

G. VALLEY.

LOCKING DEVICE FOR ELECTRIC CONTROLLERS.

No. 576,332.

Patented Feb. 2, 1897.

Fig. 1.

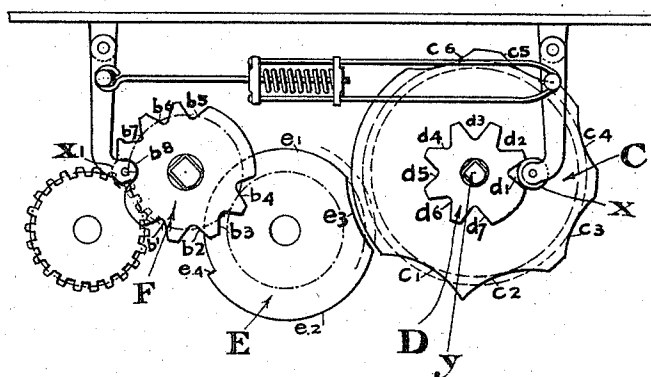


Fig. 2.

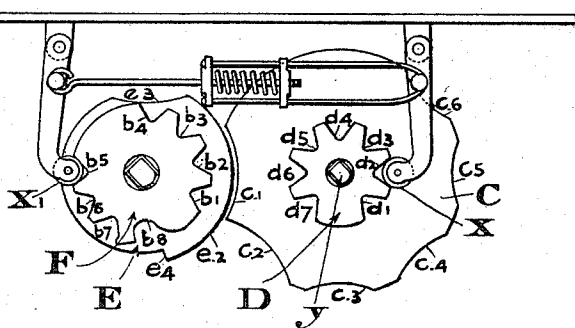
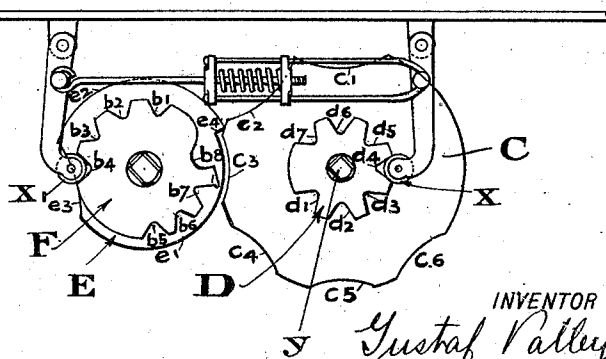


Fig. 3.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

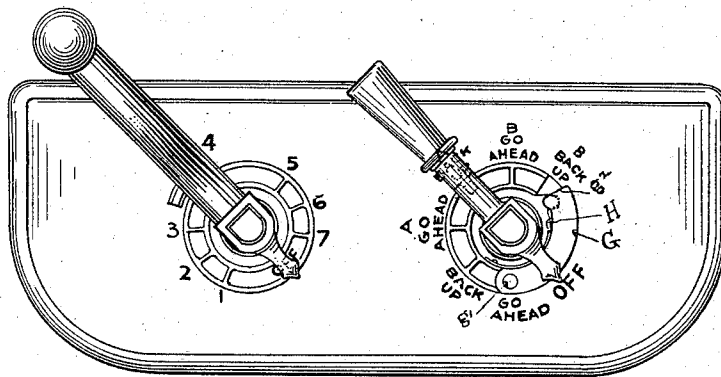
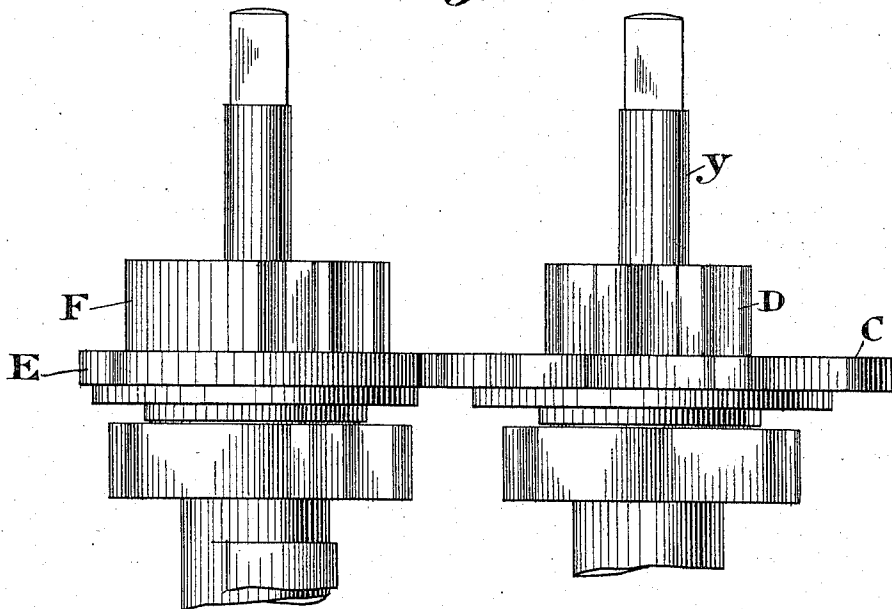


Fig. 5.

WITNESSES:

N. B. Steff
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INVENTOR

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UNITED STATES PATENT OFFICE.

GUSTAF VALLEY, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR TO THE
STEEL MOTOR COMPANY, OF SAME PLACE.

LOCKING DEVICE FOR ELECTRIC CONTROLLERS.

SPECIFICATION forming part of Letters Patent No. 576,332, dated February 2, 1897.

Application filed November 10, 1896. Serial No. 611,596. (No model.)

To all whom it may concern:

Be it known that I, GUSTAF VALLEY, of Johnstown, in the county of Cambria, State of Pennsylvania, have invented certain new and useful Improvements in Locking Devices for Electric Controllers, of which the following is a specification.

In electric controllers, as constructed for use on railway-cars, there are usually one or more drums rotated by the movement of an operating-lever. At various points in this rotation changes occur in the course which the electric current takes, so that the motors may be started from rest and brought by steps to the desired speed. In conjunction with the working drum or drums of the controller there is generally used a reversing-switch or combined reversing and cut-out switch, ordinarily taking the form of another drum also adapted to be rotated by a lever. Such a switch is described in Patent No. 561,839, granted to me June 9, 1896.

In the following specification I shall refer to a drum type of reversing and cut-out switch, such as is shown in said patent, but it is understood that my invention may be used with other forms of switches.

The object of my invention is to provide a simple, efficient, and durable device which will, under certain desired conditions, lock the operating-drums so that they cannot be rotated or can be rotated only through a desired arc, and under certain other desired conditions will lock the reversing and cut-out drum, so that it cannot be rotated, or can only be rotated through a limited arc or in a desired direction.

Referring to the drawings, Figure 1 is a plan view of the inside of what is known as a "double-drum controller," showing my improvement. This figure shows all the drums in the "off" position. Fig. 2 is a similar view of a single-drum controller. Here the reversing and cut-out switch is shown in the proper position to go ahead with both motors. The operating-drum is shown on the fifth point of a seven-point controller. Fig. 3 is a view similar to Fig. 2, but in this figure the reversing and cut-out switch is shown in the

proper position to go ahead with only one motor, the other being cut out, and the operating-drum is shown on the fourth point of a seven-point controller. Fig. 4 is a side view of the locking device attached to broken parts of the operating-drum and reversing and cut-out switch of a single-drum controller. Fig. 5 is a top view of the outside of a controller.

C is here shown as a plate, preferably of metal. The periphery of C is made up of a plurality of arcs of eccentric circles, the center of one of said circles being within the periphery, while the centers of the other circles are all outside the periphery. The plate is therefore of such a shape as to suggest a circle out of which has been cut a number of lunes. For the sake of brevity I will, in the following description and in the claims, speak of this plate as having lunes about its periphery.

D, which I prefer to make integral with C, the combination being preferably a metal casting, is a ring, the periphery of which is broken by the V-shaped corrugations d' , d^2 , &c. These corrugations are adapted to receive the spring-pressed roller x for a purpose well known to those skilled in the art. The piece CD is secured about the shaft y of the reversing and cut-out switch in any suitable manner so that it may rotate with said shaft.

The corrugations d' , d^2 , &c., correspond, respectively, to the positions "off," "go ahead," &c., shown in Fig. 5. The lunes c' , c^2 , &c., correspond to the respective positions "go ahead," "back up," &c., the "off" position corresponding to part of the unbroken circumference of C, as shown in Fig. 1.

E is shown as a plate having a periphery comprising the lines e' , e^2 , e^3 , and e^4 . e' and e^2 are arcs of two concentric circles having radii of slightly-different length. e^3 is an arc of a circle with its center outside the periphery, said arc connecting arcs e' and e^2 . I shall in the following description and in the claims refer to e^3 as a lune formed by the periphery of E. e^4 is a short line connecting e' and e^2 at their other extremities and forming a sort of lug for a purpose which will be hereinafter set forth.

F is a ring similar in its nature and purpose to ring D. In Figs. 2, 3, and 4, F is shown integral with E, while in Fig. 1, for obvious reasons, it is shown upon a separate shaft. The V-shaped corrugations on F b' b^2 , &c., correspond to the working points 1 2, &c., of the operating-drum, as shown in Fig. 5. b^8 corresponds to the "off" position. E and F are adapted to be rotated with the shaft or shafts they encircle.

The action of my locking device is as follows: When the operating-drum is at the "off" position, the roller x' is in the corrugation b^8 and the plate E is in the position shown in Fig. 1. In this position E does not interfere with the rotation of C because of the location of lune e^3 . It is evident that any other position of the lune e^3 will prevent the rotation of C, because between each lune of C there are portions of the periphery which cannot pass either e' or e^2 . I am thus enabled to prevent the operator from moving the reversing and cut-out switch except when the operating-drums are at the "off" position.

Fig. 1 also shows how I prevent the operator from moving the operating-drums when the reversing and cut-out drum is at the "off" position. If it is attempted, e' is stopped by the unbroken circumference of C. Lunes c' and c^2 extend a little nearer the center of C than do c^3 , c^4 , c^5 , or c^6 . The object of this is shown by contrasting Figs. 2 and 3. In Fig. 2 the lune c' is opposite E, E being shown with the roller x' engaging corrugations b^5 , (hereinbefore explained as corresponding to the fifth of the working points of the controller.) In this position E rotates freely, the lune c' extending far enough toward the center of C to allow every part of the periphery of E to pass. In Fig. 3, c^3 is opposite E, E being shown with the roller x' engaging corrugations b^4 , (fourth working point.) In this position E cannot rotate farther than the position shown, for the lune c^3 , while extending near enough toward the center of C to present no obstruction to the passage of the arc e' , is far enough away from said center to obstruct arc e^2 . If either c^4 , c^5 , or c^6 were in the same position, the rotation of E would be limited in the same way. The object of this limited movement is to prevent the operating-drum from passing a certain working point (in this case the fourth) when either of the car-motors are cut out of circuit.

In Fig. 5 I show a device, G, which is intended to prevent the operator from accidentally cutting a motor out of circuit. G is a pawl pivoted at g' to the index of the reversing and cut-out drum and outwardly pressed by the spring H. One end g^2 of G is adapted to receive a lug (shown by dotted lines) on the under side of the reversing-lever. When the pointer of the lever is at the "back-up" position, said lug engages the pawl and the drum cannot be turned to the position "a

go ahead" unless the operator pushes the pawl inward.

I do not limit myself to the exact form of my invention which I have described, nor to its use with the particular forms of controllers shown. On the other hand, I do not claim the broad idea of a locking device for controller-drums, as I am aware that locks have been devised for such apparatus.

What I do claim, and desire to protect by Letters Patent, is—

1. In an electric controller, a locking device comprising two contiguous rotatable disks, one of said disks having a plurality of lunes about its periphery, the other of said disks having a plurality of suitably-connected concentric arcs composing its periphery, all substantially as, and for the purpose, set forth.

2. In a locking device for electric controllers, in combination, the plate C encircling the shaft of a reversing and cut-out switch and having about its periphery a plurality of lunes, and the plate E encircling the shaft of the operating-drum and having the lune e^3 and the lug e^4 formed by its periphery, all substantially as, and for the purpose, set forth.

3. In an electric controller, in combination, the controlling-switch and a disk rotatable with the movement thereof, an auxiliary switch and a second disk rotatable with its movement, said second disk having a plurality of lunes about its periphery, said lunes corresponding in number to, and circumferentially with, the operating positions of said auxiliary switch, one of the arcs forming each of said lunes being substantially parallel to some portion of the periphery of the first-mentioned disk when in a particular position relative thereto.

4. In a locking device for electric controllers, in combination, a rotatable disk, as C, having a plurality of lunes about its periphery, some of said lunes extending nearer the center of said disk than others of said lunes, a rotatable disk, as E, contiguous to said disk C and having a periphery composed substantially of two concentric arcs connected in any suitable manner, all substantially as, and for the purpose, set forth.

5. In an electric controller, in combination, two electric switches, each having a disk secured to it and rotatable with it, said disks constituting the locking device for said switches, one of said disks, as C, having a plurality of lunes about its periphery through any one of which lunes the periphery of the other of said disks, as E, is adapted to pass, a lug, as e^4 , upon said disk E adapted to contact with the periphery of said disk C when some of the said lunes are in use, while being adapted to pass through others of said lunes.

6. In a locking device for electric controllers, a rotatable disk, a second rotatable disk contiguous thereto and having a periphery composed substantially of concentric arcs

connected to each other, one of the connections forming a lune through which the periphery of the first-mentioned disk may pass when said lune is in the desired position therefor.

5 7. In an electric controller, in combination, a rotatable switch, a lever to operate said switch, a lug upon the lower side of said lever, a spring-pressed pawl adapted to engage

the said lug, all substantially as, and for the purpose, set forth.

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

GUSTAF VALLEY.

Witnesses:

H. W. SMITH,

JOHN H. KENNEDY.