

No. 812,758.

PATENTED FEB. 13, 1906.

S. H. LIBBY.
BRAKE.

APPLICATION FILED SEPT. 16, 1904.

Fig. 1.

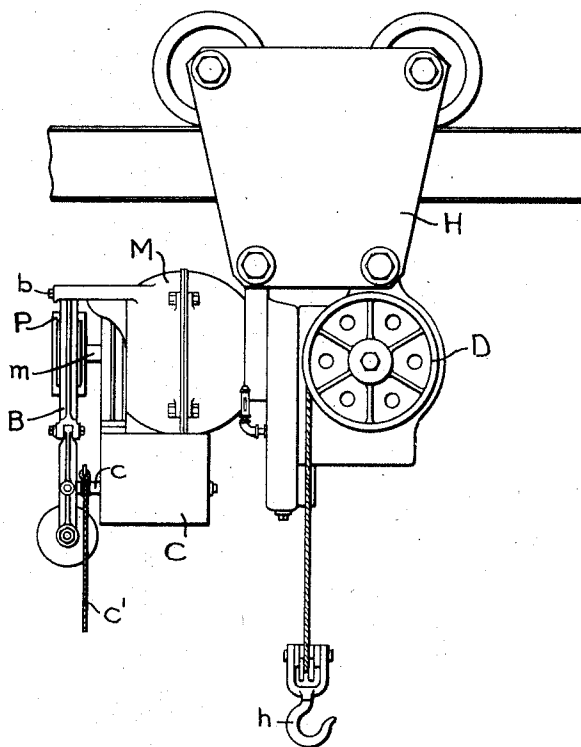
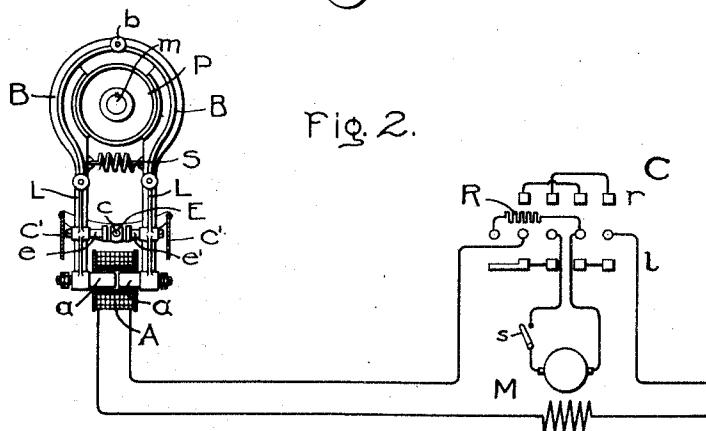


Fig. 2.



Witnesses.

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Inventor:

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Att'y.

UNITED STATES PATENT OFFICE.

SAM H. LIBBY, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO SPRAGUE ELECTRIC COMPANY, A CORPORATION OF NEW JERSEY.

BRAKE.

No. 812,758.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed September 16, 1904. Serial No. 224,644.

To all whom it may concern:

Be it known that I, SAM H. LIBBY, a citizen of the United States, residing at East Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Brakes for Hoists, of which the following is a specification.

My invention relates to electrically-operated hoists; and its object is to provide a novel form of brake adapted to prevent the load from falling when the motor is deenergized either intentionally or accidentally.

In Patent No. 706,086, issued August 5, 1902, to P. Muller, is disclosed a brake for electrically-operated hoists consisting of two brake-arms normally held in engagement with a brake wheel or pulley on the motor-shaft and arranged to be disconnected therefrom when the motor-controller is moved from its off position to either of its running positions. The specific means for accomplishing this disengagement of the brake-arms consists in a cam on the controller-shaft arranged to force the brake-arms apart when the controller is moved from its off position. This arrangement of the brake prevents the load from falling while the controller is in the off position and the motor is deenergized. It does not offer a safeguard, however, against the failure of current while the controller is in one of its running positions.

My invention consists in an improvement in the brake disclosed in the above-mentioned patent whereby the controller is effective in releasing the brakes only when there is current in the motor-circuit.

More specifically considered, my invention consists in providing a magnet-coil in the motor-circuit and so arranging said coil and the brake-arms that the movement of the controller does not result in releasing the brake unless the magnet-winding is energized or, in other words, unless there is current in the motor-circuit.

Still more specifically considered, my invention consists in making the members against which the cam on the controller-shaft bears not rigid with the brake-arms, but pivoted thereon, so as to form links or levers, the fulcrums of the levers being controlled by a magnet-winding in the motor-circuit.

My invention will best be understood by reference to the accompanying drawings, in which—

Figure 1 shows diagrammatically a side ele-

vation of a hoist provided with a brake in accordance with my invention, and Fig. 2 shows an end view of the brake and also a diagram of the motor-circuit.

In Fig. 1, H represents the hoist-frame, from which are suspended the motor M and the hoisting-drum D, the two being connected through the usual speed-reducing gears. (Not shown.) *h* represents the hoisting-hook, suspended from the drum D. C represents the motor-controller, carrying on its shaft *c* a lever to which are attached the ropes *c'*, by means of which the controller may be operated from the floor to make the proper connections in the motor-circuit for hoisting and lowering. The shaft *m* of the motor carries a pulley P, on which two brake-arms B B operate, which are pivoted to each other and to the support at *b*. The two brake-arms are drawn toward each other and into engagement with the pulley P by the spring S, as shown in Fig. 2. Pivoted to the ends of the brake-arms B B are the two levers L L, which carry two stops *e e'*, adapted to be engaged by a cam E on the controller-shaft *c* when the controller is moved in either direction from its off position. The lower ends of the levers L L carry two magnet-cores *a a*, which are surrounded by a magnet-winding A. This magnet-winding when energized locks the two cores to each other, making a rigid connection between the lower ends of the levers L L. When the levers are thus rigidly connected by the coil A, the movement of the controller-shaft *c* in either direction will cause the cam E to engage the stops *e e'* and to force the upper ends of the levers L L apart against the tension of spring S, so as to move the brake-arms B B out of engagement with pulley P. If, however, coil A remains deenergized, the movement of controller-shaft *c* and cam E acts simply to separate the lower ends of the levers L L without in any way affecting the pressure of the brake-arms on the pulley.

C in Fig. 2 shows the development of the controller-contacts. There are two sets of movable contacts for raising and lowering, respectively, (represented by the letters *r* and *l*.)

The armature and field of the motor are indicated diagrammatically at M. It will be seen that the coil A is at all times connected in the motor-circuit.

The operation is then as follows: If con-

troller C is moved to bring the movable contacts into engagement with the stationary contacts, a circuit is closed through the motor-field, through coil A, and through the motor-armature. The shaft *c* is rotated by the movement of the controller, so as to cause the cam E to push the stops *e e'* apart, and since coil A is included in the motor-circuit the brake-arms B B will be disengaged from the pulley P, provided current flows in the motor-circuit when closed. If while the controller remains in this position the current fails for any reason, winding A will immediately release its cores *a a*, allowing the spring S to apply the brake.

I have shown the movable contacts *l* of controller C arranged to connect the resistance R in shunt to the armature when the motor is connected for lowering, or, if preferred, the motor-armature may be left out of circuit entirely and the brake used for lowering as a simple mechanical brake by closing and opening the circuit of coil A. Thus if the switch *s* is moved to its open position it will be seen that the armature of motor M will be open-circuited and coil A alone energized with resistance R and the motor-field in series with it. The load may thus be allowed to descend under its own weight, checked as required by the brake.

I do not desire to limit myself to the particular construction and arrangement shown, but aim in the appended claims to cover all modifications within the scope of my invention.

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

1. In a motor-operated hoist, a manually-operated motor-controller, a magnet-winding in the motor-circuit, a member controlled by said magnet-winding, a brake, and operative connections from said brake both to said controller and to said member adapted to release said brake only upon the simultaneous movement of said controller to a running position and the energizing of said winding.

2. In a motor-operated hoist, a motor-controller, a brake, and means for releasing the brake comprising a cam operated by the con-

troller, and an electromagnet in circuit with the motor.

3. In a motor-operated hoist, a motor-controller, a magnet-winding in the motor-circuit, a brake, a member pivotally supported on said brake, means operatively connected to said controller arranged to exert a pressure at one point on said member when said controller is moved to a running position, and means controlled by said magnet-winding for exerting a pressure at another point on said member.

4. In a motor-operated hoist, a motor-controller, a magnet-winding in the motor-circuit, a brake, a lever adapted by its movement to release said brake, means operatively connected to said controller arranged to exert a pressure at one point on said lever when said controller is moved to a running position, and means controlled by said magnet-winding for exerting a pressure at another point on said lever.

5. In a motor-operated hoist, a brake-wheel, two pivoted brake-arms, a spring normally pressing said arms toward each other and into engagement with said brake-wheel, two levers pivoted at one of their ends near the extremities of said brake-arms, a motor-controller, a cam on the controller-shaft, adapted to engage said levers intermediate their ends and to press said levers apart when said controller is moved to a running position, and a magnet-winding connected in the motor-circuit and adapted to draw the loose ends of said levers together.

6. In a motor-operated hoist, a motor-controller, a brake, a lever adapted by its movement to release said brake, means operatively connected to said controller for exerting a pressure on said lever when said controller is moved to a running position, and a magnet-winding connected in the motor-circuit and controlling the fulcrum of said lever.

In witness whereof I have hereunto set my hand this 14th day of September, 1904.

SAM H. LIBBY.

Witnesses:

ROGER H. BUTTERWORTH,
ANNA M. GILLIN.