description. Normally the circuit is closed between the contact members A and B. Under this condition current is turned on and magnet O is energized, thereby attracting the weighted armature M, which under the influence of the momentum of the weight strikes the contact member A a sharp hammer-blow, thereby breaking the circuit between the contacts A and B, and consequently the magnet O becomes deënergized and the weighted armature is drawn back against its adjustable back-stop by retractile G and the spring-supporting plate L, thereby again completing the circuit between the contact members A and B, and hence magnet O again is energized and the above-described operation is repeated, and each time the magnet is energized the weighted armature is attracted thereby and delivers a sharp hammer-blow upon the movable contact member A, and hence efficiently and quickly breaks the circuit.

In the use of the device in spark-producing apparatus the magnet O is an induction-coil, the spark being produced between the terminals of the secondary coils thereof in a well-understood manner. In this case the primary coil of the induction-coil acts as the energizing-coil of the circuit-breaker.

It is obvious that the principles of my invention may be applied in any situation where a make and break of an electric circuit is desired and that many variations in the details of construction and arrangement would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited to the nature of the use of my invention nor to the exact details of construction and arrangement shown and described; but,

Having now set forth the object and nature of my invention and a construction embodying the principles thereof and having set forth and described the object, purpose, and mode of operation thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a circuit make-and-break device, the combination with separable contacts, one of said contacts being movable toward and from the other, a spring for yieldingly maintaining said contacts closed upon each other, and means for adjusting the tension of said spring, of a magnet, and a spring-supported armature therefor arranged to strike said movable contact to separate the same from its coöperating contact, said armature being weighted, whereby it delivers a hammer-blow, and an adjustable back-stop for said armature, as and for the purpose set forth.

2. In a circuit make-and-break device, the combination with separable contacts, a spring connected to one of said contacts and operating to yieldingly maintain said contacts closed upon each other, an adjusting-screw for adjusting the tension of said spring and a spring-plate carrying a weight arranged to strike said spring-actuated contact with a hammer-blow to separate the same from its coöperating contact, of a magnet arranged in the circuit of said contacts, said weight forming the armature of said magnet, as and for the purpose set forth.

3. In a circuit make-and-break device, the combination with separable contacts, of an electromagnet, a weighted armature therefor arranged to strike one of said contacts a hammer-blow to open the circuit between said contacts, and an adjustable back-stop for said weighted armature, as and for the purpose set forth.

4. In a circuit make-and-break device, the combination with an adjustable contact, a cooperating movable contact, a spring connected to said movable contact and operating to yieldingly hold the same in closed contact relation with respect to said stationary contact, and

means for adjusting the tension of said spring, of an electromagnet, a spring-supported weighted armature therefor arranged when said magnet is energized to strike said movable contact a hammer-blow to separate said contacts, a back-stop for said armature, and means for adjusting said back-stop, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 7th day of March, 1903, in the presence of the subscribing witnesses.

CHESTER H. THORDARSON.

Witnesses:
C. H. SEEM,
S. E. DARBY.