

J. F. KEELY.  
SELF LOCKING RELAY.  
APPLICATION FILED JAN. 16, 1909.

938,588.

Patented Nov. 2, 1909.  
2 SHEETS—SHEET 1.

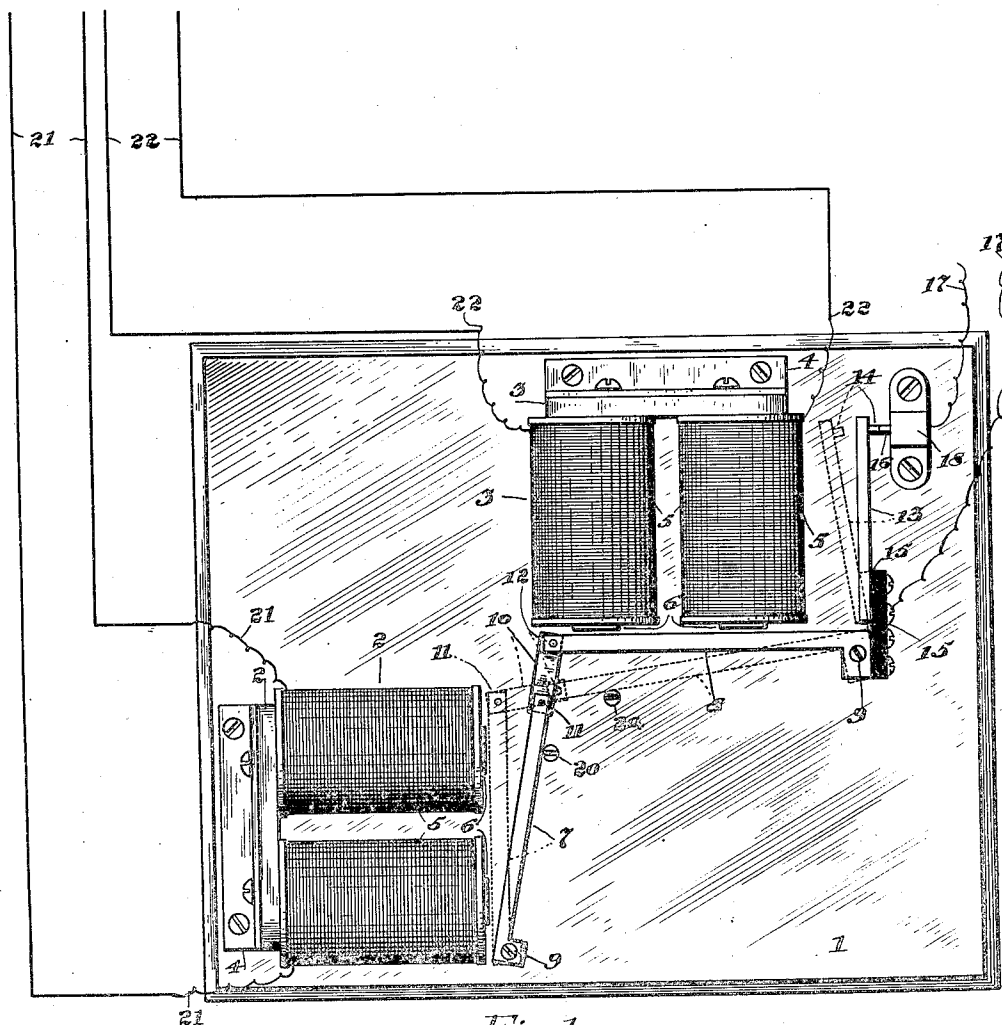


Fig. 1.

Witnesses:

*W. E. Smith*  
*P. E. Bretcher*

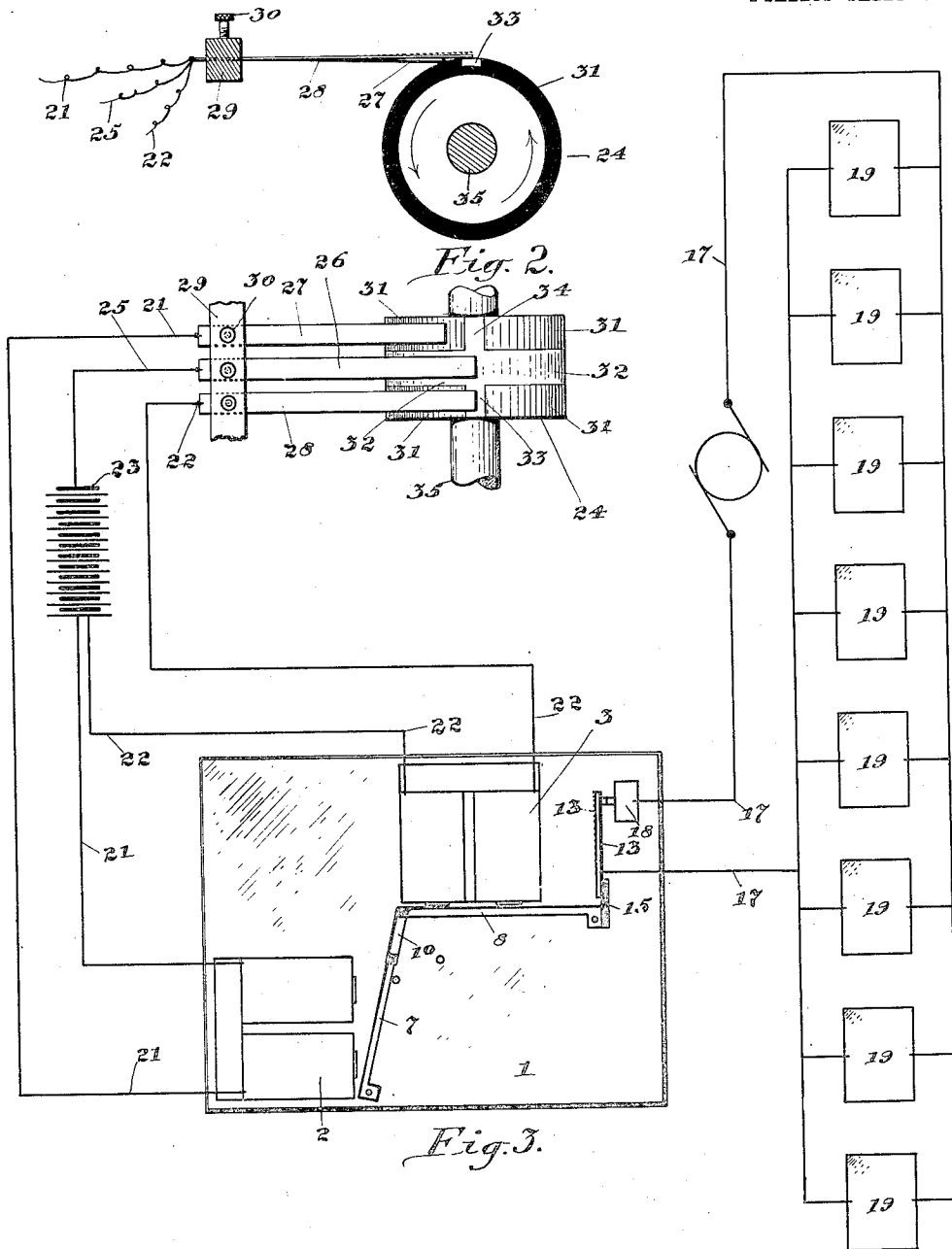
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# UNITED STATES PATENT OFFICE.

JEROME F. KEELY, OF CHICAGO, ILLINOIS.

## SELF-LOCKING RELAY.

938,588.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed January 16, 1909. Serial No. 472,748.

*To all whom it may concern:*

Be it known that I, JEROME F. KEELY, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Self-Locking Relays, of which the following is a specification.

My invention relates to electrical apparatus used in connection with time recording stamps, and more particularly to self-locking relays designed to maintain the time recorders in constant synchronism with a central clock. In the ordinary system the time recorded by the stamps often varies from the central clock time, and this is due to inadequate means provided in connection with the relay in the electrical system to insure its operation in a positive and reliable manner. To provide a relay having a positive action is therefore the main object of the present invention, which consists in a magnet provided with means whereby the armature thereof is locked automatically at each time the same is drawn toward its magnet, and in a second magnet adapted to cooperate with the first magnet for unlocking the same, each magnet armature being self-locking but depending on the other for unlocking means.

My invention further consists in certain details of construction and arrangement of parts all as will be hereinafter fully described and more particularly pointed out in the appended claim.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a plan view of my self-locking relay in its preferred form. Fig. 2 is a side elevation of the central clock control switch, and Fig. 3 is a plan view of the control switch showing diagrammatically the wiring and general arrangement of the relay and time recorders.

Referring now to the drawings 1 indicates a suitable base on which the magnets 2 and 3 may be mounted by means of the angle plates 4. The coils 5 and cores 6 of the magnets 2 and 3 are disposed at ninety degrees to each other, and consequently the respective armatures 7 and 8 of said magnets have approximately the same relative position.

The armatures 7 and 8 may be pivoted as by screws 9 to the base 1, and be provided with perforations at their free ends. The

link 10 pivoted to the ends 11 and 12 of the armatures 7 and 8 respectively constitutes the main feature of my invention, since by its use the armatures are adapted to be locked and unlocked automatically.

An arm 13 having an electric contact-piece 14 inserted therein is rigidly connected with the armature 8 and insulated therefrom by means of the fiber insulating block 15. The other contact-piece 16 of the stamp circuit may be inserted in a block 18 screwed to the base 1, said circuit being the ordinary 110 volt light circuit. Stops 20 are provided to limit the movement of the armatures and 8. The relay circuits 21 and 22 arranged in parallel and connected to the battery 23 connect respectively the magnets 2 and 3 with the central clock control switch 24. The common wire 25 in the circuits 21 and 22 is connected to the central contact finger 26 of the control switch 24, and the fingers 27 and 28 are in the circuits 21 and 22 respectively. The fingers 26, 27 and 28 may be secured in the block 29 by means of screws 30, all of said fingers being in slidable contact with the switch drum. The switch drum comprises two fiber rings 31 and a central brass ring 32 having two laterally projecting contact pieces 33 and 34. The periphery of the composite drum thus formed is smooth and cylindrical, the hub of the drum being preferably mounted on the second-hand arbor 35 of the central clock. By means of this construction the relay circuits 21 and 22 are closed once every minute, and if it is desired to close said circuits every half or quarter minute the proper number of equally spaced contact-pieces similar to 33 and 34 may be provided in the periphery of the drum.

In the operation of the control switch in ordinary use which is similar to the herein described switch, particles of matter floating in the atmosphere, such as lint, may collect on the switch drum and cause the contact fingers to spring away from the same as shown by dotted lines in Fig. 2, or in certain cases the contact fingers may vibrate. In this event a double contact may be made during a single passage of a contact-piece 33 or 34 under a contact finger 27 or 28. And should this happen, which is far from being an unusual occurrence, the operating magnet would be energized twice instead of once and cause the stamps to gain a minute in time.

In the present invention when the magnet 3 is energized by means of the contact fingers 26 and 28 coming into electrical connection as shown in Fig. 3, the armature 8 is drawn 5 to the position shown and the main switch having the contact-pieces 14 and 16 is closed. The armature 8 is now locked in position and cannot be affected by a second accidental energizing of the magnet 3 during the 10 revolution of the clock arbor 35. After the circuit 22 is broken by the rotation of the drum as indicated by arrows, the circuit 21 is closed by means of the contact finger 27 coming into contact with the contact-piece 15 34. The magnet 2 is now energized which causes the armature 7 to move into the position as indicated by dotted lines. By means of the link connection of the armatures 7 and 8, the latter is moved to the open position and the main switch is opened as indicated by dotted lines. The actuation of the 20 relay armatures and the main or stamp circuit switch is then seen to be positive, and consequently the time recording stamps must also be in synchronism with the central clock. 25

While I have shown what I deem to be the preferable form of my improved relay, I do not wish to be limited thereto, as there might be minor changes made in the details 30 of construction and arrangement of parts without departing from the spirit of my in-

vention. And while I have described my device with special reference to time recording apparatus, it may be used for any other purpose for which it may be adapted. For 35 instance, its use in connection with secondary clocks would be particularly important, as there would be the same advantages as in the present application.

Having described my invention what I 40 claim as new and desire to secure by Letters Patent is:

In a device of the character described, a magnet in electrical connection with a clock control switch provided with a pivoted armature having an insulated arm secured 45 thereto adapted to open and close a time recorder circuit switch, a second magnet also in electrical connection with a clock control switch and provided with a pivoted armature, and a connecting link pivoted to said 50 armatures, whereby each armature is self-locking and adapted to be unlocked by the other armature, substantially as and for the purposes set forth. 55

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

JEROME F. KEELY.

Witnesses:

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RUDOLPH C. BRETHER.