(No Model.)

G. T. WOODS.

POLORIZED RELAY.

No. 366,192. Patented July 5, 1887.

Fig. 1.

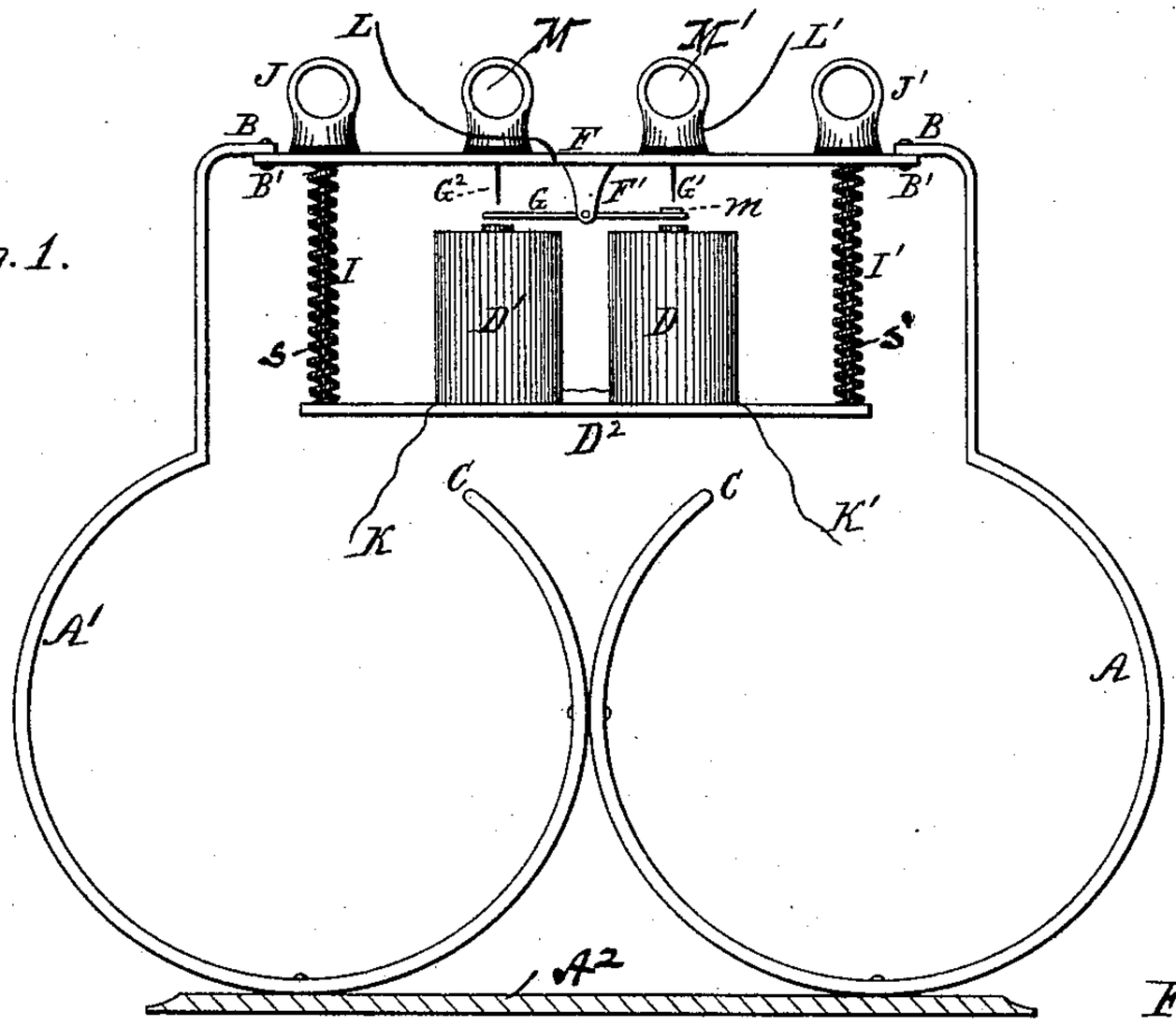


Fig. 3

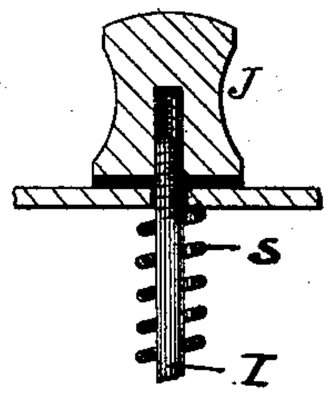
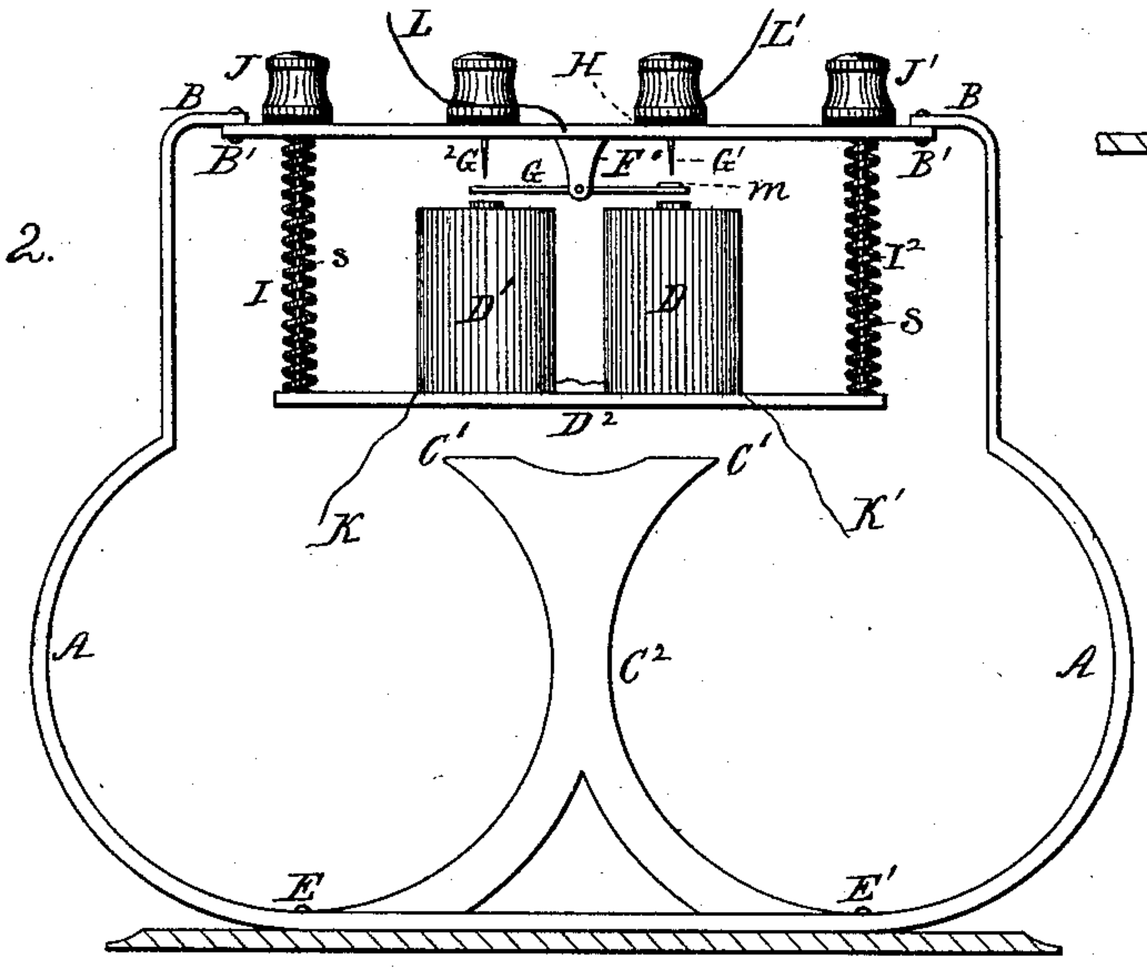


Fig. 2.



Witnesses:
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Inventor:
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by Lee Howes.
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UNITED STATES PATENT OFFICE.

GRANVILLE T. WOODS, OF CINCINNATI, OHIO.

POLARIZED RELAY.

SPECIFICATION forming part of Letters Patent No. 366,192, dated July 5, 1887.

Application filed November 3, 1886. Serial No. 217,859. (No model.)

To all whom it may concern:

Be it known that I, GRANVILLE T. WOODS, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Polarized Relays, of which the following is a specification.

My invention relates to "polarized relays," its object being to improve the construction in order to obtain a more sensitive and perfect action of the same under all conditions of use, especially with reference to the employment of said relay in systems of induction telegraphy, and particularly in telegraphy between moving trains of cars on railways by means of induced currents of comparatively low tension, where the relay is also subject to the vibrations of moving cars. In such situations, especially, the operations of relays are liable to be impeded by the jarring and shaking movements of the cars, and my improvement seeks to increase the efficiency and certainty of action of the relay in order to render the same independent of such jarring, and also to provide a construction tending to lessen the liability to such interfering conditions and obtain means for a more perfect adjustment of parts.

To this end my invention consists in the construction of a relay, as hereinafter more fully described, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved relay complete; Fig. 2, a side elevation showing a slight modification of structure; and Fig. 3, a detail section of the adjusting-nut, showing the means of adjusting the position of the electro-magnets relatively to the vibrating armature.

Referring now to the drawings, Fig. 1, A A′ designate two curved permanent magnets secured to a common base, A^2. Corresponding poles, B B, of the magnets are brought upward to a common horizontal plane sufficiently elevated, and connected by a horizontal bridge-piece, F, by rivets B′ B′, or other fastening. The remaining poles, C C, of the magnets A A′ terminate beneath the lower ends or poles of two electro-magnets, D D′, which latter rest vertically upon a second bridge-piece, D^2, suspended beneath the bridge F by means of suspension-rods I I′, which pass through the bridge F, and are threaded above into set-nuts J J′. Coiled springs *s s′* surround the rods I I′ between the bridges F D^2 and hold the bridge D^2 downward against the holding adjusting-nuts J J′, the construction thus affording means of adjusting the magnets D D′ vertically. Immediately over the electro-magnets D D′ is pivoted (between lugs F′, secured beneath and upon the bridge F) midway between the magnets D D′ a delicately-balanced armature, G, extending horizontally over the upper poles of the magnets D D′. This armature G is the local-circuit controller, and is vibrated by the alternate energizing of the electro-magnets D D′, whose coils are in the main line K K′. Back-stops G′ G^2 are arranged in the bridge F above the respective ends of the armature G, adjustable by set-nuts M M′. Back-stop G′ is insulated from bridge F. The local-circuit line L connects with the bridge F, the current passing through the armature-pivot and armature to *m*, thence by the contact-stop G′ out to the continued circuit L′. The cores of electro-magnets D D′ are polarized by induction from the magnet-poles C C, and are respectively strengthened and weakened alternately by the currents passing alternately in opposite directions through the main line K K′. Thus that magnet which predominates in strength for the time being always attracts the nearest end of the armature G, thus vibrating the armature in unison with the reversals in the main circuit. It will be readily understood from the construction that the magnets A A′ are made to exhibit opposite polarities at C and B, respectively, and that the polarities of B B are practically extended to and most strongly effective at F′, thus polarizing the armature G.

In the modification exhibited in Fig. 2 a single permanent magnet, A, is employed, but charged to exhibit the same sign of polarity at B B. In this case a central pole-piece, C^2, drawn out laterally to extend beneath the electro-magnets, as at C′ C′, is secured in the lower curve of magnet A, which thus becomes the second pole of the magnet, and the same effect is produced as in the case described.

It will be perceived that in point of mechanical construction the improvement offers great facilities for adjustment, and that the armature G is poised in such manner as to reduce liability to abnormal action through jar-

ring or shaking, while preserving its sensitiveness to current action.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a polarized relay, a horizontal pivoted armature arranged beneath a horizontal extension connecting two like poles of a permanent magnet, and constituting a switch in the local circuit, in combination with two electro-magnets in the main circuit suspended beneath the vibrating armature and above the remaining pole of the permanent magnet, substantially as set forth.

2. In a polarized relay, the combination of the permanent magnet A A′, having poles B B and C C, respectively corresponding, a bridge-piece, F, connecting the poles B B, insulated bridge D^2, suspension-rods I I′, springs *s*, adjusting-nuts J J′, electro-magnets D D′, armature G, contact-stop G′, local-circuit wire L L′, and main-line wire K K′, substantially as set forth.

3. In a polarized relay, the combination of a curved or U-shaped permanent magnet showing the same sign of magnetism at its outer poles, a bridge-piece connecting said poles, a second insulated bridge-piece suspended adjustably beneath the first in proximity to the inner pole of the magnet, and carrying two electro magnets with coils in the main circuit and vertical cores arranged between in the plane of the bridges, a horizontal balanced armature pivotally suspended beneath the first bridge with its ends in attractive proximity to the electro-magnet cores, and two back-stops, one of which, with the pivot of the vibrating armature and the intervening portion of the armature, is in the local circuit, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GRANVILLE T. WOODS.

Witnesses:
E. L. KERR,
C. D. KERR.