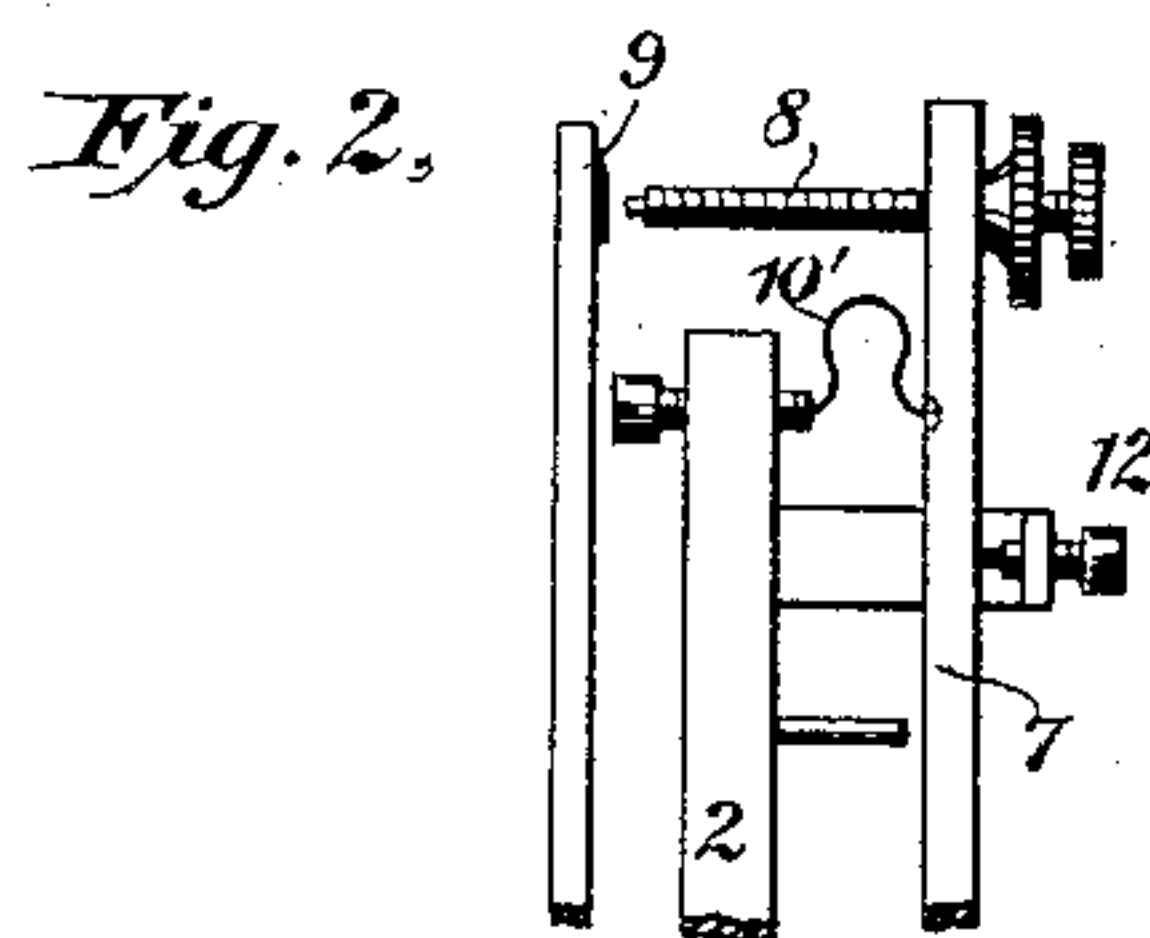
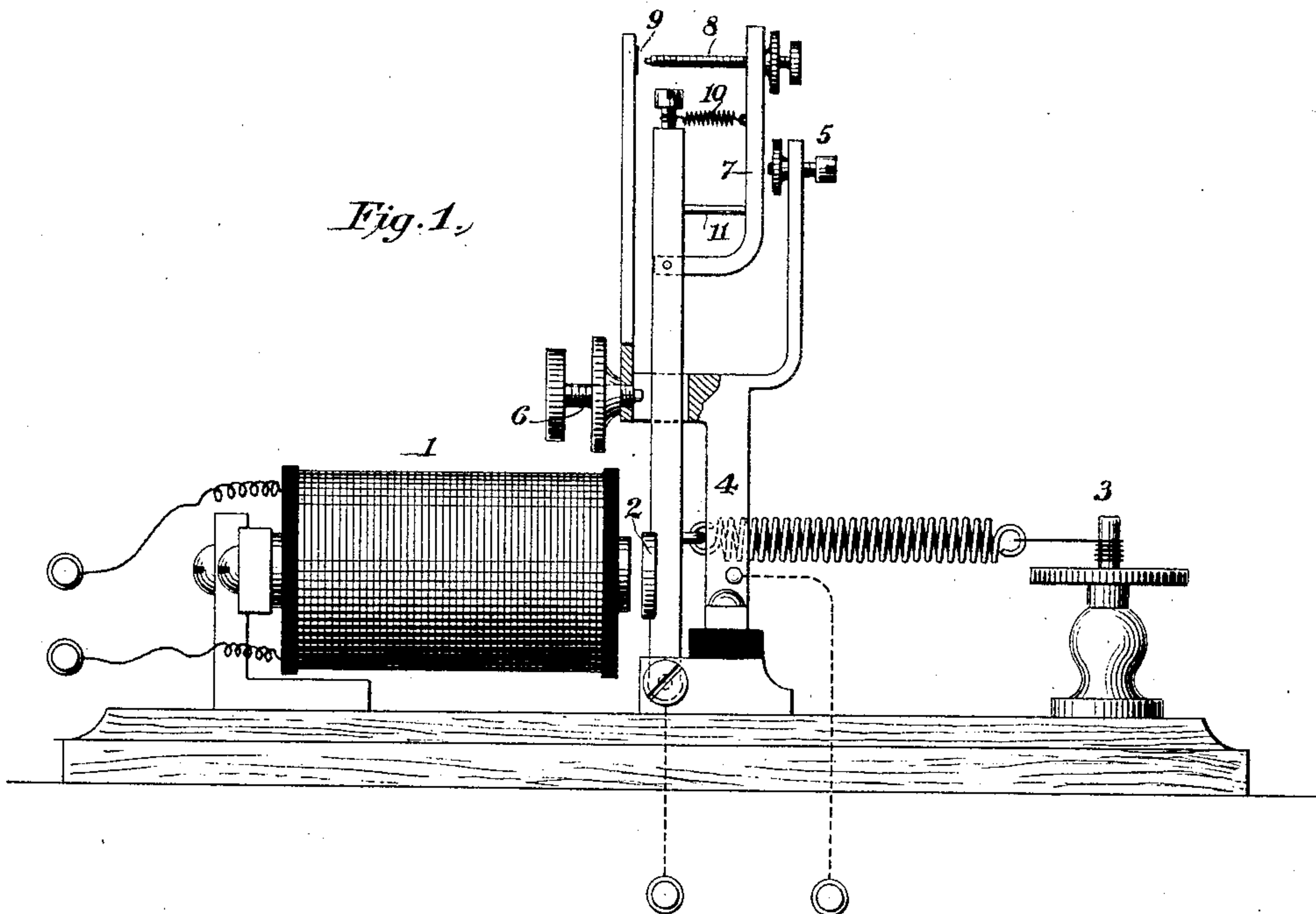


(No Model.)

R. VARLEY, Jr.  
RELAY.

No. 464,133.

Patented Dec. 1, 1891.



Witnesses  
Geo. W. Breck  
Edward Thorpe.

Inventor  
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# UNITED STATES PATENT OFFICE.

RICHARD VARLEY, JR., OF ENGLEWOOD, NEW JERSEY.

## RELAY.

SPECIFICATION forming part of Letters Patent No. 464,133, dated December 1, 1891.

Application filed February 10, 1891. Serial No. 380,968. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD VARLEY, JR., a citizen of the United States, residing at Englewood, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Relays; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to relays for electric circuits, and has for its object to provide an instrument of this character which will not close the circuit it controls except when currents of definite magnetizing power or duration flow through the coils of its electro-magnet. In relays as ordinarily constructed currents of very brief duration will actuate the armature, thus permitting effects of static charge or discharge to interfere with the reliable action of the instrument. I overcome this difficulty by providing the armature of the relay with a yielding contact for retarding the closure of the local circuit, the retardation being produced by the *vis inertia* or by a backward thrust of the contact when the armature is actuated, thus delaying the commencement of movement of the contact from its back-stop a little later than the commencement of movement of the armature to which it is connected. With currents of exceedingly short duration the armature begins its backward travel toward the back-stop before the lagging contact has closed its circuit, and therefore the circuit controlled by the relay is unaffected by the brief excitement designed to be ignored. My invention therefore embodies a relay the armature of which is provided with a yielding contact to permit a retardation of the time of closure of the circuit it controls.

The several features of novelty of the device will be hereinafter definitely indicated in the claims appended to this specification.

In the accompanying drawings, which illustrate the invention, Figure 1 illustrates an instrument embodying my invention. Fig. 2 illustrates a modification of a detail.

1 is an electro-magnet designed for insertion in the controlling-circuit, and 2 is an armature co-operating therewith, pivotally mounted in a support 4, and provided with a

retracting-spring controlled by an adjusting-button 3. The armature is provided with a limiting-stop 6, adjustable in the support 4, to control the extent of its forward sweep. Upon the upper end of the armature is a pivoted arm 7, capable of movement in the line of attraction and held in contact with a projection or lug 11 on the armature when the armature is in its retracted position, as illustrated in the drawings. The tension of a delicate spring 10, regulated by an adjusting-pin, as shown in Fig. 1, is sufficient to maintain the arm 7 against the lug 11 when the armature is held free of the back-stop 5; but when the armature is influenced by a sudden forward impulse the inertia of the pivoted arm and the contact 8 carried thereby prevents it from following immediately the movement of the armature, and thereby causes the contact or stop 8, with its co-operating anvil 9, to be a little later in point of time than it would be if the contact 8 were rigidly mounted upon the armature; but if the force impelling the armature toward its front stop be continued for a definite short period the tension of the spring 10 will draw the contact 8 into engagement with its anvil.

The most delicate form of adjustment for the elastically-mounted contact would be when the spring 10 is under no tension when the armature is retracted, but will be stretched sufficiently when it is attracted to drag the contact 8 over to its anvil 9. The mode of adjustment illustrated permits the tension to be regulated to the degree most suitable for any particular case in which the relay is used. The controlled circuit will be affected only when current of a definite duration circulates in the coils of the controlled magnet. A static charge of the circuit does not affect the local or controlled circuit, whereas with the ordinary relay such charge would close the local.

While I have shown the contact-stop carried by the armature mounted in elastic bearings, I desire to have it understood that if the contact-stop were so hung as to be normally held by gravity against the limiting-stop 11, or its equivalent, good results might be attained, and such an organization would be within the scope of my invention, the essential feature of the invention being the capability of the contact lagging behind the move-



ment of the armature when the latter is affected.

In Fig. 2 is shown a modified way of adjusting the contact-arm. As shown here, a push-spring 10' of limited range of movement is used. The tendency of the spring is to force the contact-arm away from the armature, and thus magnify the effect of inertia in causing a lag in contact of contacts 8 and 9. If desired, a back-stop 12, mounted on the armature, might be used to regulate to a greater nicety the amount of lag. In either case the effect is the same, the contact by reason of its freedom of movement starting on its path toward the co-operating anvil later in time than the armature itself.

I am aware that relays provided with contacts frictionally mounted upon the armature have been proposed. In such cases, however, the contact is not capable of lag under the influence of inertia, but yields only when brought into positive engagement with its co-operating contact-stop.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A relay provided with an armature carrying a rearwardly-yielding contact mounted to lag under the influence of inertia when the armature is attracted, whereby the circuit controlled by the relay is affected only when currents of definite duration flow through the relay-coils.

2. A relay provided with an armature carrying a freely-pivoted contact adapted to yield rearwardly from its co-operating contact un-

der the influence of inertia when the armature is attracted, whereby the contact will lag behind the stroke of the armature and affect the controlled circuit only when the relay-magnet is energized to a definite extent.

3. The combination of an electro-magnet, a pivoted armature, and circuit-closing contact freely pivoted on the armature and adapted to yield under the influence of inertia in a direction opposite that of attraction when the armature is attracted, whereby the inertia of the contact prevents a change of the local circuit unless the magnet be excited by a current of definite continuance.

4. In a relay, the combination of the electro-magnet, pivoted armature, pivoted contact mounted on said armature, stop, as 11, to limit the forward movement of the contact, limiting-stops for the armature, contacts 8 and 9, and a spring connection between the armature and contact, as and for the purpose described.

5. In a relay, the combination of the electro-magnet, pivoted armature, pivoted contact mounted on said armature, stop, as 11, to limit the forward movement of the contact, limiting-stops for the armature, contacts 8 and 9, and adjustable spring 10, as and for the purpose described.

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

RICHARD VARLEY, JR.

Witnesses:

STEPHEN L. COLES.

E. C. GRIGG.