W. H. GREENLEAF.

ELECTROMAGNET.

APPLICATION FILED SEPT. 25, 1917.

1,284,891. Patented Nov. 12, 1918.

Fig. 1.

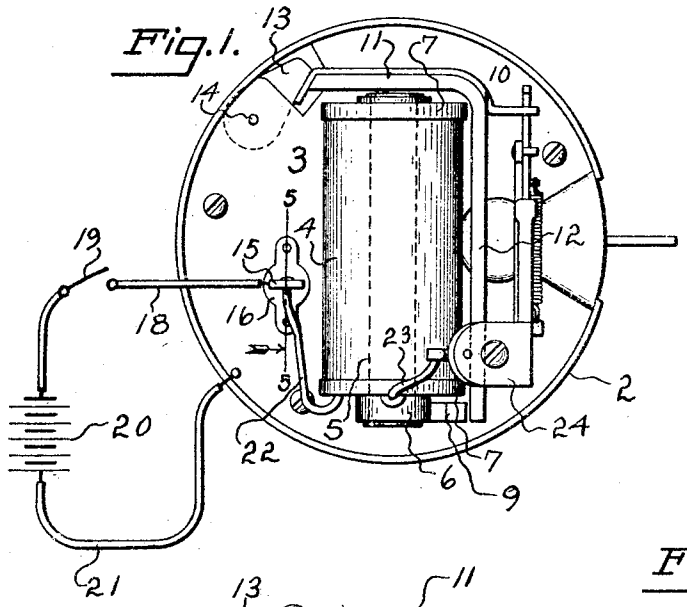


Fig. 3.

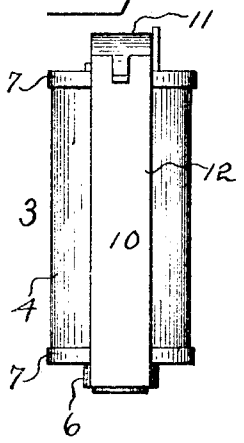


Fig. 2.

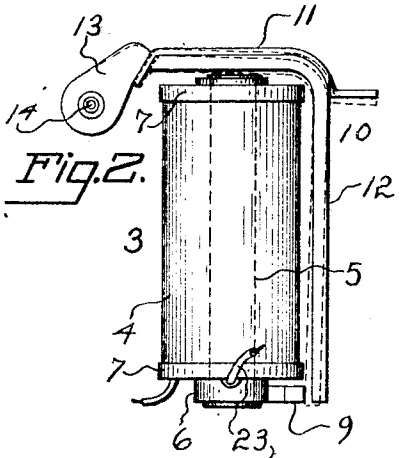
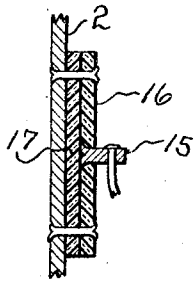


Fig. 5.



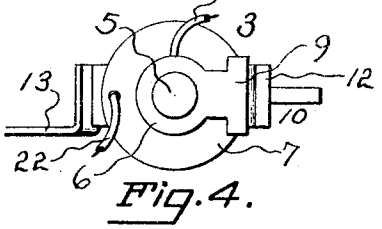


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ELECTROMAGNET.

1,284,891. Specification of Letters Patent. Patented Nov. 12, 1918.

Original application filed October 16, 1916, Serial No. 125,935. Divided and this application filed September 25, 1917. Serial No. 193,174.

To all whom it may concern:

Be it known that I, WILLIAM H. GREENLEAF, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Electromagnets, of which the following is a specification.

This invention relates to electromagnets. An electromagnet involving the invention can be used with advantage in widely different connections, although I have found it of particular utility, however, when incorporated in or forming part of a time-piece such as illustrated in my application for Letters Patent for time controlled mechanism, filed October 16, 1916, Serial No. 125,935, of which the present case is a division. One of the fundamental purposes I have in view is to provide an exceedingly simple and economical structure, the magnet in fact having but a single coil yet possessing the qualities and power of the plural coils now in ordinary use.

In the drawings accompanying and forming part of the present specification I have shown in detail one convenient form of embodiment of the invention which to enable those skilled in the art to practice the same will be set forth fully in the following description. I do not necessarily restrict myself to this particular disclosure; I may depart therefrom in several respects within the scope of the invention defined by the claim following said description.

Referring to said drawings:

Figure 1 is a rear elevation of a clock equipped with a magnet involving the invention.

Fig. 2 is an elevation of the magnet.

Fig. 3 is a view of said magnet as seen from the right in Fig. 2.

Fig. 4 is a bottom plan view of the magnet, and

Fig. 5 is a section on a large scale taken on the line 5—5 of Fig. 1, looking in the direction of the arrow.

Like characters refer to like parts throughout the several views.

As I have already observed, a magnet, comprising the invention is susceptible of employment in widely different fields, one having been mentioned and this a clock such as that denoted in a general way by 2. On the back of the clock is mounted a magnet such as that denoted by 3. This magnet contains but a single coil and also only one core, being of such character as I will hereinafter more particularly set forth, as to exert pulls in transverse directions to each other. Although these pulls may be applied in any suitable direction, it is desirable that they be at right angles to each other. The coil of the magnet is designated by 4 and through it centrally or axially extends the core 5, said core being held against displacement by the collars 6 fitted against the heads 7 of the coil. The coil of the magnet may be and preferably is held in fixed relation with the back of the case of the clock 2 in some convenient manner; for instance as set forth in my prior application. The core 5 is provided at one end, the lower end as shown best in Figs. 1 and 2 with a lateral projection or extension 9 at right angles to the core or the body thereof. The result is that when the magnet or rather the coil 4 is energized or traversed by current of the proper strength, there will be created electric fields transverse to each other, one part of the armature hereinafter described being in correlation with one of the fields and another part being in the same relation with the other field.

The armature is denoted in a general way by 10. As shown it is of angle or elbow form, the branches or arms being denoted respectively by 11 and 12. As illustrated the arm 11 is provided with a flattened portion 13 which fits flatwise against the case of the clock 2 and which receives the pivot 14 to permit of the requisite swing of the armature. The latter is shown as occupying its two positions by full and dotted lines in Fig. 2.

The back of the clock carries the terminal 15 directly supported by the two insulating strips 16 riveted at 17 or otherwise suitably held to the clock case. The terminal 15, is therefore, insulated from said case. From said terminal the lead or wire 18 extends and is intersected by a switch 19, being also connected to the battery 20 or other source of electrical energy. The wire 18, it will be understood, is connected with one terminal of the battery, and from the other the wire 21 leads and is connected electrically with the case of the clock. From the terminal 15 the wire 22 extends and is connected with one end of the coil 4 of the

magnet, the other end of said coil having the wire 23 leading therefrom and connected to the circuit controlling means denoted in a general way by 24. This circuit controlling means I might say may be like that shown in my prior application. There is provided means for automatically and at regular intervals making and breaking the circuit. When the circuit is made, the magnet 3 is energized to effect as I will hereinafter point out the attraction of the armature 12 by the core 5. When the circuit is broken the magnet is deënergized to thus cause the retractive movement of the armature. The invention, however, does not concern this particular matter which has been but briefly described.

It will be perceived that the armature 12 is occupying its retracted position by full lines in Fig. 2, the magnet at this time being deënergized. It will be assumed that the magnet is energized by the passing of current through the coil 4 thereof. In this event there are magnetic fields created at the terminals of the core 5, that is at and around the upper end of the core and at and around the free end of the projection 9. In view of this circumstance lines of force at right angles to each other are applied to the armature, one series of lines being applied to the arm or branch 12 near the free end thereof and the others to the branch 11 between its ends. As a matter of fact the pull of the extension 9 is a longitudinal pull which is a feature of considerable advantage.

What I claim is:

An electromagnet and its armature, the magnet having a single coil and also having a core extending through the coil, one end of the core having a lateral extension, the armature being approximately of angular shape and being supported for swinging movement by one of its branches independently and outside of the coil, said extension when the magnet is energized applying an endwise pull to one of the branches of the armature near the free end thereof, the core applying at such time a pull upon the other branch of the armature between the ends of said branch.

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

WILLIAM H. GREENLEAF.

Witnesses:
L. L. MARKEL,
HEATH SUTHERLAND.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."