W. A. PEARCE.

ELECTRIC SIGNAL SWITCH.

APPLICATION FILED MAR. 7, 1913.

1,146,204.

Patented July 13, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

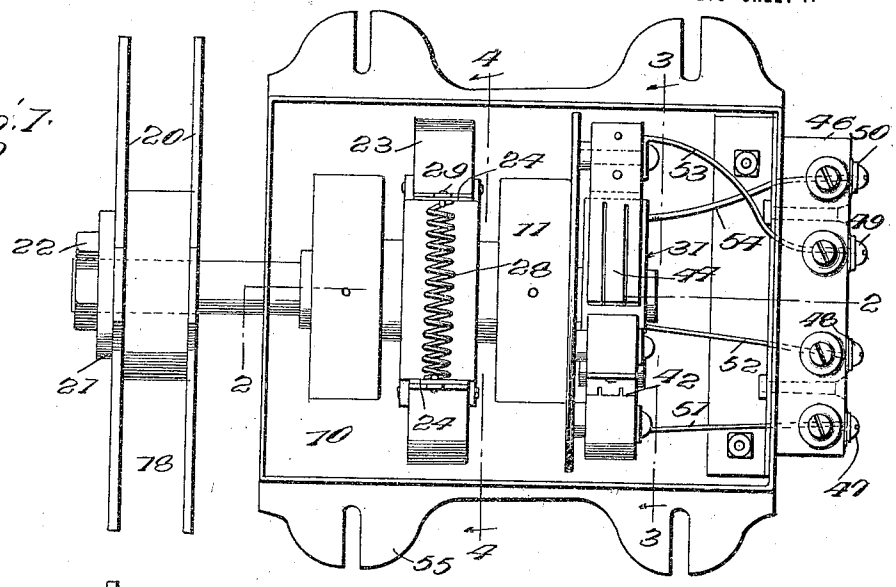


Fig. 2.

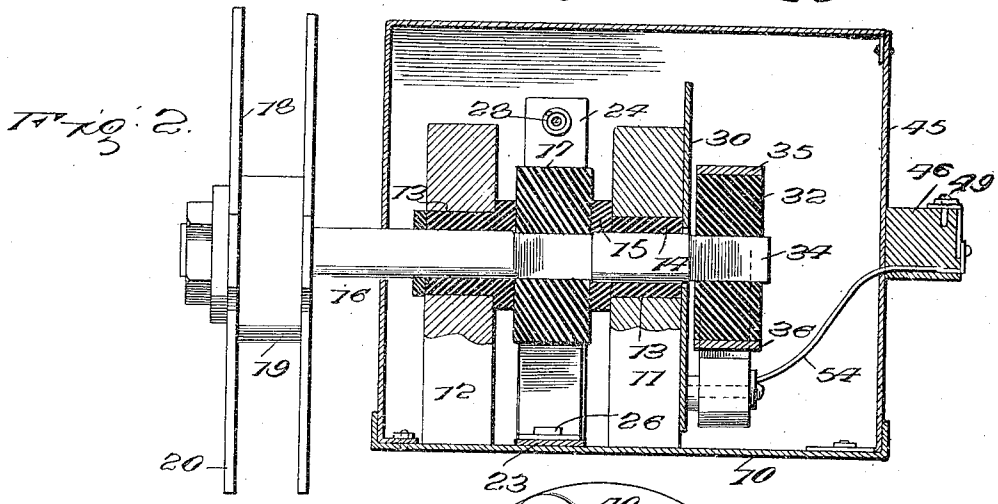


Fig. 5.

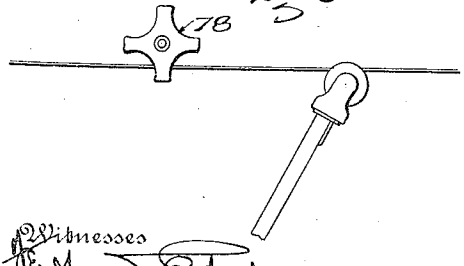
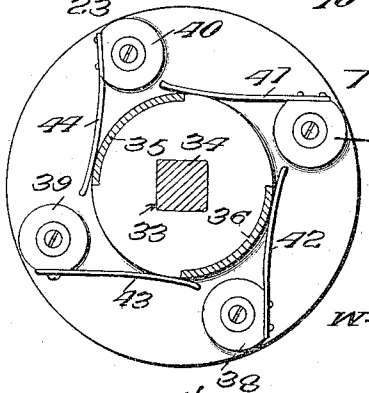


Fig. 3.



Witnesses

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2 SHEETS—SHEET 2.

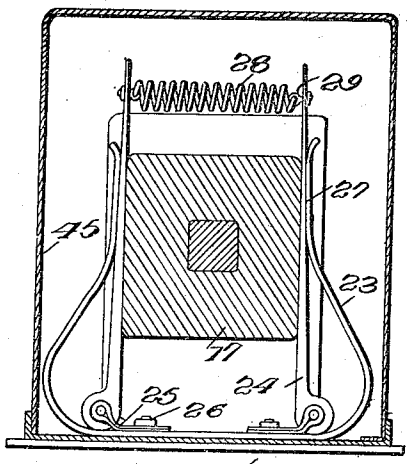


Fig. 4.

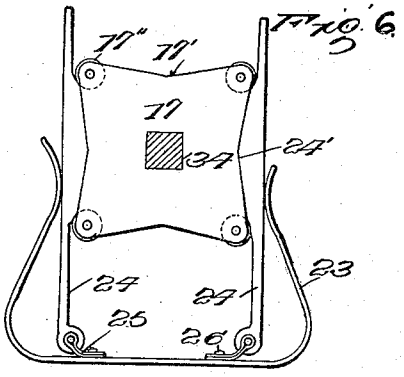


Fig. 6.

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UNITED STATES PATENT OFFICE.

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ELECTRIC-SIGNAL SWITCH.

1,146,204. Specification of Letters Patent. Patented July 13, 1915.

Application filed March 7, 1913. Serial No. 752,794.

To all whom it may concern:

Be it known that I, WILLIAM A. PEARCE, citizen of the United States, residing at Virginia, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Electric-Signal Switches, of which the following is a specification.

My invention relates to new and useful improvements in circuit closers or switches, the primary object of my invention being the provision of a circuit closer controlling two or more circuits and so constructed that while current will always be passing through one of the circuits, successive changing of the circuit closer will act to alternate the circuit through which the current passes.

A still further object of my invention is the provision of means in such a circuit closer adapted to automatically limit the turning of a rotating contact carrying member to prevent over-movement of parts, and the consequent faulty closing of circuits. And a still further object of my invention is to provide the rotor carrying the contacts with a stop member so arranged as to prevent over-rotation and yet so arranged as to prevent stopping of rotation before the rotor is turned through a predetermined distance.

With these and other objects in view, my invention will be more fully described, illustrated in the accompanying drawings, and then specifically pointed out in the claims which are attached to and form a part of this application.

In the drawing: Figure 1 is a top plan view of an improved form of circuit closer for use in connection with my signaling system, the casing being removed to more clearly show the construction of the parts; Fig. 2 is a sectional view on the line 2—2 of Fig. 1, the casing here being shown in section; Fig. 3 is a detail sectional view on the line 3—3 of Fig. 1; Fig. 4 is a sectional view on the line 4—4 of Fig. 1; Fig. 5 is a fragmentary elevational view, showing one manner in which my circuit closer may be mounted in position to be operated by a passing car. Fig. 6 is a fragmentary sectional view, showing a modified form of stop block and controlling springs.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The circuit closer includes a base 10 preferably formed of metal and carrying vertically extending spaced pedestals 11 and 12 provided with alined bores 13 to receive fiber bearing sleeves 14, the adjacent ends of which are formed with encircling stop shoulders 15, as shown. A continuous shaft 16 is journaled in these bearing sleeves 14 and that portion of the shaft between the sleeves 14 carries a squared fiber stop block 17. One end of the shaft 16 extends beyond the base and carries a star wheel, indicated as a whole by the numeral 18. This wheel includes a cylindrical hub 19 mounted upon the shaft and carrying spaced star wheel plates 20, the teeth of which are in alinement with each other as clearly shown in the drawings. This gear, as a whole, may be secured upon the shaft against rotation independently thereof in any preferred manner and is secured against disengagement from the shaft by a rubber washer 21 and a nut 22 which is threaded upon the extended end of the shaft 16.

A U-shaped spring 23 is secured by its bight portion to the base 10 of the circuit closer and the sides of this spring extend upwardly and inwardly one upon either side of the stop block 17. Arms 24 are swingingly mounted in brackets 25 which are fastened to the base by the same fastening bolts 26 which secure the spring 23 in place and these arms extend upwardly to engage in one position flatly against the opposite sides of the stop block 17, being normally held in this position by the inturned end portions 27 of the spring 23, as clearly shown in Fig. 4 of the drawings. It will therefore be apparent that if the star wheel is partially turned by engagement with some passing object that the spring pressed arms 24 engaging against the parallel faces of the stop block will absolutely prevent the stop block from turning through an angle of over 90 degrees and will also prevent its stopping until it has completely turned to such an extent. If preferred, the spring 23 may be omitted and a helical spring 28 connected at its ends to eye bolts 29 carried by the free ends of the arms 24 employed in its stead, the action in either case being the same.

A disk 30, preferably formed of metal, is

mounted upon the outer face of the pedestal or bearing 11, being perforated for the passage of the inner end of the shaft 16 which does not however, come into electrical contact with the disk. The inner end of the shaft 16 carries a contact drum, indicated as a whole by the numeral 31, this drum including a cylindrical shaped body member of fiber or vulcanized rubber 32 provided centrally with a squared opening 33 for the reception of the squared terminal 34 of the shaft 16. The peripheral face of the fiber body member or drum 32 is recessed at diametrically opposite points to form seats for contact plates 35 and 36 which, as clearly shown in Fig. 3 of the drawings, lie with their outer faces flush with the peripheral face of the body member 32.

The disk 30 carries four equally spaced apart contact holding studs 37, 38, 39 and 40 carrying the spring contact arms 41, 42, 43 and 44, respectively. The contact carrying studs are preferably insulated from the disk 30 and the contact arms are arranged to bear against the contact plates 35 and 36 of the drum 31. These contact plates 35 and 36 are so proportioned that in any of the four positions of the drum, permitted by the stop block and controlling arms 24, a pair of adjacent contact arms will engage against each of the contact plates. As shown in Fig. 3 of the drawings, the contact arms 42 and 43 are engaging against the plate 36, while the arms 41 and 44 are engaging against the plate 35. If the drum is turned 90 degrees in a clockwise direction, it will be apparent that the contact arms 41 and 42 will engage against the contact plate 35, while the contact arms 43 and 44 will engage against the contact plate 36. Upon further rotation of the drum through 90 degrees, the arms 42 and 43 will engage the plate 35 and the arms 41 and 44 will engage the plate 36. In other words, circuits will be formed through the arms 41, 44 and one of the contact plates and through the arms 42, 43 and the other contact plate or through the arms 41, 42 and a contact plate and the arms 43, 44 and a contact plate depending upon the position occupied by the shaft 16.

The above described mechanism, with the exception of the star wheel, is preferably inclosed in a metallic casing 45 and mounted upon the end of this casing, is a fiber block 46 carrying pairs of electrically connected binding posts 47, 48, 49 and 50. Conductor wires 51, 52, 53 and 54 electrically connect the contact fingers 41, 42, 43 and 44 with said binding posts.

If the above described circuit closer is to be used where it would be exposed to the weather, the binding post carrying block 46 will preferably be mounted in the casing and the wires of the signaling system will be run into the casing and connected to the proper binding post. For mining operation and other purposes where the signaling device will not be exposed, the binding posts are preferably mounted outside of the casing, as shown, for more convenient use.

The base 10 is preferably provided with slotted ears 55 by means of which the casing may be mounted upon any suitable support and in use the circuit closer is so mounted that the star wheel will extend in the path of some suitable portion of a car passing along the track in connection with which the signaling system is being employed. For instance, it may be mounted in the manner shown in Fig. 5 of the drawings in systems using the overhead trolley with one of the star wheel plates positioned upon each side of the trolley wire in such a manner that the trolley wheel in passing along the wire will strike against the teeth of the wheels to turn the same.

In steam service or in electric service, using a third rail or underground trolley system, the switch may be rigidly fastened between the rails so that the star wheel may be engaged by any suitable projection carried by the locomotive or car for that purpose.

It will of course be understood that I do not wish in any way to limit myself to the specific details of switch construction shown in the drawings as various changes may be made, within the scope of the appended claims, without in the slightest degree departing from the spirit of my invention. For instance, in Fig. 6 of the drawings, I have illustrated a slightly modified form of circuit closer construction which, with the exception of the stop block 17 and guide arms 24, is identical in construction with that shown in Figs. 1 and 4 of the drawings. In this modified form of construction the stop block has its peripheral faces formed centrally with transverse depressions as shown at 17′ to form seats for correspondingly shaped extensions 24′ formed upon the inner faces of the guide arms 24, this construction insuring a more positive locking action of the shaft. Furthermore, the corner portions of the stop block are recessed to receive rollers 17″ which are suitably journaled upon shafts extended through the corner portions of the block and against which the extended cam portions 24′ of the guide arms engage during rotation of the block.

It will of course be apparent that the operation of the above described circuit closer is identical with that previously described but said operation is rendered more effective and rapid, due to the co-action of the cam shaped extensions of the guide arms and seats formed in the block. Although in both instances the block has been described as

made of fiber, it will of course be understood that any suitable insulating material may be employed.

Having thus described the invention, what is claimed as new is:

1. A switch including a rotatable shaft, a drum mounted on the shaft and insulated therefrom, a plurality of contact plates carried by the drum and each adapted to close a circuit between two adjacent contact arms, and a plurality of contacts engaging the contact plates, each contact plate being selectively engaged by two adjacent contacts.

2. A switch including a shaft, a drum carried by the shaft and having spaced contact plates, contact arms engaging the plates, binding posts, electrical connection between the contact arms and binding posts, and means carried by the shaft for always holding the same in such a position that each contact plate of the drum will electrically connect two adjacent contact arms.

3. A switch including a shaft journaled in bearings, a stop block carried by the shaft and having angularly disposed peripheral faces, hingedly mounted guides adapted to bear against opposite peripheral faces of the stop block, resilient means for constantly holding said guides in clamping engagement with the stop block, a rotary member carried by the shaft, contacts on said member, and a plurality of contact arms engaging with the contacts of said member.

4. A switch including a revoluble shaft, a contact member mounted upon the shaft to revolve therewith, contact arms positioned about the shaft and engaging the contacts of said contact member, and means for stopping the rotation of the shaft at predetermined positions of the contact member, said means including a square block carried by the shaft, hingedly mounted guides bearing against opposite faces of the block and spring operated means for holding the guides in engagement with said faces.

5. A switch including a shaft mounted for rotation, a contact carrying drum carried by the shaft, a pair of diametrically disposed contact plates carried by the drum, and contact arms spaced about the drum at ninety degrees from each other and engaging the contact plates, the arms and plates being so proportioned that each contact plate at all times closes a circuit between a pair of adjacent arms.

6. A switch including a shaft, a stop block carried by the shaft and having angularly disposed peripheral faces depressed centrally and transversely, guide arms adapted to bear against opposite peripheral faces of the stop block and having cam shaped extensions seating in the depressions of said faces, rollers journaled in the corner portions of the block and extending beyond the same to engage the guide arms during rotation of the block, means for constantly holding said guide arms in engagement with the block, a rotary contact member carried by the shaft, and a plurality of contact arms adapted for engagement with the contacts of said member.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM A. PEARCE. [L. S.]

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R. EMMONS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."