N. H. SUREN.

RELAY.

APPLICATION FILED JUNE 1, 1914.

1,174,911.

Patented Mar. 7, 1916.

2 SHEETS—SHEET 1.

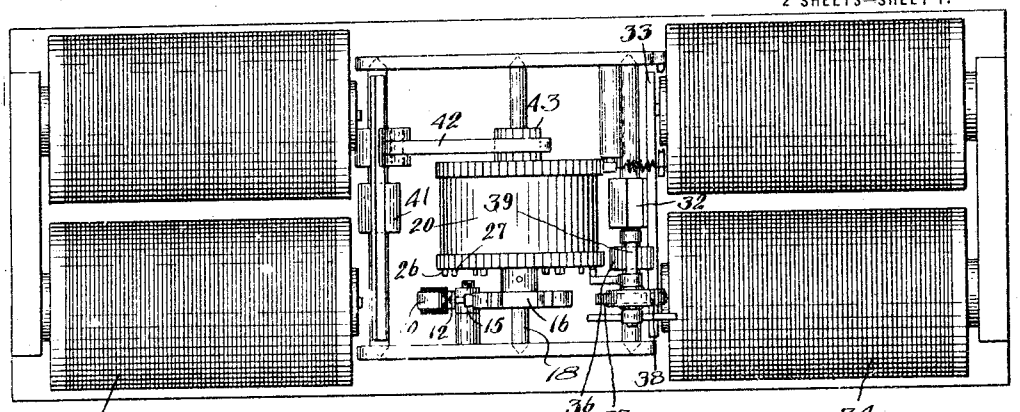


Fig. 1.

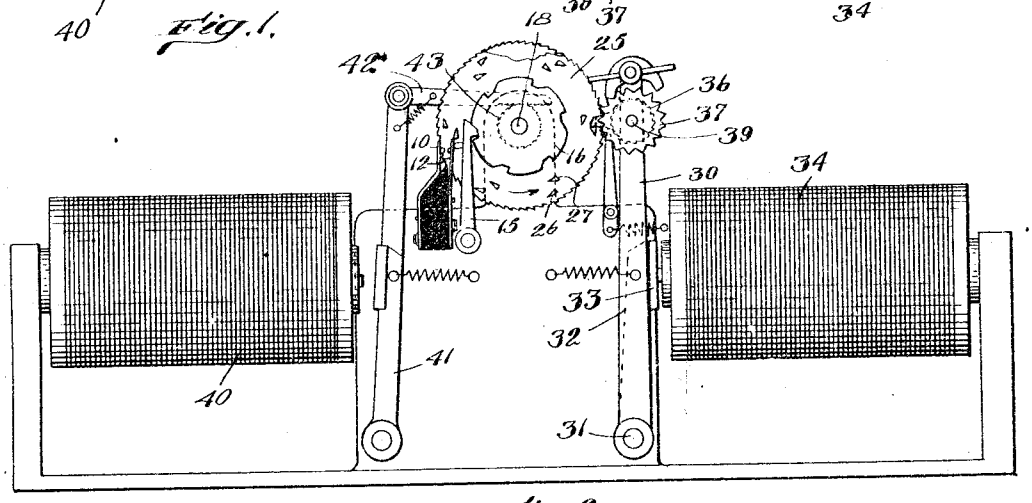


Fig. 2.

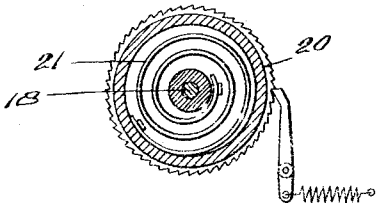


Fig. 3.

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2 SHEETS—SHEET 2.

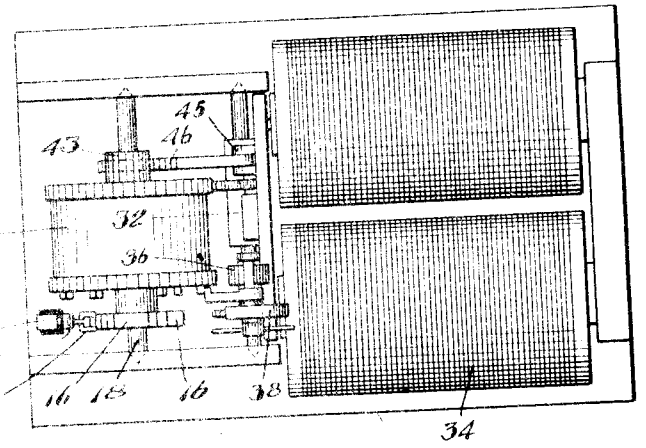


fig. 5.

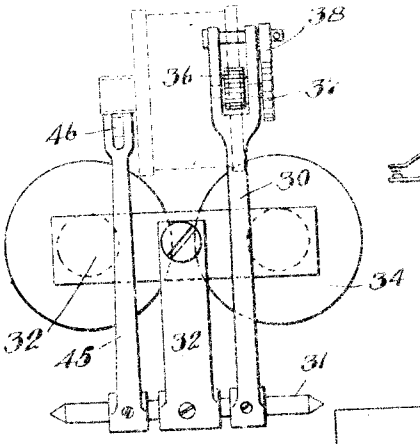


fig. 6.

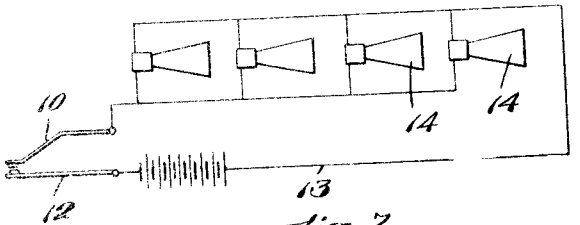


fig. 7

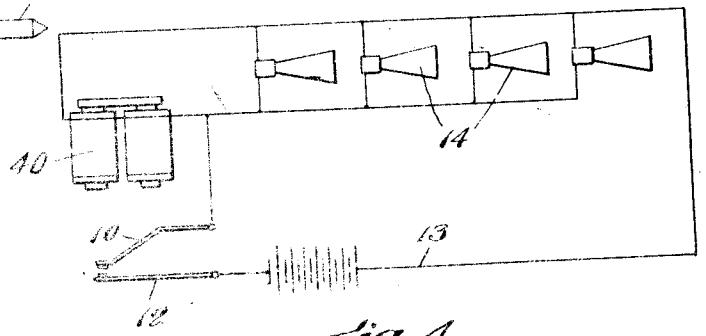


fig. 4.

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UNITED STATES PATENT OFFICE.

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RELAY.

1,174,911. Specification of Letters Patent. Patented Mar. 7, 1916.

Application filed June 1, 1914. Serial No. 842,012.

To all whom it may concern:

Be it known that I, NATHAN H. SUREN, a citizen of the United States, residing at Needham, in the county of Norfolk and State of Massachusetts, have invented an improvement in Relays, of which the following is a specification.

This invention relates to relays adapted for use in signaling systems and particularly fire-alarm telegraph systems.

The object of the invention is to provide a relay especially adapted to control the circuit of an electrically operated whistle, horn, signal-recorder, or other signal receiving-device for fire alarms and other signals, whereby the blasts of the whistle and horn and the dashes of the signal-recorder will have a pre-determined and uniform length regardless of the duration of the length of the breaks produced by the signal-transmitter or other cause.

In the generally accepted standard of fire-alarm systems, a closed circuit is employed, and the circuit-controlling wheels of the signal-transmitter, are of the skeleton type, whereby during the operation thereof, the circuit-closing periods are of the same duration and the open-circuit periods are of three different durations, the shortest period being between the successive closures of a number group of a round of a signal, the next longest period being between the successive number-groups of a round of a signal and the longest period being between the successive rounds of a signal, or, as it is sometimes stated, between the successive repetitions of the signal, it being understood that usually the signal is repeated four times, each being commonly termed a round. The blasts of the whistle and horn and the dashes of the signal-recorder are given during the aforesaid open-circuit periods and it is very important that they shall be of approximately uniform duration regardless of the varying duration of the open-circuit periods.

Figure 1 is a plan view of a relay embodying this invention. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse vertical section of the spring-drum of the timed actuating-mechanism. Fig. 4 is a diagram of a local circuit which includes the circuit controller. Fig. 5 is a modified form of relay wherein the spring of the timed actuating-mechanism is energized by a relay magnet. Fig. 6 is an enlarged detail of the controlling and winding member of a modified form of relay shown in Fig. 5. Fig. 7 is a diagram of a local circuit which includes the circuit controller for the modified form of relay of Fig. 5.

The local circuit-controller which corresponds with the usual relay-contacts, is represented by resilient contact-members 10 and 12, and a pivoted arm 15 arranged adjacent the member 12 for moving it into engagement with the member 10 to close a local-circuit 13 containing signal-receiving instruments 14, such for instance, as whistles, horns, recorders, bells, etc. Such local-circuit is here shown as open, the contact-members being in disengaged position. Associated with said circuit controller is a timed actuating-mechanism arranged to operate the arm 15 to close the contact-members for a short period of time upon each operation thereof, and all said closures will be of substantially the same duration, thus resulting in producing blasts of uniform length on the whistle and horns and dashes of uniform length on the recorder, regardless of the length of time the controlling-circuit is open. One form of timed actuating-mechanism is here shown merely to illustrate my invention, for it will be understood that other forms having substantially the same capabilities come within the spirit and scope of my invention.

The timed actuating-mechanism here shown will now be described. 16 represents an actuating-disk for the arm 15 having depressions arranged at regular intervals to receive a projection on said arm and into engagement with which said arm is held by the resilient contact-member 12. The portions of said disk between said depressions are of uniform length, so that as the disk rotates said arm will be moved by it for periods of time corresponding to the length of said portions and the speed of rotation of the disk, but in all instances will be for periods of uniform duration. Said actuating-disk 16 is secured to a spring-drum or barrel 20, which is arranged upon a shaft 18, said drum being here shown as of cylindrical form, and containing a spring 21, the outer end of which is connected with the drum and the inner end of which is connected with the shaft or a hub thereon. Said drum has an end wall 25 with a toothed periphery and with a plurality of pairs of detents 26, 27, arranged upon its outer

side or face, said pairs being arranged at equidistances apart and the detents of each pair being arranged at different distances from the edge of the end wall, so that all the detents 26 are arranged to move in one path and all of the detents 27 are arranged to move in another path, as the drum rotates. A detaining-lever 30 is provided for holding the drum in a predetermined position with the actuating-disk in position to admit of the projection on the arm 15, entering one of the depressions therein, so that the contact-members are normally disengaged. Said detaining-lever is secured to a pivot-shaft 31 to which an armature-lever 32 is secured, the armature 33 of which is arranged for coöperation with a relay-magnet 34, which is arranged in the controlling-circuit in any usual or suitable manner. Said detaining-lever also bears a timing-element which is arranged for engagement with the toothed edge of the end wall of the drum but is normally disengaged therefrom when the detaining-lever is held by the attracted armature, and is permitted to move into engagement therewith upon retraction of the armature. Said timing-element, as here shown, comprises a toothed-wheel 36 sec red to a shaft bearing an escape-wheel 37, which is engaged by a pallet 38, secured to a shaft 39, all of said shafts being borne by the detaining-lever. The engaging-portion of the detaining-lever, which is arranged for engagement with the detents on the drum, consists of an angularly formed extension, and said engaging-portion normally engages one of the detents nearest the edge of the end-wall, being the outermost detent of the pair, when the armature is in its attracted position, but upon retraction of said armature said engaging-portion is moved to disengage said detent and to move into position to engage the other or innermost detent of the next pair, which is arranged in the other path or remote from the edge of the end wall of the drum, thereby to check rotation of said drum, in case said detaining-lever still remains in such position at the moment the said detent arrives in position to engage it, but in case said armature should have been attracted in the meantime then said engaging-portion will engage the outermost detent of the next pair of detents, thereby to check rotation of the drum.

It will be observed that upon retraction of the armature the toothed-wheel of the timing-element is moved into engagement with the toothed end-wall of the drum, thereby to retard rotary movement of said drum during the time engagement continues, thereby insuring a predetermined period of time of operation for said drum each time the armature is retracted. The several pairs of detents are arranged relatively to each other to correspond with the depressions in the actuating-disk, there being one pair for each depression, so that while the drum is rotating the arm 15 will be moved to hold the contact-members in closed position, thereby insuring a closure of the local-circuit for a uniform length of time. In case the armature remains retracted as it will do upon the occurrence of a prolonged break in the controlling-circuit, rotary movement of the drum will be checked by one of the innermost detents but at such time the arm 15 will be permitted to move inward to enter one of the depressions, more or less, so as to permit separation of the contact-members, and upon subsequent attraction of the armature said drum will be again released and permitted to rotate, but such subsequent rotary movement will be short and of very short duration, particularly as the drum is at such time unrestrained, and the result of such short movement of the drum will be inconsequential.

It is important that the spring for moving the drum shall be energized automatically as it is not convenient or desirable to provide a long spring which may be manually wound and arranged for many repeated operations. Hence means are herein provided for winding said spring by means controlled by a magnet, which is arranged in the local-circuit or by the relay-magnet itself.

Referring to Figs. 1, 2 and 4, a magnet 40 is arranged in the local-circuit, the armature-lever 41 of which bears a rack-bar 42, arranged for engagement with a ratchet-wheel 43, which is secured to the shaft or hub connected with the inner end of the spring 21, and upon attraction of the armature of said magnet said spring will be energized. Referring to Figs. 5 to 7 a similar arm 45, is secured to the armature-shaft of the relay-magnet, said arm bearing a rack-bar 46, which is arranged for engagement with a ratchet-wheel upon attraction of the armature to energize the spring. The construction of the means here shown for winding the spring, however, may be changed, so far as my invention is concerned, as it is not material, the main point being that the spring is wound automatically by means controlled by a magnet in the local-circuit or by the relay-magnet.

I claim:—

1. In a relay, the combination of a circuit-controller, a timed actuating-mechanism adapted when released to operate it to close a circuit for a predetermined period of time, and then open the circuit regardless of whether its releasing-means remains in its abnormal position or returns to its normal position, and a relay-magnet arranged to control the release of said timed actuating-mechanism upon the retractive movement of its armature, substantially as described.

2. In a relay, the combination of a circuit-controller, a timed actuating-mechanism adapted when released to operate it to close a circuit for a predetermined period of time, and then open the circuit regardless of whether its releasing-means remains in its abnormal position or returns to its normal position, and a relay-magnet arranged to control the release of said timed actuating-mechanism upon the retractive movement of its armature and subsequently to control the stopping thereof when in either its retracted or attracted position, substantially as described.

3. In a relay, the combination of a circuit-controller, a timed actuating-mechanism adapted when released to operate it to close a circuit for a predetermined period of time, and then open the circuit regardless of whether its releasing-means remains in its abnormal position or returns to its normal position, and a relay-magnet arranged to control the release of said timed actuating-mechanism upon the retractive movement of its armature, and automatic-means for winding the spring of said timed actuating-mechanism upon each operation thereof, substantially as described.

4. In a relay, the combination of a circuit-controller, a timed actuating-mechanism adapted when released to operate it to close a circuit for a predetermined period of time, and then open the circuit regardless of whether its releasing-means remains in its abnormal position or returns to its normal position, and a relay-magnet arranged to control the release of said timed actuating-mechanism upon the retractive movement of its armature, and means arranged for operation by the relay-magnet to energize the spring of the timed actuating-mechanism upon each operation thereof, substantially as described.

5. In a relay, the combination of a circuit-controller, a timed actuating-mechanism adapted when released to operate it to close a circuit for a predetermined period of time and then open the circuit regardless of whether its releasing-means remains in its abnormal position or returns to its normal position, a detaining-lever normally engaging said mechanism, and a relay-magnet, the armature of which is arranged to operate said detaining-lever to release said mechanism upon its retractive movement, substantially as described.

6. In a relay, the combination of a circuit-controller, a timed actuating-mechanism adapted when released to operate it to close a circuit for a predetermined period of time, and then open the circuit regardless of whether its releasing-means remains in its abnormal position or returns to its normal position, a detaining-lever normally engaging said mechanism, and a relay-magnet, the armature of which is arranged to operate said detaining-lever to release said mechanism upon its retractive movement and subsequently to stop said mechanism when in either its retracted or attracted position, substantially as described.

7. In a relay, the combination of a circuit-controller, a timed actuating-mechanism adapted when released to operate it to close a circuit for a predetermined period of time, and then open the circuit regardless of whether its releasing-means remains in its abnormal position or returns to its normal position, and having one or more pairs of detents arranged to move in two separate paths, a detaining-lever normally engaging a detent movable in one of said paths and arranged for movement to engage a detent which is movable in the other path, and a relay-magnet, the armature of which is arranged to move said detaining-lever out of engagement with its normally engaged detent and into position to engage a detent moving in the other path upon its retractive movement and then into position to engage a detent in the same path upon its subsequent movement, substantially as described.

8. In a relay, the combination of a circuit-controller, a timed actuating-mechanism adapted when released to operate it to close a circuit for a predetermined period of time, and then open the circuit regardless of whether its releasing-means remains in its abnormal position or returns to its normal position, and having a set of detents arranged in pairs, a pivoted detaining-lever normally engaging one of the detents, a relay-magnet the armature of which is arranged to operate said detaining-lever and upon its retractive movement to move said lever to disengage one of the detents of a pair to release said mechanism, and subsequently to engage either of the detents of a pair to stop the mechanism according to its position, substantially as described.

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

NATHAN H. SUREN.

Witnesses:
FRANK J. JOFFREY,
C. C. BISSETT.