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ELECTROMAGNET FOR CLOCKS AND MOTORS.
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929,269.

Patented July 27, 1909

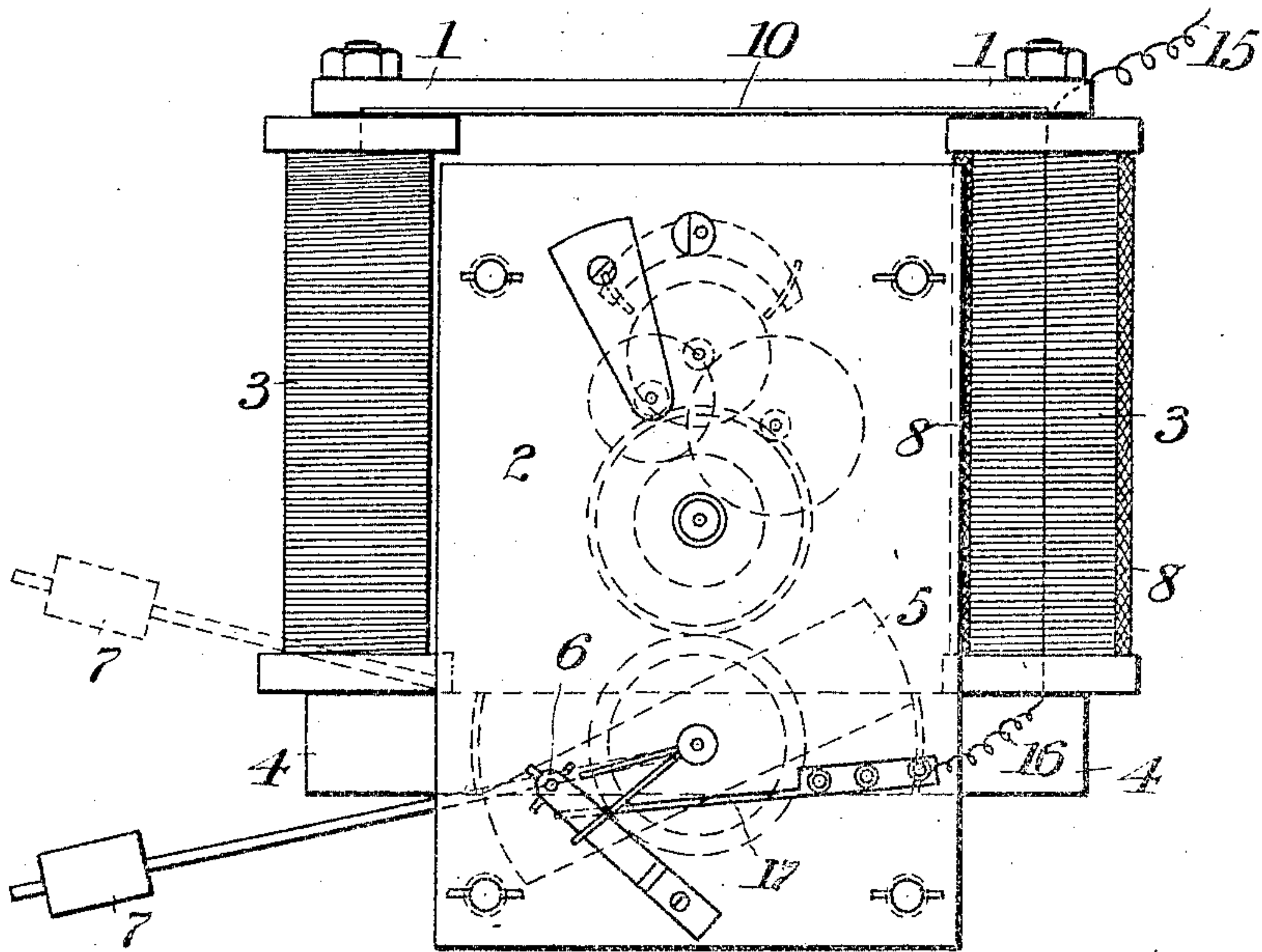


Fig. 1.

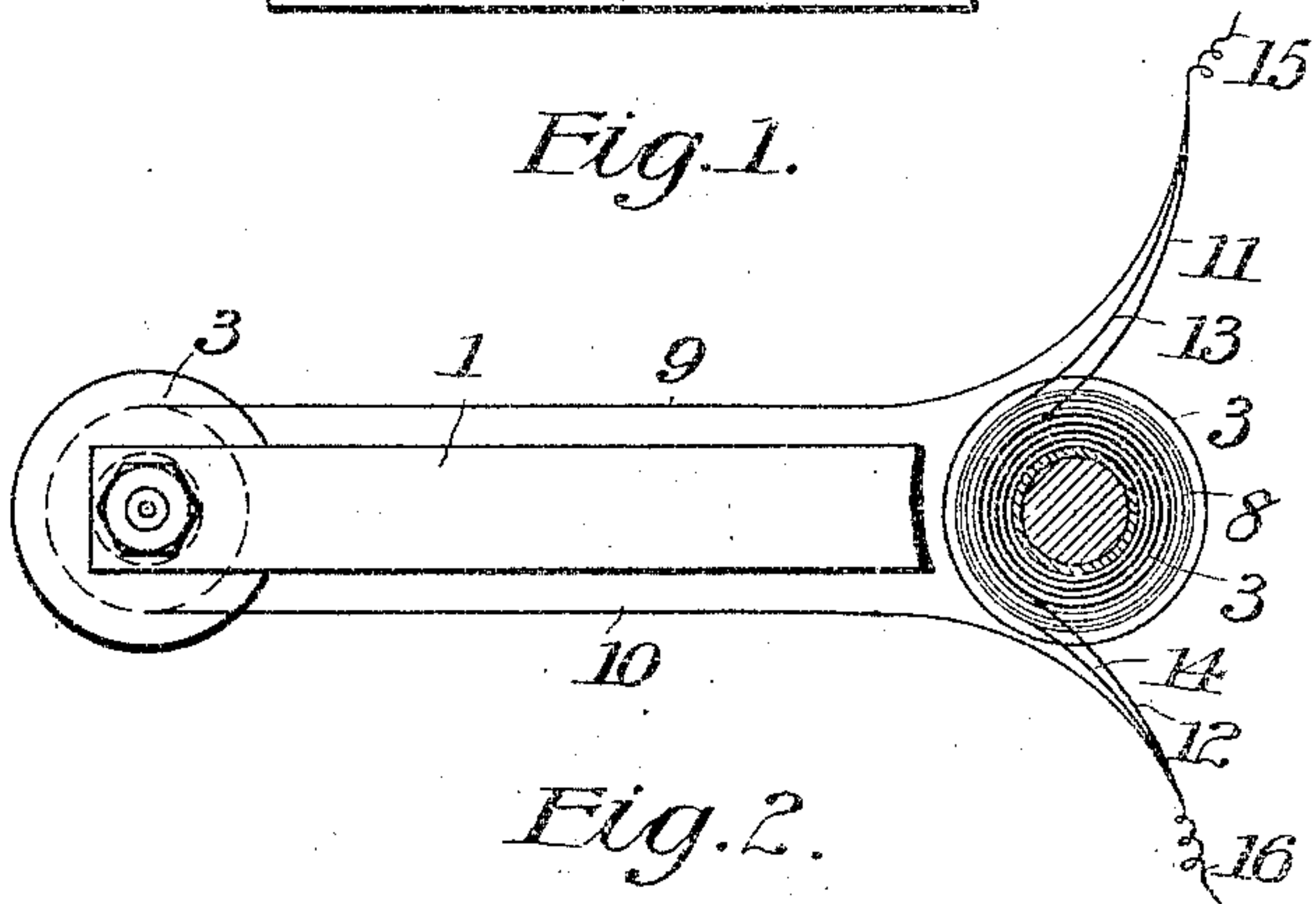


Fig. 2.

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UNITED STATES PATENT OFFICE.

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ELECTROMAGNET FOR CLOCKS AND MOTORS.

No. 929,269.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed May 11, 1908. Serial No. 432,315.

To all whom it may concern:

Be it known that I, CAROLUS ARNOLD, a citizen of Hamburg, and resident of No. 53 Weidenallee, Hamburg, in the Empire of Germany, have invented new and useful Improvements in Electromagnets Especially for Driving Electric Clocks and Small Motors, of which the following is a specification.

The present invention relates to electromagnets for small motors, especially for motors employed in periodically winding up or driving clocks.

The object the invention aims at consists in suppressing the interrupter spark, which is objectionably noticeable in apparatus of the kind referred to when inserted in intense current circuits.

Further objects of the invention consist in providing for the purposes mentioned an electromagnet of handy shape and in constructing the machines in such a manner that same can be inserted directly in intense current circuits without any danger and without special auxiliary devices being required.

Further objects of the invention are to simplify and cheapen the construction and to render more efficient serviceable and durable in operation devices of the kind referred to.

With these ends in view the invention consists in the novel combination, arrangement and adaptation of parts, all as more fully hereinafter explained, shown in the accompanying drawings and then specifically set out in the appended claims.

In the drawing is shown an electromagnet constructed in accordance with the principle of this invention applied by way of example to an electric clock.

Figure 1 shows in front elevation, partly in section, the clock work and the electromagnet, Fig. 2 is a plan view, partly in section, of the electromagnet separately.

It is well known for extinguishing the interrupter spark between the terminals of the magnet coils to insert special resistance coils for producing a short circuit or to insert suitable resistances for protecting the coils in their connection with the intense current circuit.

For the electromagnets of small apparatus such devices are either too complicated or they require too much room. Furthermore said safety appliances render difficult

the fitting up and the manipulation of the whole apparatus.

In electromagnets constructed according to the principle of this invention a special resistance coil is rendered unnecessary for the reason that a second resistance coil of suitably thin and long wire is wound over the wire coils for energizing the magnet cores, the extremities of said second coil being connected with the ends of the magnet coils for the reception of the induced current set up at the moment the interruption takes place. According to circumstances or requirements both magnet coils or only one may be provided with a second resistance coil of the nature set forth.

To avoid induction in the resistance coil itself, same may be produced bifilar in the well known manner and the free ends may be connected together and to the terminals of the magnet coils in an appropriate manner for suppressing induction. Or the wire for the resistance coil is doubled back in the middle of its length and is thereupon bifilar wound, so that two inter-connected coils of equal lengths originate which run in opposite directions.

The electromagnet 1 is so arranged that its cores depend at both sides of the clock work 2 while on top thereof they are united together by a bridge. Each core carries an ordinary magnetizing coil 3. Between the pole shoes 4 is mounted on a suitable bearing pin an oscillating armature 5, which at each circuit closure by the contact device 6 raises the weighted lever 7 and in consequence winds up the clock a corresponding amount. The weighted lever 7 and the armature 5 are shown in Fig. 1 in one of their two extreme positions.

Around one of the magnet coils 3—in the instance illustrated in the drawing the right hand one—is arranged the resistance coil 8. The connection between the magnet coils 3 and the resistance coil, which consists of a double wire *i. e.* of two coils of opposite directions, is effected in the following manner.

The two ends 9 and 10 of the left hand coil 3, as indicated in Fig. 2, are so connected with the ends 11 and 12 of the right hand coil, that both coils are in series and the magnet cores are simultaneously energized in opposite sense. The ends 13 and 14 of the resistance 8 are inserted in the wires 9 and 11 and 10 and 12 respectively. The connection

15 of the wires 9, 11 and 13 leads to one terminal of the source of electricity; the connection 16 of the wires 10, 12 and 14 is attached to the contact spring 17, which is mounted
5 on the clock work insulated therefrom and the clock work itself is connected with the second terminal of the source of electricity.

As will be readily understood without further detailed description, on breaking the
10 circuit by the contact device 6 the two coils 3 are closed by the inductionless double resistance coil 8, so that no spark emission is possible.

The manner of connection may be varied
15 in any suitable and convenient way, the characteristic feature of the invention consisting in the arrangement, that the inductionless resistance coil surmounts one or both of the magnet coils, which are advantageously coupled in series, for the purpose
20 of receiving the interrupter spark or the induced current set up in breaking the circuit respectively without the necessity of a special coil.

25 I do not desire to be understood as limiting myself to the detail construction and arrangement of parts as herein shown and described, as it is manifest that variations and modifications therein may be resorted to, in
30 the adaptation of my invention to varying conditions of use, without departing from the spirit and scope of my invention and improvements. I therefore reserve the right to all such variation and modification as
35 properly falls within the scope of my invention and the terms of the following claims.

What I do claim as my invention, and desire to secure by Letters Patent, is:

1. In an electromagnet for small motors and for driving electric clocks, a resistance
40 for the reception or absorption of the effects of induction set up in breaking the circuit, said resistance being arranged in the form of an inductionless double coil of opposite directions upon the magnet coils directly, substantially as described and shown and for the
45 purposes set forth.

2. An electromagnet for periodically winding up clocks provided with a resistance wire 8 arranged around the ordinary coil 3,
50 said resistance wire being wound bifilar, so that two parallel but oppositely directed coils are produced, whose outer ends are each connected with separate ends of the magnet coil 3, substantially as and for the purpose
55 set forth.

3. An electromagnet for use with electric clocks provided with a resistance coil in the shape of an inductionless coil of suitably thin wire arranged around the ordinary magnet coils, for the purpose of saving a separate
60 resistance and for facilitating a compendious structure, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed
65 my name this 6th day of April 1908, in the presence of two subscribing witnesses.

CAROLUS ARNOLD.

Witnesses:

ERNEST H. L. MUMMENHOFF,
OTTO W. HELLMRICH.