Sept. 2, 1924. 1,507,493

R. C. LEAKE

CIRCUIT CONTROLLER FOR SEMAPHORE SIGNAL MECHANISMS

Filed Nov. 18, 1920 2 Sheets-Sheet 1

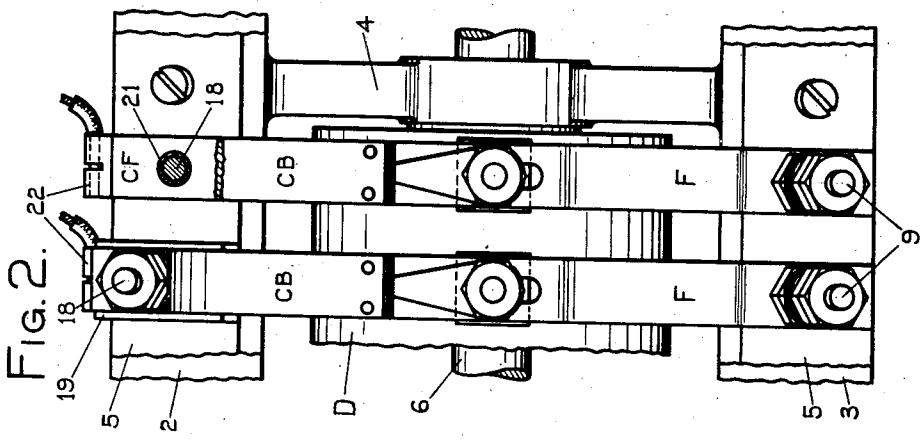


FIG. 2.

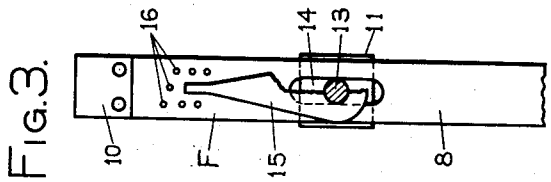


FIG. 3.

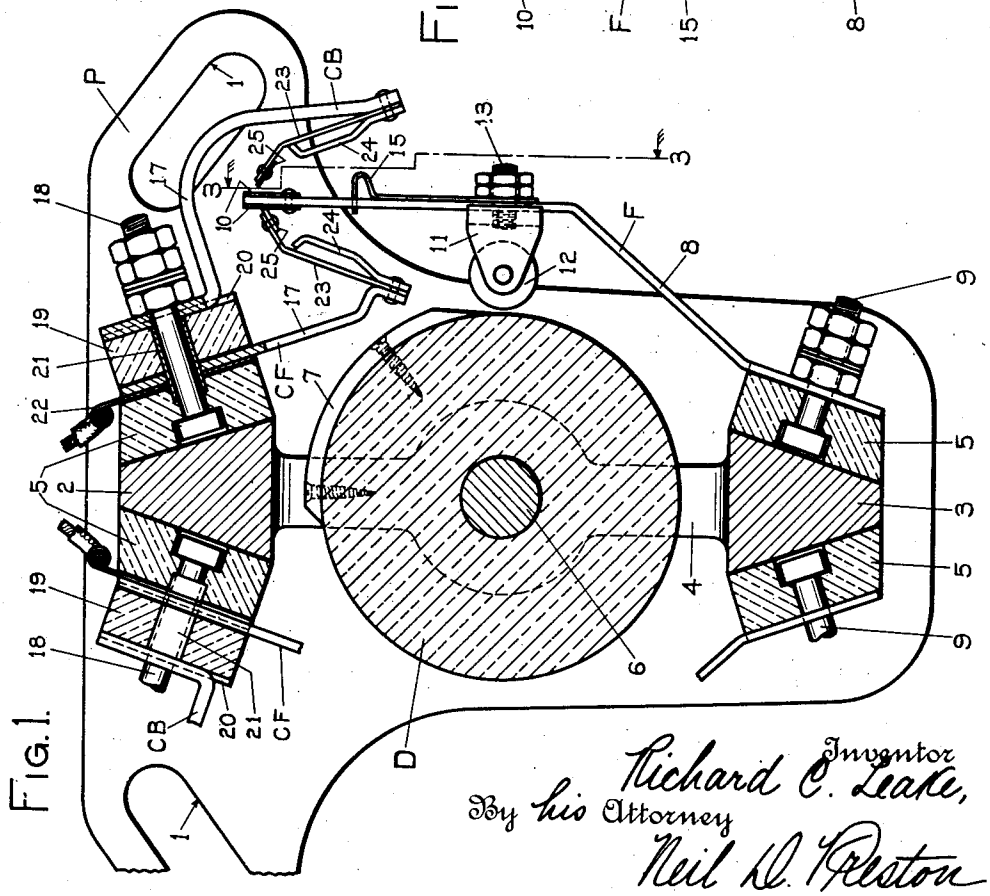


FIG. 1.

Inventor
Richard C. Leake,
By his Attorney
Neil D. Preston

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R. C. LEAKE

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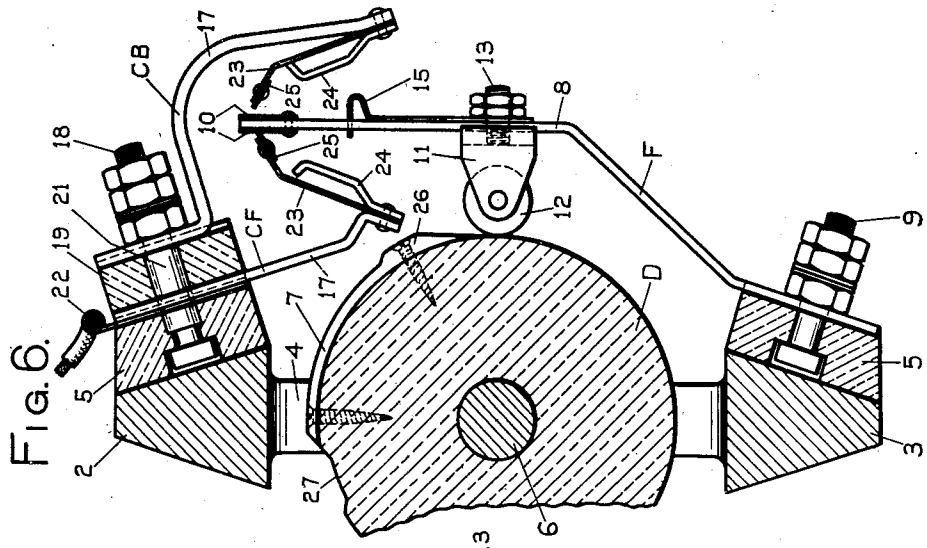


FIG. 6.

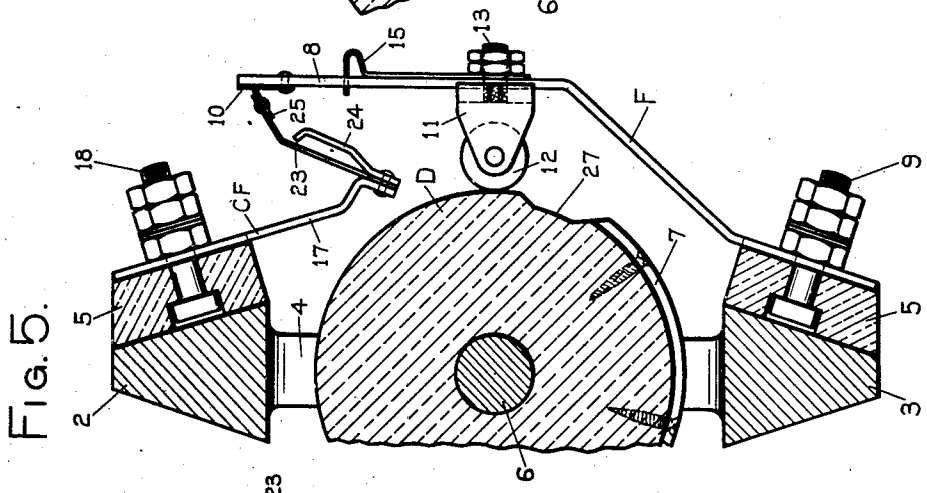


FIG. 5.

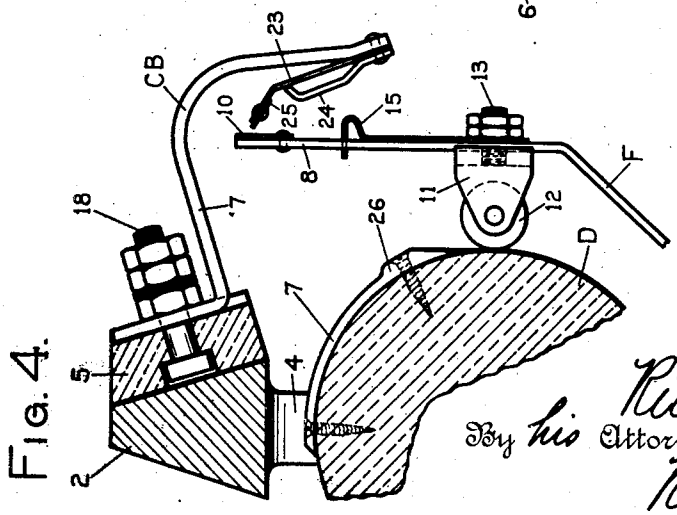


FIG. 4.

Inventor
Richard C. Leake,
By his Attorney
Neil C. Preston

Patented Sept. 2, 1924. 1,507,493

UNITED STATES PATENT OFFICE.

RICHARD C. LEAKE, OF ROCHESTER, NEW YORK, ASSIGNOR TO GENERAL RAILWAY SIGNAL COMPANY, OF GATES, NEW YORK, A CORPORATION OF NEW YORK.

CIRCUIT CONTROLLER FOR SEMAPHORE SIGNAL MECHANISMS.

Application filed November 18, 1920. Serial No. 424,824.

To all whom it may concern:

Be it known that I, RICHARD C. LEAKE, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Circuit Controllers for Semaphore Signal Mechanisms, of which the following is a specification.

This invention relates to the automatic circuit controllers employed in semaphore signal operating mechanisms for making and breaking at the proper time the various circuits utilized in the operation of said mechanisms.

The circuit controllers commonly employed in semaphore signal mechanisms, with which I am familiar, are of the drum type, in which stationary contact fingers rub over segments carried by a drum, the desired circuit connections being made and broken at the appropriate time as the drum is turned. It has been found that semaphore signal mechanisms in practical use are subjected to widely varying atmospheric conditions of temperature, moisture, smoke, and the like; and although the parts are enclosed in a protecting casing, difficulty has been encountered with the present type of circuit controller because of the failure of the contacts to make circuits at certain times, on account of the accumulation of dirt, frost, and the like on the contact surfaces, especially since the circuit controller is often operated only at long intervals.

One of the principal objects of the present invention is to devise a circuit controller adapted for semaphore signal mechanisms, in which the contacts are disposed in a position to be protected against the accumulation of moisture and dirt.

A further object of the invention is to provide a circuit controller in which the contact surfaces are automatically cleaned of dirt and frost at each operation and the current conducted by these clean surfaces.

Other specific objects and advantages of the invention will appear as the description progresses.

In describing the invention in detail reference will be made to the accompanying drawings in which:

Figure 1 is a vertical transverse section through a circuit controller for semaphore signals showing one contact unit embodying my invention;

Fig. 2 is a side view of a portion of the circuit controller;

Fig. 3 is a detail view illustrating the manner of adjustment of the contacts;

Fig. 4 is a vertical transverse section similar to Fig. 1, showing a modified construction; and

Figs. 5 and 6 are other fragmentary views showing other arrangements of the construction illustrated in Fig. 4.

I have shown my invention incorporated with a circuit controller of well known construction, similar to that shown and described, for example, in the patent to W. K. Howe, No. 1,056,992, dated March 25, 1913; but it should be understood that the invention may be used equally well in connection with other specific types of circuit controllers by making the appropriate changes in mechanical details.

Referring to Fig. 1, the circuit controller as a whole comprises a supporting plate P which is fastened to the main frame of the signal mechanism by bolts (not shown) passing through elongated holes 1 in said plate. Integral with the plate P are upper and lower bars 2 and 3, which are connected by a web or cross-brace 4. To the bars 2 and 3 are fastened blocks 5, of wood or other suitable insulating material, to which the several groups of contacts, hereinafter described, are secured. Supported in suitable bearings in the plate P and the cross-brace 4 is an operating shaft 6, to which is fastened a drum D of wood or other suitable insulating material. On the drum D are secured curved strips or segments, as 7. These segments 7 are fastened to the drum D at different points and are made of different lengths, so as to open and close circuits at the desired point in the movement of the drum, this drum is practice being rotated in opposite directions in accordance with the movement of the semaphore blade.

A circuit controller unit constructed in accordance with the present invention, comprises, in general, a movable finger F, and one or more stationary contacts, as CB and

CF. The finger F alternately engages the stationary contacts, and assuming the position of the parts shown in Fig. 1 to be in the normal position, the contact CF with which the finger F is then engaged is conveniently termed the front contact, and the other contact CB, the back contact, it being understood that these terms are employed for the purpose of convenience.

The finger F comprises a relatively stiff member 8 of spring material anchored at its lower end to the corresponding insulating block 5 by a bolt 9 which also constitutes a binding post for attaching wires. The upper end of the member 8 is preferably provided with conductive tips 10 of silver or similar material, riveted and soldered, or otherwise suitably secured to said member. To the middle part of the member 8 is adjustably attached a bracket or yoke 11, carrying a freely revoluble roller 12. This bracket 11 is clamped to the member 8 by a stud bolt 13 passing through an elongated slot 14 in said member (see Fig. 3). In order to positively hold the bracket 11 in its different adjusted positions, there is preferably provided a clip 15 which has a hole at one end receiving the bolt 13, and is formed with a prong at its other end adapted to enter any one of a number of holes 16 in the member 8 (see Fig. 3), said holes being staggered in rows as shown to provide relatively close adjustment in a limited space.

The construction of the front and back stationary contacts CF and CB is similar, and a description of one will suffice for both. Each of these stationary contacts comprises a supporting arm 17 of relatively stiff material, which is clamped at one end to the corresponding insulating block 5 by a binding post 18. Where both front and back contacts CF and CB are required, as shown in Fig. 1, an insulating washer or clamp block 19 is employed, said block having grooves 20 in its opposite faces to receive the supporting arms 17 of said contacts. The hole in the washer 19 is made larger than the bolt 18 so that a sleeve or bushing 21, of oiled linen or other suitable insulating material, may be used to insulate the supporting arm 17 of the front contact CF from the bolt 18. Wiring connection is made to the front contact CF by means of a terminal clip 22 clamped between said arm 17 and the insulating block 5. Where a front contact CF or a back contact CB alone is employed, as shown in Figs. 4 and 5, the supporting arms 17 of this contact is clamped to the bar 5 directly by a nut on the bolt 18. A contact spring 23 is suitably fastened, as by rivets, to the supporting arm 17, the outward movement of said spring being limited by a relatively stiff retainer 24 also fastened to said arm 17. The outer or free end of each contact spring 23 is provided with a suitable conductive tip 25 of silver or the like.

As shown in Fig. 1, the parts are so arranged and positioned that the contact surfaces of the tips 10 of the finger F are disposed substantially vertical, while the tips 25 of the springs 23 are arranged at an angle so as to scrape the surface of the cooperating tip 10. With the parts in the position shown in Fig. 1, the finger F is in contact with the front contact CF, and a circuit connection is established between the clip 22 and binding post 9. When the drum is turned in a clockwise direction, the beveled or inclined end of the segment 7 strikes roller 12 and forces the finger F outward. The outward movement of the spring 23 of contact CF is limited by its retainer 24, so that the connections between this spring and the finger F is broken. If a back contact CB is employed, the movement of the finger F brings its conductive tip 10 into engagement with the tip 25 of the spring 23 of this back contact. On account of the angular relation of these two tips 10 and 25, there is a scraping or digging action which serves to rub off and clean the surfaces as these parts are forced together. The contact finger F remains in this position so long as the roller 12 is held out by the segment 7; and by varying the length of the segment 7, this condition may be maintained for any predetermined portion of the rotation of the drum D. When the roller 12 rides off the segment 7, the parts are returned to the position shown, the circuit connection through the back contact CB being broken, and that through the front contact CF again established.

It will be observed that the contact surfaces of the finger F are disposed vertically, so that dirt and moisture will not accumulate on these surfaces. Also, the arrangement of the cooperating tip 25 of the spring 23 at an angle to the tip 10 gives a scraping and cleaning action which will remove any slight layer of frost or the like on the contact surfaces of said tip 10. Thus, one contact will dig in and remove any layer of frost or dirt on the cooperating surface of the other contact, rather than ride up over this layer, which is very likely to happen with the simple rubbing contact existing in the circuit controller construction heretofore employed.

In the modified construction shown in Figs. 4, 5 and 6, the arrangement and construction of the stationary and movable contacts is the same as already described, but in order to assure the conduction of current through surfaces that have been thoroughly cleaned, provision is made to give a special movement to the finger F, so that after scraping a clean surface, it settles back

and maintains completion of the circuit through the cleaned surface. In the particular construction illustrated, this special movement of the finger F is obtained, where a back contact CB is used, as shown in Fig. 4, by providing the segment 7 with a hump or projection 26 at one end. When the roller 12 rides over this hump 26, the finger F is forced outwardly and puts the corresponding spring 23 under greater tension than required for the desired contact pressure, thereby flexing it and causing its tip 25 to slide up over the cooperating tip 10 and scrape off the surface, so that when said roller rides down off of said hump and the finger F settles back, the tension on spring 23 being partly relaxing, the tip 25 slides back or down a little on its cooperating tip 10 so as to bear upon the surface already cleaned by the previous upward slide. In this way any frost, dirt or the like which may gather about the tip 25 during its upward scraping movement is not likely to interfere with its proper contact, because the conducting contact is finally made between surfaces which have been scraped clean. Also, the backward or downward slide of the tip 25 on the tip 10 produces a scraping action, and it may be said that the contact surfaces are scraped twice in the same operation.

Where a front contact CF is used, as shown in Fig. 5, the same principle of giving extra movement to the finger F for cleaning purposes is obtained by forming a depression 27 in the surface of the drum D at the end of the segment 7. Thus, when the front contact CF is closed (which happens when the roller 12 rides off of the segment 7), the finger F takes an extra inward movement under its own tension, and then returns to the position shown, thereby causing the tip 25 to slide upward and then settle back on the cooperating tip 10. Fig. 6 shows the arrangement of Figs. 4 and 5 combined to provide for both front and back contacts.

The distinguishing features of the invention, generally stated, reside in the disposition of one contact surface vertically so as to avoid accumulation of moisture and dirt; the angular relation of the cooperating contact members with respect to their relative movement so as to cause a scraping or digging action; and the double back and forth relative movement of the contact members so as to cause the surfaces to be cleaned twice and the final conducting contact made through thoroughly cleaned surfaces. It will be evident that these principles may be followed and the same mode of operation obtained by various specific constructions and arrangements of parts. For example, the stationary contact member may be disposed with its surface vertical, and the movable contact member at an angle. I desire to have it understood, therefore, that the particular construction shown and described is merely illustrative of the invention and does not exhaust the various practical embodiments of the invention that may be employed in practice.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A circuit controller for semaphore signal mechanisms and the like comprising, a rotatable drum, a tiltable contact member of relatively stiff resilient material anchored at one end and having a contact surface at the other end disposed substantially vertically, a stationary contact member having a spring disposed at an acute angle to the contact surface of said tiltable member, means limiting the movement of said spring toward the tiltable member, said spring being more flexible than said tiltable member and being flexed by movement relative thereto to scrape the contact surface thereof, a roller secured to said tiltable contact member at an intermediate point in its length and adjustable lengthwise thereof, said drum being formed with peripheral surfaces at different radial distances from the axis of the drum and connected by inclined surfaces, whereby rotary movement of the drum acts to tilt the relatively stiff contact member into and out-of contact with the contact spring of the other member and causes flexing of the spring.

2. A circuit controller for semaphore signal operating mechanisms, comprising, a relatively stiff tiltable member anchored at one end and having a vertically disposed contact surface at its other end, a stationary contact member carrying a spring more flexible than said tiltable member, said spring being inclined at an acute angle to the vertical, and means acting at an intermediate point in the length of the tiltable member for shifting its free end substantially horizontally to different extents successively over and back after engagement with said spring.

3. A circuit controller for semaphore signal operating mechanisms and the like comprising, a rotary drum, a contact finger vertically disposed at one side of said drum and having one end anchored, a stationary contact on the opposite side of said drum from the anchored end of said finger, said stationary contact including a spring and a retaining member limiting movement of said spring toward said finger, said spring being disposed at an acute angle to the contact surface of the finger, a roller attached to said finger at an intermediate point in its length, and means on said drum cooperating with said roller to cause movement of said finger backward and forward

as the drum is rotated; said roller and means being relatively adjustable to vary the point in the rotation of the drum at which the predetermined movement of the finger exists.

4. A circuit controller for semaphore signal mechanisms comprising a drum, a vertically disposed finger at one side of the drum and anchored below the drum, an adjustable roller carried by said finger, a stationary contact having a spring arranged at an angle to the finger, and projections on the drum for cooperating with said roller.

5. A circuit controller for semaphore signal mechanisms comprising, cooperating movable and stationary contact members, said members being arranged to cause relative sliding movement of their contacting parts when the members are pressed together, and means for moving said members during engagement toward each other and then back.

6. A circuit controller for semaphore signal mechanisms, comprising relatively movable contact members, one member having a spring and a retainer, said members being arranged to cause flexing of the spring and relative sliding movement of the contacting parts of said members when they are pressed together, and a drum for operating said members, said drum having projections thereon at different radial distances.

7. A circuit controller for semaphore signal mechanisms, comprising a drum, fixed insulating blocks above and below the axis of the drum, a stationary contact attached to one block and having a spring disposed at an acute angle to the vertical, a vertically disposed finger at one side of the drum attached at one end to the other block, and an adjustable roller carried by said finger and bearing on the surface of the drum, said drum having portions at different radial distances for cooperating with said roller and causing inward and outward movement of the finger to varying extents at predetermined points in the rotation of the drum.

In testimony whereof I affix my signature.

RICHARD C. LEAKE.