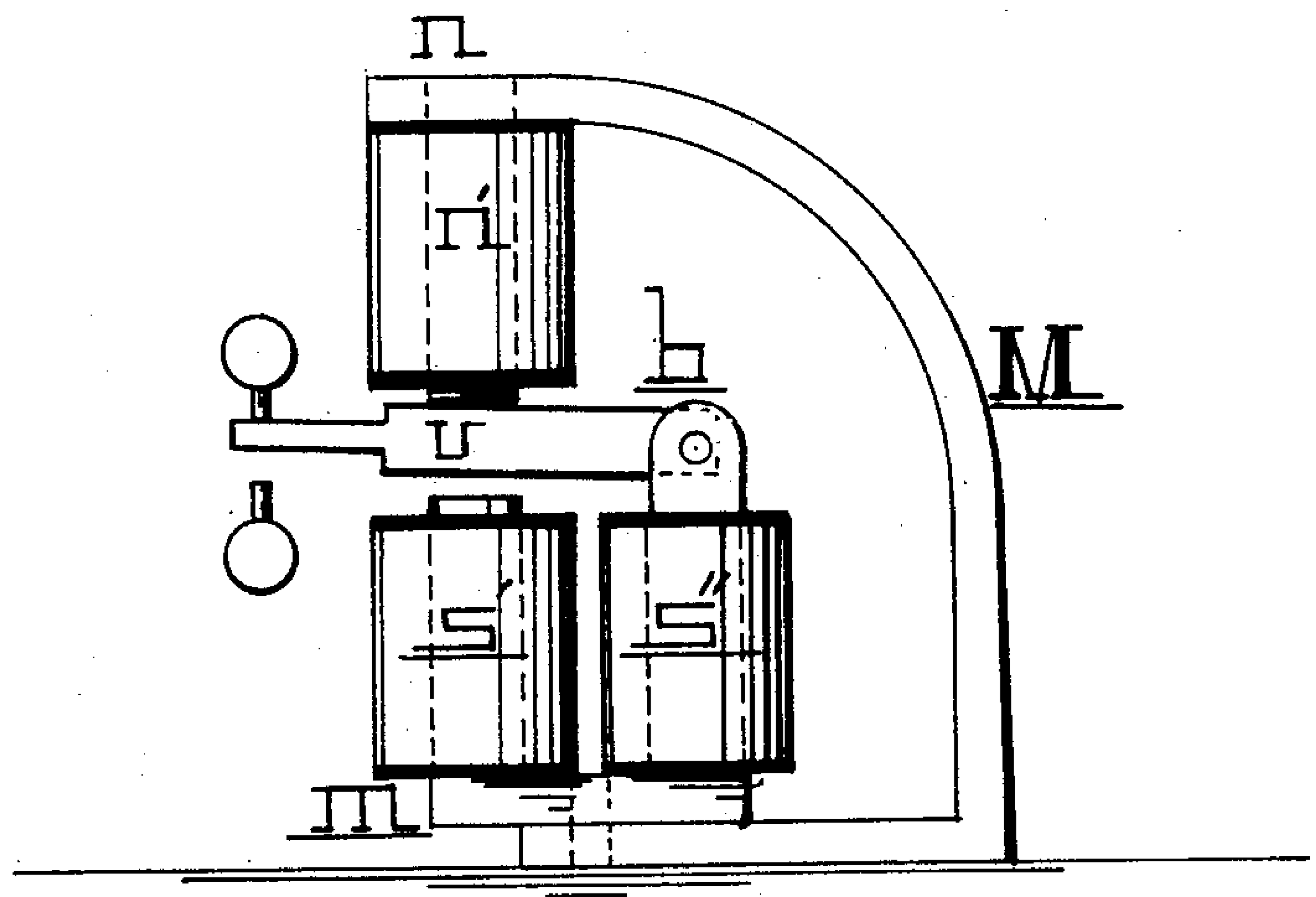
No. 750,807. PATENTED FEB. 2, 1904.

J. E. CARNEY.

TELEGRAPH APPARATUS.

APPLICATION FILED FEB. 24, 1903.

NO MODEL.



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No. 750,807. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

JOHN EDWARD CARNEY, OF MONTGOMERY, ALABAMA.

TELEGRAPH APPARATUS.

SPECIFICATION forming part of Letters Patent No. 750,807, dated February 2, 1904.

Application filed February 24, 1903. Serial No. 144,665. (No model.)

To all whom it may concern:

Be it known that I, JOHN EDWARD CARNEY, a citizen of the United States of America, residing and having a post-office address at 737 South Perry street, in the city of Montgomery, State of Alabama, have invented certain new and useful Improvements in Telegraph Apparatus, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to practically all or nearly all of that class of telegraph apparatus actuated or controlled by electromagnets and is not confined to any special class of apparatus, being applicable, as will appear below, to sounders, relays, &c., with advantage.

The object of my invention is to so arrange the controlling or actuating electromagnets or electromagnet in connection with a relatively permanent magnetic system as to produce the maximum effect from given sources of energy acting on the apparatus and in addition to the minor advantages described hereinafter to secure a more sensitive electromagnetic control in instruments of the class described. In other words, an instrument constructed in accordance with my invention will have greater sensitiveness and require less energy for its operation than an instrument constructed in the older forms.

Referring to the drawing, M is an elevation of a permanent magnet, having, for example, a "south" pole at its base and a "north" pole n at its upper end. To the pole n is secured a soft-iron core n', carrying a coil and being a simple electromagnet. To the south pole of M is attached the soft-iron yoke m of the pair of cores s' and s'', both of which also carry coils and are wound so as to produce unlike polarities at their free ends under the influence of a current flowing around their coils. Core s'' is prolonged at its upper end, and at b is pivoted an armature u, also of soft iron, which armature will, of course, under the influence of the permanent magnet, take the position shown in the drawing. Suitable stops or contacts are shown; but there is no particular novelty intended in this feature. It is immaterial whether the coils be connected in series or in some other method, the connection depending on questions of expediency. Coil on core n' is supposed to be so wound as when energized to strengthen or increase the polarity of the permanent magnet at that point, while coils on s' and s'' are wound so as to produce a strong north polarity at b and to divert the south polarity of the permanent magnetic system to s', (or to its free end.) The lower electromagnetic system forms a couple having a soft-iron yoke. The free end of the armature will be then strongly attracted downward when the lower coils are energized, and there will be also a repulsion from n', acting on the induced north pole in the free end of the armature. The permanent magnet need not ordinarily be of great relative strength, merely sufficient to cause a quick return of the armature to its normal position when the coils cease to act. In this way it takes the place of a return-spring, although a spring can be used, if desired, in any of the well-known methods.

It is obvious that different windings on the core-pieces could be used, which would give in modified degrees the effects sought. Differential winding could be employed or one or more coils could be of higher relative resistance.

One or more of the coils can be dispensed with for certain uses, leaving only one coil on one of the lower couple.

A number of constructions can obviously be made embodying the polar distribution of the permanent magnetic system to produce the polarities, as shown.

It will be noticed that while the apparatus has some of the characteristics of a polar relay yet it is not a true polar instrument in that it may be operated by current impulses of either direction if of sufficient strength. Its normal use, however, in order to obtain the greatest sensitiveness would be as a polar instrument responding to unidirectional current impulses, when the attractive and repellent influences would act together to produce the maximum effect. A sufficiently-powerful current impulse of the opposite direction would still have power to cause the armature to drop regardless of the permanent magnet and of the effect of the electromagnetic polarity at n'. This capability of acting with an excessive current in a direction opposite to the normal has obvious uses. The distinctive difference between the apparatus shown and a polar relay is that in a polar relay the armature is adjusted to play between two polar faces of one like polarity, while the armature has a normal induced polarity opposite to both; but in this apparatus the armature has a polarity opposite only to one of the adjacent polar faces, and though in the polar relay the armature has two positions of rest—*i. e.*, against either polar face—in my device there is only one rest position.

The armature only moves toward the normally like polar face when the magnetic system has been modified by the coils. Reversals of the current, unless, as shown above, these reversals are of considerably greater relative strength, do not affect the instrument nor cause the armature to leave its rest position. It is only when the abnormal current impulse is of considerable strength that there is any action from current impulses of the "wrong" direction, and it is only when the attractive effect of the lower pair of polar faces is very strong that the armature will be drawn away from its normal position through the influence of a reverse-current impulse.

Having described my invention, what I claim is—

1. In a telegraph instrument a permanent magnetic system having one of its poles divided into two pole-pieces of like polarity, an armature pivoted on one of said pole-pieces and free to play between the other pole-piece and the other pole of said magnetic system, and a winding adapted when energized to modify the action of said permanent magnetic system, substantially as described.

2. In a telegraph instrument a permanent magnet having one of its poles divided into two pole-pieces of like polarity, an armature pivoted on one of said pole-pieces and free to play between the other pole-piece and the other pole of said magnet, and a winding adapted when energized to modify the action of said permanent magnet substantially as described.

3. In a telegraph instrument a permanent magnet inducing normally a like polarity in both poles of the core of an electromagnet, an armature pivoted on one pole of said core and free to play between the other pole of said core and the pole of the permanent magnet of unlike polarity to that of said cores, and a winding on said cores adapted when energized to modify the action of said permanent magnet on said armature, substantially as described.

4. In a telegraph instrument a permanent magnet normally inducing in both poles of the core of an electromagnet a like polarity, an armature pivoted on one pole of said core and free to play between the other pole of said core and a pole-piece of said permanent magnet of unlike polarity to the induced polarity of said cores and normally attracted to said unlike pole-piece of said permanent magnet, and windings adapted when energized to move said armature in opposition to the attraction of said unlike pole-piece of said permanent magnet, substantially as described.

5. In a telegraph instrument a permanent magnetic system, a core of an electromagnet both poles of which are induced with like polarity from said permanent magnetic system, an armature pivoted on one pole of said core and normally held away from the other pole of said core by said permanent magnetic system and a winding adapted when energized to move said armature in opposition to such normal position, substantially as described.

6. In a telegraph instrument an electromagnet, an armature pivoted on one pole of said electromagnet, a permanent magnet normally attracting said armature and normally inducing like polarities in the poles of said electromagnet, the winding of said electromagnet adapted when energized in one direction electrically to cause said armature to move in opposition to the attraction of said permanent magnet.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN EDWARD CARNEY.

Witnesses:
W. B. SWETT,
E. S. ALEXANDER.