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DRAFTSMAN.

No. 881,642. PATENTED MAR. 10, 1908.

E. WESTON.

ELECTRIC RELAY.

APPLICATION FILED JUNE 21, 1904.

2 SHEETS—SHEET 1.

Fig. 1

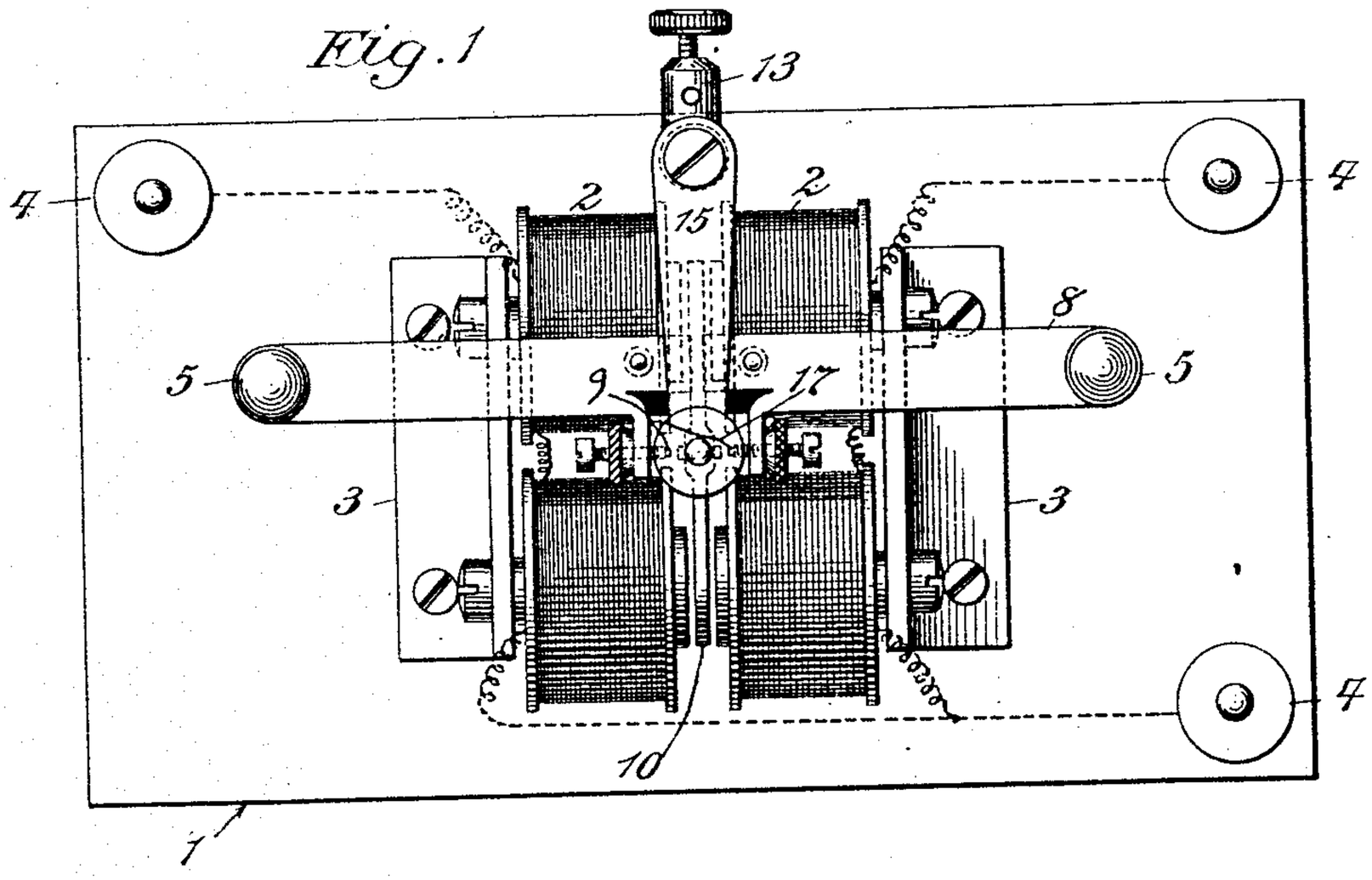
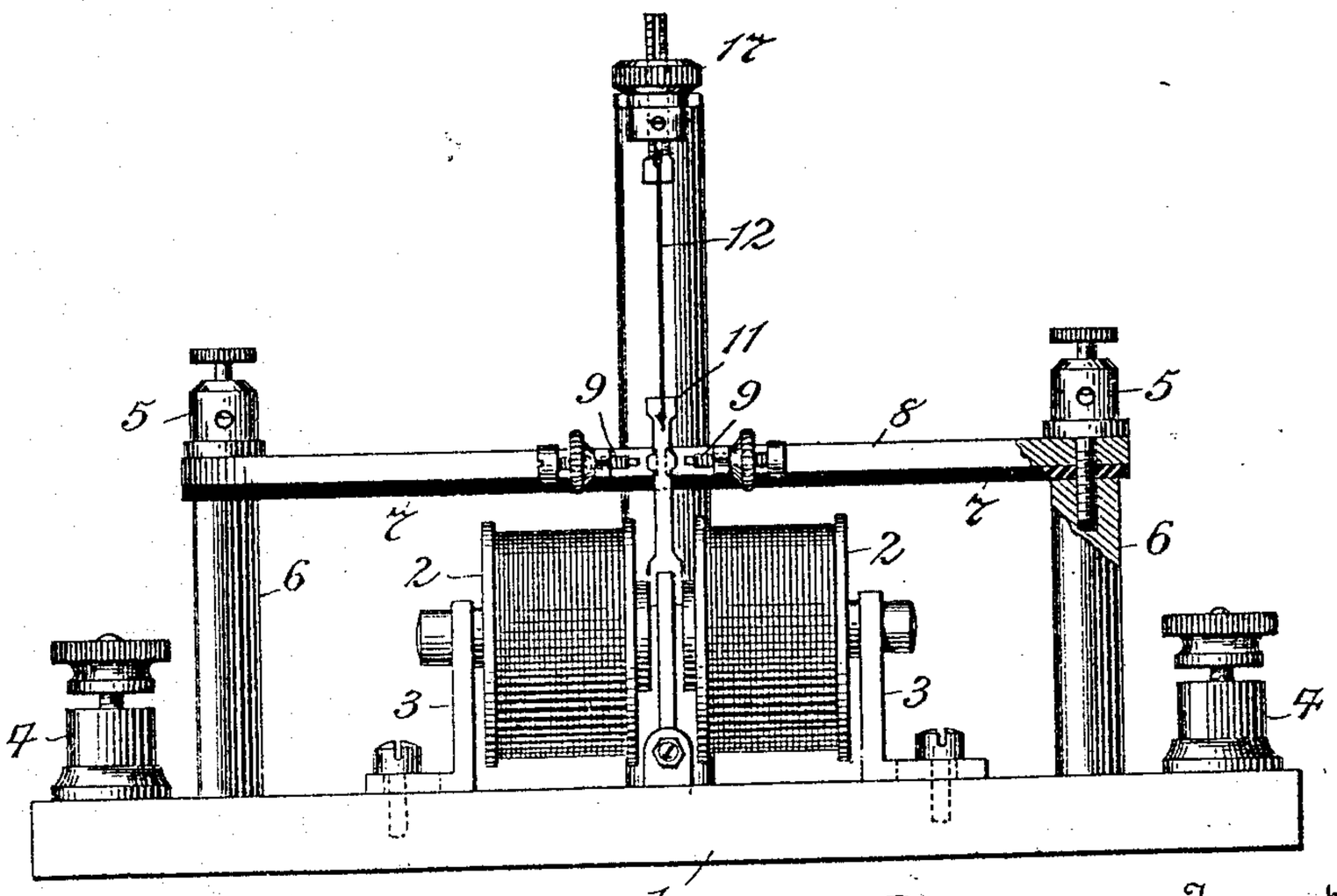


Fig. 2



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Edward C. Rowland,
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By his Attorney
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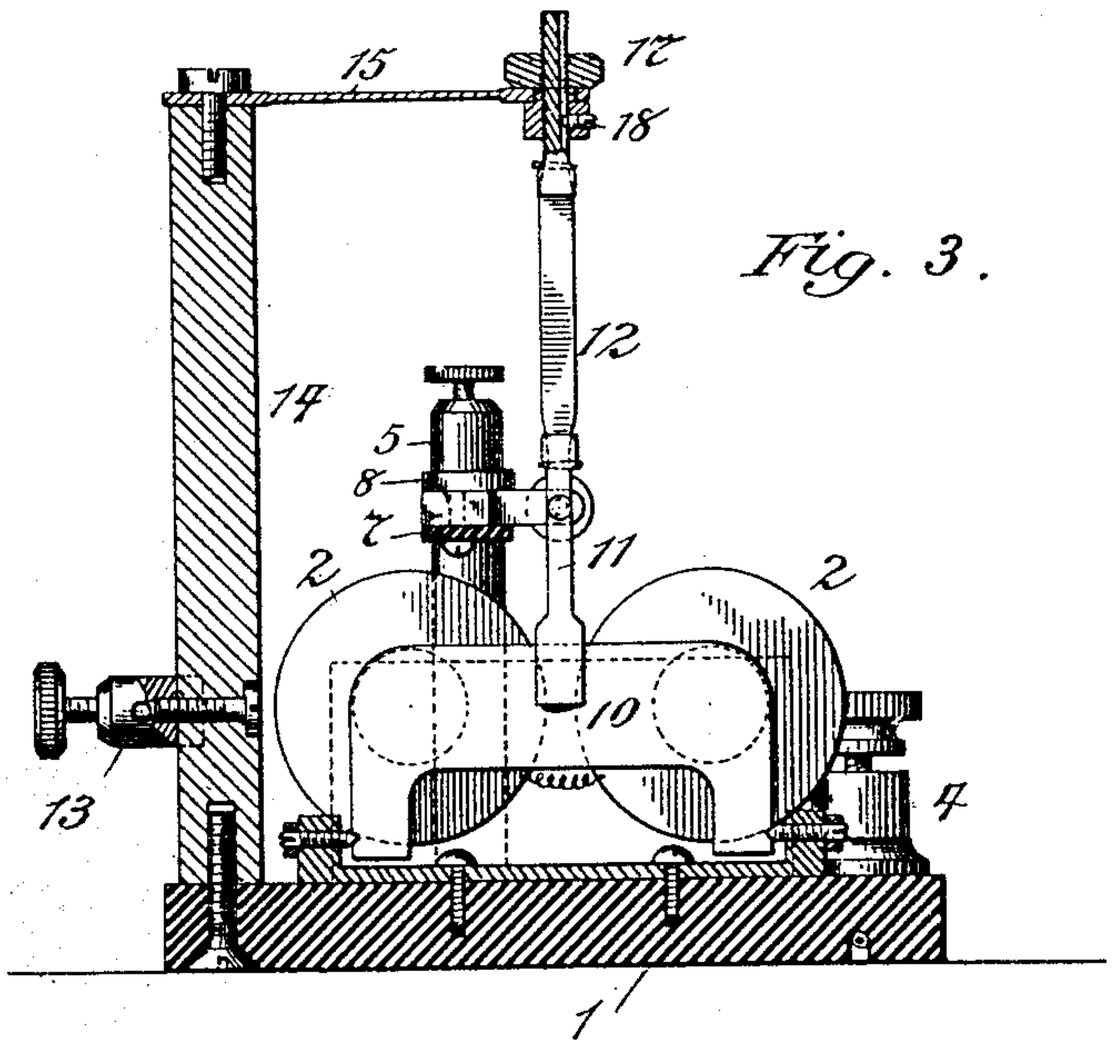

Fig. 3.

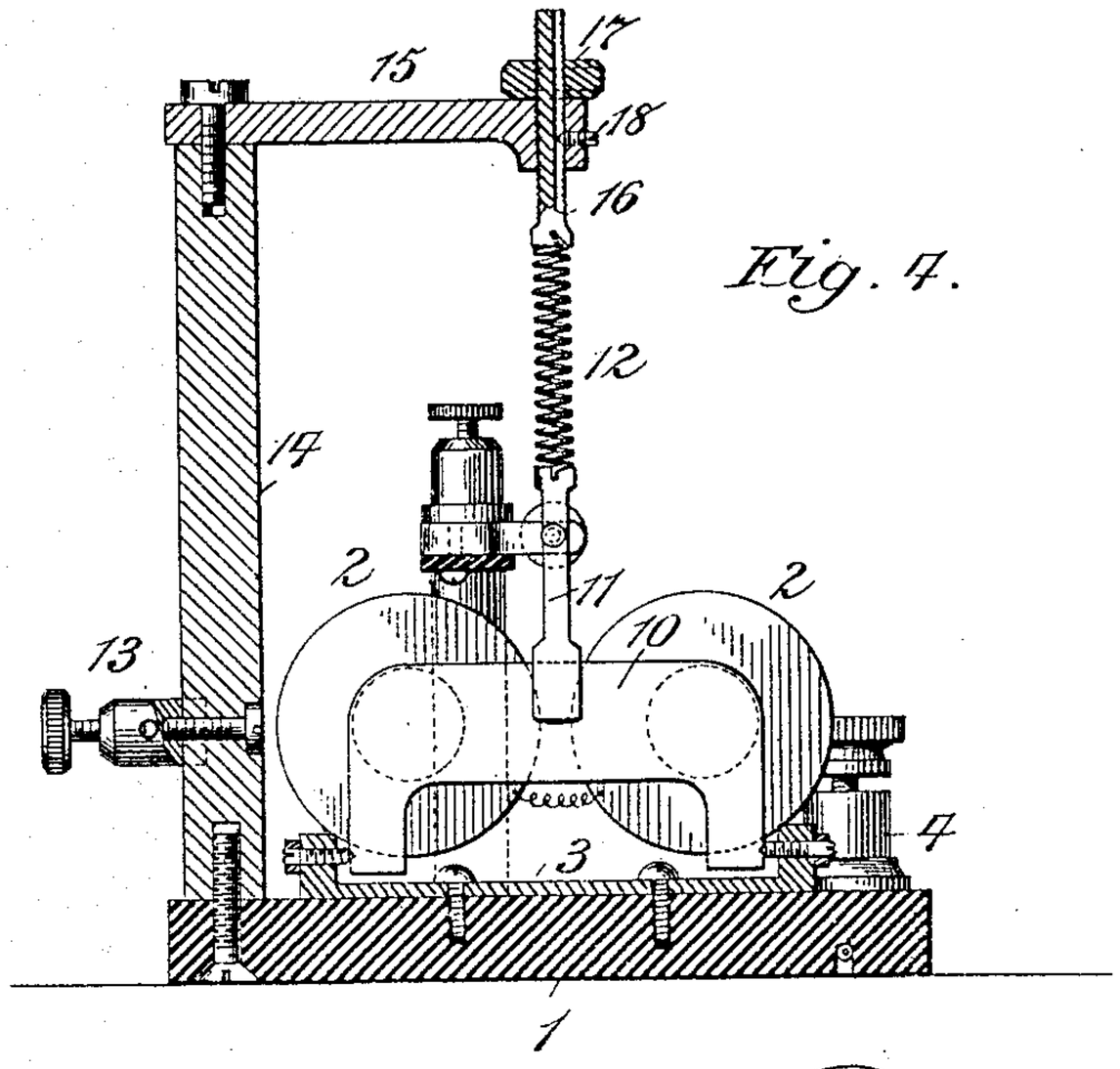

Fig. 4.

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UNITED STATES PATENT OFFICE.

EDWARD WESTON, OF NEWARK, NEW JERSEY.

ELECTRIC RELAY.

No. 881,642. Specification of Letters Patent. Patented March 10, 1908.

Application filed June 21, 1904. Serial No. 213,500.

To all whom it may concern:

Be it known that I, EDWARD WESTON, a subject of the King of Great Britain, residing at Newark, county of Essex, and State of New Jersey, have made a new and useful Invention in Electric Relays, of which the following is a specification.

My invention is directed particularly to improvements in that type of electric relays in which the movable contacts carried by the relay armature lever close local circuits on stationary front and back contact stops, said armature lever being controlled by electromagnetic coils located on opposite sides thereof, such instruments being known in the art as double contact relays, and it has for its objects:—First, to maintain the armature lever in a position substantially equidistant between the two poles of the two independent controlling or operating relay electromagnets located on opposite sides of said lever. Second, to make the apparatus simple and positive in its adjustments and in such manner that the stationary contacts cannot be thrown out of relation with the adjustable contacts which close the circuits on either side of the armature lever dependent upon which magnet is excited by the operating current.

My improved relay is designed to be used in such manner as to operate without there being the slightest danger of any false back-contact when the armature lever is released from either of the operating or controlling magnets; that is to say in such manner as to prevent the possibility of the armature lever falling back sufficiently beyond its normal position of rest to make a false contact by its swing on either one side or the other.

My novel relay has an especial utility also in the fact that it is designed to operate with the slightest possible force and in such manner as to close the circuit on either one or the other of the adjustable contact screws and avoid any false contact. The normal position of the armature lever of this instrument is practically equidistant from the opposite contacts and, consequently, from the poles of the opposing magnets, so that it can be moved from this position quickly and by the least possible application of force applied on either side of its path of motion.

Relays of this type as heretofore devised have usually been provided with retractile springs located on opposite sides of the armature lever and with means for independently adjusting said springs. I have ascertained that with relays of this nature the best results cannot always be obtained for the following reasons; first, because it is not always possible to construct two retractile springs of exactly the same tensile strength and dimension; second, it is not always possible to provide and apply adjusting means which shall so equally centralize the armature lever as to obtain like results at the opposite contacts when the same is vibrated back and forth.

For a full and clear understanding of the invention such as will enable others skilled in the art to construct and use the same, reference is had to the accompanying drawings, in which,

Figure 1 illustrates a plan view of a relay constructed in accordance with my improvement, and Fig. 2 is a side elevational view thereof as seen looking thereat from the bottom toward the top of the drawings. Fig. 3 is a transverse sectional view taken through Fig. 2 at substantially the center of the instrument and as seen looking thereat from left to right, Fig. 4 being a similar sectional view showing a spiral retractile spring and rigid support in place of the flat type of spring and yielding support illustrated in the other figures of the drawings.

Referring to the drawings in detail, 1 represents the base of the instrument, preferably of insulating material, and 2, 2, the relay electromagnets of usual type secured directly thereto by angle irons 3, 3, and screws.

4, 4, 4, represent the binding posts which are connected to the coils of the magnets and designed to be connected in a main line circuit in the usual way.

5, 5, represent two of the binding posts for the local circuits secured directly to a conducting cross-bar 8 resting upon a bar of insulating material 7 which in turn is secured directly to the base of the instrument by standards 6, 6.

9, 9 are the adjustable contact points for the relay secured in lateral integral extensions of the cross-bar 8 (see Fig. 1).

10 is the armature lever pivotally supported upon trunnions in the usual manner between the poles of the electromagnets 2, 2, and provided at its upper end with a conducting bar 11, to which the movable contacts are directly secured, 12 being, as shown in Figs. 1, 2 and 3, a thin flat spring of the desired elasticity and provided at its upper

end with means in the nature of screw-threaded parts—a nut 17 and a set-screw 18—for adjustably securing it to a yielding conducting arm 15 supported in turn by a conducting standard 14 secured directly to the insulating base 1 (see Fig. 3).

13 is the third or additional local binding post, the circuit relations being of the ordinary nature whereby two local sounders or translating devices may be operated from a single battery, as will be readily understood by those skilled in the art. By thus pivotally supporting the armature lever 10 at its lower end and securing the free or independent end thereof by a yielding spring 12 adjustably secured as described to a yielding arm 15, I am enabled to effect the adjustment of the vibratory contacts carried by the armature lever with relation to the adjustable stationary contacts 9, 9, with the greatest degree of nicety and be assured of having the same effect in the local circuits when the same are closed on opposite sides by the vibrating action of the armature lever.

In Fig. 4 I have illustrated a spiral retractile spring adjustably secured at its upper end to a rigid arm 15 and having its axis located in alinement with the pivot supports and so arranged as above described that when the adjustment is perfectly effected the poles of the magnets 2, 2, located on opposite sides of the armature will produce the same effect as is produced by the modified arrangement shown in Fig. 3 and give equally good results.

With a relay as thus constructed the armature is kept in a position substantially equidistant between the poles of the two independently operating electromagnets 2, 2, located upon the opposite sides thereof, and is of the simplest and most positive nature in its adjustment and operation, the arrangement being such that the armature contacts cannot be thrown out of relation to the adjustable stop contacts which close the circuit on either one side or the other, according to which magnet is energized. This type of relay has an especial utility in systems of electrical energy where it is desired to utilize a local current on either side of the system, and to effect this result positively and without the slightest danger of there being a false back contact when the armature is released; that is to say, in such manner as to prevent any possibility of the armature flying back so far beyond its normal position of rest that it will make a false contact by reason of its inertia or over-throw. The armature of such an instrument is also adapted to move with the slightest possible electrical energy and is of the most delicate nature, its normal position being absolutely equidistant from the opposite front and back contacts and, consequently, from the opposite or opposing poles of the magnets it can be moved quickly and always return, when the magnet which moves it is deënergized, to its normal or absolutely central position.

I do not limit my invention to the specific details of structure disclosed in the accompanying drawings as the same may be departed from and still come within the scope of my claims hereinafter made. I believe it is broadly new with me to so devise a double contact relay that the retractile effect will be alike or substantially alike for the double vibrations of the armature lever, and my claims are designed to be of the most generic scope in this respect. Nor do I limit my invention to any specific use, as it may be utilized anywhere in the art where a double contact relay is required, there being many such uses as is obvious to those skilled in the art.

The principal use to which I propose to apply this instrument is that of starting, stopping, or reversing the direction of motion of an electric motor employed to drive a recording instrument either for electrical or other purposes, this form of relay making it impossible that a motor so controlled shall make any false registration upon the record sheet by reason of false back-contacts.

The preferred form of my invention is illustrated in Figs. 2 and 3 of the drawings.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is—

1. A relay provided with a pair of electromagnets; an armature lever pivotally supported at one end between the poles of said magnets; a retractile spring secured to the free end of said lever and to a stationary support located in alinement with the axis thereof; in combination with movable and stationary contacts located intermediate the pivoted end of the armature lever and the stationary support for the retractile means, said retractile means being provided with adjusting means for placing it under tension, the arrangement being such that normally the armature lever and its retractile means are located in the same plane and the stationary contacts at equal distances on opposite sides from the movable contacts, substantially as described.

2. A relay provided with a pair of electromagnets and an armature lever pivotally supported at one end between the poles thereof; a pair of stationary contacts located on opposite sides of the armature lever and intermediate the ends thereof, said contacts being electrically connected to and supported by a conducting bar secured to the base of the instrument by standards located on opposite sides of the electromagnets; in combination with yielding retractile means secured to the free end of the armature lever and to a standard supported also by the base;

together with movable contacts carried by the armature lever, the lever, the retractile means and the supporting end of the standard being normally in alinement and the arrangement such that the forces opposing the action of the magnets is always equal, substantially as described.

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

EDWARD WESTON.

Witnesses:
C. J. KINTNER,
M. F. KEATING.