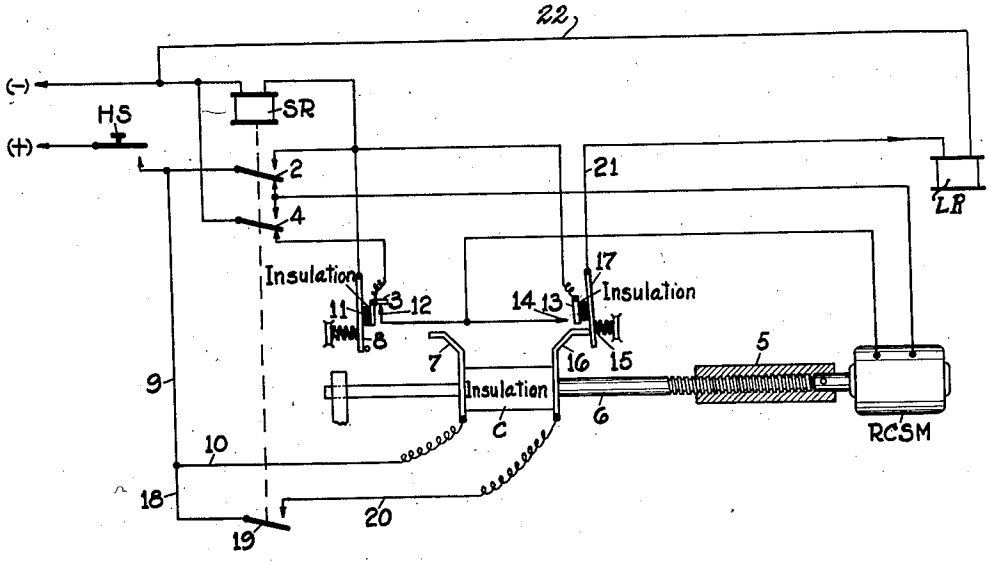
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TIMING SYSTEM

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TIMING SYSTEM

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This invention relates in general to timing means, and has more particular reference to timing means for electric circuits and the like, as used in railway operation, for example.

In accordance with this invention, when the system is initiated, a self-starting reversible constant speed motor, operates a contactor to complete a timing circuit a predetermined period of times after the initiation.

In timing circuits as used in connection with railway track switch operation and the like, it is most desirable to employ an accurate time measuring means, and also a means which lends itself readily to varying the predetermined time measured within wide limits, such as cannot be practically realized with devices of the thermal, and similar, types.

Further objects, purposes and characteristic features of the present invention will appear as the description progresses, reference being made to the accompanying drawing which shows, in a purely diagrammatic form, and in no manner whatsoever in a limiting sense, one form which the invention can assume. In the drawing the single figure of drawing shows, in a wholly schematic manner, one form which the present invention can assume.

Referring now to the drawing, there is shown a reversible constant speed motor RCSM, which operates a contactor C, between spaced fixed contacts, to first pick up a stick relay SR, and to then complete a timing circuit to a lock relay or the like, (not shown), which circuit includes a front point of the stick relay and a contact closed by the contactor C in its normal position.

The motor can be of any usual or desirable type so long as it is self-starting and reversible and of constant speed. It can be of the D. C. type, such as disclosed in application Ser. No. 198,928, in the name of O. S. Field, filed March 30, 1938, now Patent 2,206,667 granted July 2, 1940, or it can be of the alternating current type and if so, the arrangement of circuits entering the motor would differ somewhat from that described below.

The present timing system can be used in various connections. One particular situation in which it can be used to advantage is to complete a circuit through a lock relay to cause the lock relay to pick up, and thus to release the control of a track switch, only after the lapse of a predetermined time after the system is initiated. The initiation of the system can be dependent upon the presence of an approaching train in an approach section, or upon any other desired happening, or the initiation can be controlled by a hand switch, such as HS, in the drawing.

Considering the system more in detail, upon the closure of the hand switch HS, the reversible motor RCSM is energized to operate in a normal direction, through a circuit including hand switch HS in its closed position, contact finger 2 and back point of relay SR, the reversible motor, forward contact block 3, and contact finger 4 and back point of relay SR.

Upon the motor operating in the forward direction, the contactor C is moved to the left, by means of any desired mechanism, such for example, as that shown which includes a threaded socketed member 5, fixed or operatively connected to the motor shaft, receiving a threaded stem 6 fast to the contactor C.

Upon contactor C moving to the left a sufficient distance, the conducting contact finger 7 carried thereby makes contact with the pivoted contact finger 8, to thereby complete a pick-up circuit for relay SR which circuit includes hand switch HS in its closed position, wires 9 and 10, contact fingers 7 and 8, and the winding of relay SR.

Upon relay SR picking up, it is stuck up through an obvious stick circuit, which includes hand switch HS in its closed position, and contact finger 2 and front point of relay SR.

As contactor C moves from its shown, normal, position, contact block 13 closes on contact 14, under the influence of biasing spring 15, and with the stick relay SR picked up, a reverse energizing circuit for the motor is completed, which circuit includes hand switch HS in its closed position, contact finger 2 and front point of relay SR, contact block 13 and contact 14 in closed position, the motor RCSM, and contact finger 4 and front point of relay SR.

If, for any reason, relay SR should fail to pick up, when energized, the reverse circuit remains open and the forward energizing circuit remains closed. Thus, the motor continues to move the contactor C to the left, and carries finger 8, and wipe contact 3, connected thereto by an insulating member 11, with it, to ultimately break the wipe contact between 3 and contact point 12; thus to break the forward energizing circuit and leave the parts in their then positions.

With the motor energized for reverse operation, contactor C is moved to the right, to ultimately return to its shown position, to thereby open contact block 13 and contact 14, to break the reverse motor operating circuit, and to make contact between the traveling contact finger 16, and pivoted contact finger 17. This completes the timed circuit to the lock relay LR, or other device, which circuit includes hand switch HS in its closed position, wires 9 and 18, contact finger 19 and front point of relay SR, wire 20, contact fingers 16 and 17, wire 21 relay LR, and wire 22.

As described above, it can be seen that the timed circuit includes a front point of stick relay SR, and contacts closed only after the motor has returned the contactor to its initial position. With such an arrangement, it can be readily appreciated that the time measured is constant,

and that the system is always prepared, immediately after measuring one time, to measure a second time.

Also, with this system, which involves reversible electro-mechanical means, the time can be varied throughout a very wide range, it being merely necessary to vary the spacing of the pivoted contact fingers **8** and **17**, to thereby vary the measured time. The time measured can also, of course, be varied by varying the drive connection between the motor and the contactor C, and while a screw thread drive means has been shown it should be appreciated that any desired means, such as gears, clutches, or the like, can be employed. Also, the time measured can be varied by bending the contact fingers **7** and **16**, carried by the contactor C, so as to be either closer together, or further apart, than as now shown.

It is entirely practical, with a system of the kind described above, to vary the measured time over a range of from a matter of seconds, to minutes, from 10 to 20 minutes, hours, or even days, if desired, a range which can, of course, not be realized with the usual thermal, or electro-magnetic, or other types, of time measuring systems.

The above rather specific description of one form which the present invention can assume, is given solely by way of example, and is not intended, in any manner, in a limiting sense. It should be understood that all such variations, modifications and adaptations, as may be made from time to time, are intended to be covered by the present application, except insofar as they are specifically excluded therefrom by the appended claims.

Having described my invention, I now claim:

1. In a timing system for use on railways and the like, in combination, a self-starting constant speed reversible motor, a stick relay, a contactor having an initial position, means operably connecting the contactor to the motor for forward and reverse movement, a forward energizing motor circuit including a back point of the stick relay, a pick-up circuit for the stick relay closed upon a predetermined forward movement of the contactor, a reverse energizing motor circuit including a front point of the stick relay and a normally open contact closed during the first part of the forward movement of the contactor, and a timing circuit including in series a front point of the stick relay and a contact closed only when the contactor is in its initial position.

2. In a timing system for use on railways and the like, in combination, a self-starting constant speed reversible motor, a stick relay, a contactor having an initial position, mechanical means operably connecting the contactor to the motor for forward and backard movement, a forward energizing motor circuit including a back point of the stick relay and a normally closed contact, a pick-up circuit for the stick relay closed upon a predetermined forward movement of the contactor, a reverse energizing motor circuit including a front point of the stick relay and a normally open contact closed during the first part of the forward movement of the contactor, a timing circuit including in series a front point of the stick relay and a contact closed only when the contactor is in its initial position, and means for opening said normally closed contact only upon forward movement of the contactor additional to said predetermined forward movement.

3. In a timing system for use on railways and the like, in combination, a self-starting constant speed direct current reversible motor, a stick relay, a contactor having an initial position, mechanical means operably connecting the contactor to the motor for forward and backward movement, a forward energizing motor circuit including a back point of the stick relay and a normally closed contact, a pick-up circuit for the stick relay closed upon a predetermined forward movement of the contactor, a reverse energizing motor circuit including a front point of the stick relay and a normally open contact closed during the first part of the forward movement of the contactor, a timing circuit including in series a front point of the stick relay and a contact closed only when the contactor is in its initial position, and means for opening said normally closed contact only upon forward movement of the contactor of a substantial amount in addition to said predetermined forward movement.

4. In timing means, in combination, a constant speed self-starting reversible motor, a contactor having an initial position and operably connected to the motor, a forward and a reverse energizing circuit for the motor, a means operable upon a predetermined forward movement of the contactor to open the forward circuit and close the reverse circuit, a normally closed contact in the forward circuit, means for opening said closed contact only upon movement of the contactor a substantial distance beyond the point of said predetermined forward movement, and a timing circuit closed only upon the contactor moving said predetermined forward movement and then returning to its initial position.

5. In a timing system for use on railways and the like, in combination, a self-starting constant speed reversible motor, a stick relay, a contactor having an initial position, mechanical means operably connecting the contactor to the motor for forward and backward movement of the contactor, the contactor carrying spaced, deformable contact fingers, a forward energizing motor circuit including a back point of the stick relay, a pick-up circuit for the stick relay closed by one of said contact fingers upon a predetermined forward movement of the contactor, a reverse energizing motor circuit including a front point of the stick relay and a normally open contact closed on the other contact finger during the first part of the forward movement of the contactor, and a timing circuit including in series a front point of the stick relay and a contact closed only when the contactor is in its initial position.

6. In a timing system for use on railways and the like, in combination, a self-starting constant speed direct current motor, a stick relay, a contactor having an initial position, mechanical means operably connecting the contactor to the motor for forward movement, a forward energizing motor circuit including a back point of the stick relay and a normally closed contact, a pick-up circuit for the stick relay closed upon a predetermined forward movement of the contactor, circuit means effective only when the stick relay is picked up to cause the return of the contactor to its initial position, and a timing circuit including in series a front point of the stick relay and a contact closed only when the contactor is in its initial position, and means for opening said normally closed contact only upon forward movement of a substantial amount of the contactor in addition to said predetermined movement.

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