No. 678,989. Patented July 23, 1901.

E. W. STULL.

CONTROLLER FOR ELECTRIC MOTORS.

(Application filed Sept. 28, 1900.)

(No Model.)

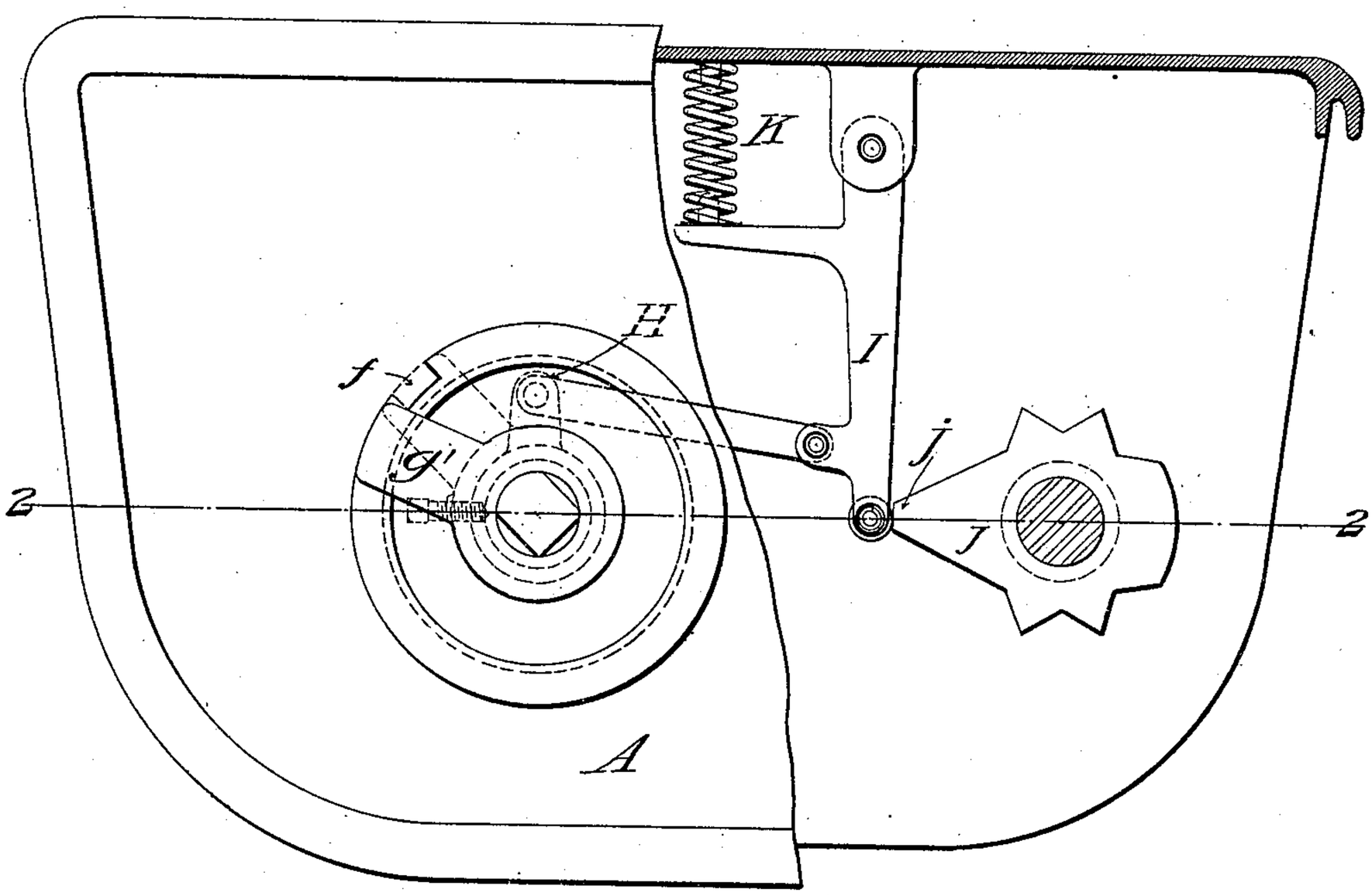

Fig. 1.

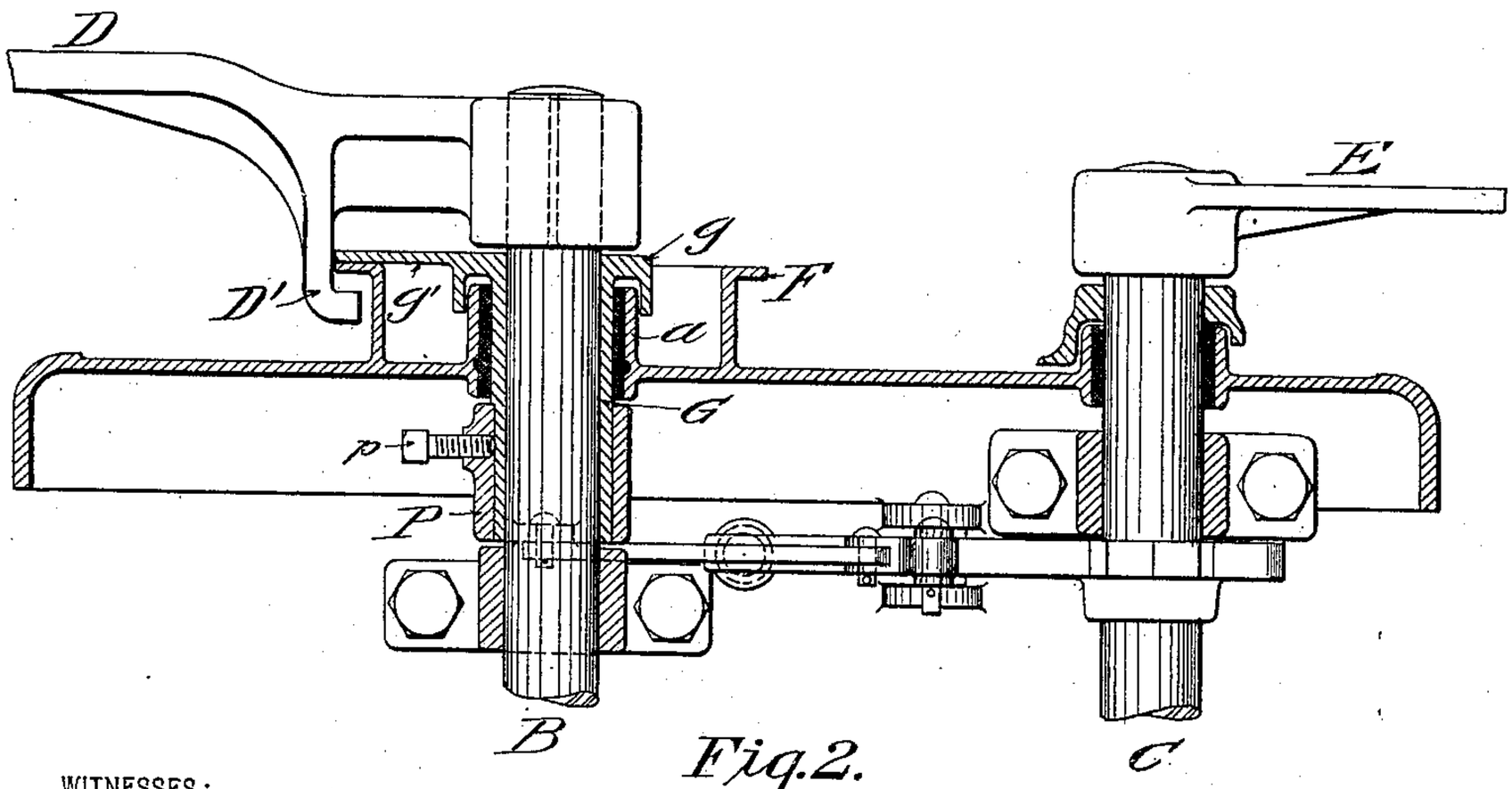

Fig. 2.

WITNESSES:

W. E. Grindle

Blanche M. Smith.

INVENTOR

E. W. Stull,

BY

Geo. H. Parmelee

his ATTORNEY.

UNITED STATES PATENT OFFICE.

EMMETT W. STULL, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR TO THE LORAIN STEEL COMPANY, OF PENNSYLVANIA.

CONTROLLER FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 678,989, dated July 23, 1901.

Application filed September 28, 1900. Serial No. 31,427. (No model.)

To all whom it may concern:

Be it known that I, EMMETT W. STULL, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Controllers for Electric Motors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention has relation to controllers for electric motors, and more particularly to operating devices therefor, my object being to provide means whereby the handle of the regulating-switch cannot be removed from said switch unless both the regulating and reverse switches have been first moved to off position.

My invention consists in the combination, with a regulating and reversing switch and independent operating-handles therefor, of means whereby the handle of the regulating-switch cannot be removed unless the said switch is at off position, and, in addition thereto, of other means whereby said handle cannot be removed at all unless the reversing-switch is also at its off position.

My invention further consists in the novel construction, arrangement, and combination of parts, all substantially as hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a plan view of the top of a motor-controller embodying my invention, the top of the casing being partly broken away; and Fig 2 is a vertical section of the same, taken on the line 2 2 of Fig. 1.

A designates the controller-casing, B the shaft of the usual regulating-switch, and C the shaft of the reversing-switch.

D is the handle of the regulating-switch, and E the handle of the reversing-switch, said handles having the usual hub portions with squared portions, which detachably engage the squared upper end portions of the respective switch-shafts.

The top of the controller-casing is formed with a circular raised horizontal flange F, underneath which moves a depending inturned lug D′ of the handle D, said flange and lug forming means whereby said handle cannot be applied or removed except when in a position where the lug registers with a slot *f* in the flange F. When the handle is at this position, the regulating-switch is at its open circuit or off position.

G is a sleeve which loosely surrounds the upper portion of the shaft B and terminates at its upper end in a water-guard portion *g*, which fits over a raised boss *a* on the controller-top around the shaft-opening. This portion *g* is formed with an extension *g′*, which rests on the flange F and is of sufficient width to cover the slot *f*. Connected to the lower end of said sleeve is a link H, whose opposite end is connected to a pivoted follower-arm I, whose free end bears against a cam J on the shaft C. Said cam has a high portion *j*, which is properly positioned to impinge the follower when the reverse-switch is at its off position. A compression-spring K moves said follower in the opposite direction when it is released by the said high portion of the cam. In the present instance I have shown the cam as being carried by the usual notch or index plate; but this is immaterial to my invention, which includes any means controlled by the movement of the shaft C for operating the sleeve G.

The operation will be readily understood. Normally the sleeve G is in such position that the extension *g′* closes the slot *f*, and thereby prevents removal of the handle D. When the reverse-switch is moved to off position, however, the cam J actuates the said sleeve through the connecting-link H to move the said extension to the position shown in full lines in Fig. 1, and thereby uncover the said slot. In order to prevent the sleeve G from being withdrawn, its lower end is provided with a collar P, held by a set-screw *p*. By thus compelling the motorman to bring both switches to off position before he can remove the handle of the regulating-switch I prevent said switches from being left in improper position when the motorman leaves the car or takes off the handles and goes from one end of the car to the other.

I do not limit myself to the use of the particular mechanical devices which I have here-

in shown and described, it being obvious that various equivalent means within the province of the mechanic may be employed.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a controller, the combination of a casing, a regulating-switch and a reverse-switch, the two switches being arranged side by side upon independent shafts journaled in said casing, a handle for the regulating-switch, a slotted guard-flange on said casing for preventing the removal of said handle except at the off position of its switch, and means controlled by the reverse-switch for preventing the removal of said handle at any time unless the reverse-switch be at its off position.

2. In a controller for electric motors, the combination with a casing, a regulating-switch journaled therein, a reverse-switch carried by an independent shaft also journaled in said casing to one side of the regulating-switch, a handle for the regulating-switch, and means controlled by the reversing-switch whereby said handle can be removed only when the reversing-switch is at its off position.

3. In a controller for electric motors, the combination of a casing, a regulating-switch journaled therein, a removable handle for said switch, a slotted guard-flange engaged by said handle and preventing its removal except when the switch is at off position, a device for closing the slot of said flange, a reverse-switch also journaled in said casing upon an independent shaft, and an operative connection between the reverse-switch shaft and the device for closing the said slot.

4. In a controller for electric motors, the combination of a casing, a regulating-switch journaled therein, a handle for said switch, a guard-flange on the casing engaged by said handle and preventing its removal except at the off position of the said switch, an auxiliary guard device sleeved on the shaft of said switch, a reverse-switch also journaled in said casing upon an independent shaft, and cam means operated by the reverse-switch for controlling the movement of said auxiliary guard device.

5. In a controller, the combination of the casing having a slotted guard-flange, a regulating-switch, a handle for said switch having an engagement with the said flange, a sleeve mounted on the shaft of said switch to have an independent rotary movement and having an extension arranged to close the said slot, a reverse-switch, a cam carried thereby, and a device impinging the said cam and connected to said sleeve.

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

EMMETT W. STULL.

Witnesses:

BLANCHE M. SMITH,

H. W. SMITH.