

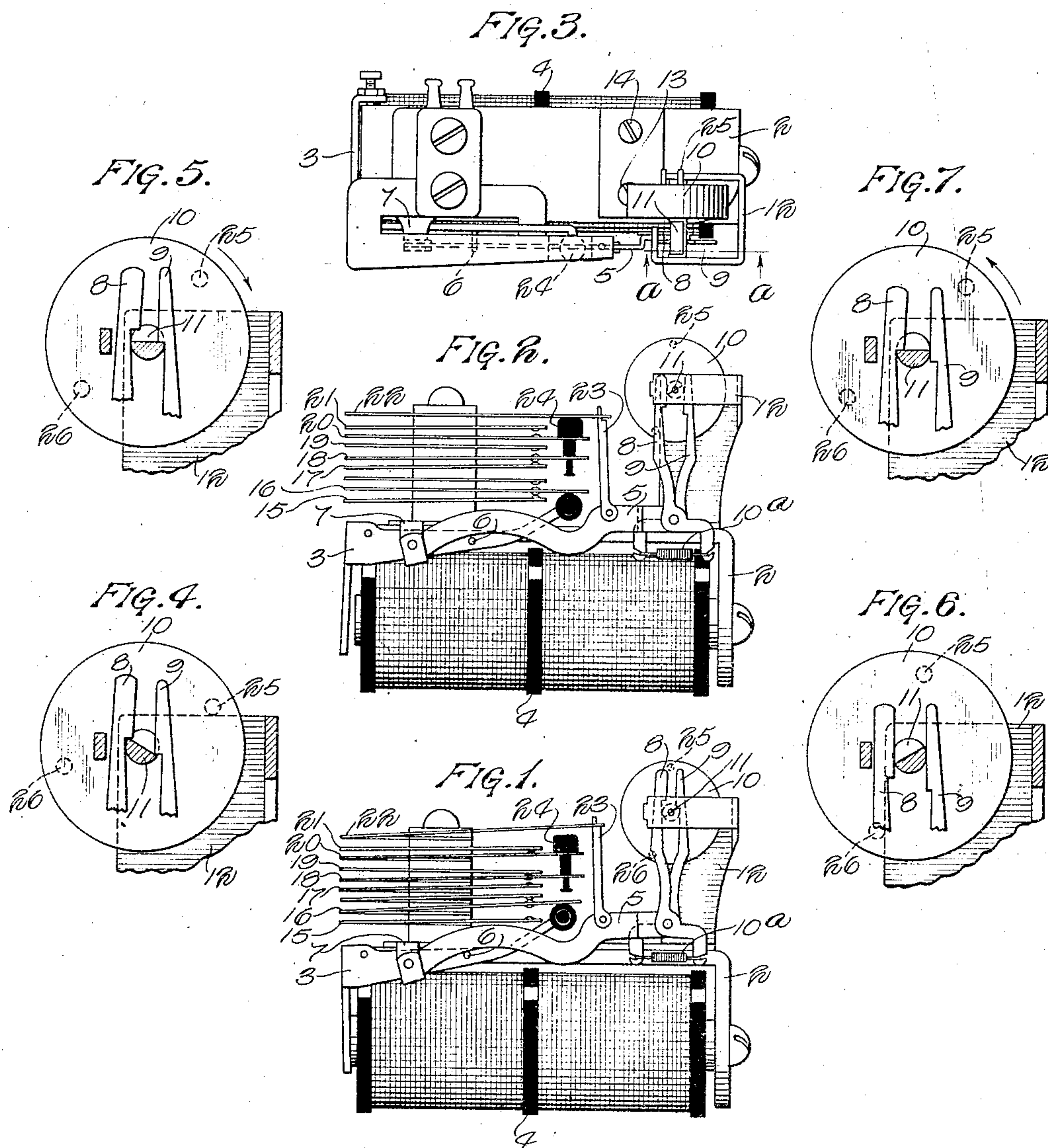
J. ERICKSON.

RELAY.

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1,177,768.

Patented Apr. 4, 1916.



WITNESSES

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RELAY.

1,177,768.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN ERICKSON, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Relays, of which the following is a specification.

My invention relates to an improvement in relays, and more particularly to that type of relay which is adapted for use in connection with automatic telephone switches.

To this end my invention relates to a relay having quick and slow acting contact springs, certain of which springs are so arranged that they are operated when the relay is intermittently energized, while other of the springs are operated but are maintained in operated position when the relay is thus intermittently energized. In this manner I provide a very efficient relay in that it employs features which heretofore required two separate relays.

The nature and advantages of my invention will, however, hereinafter more fully appear.

In the accompanying drawings Figure 1 is a side elevation of my improved relay, showing the armature in an operated position. Fig. 2 is a similar view, showing the armature in a normal position. Fig. 3 is a top view of said relay. Figs. 4, 5, 6 and 7 are detail sections on line *a-a* of Fig. 3, showing the apparatus at different periods of operation.

As shown in Fig. 1, the mechanism of my improved relay consists of a heel piece 2 upon the upper end of which there is pivotally mounted an armature 3 capable of being operated by the electromagnet 4. Attached to said heel piece 2 is an arm 7, to the end of which there is pivotally secured a lever arm 5 which normally rests against the pin 6 in the armature 3. Upon the lower end of the arm 5 there are loosely mounted two pawls 8 and 9 which act upon the axis of the wheel 10, one end of the axis of said wheel being made semi-circular, as shown in detail views 4, 5, 6 and 7. The spring 10^a serves to hold the pawls 8 and 9 in contact with the axis 11. The solid wheel 10 is mounted upon the axis 11, which is rotatably supported in the frame 12, said frame being

secured to the heel piece 2 by means of screws 13 and 14.

It will now be described how a portion of the group of springs 15 to 22 is made to operate quickly, while the remainder of said group of springs operate slowly. When the armature 3 is attracted by the electromagnet 4, the spring 16 is forced out of engagement with the spring 15, and the pin 6 strikes the arm 5, forcing it outward, thereby, through the medium of the pin 23, forcing the spring 22 away from the bushing 24. The spring 22, in being forced from the bushing 24, allows the spring 18 to disengage the spring 17 and engage the spring 19, and allows the spring 20 to engage the spring 21.

When the arm 5 is forced outward upon the energization of the electromagnet 4, the notches in the pawls 8 and 9 are carried past the semi-circular end of the axis 11 of the wheel 10. When the circuit of the magnet 4 is broken, the spring 16, acting directly on the armature 3, forces the armature back, thus allowing the spring 16 to immediately engage the spring 15. The arm 5 tends to return to normal position, but is held from returning quickly due to the fact that the notch in the pawl 9 engages the axis 11 of the wheel 10, as shown in Fig. 5. The wheel 10, being solid possesses considerable inertia and therefore acts slowly to allow the arm 5 to return to normal position. However, before the arm 5 reaches normal position, *i. e.*, before the springs 18 and 20 disengage the springs 19 and 21, the pin 25 strikes the frame 12, which prevents further rotation of the wheel 10. The axis 11 is then in the position shown in Fig. 4, whereupon the pawl 9 slips off and the notch in the pawl 8 engages the upper portion of said axis, thereby causing the wheel 10 to rotate in the opposite direction as the arm 5 continues its restoration. The stopping and reversal of the wheel 10 further averts the motion of the arm 5.

Since the spring 22 does not engage the bushing 24 to force the springs 18 and 20 back to normal position until the wheel 10 has returned far enough to allow the pawl 8 to slip off the top of the shaft 11 (Fig. 6), an appreciable time interval elapses between the restoration of the spring 16 and that

of the springs 18 and 20. If the magnet 4 is again energized before the arm 5 has fully returned to normal, said arm is again brought into its operated position and starts its slow restoration over again. It will thus be seen that if the magnet 4 is energized and deenergized rapidly, the spring 16 may be made to pass out of and into engagement with the spring 15 as many times as desired while the springs 18 and 20 are retained continuously in their operated position.

From this it will be seen that I provide a very efficient form of relay and one which is adapted for use in connection with automatic telephone systems, and one in which slow acting and quick acting contact springs are combined in a very efficient and economical manner.

While I have illustrated and described one particular embodiment of my invention, it is to be understood that I do not wish to be limited to the exact construction shown and described, as various modifications will readily suggest themselves to those skilled in the art, and come within the contemplated scope of my invention.

What I claim as my invention is:—

1. In a relay, a magnet, a heel-piece, an armature mounted thereon, a plurality of contact springs adapted to be moved into operative position by the attraction of said armature, and means whereby certain of said contact springs return quickly to normal position, while other of said contact springs are slow acting in returning to normal position upon the demagnetization of said magnet.

2. In a relay, a magnet, an armature therefor having an arm extending substantially at right-angles thereto, and a plurality of contact springs controlled by said arm, certain of said contact springs being slow acting and other of said contact springs being quick acting, said slow-acting springs controlling a circuit exclusive of said quick-acting springs.

3. In a relay, a magnet, an armature therefor an arm carried by said armature and extending at right-angles thereto, a plurality of contact springs controlled by said arm and adapted to be moved into operative position thereby, and means whereby certain of said contact springs return to normal position more rapidly than other of said contact springs.

4. In a relay, a magnet, an armature therefor, an arm carried by said armature and extending at right-angles thereto, a plurality of contact springs controlled by said arm and adapted to be moved into operative position thereby, and means for delaying the return to normal position of certain of said contact springs.

5. In a relay, a magnet, a heel-piece, an armature mounted thereon, an arm carried

by said armature, contact springs controlled by said arm, a second arm carried by said heel-piece and operated by said first-mentioned arm, and other contact springs controlled by said second arm.

6. In a relay, a magnet, a heel-piece, an armature mounted thereon, an arm carried by said armature, contact springs controlled by said arm, a second arm carried by said heel-piece and operated by said first-mentioned arm, other contact springs controlled by said second arm, and means for retarding the action of said second arm, whereby the springs controlled thereby are slow acting.

7. In a relay, a magnet, a heel-piece, an armature mounted thereon, an arm carried by said armature, contact springs controlled by said arm, a second arm carried by said heel-piece and operated by said first-mentioned arm, other contact springs controlled by said second arm, and means for retarding the return motion of said second arm, whereby the contact springs controlled thereby are slow acting.

8. In a relay, a magnet, a heel-piece, an armature mounted thereon, an arm carried by said armature, a second arm carried by said heel-piece, a pin on said first-mentioned arm adapted to engage said second arm to operate the same, and a plurality of contact springs controlled by said second arm.

9. In a relay, a magnet, a heel-piece, an armature mounted thereon, an arm carried by said armature, a second arm carried by said heel-piece, a pin on said first-mentioned arm adapted to engage said second arm to operate the same, a plurality of contact springs controlled by said second arm, and means for retarding the operation of said second arm, whereby the springs controlled thereby are slow acting.

10. In a relay, a magnet, a heel-piece, an armature mounted thereon, an arm carried by said armature, a second arm carried by said heel-piece, a pin on said first-mentioned arm adapted to engage said second arm to operate the same, a plurality of contact springs controlled by said second arm, and means for retarding the return motion of said second arm, whereby the contact springs controlled thereby are slow acting.

11. In a relay, a magnet, an armature therefor, contact springs controlled thereby, a disk, and means controlled by said disk for retarding the operation of said contact springs.

12. In a relay, a magnet, an armature therefor, contact springs adapted to be moved into operated position upon the operation of said armature, and a disk and means controlled thereby for retarding the return movement of said contact springs.

13. In a relay, a magnet, an armature therefor, an arm carried by said armature, contact springs operated by said arm, a sec-

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ond arm controlled by said first-mentioned arm, contact springs controlled by said second arm, a disk operatively connected to said second arm, and means controlled thereby for retarding the operation of said second arm, whereby the contact springs controlled thereby are rendered slow acting.

Signed by me at Chicago, Cook county, Illinois, this 17th day of February, 1911.

JOHN ERICKSON.

Witnesses:

ARTHUR J. RAY,
E. D. FALES.