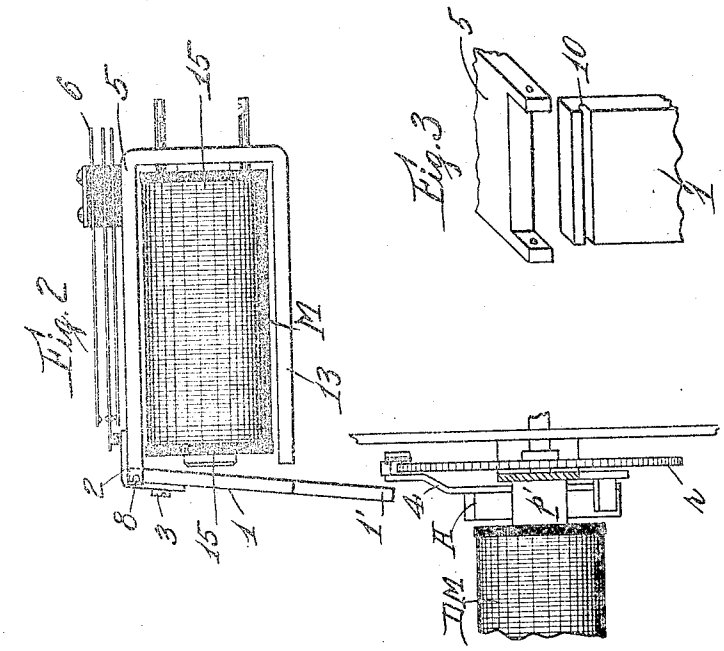
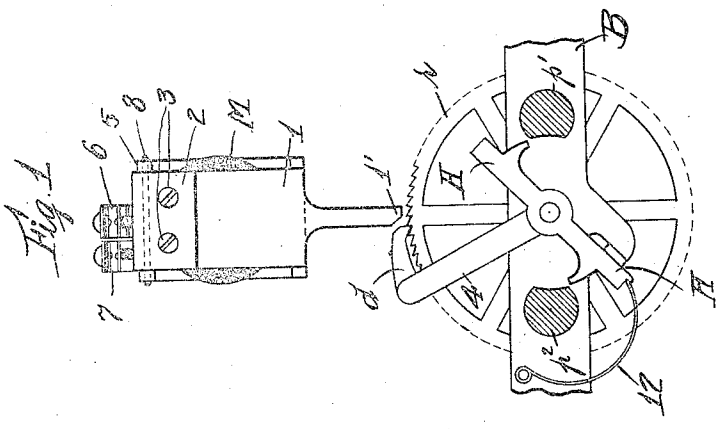
W. KAISLING.

ELECTROMAGNET.

APPLICATION FILED AUG. 1, 1908.

995,255. Patented June 13, 1911





Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO KELLOGG SWITCHBOARD & SUPPLY COMPANY, A CORPORATION OF ILLINOIS.

ELECTROMAGNET.

995,255. Specification of Letters Patent. Patented June 13, 1911.

Application filed August 1, 1908. Serial No. 446,451.

To all whom it may concern.

Be it known that I, WILLIAM KAISLING, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented new and useful Improvements in Electromagnets, of which the following is a specification.

The object of the invention is to provide an improved armature arrangement for an electromagnet, the improvement consisting both in the manner in which the armature is mounted in the customary pole-piece or heel-iron, and in the design of the magnetic circuit afforded.

Figure 1 is a front elevation of a magnet, embodying the invention, and Fig. 2 a side elevation thereof, both figures including auxiliary mechanism to indicate one use to which the invention may be applied. Fig. 3 illustrates a detail of the armature and heel-iron connection.

The magnet M of the invention may comprise a core 15 with the usual energizing winding and the heel-iron 5 of magnetic material in contact with the core 15, angular in shape and extending along the top of the winding, upon which iron are insulatingly supported a pair of spring sets 6 and 7. The forwardly extending end of 5 is cut away, leaving forwardly extending pieces, as indicated in Fig. 3, which are pierced to receive the pivot-pin 8. The armature 1, which, in assembling the mechanism, has its upper end placed between the extending pieces of the heel-iron 5, has a groove 10 in which the pivot-pin 8 fits when passed through the holes in the heel-iron 5. Said groove 10 is of such depth that when it receives the pin 8, the periphery of said pin will extend beyond the surface of the armature 1 so that when the angular piece 2 of brass or other material is screwed at 3 to the armature 1, it clamps the pin 8 firmly in the groove, ordinarily making a fixed connection between said pin 8, armature 1 and the piece 2, the ends of the pin, however, of course turning freely in the holes of the heel-iron 5. A primary purpose of clamping the pin to the armature is to prevent it from sliding transversely out of the bearing in either piece of 5. So long as the connection is sufficient to serve this end, a looseness in the connection between pin and armature is immaterial, although I preferably clamp the parts rigidly together. The horizontally extending portion of the arm 2 bears upon suitable actuating studs of insulating material for the spring sets 6 and 7, and when the armature 1 is attracted, is rotated and shifts the springs to their alternate positions.

A driving magnet DM is shown having the pole-pieces p' and p^2, between which is transversely disposed a pivoted armature A having a spring 12 adapted to restore it when the pole-pieces have been magnetized and de-magnetized by a current impulse passed through the coils of magnet DM. The armature A has an arm 4, to which is pivoted a pawl d for driving a rotary ratchet-wheel r. The arrangement shown provides means for causing long strokes of the pawl d to rotate the ratchet-wheel r, for each actuation of magnet DM, through an arc including the space occupied by, say, eleven ratchet teeth of ratchet r, whereafter further actuations of the pawl d may be caused to effect short steps of ratchet r, each step being of the space occupied by one ratchet tooth of r. Thus when magnet DM receives actuations and magnet M is inert, the armature A will be fully attracted and long strokes of pawl d will be effected. When, however, magnet M is held energized, the end 1′ of armature 1 will be brought into the path of pawl d and then actuations of magnet DM will be available to attract the armature only a short distance, short strokes of the pawl d being thereby effected. As the pawl d is preferably of steel and the armature 1 and its end 1′ of iron, it will be seen that unless means are provided to prevent the end 1′ from becoming magnetized when magnet M is energized, the pawl d will become magnetized and tend to stick to the end 1′, preventing the armature A from being freely retracted by the spring 12 at the conclusion of an energization of the magnet DM. The heel-iron 5 is accordingly provided with an extension 13 which extends forwardly and is of magnetic material, so that when armature 1 attracts, it contacts with said arm 13 so that a closed circuit of magnetic material is provided for the lines of force generated by the magnet M, the result being that the end 1′ of armature 1

will, on energization of magnet M, remain substantially magnetically neutral, whereby a magnetic interaction between the pawl *d* and armature 1 is avoided to any harmful degree.

It will be seen that were it possible for armature 1, as viewed in Fig. 1, to be tilted to the right or left upon the actuation of magnet M, the length of the stroke of pawl *d* would be varied and one object of the mounting of the armature 1, as herein shown, by pivoted connections at its two sides, is to provide a structure in which sidewise tilting of the armature 1 will be prevented. Further, for certain classes of work such as automatic telephone systems, relay magnets are employed having a large number of spring contacts, and the present armature mounting is also designed to provide a reliable means for operating a plurality of spring sets, each comprising a number of contact springs. For instance, in Fig. 1, I have shown two spring sets, designated 6 and 7 respectively, the actuating stud for the spring set 6 bearing upon the middle of the metallic piece 2, while the stud for the set 7 bears upon the left side of the said piece. By having the piece 2 connected to the armature 1 and supported by the pin 8 fitting in opposed bearings in the piece 5, it is apparent that no tilting of the actuating piece 2 can occur, but that on the attraction of the armature 1, it will be raised against the studs evenly, irrespective of the positions in which they bear upon the piece 2. I have thus devised a magnet not only efficient for the specific purpose of the relation in which it is shown in the drawings, but one adapted for general use with difficult circuit changing spring combinations, and I shall claim the invention broadly. For restoring the armature when the magnet deënergizes, the tension of the switch springs will serve, or a special spring for the purpose may be provided.

Modifications may be readily made in the relative arrangement of the parts without departing from the scope of the invention; for example, it is obvious that the groove 10 may be transferred to the piece 2. This and other modifications will be easily seen and it is the intention to cover such in the appended claims.

I claim:—

1. An electromagnet having a grooved armature, opposed bearings, a pin supported in said bearings and a clamping piece having a flat clamping surface for clamping said pin between itself and a groove in said armature.

2. An electromagnet having an armature provided with a transverse groove, opposed bearings, a pin lying in said groove and extending beyond it into said bearings, and a clamping piece overlying said groove and pressing against said pin to frictionally hold it in position.

3. An electromagnet comprising an armature pivot pin, an armature member, a clamping member, one of said members being provided with a groove adapted to receive said pivot pin, means for securing said members whereby said pin is frictionally clamped in the groove and having its ends extending beyond said armature, and a supporting member having bearings adapted to receive the ends of said pin.

4. An electromagnet's armature having mounting means including a support of magnetic material in contact with one pole of the magnet, said armature being disposed adjacent to the opposite pole, a transverse groove in said armature, a pin therein, an auxiliary member fastened to said armature to clamp said pin thereto, the ends of said pin engaging bearings provided in said support.

5. An electromagnet's armature having circuit changing springs for operation by its actuation and mounting means including an angular heel-iron extending lengthwise of the magnet from one pole to a position adjacent to the opposite pole, the armature being placed adjacent to said opposite pole, a transverse groove in said armature, a pin in said groove, an auxiliary member clamping said armature to said pin, and bearings in said heel-iron engaging the ends of said pin.

6. An electromagnet's armature disposed adjacent to one pole of the magnet, a return circuit piece of magnetic material extending toward the opposite pole from a position adjacent to a point on said armature between the pole adjacent thereto and the end of the armature, said armature contacting with said piece on attraction to magnetically short-circuit the end of the armature.

In witness whereof, I hereunto subscribe my name this 28th day of July, 1908.

WILLIAM KAISLING.

Witnesses:

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