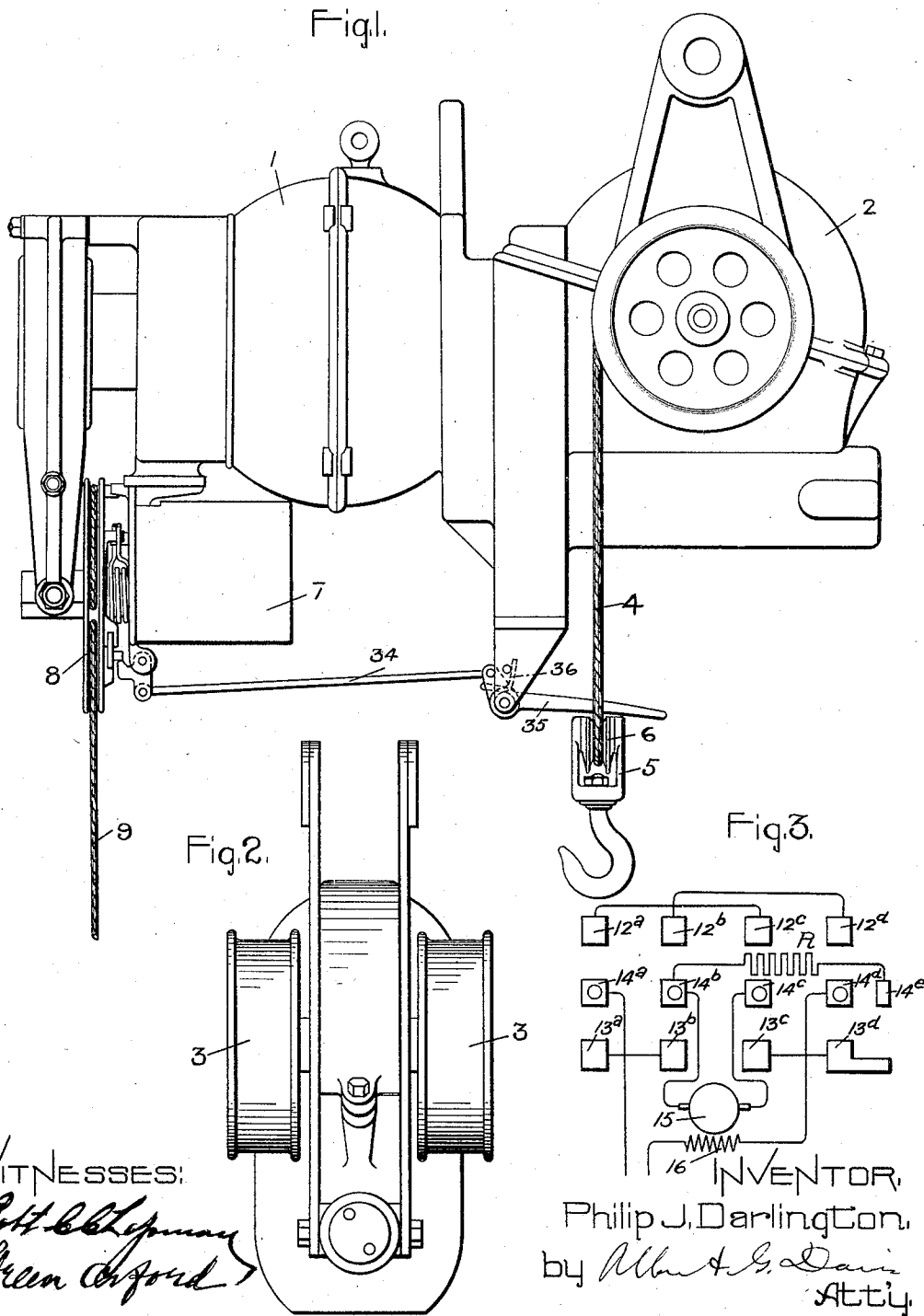


P. J. DARLINGTON.
ELECTRIC HOIST.
APPLICATION FILED JAN. 28, 1904.



WITNESSES:
Robt. Chapman
Green Oxford

INVENTOR:
Philip J. Darlington,
by *Albert G. Davis*
Atty.

P. J. DARLINGTON.
ELECTRIC HOIST.
APPLICATION FILED JAN. 28, 1904.

Fig. 4.

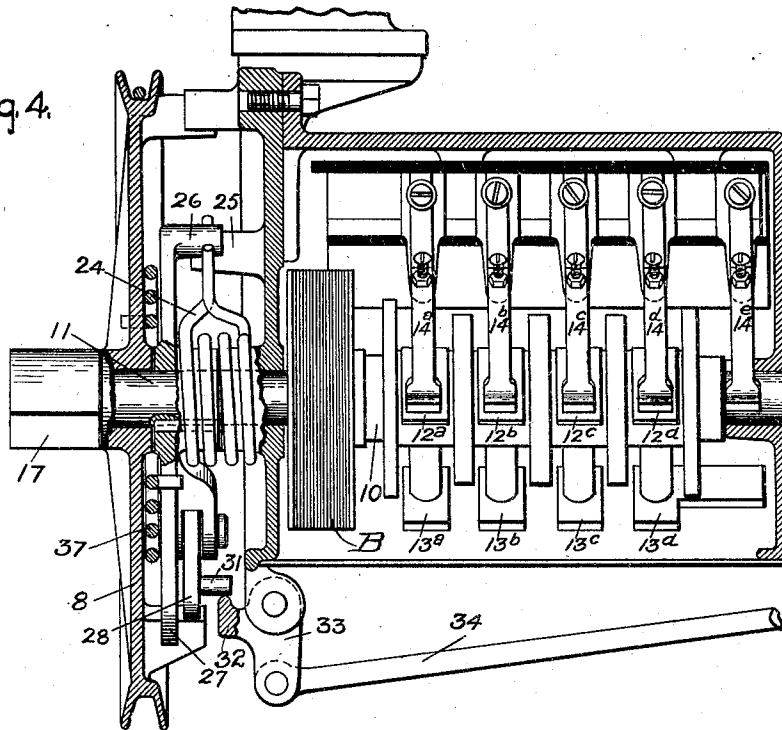
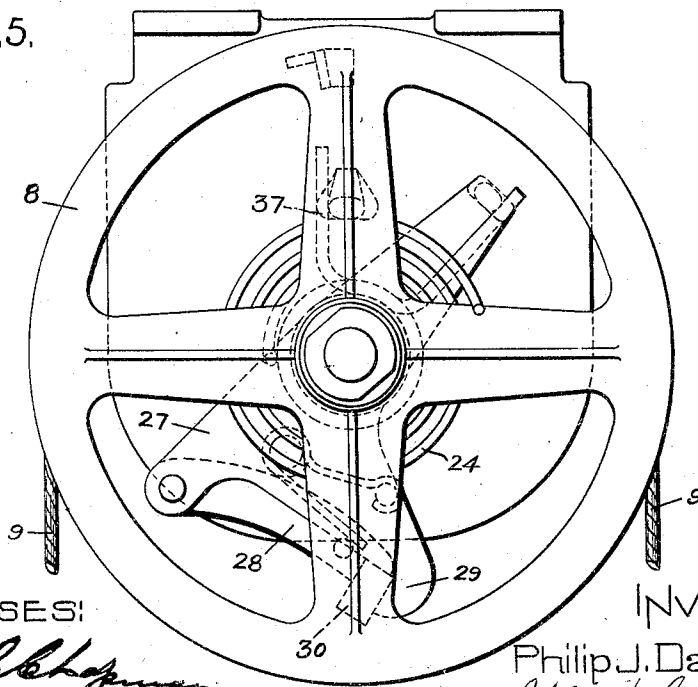


Fig. 5.



WITNESSES:

Robt. Chapman
Allen Orford

INVENTOR:

Philip J. Darlington,
by *Albert G. Davis*
Att'y.

No. 793,626.

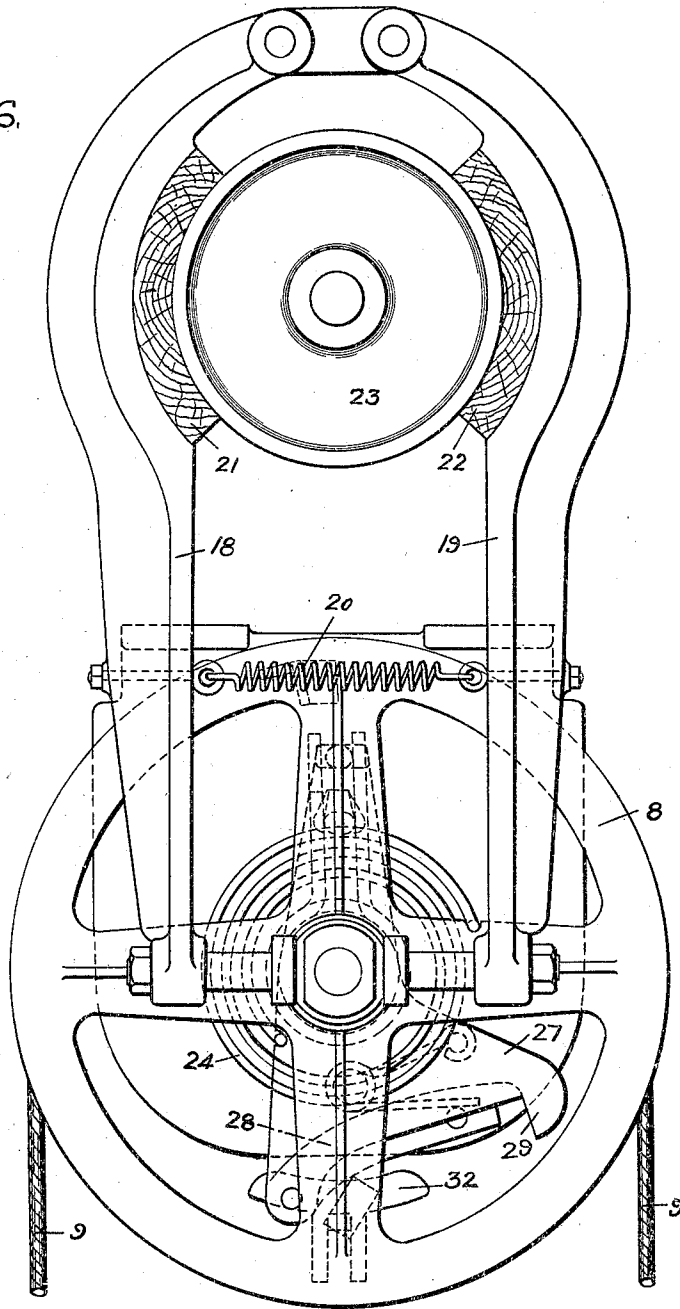
PATENTED JUNE 27, 1905.

P. J. DARLINGTON.
ELECTRIC HOIST.

APPLICATION FILED JAN. 28, 1904.

3 SHEETS—SHEET 3.

Fig. 6.



WITNESSES:

Prof. L. L. Johnson
Helen A. Ford

INVENTOR:

Philip J. Darlington.
by *Albert S. Davis*
Att'y.

UNITED STATES PATENT OFFICE.

PHILIP J. DARLINGTON, OF GLENRIDGE, NEW JERSEY, ASSIGNOR, BY
MESNE ASSIGNMENTS, TO SPRAGUE ELECTRIC COMPANY, A COR-
PORATION OF NEW JERSEY.

ELECTRIC HOIST.

SPECIFICATION forming part of Letters Patent No. 793,626, dated June 27, 1905.

Application filed January 28, 1904. Serial No. 190,948.

To all whom it may concern:

Be it known that I, PHILIP J. DARLINGTON, a citizen of the United States, residing at Glenridge, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Electric Hoists, of which the following is a specification.

My invention relates to electrically-operated hoists, and has particular reference to means for cutting out the hoisting-motor to prevent overwinding of the hoisting-ropes, and thereby an injury to the apparatus or workman, which might otherwise result through a failure of the operator to stop the motor at the right time.

Although the invention is capable of use in connection with any hoisting apparatus in which the winding-drum is driven by an electric motor, I have chosen in the present case to illustrate it applied to a foundry-hoist of the type disclosed in Patent No. 732,619, granted to me June 30, 1903.

The objects and nature of my invention will be best understood upon reference to the following detailed description taken in connection with the accompanying drawings, and the various combinations and features of the invention will be specifically pointed out in the appended claims.

In said drawings, Figure 1 is an elevation of a portion of a hoist constructed in accordance with my invention. Fig. 2 is an end view of the same, illustrating particularly the location of the winding-drums. Fig. 3 is a diagram of the controller and motor connections. Fig. 4 is a view illustrating the controller and its operating parts, with the controller-casing and the operating-wheel shown in section. Fig. 5 is an end view of the controller, showing the operating-wheel and connecting parts in the position corresponding to the hoisting position of the controller; and Fig. 6 is a view similar to Fig. 5, illustrating the parts in a position corresponding to the "off" position of the controller and also showing the brake applied.

Throughout the several views like characters refer to like parts.

The hoisting-motor, which is of the series type, is located in a casing 1 and through the agency of suitable gearing located in the gear-case 2 drives the winding-drums 3 to wind up the hoisting-rope 4, and thereby raise the pulley-block 5, which is provided with a suitable sheave 6, with which the rope 4 engages. The motor is adapted to be rotated in either direction to raise or lower the load on the pulley-block 5 through the agency of a controlling-switch or controller located in the casing 7 and provided with an operating member or wheel 8, which may be actuated through a suitable hand-rope 9 to move the controller into its various operative positions. The controller comprises a rotatable contact-carrying member 10, mounted on a shaft 11 and provided with segments 12^a 12^b 12^c 12^d and 13^a 13^b 13^c 13^d, adapted to cooperate with corresponding fingers 14^a, 14^b, 14^c, 14^d, and 14^e to produce the necessary motor connections. When the controller is moved to "hoisting" position, the contact-fingers 14^a 14^b 14^c 14^d are brought into contact with the corresponding segments 12^a, 12^b, 12^c, and 12^d and a circuit is completed through the motor-armature 15 and the field-coil 16 in series. On the other hand, when it is desired to lower the load the contact-fingers 14^a, 14^b, 14^c, and 14^d are brought into contact with the corresponding segments 13^a, 13^b, 13^c, and 13^d and the direction of current-flow in the armature 15 is reversed. If the controller is moved in this direction far enough to bring the finger 14^e into engagement with the segment 13^d, the motor-armature is shunted by the resistance R. The controller is also provided with a blow-out coil B, located on the shaft 11 of the controller and adapted to create a magnetic field sufficient to blow out arcs formed between the contact-fingers and segments of the controller.

The outer end of the controller-shaft 11 is provided with a cam 17, which is arranged to spread apart the brake-arms 18 and 19 whenever the controller is in hoisting or lowering position and to permit the spring 20 to draw said arms together whenever the con-

troller is in off position. The arms 18 and 19 are provided with suitable brake-shoes 21 22, which engage a disk 23 on the outer end of the shaft of the hoisting-motor.

5 The construction thus far described is substantially the same as that in the patent previously referred to, and therefore need not be described in greater detail in the present application.

10 In order to cut out the hoisting-motor at the right time to prevent any injury by overwinding of the hoisting-rope 4, the controller is returned to off position. This is accomplished by rotatably mounting the operating member 8 on the controller-shaft 11, providing means for locking said member and shaft together, so that the controller may be operated in response to the movements of the hand-rope 9, and providing other means actuated directly by the pulley-block 5 for tripping the locking means, so as to free the shaft 10 and allow the controller to return to off position under the action of a suitable spring 24. This return-spring is coiled about the shaft 11 and terminates in radial portions which bear on the opposite sides of a fixed lug 25, located on the end of the controller-casing, and a cooperating lug 26, located on a triangular latch member 27, keyed to the shaft 11. From the normal position of the parts illustrated in Fig. 6 and corresponding to the off position of the controller the latch member 27 may be moved either to the right or to the left to connect the motor for hoisting or lowering.

35 The locking mechanism for connecting the operating-wheel 8 and the rotatable member 10 of the controller comprises a spring-pressed latch 28, pivoted to the member 27 and adapted to cooperate with the projection 29 on said member to engage a lug 30 on wheel 8 to lock said wheel and latch member in the manner illustrated in Fig. 5. When so locked, the controller may be moved to any of its operative positions by simply turning the wheel 8. The location of the parts of the locking mechanism with reference to the operative position of the controller is such that when the controller is moved to hoisting position, which is the position illustrated in Fig. 4, a projecting pin 31 on the latch 28 will lie in the path of movement of the head 32 of a small lever 33, pivoted to the lower edge of the controller-casing. This lever is connected at its lower end by a link 34 to a bell-crank lever 35, pivoted to a convenient point on the hoist and having one arm extending into the path of movement of the pulley-block 5. These levers, which constitute the tripping mechanism for the latch 28, are normally held in the position illustrated in Fig. 1 by the spring 36. In operation whenever the operator leaves the controller in hoisting position a sufficient time for the pulley-block to reach 65 the lever 35 said lever is moved against the

tension of its spring 36 and the head 32 of the lever 33 is thrust upward, whereupon the latch 28 is moved out of engagement with the lug 30 on the operating-wheel 8 and through the action of the spring 24 the controller is returned to off position and the brake is simultaneously applied, as illustrated in Fig. 6. After the latch 28 has been once tripped the controller can be operated only by moving the operating-wheel 8 to the position in which the latch 28 will engage the lug 30 and the operating-wheel and latch member 24 be again firmly locked.

Although not essential to the operation of the controller, I employ a spiral spring 37, located between the wheel 8 and the member 27 and having its opposite ends engaging said wheel and member and acting to move one relative to the other. For certain positions of the controller this spring assists the spring 24 in producing a quick initial movement of the controller and at all times prevents the wheel 8 from sticking to the shaft 11, as might readily occur if the lubrication were poor.

From the above disclosure it will be apparent that many alterations and modifications may be made in the specific construction shown without departing from the spirit and scope of my invention, and I therefore do not wish to be limited to the specific construction shown, but aim to cover by the terms of the appended claims all such alterations and modifications.

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

1. The combination with a winding-drum and a pulley-block to be operated thereby, of an electric motor for operating said drum, an electric circuit including said motor, a controlling-switch in said circuit, an operating member, means for locking said member to the movable contact-carrying member of said switch, means for returning said contact-carrying member to its "off" position when said members are unlocked, and means controlled by said pulley-block for unlocking said members and allowing said switch to return to "off" position.

2. The combination with an electric motor, of a controlling-switch in circuit therewith, an operating member, means for locking said operating member to the movable contact-carrying member of said switch, and means operated by said motor for unlocking said members.

3. The combination with an electric motor, of a controlling-switch in circuit therewith, an operating member, means for locking said member to the movable contact-carrying member of said switch, means for returning said contact-carrying member to its "off" position when said members are unlocked, and means operated by said motor for unlocking said members.

4. The combination with an electric motor, of a controlling-switch in circuit therewith, a

movable operating member adapted to be locked to said switch to move it into its closed position, means for returning said switch to open position when said member is unlocked, and means operated by said motor for unlocking said member.

5. The combination with an electric motor, of a controlling-switch in circuit therewith operable to connect the motor for rotation in either direction, a movable member adapted to be locked to said switch to move it into either of its operative positions, means for returning said switch to open position when said member is unlocked, and means operated by said motor for unlocking said member.

6. The combination with the rotatable contact-carrying member of a controlling-switch and a rope-wheel for operating said contact-carrying member, of a latch member rigidly secured to said contact-carrying member, a spring for normally holding said contact-carrying member in "off" position, a lug on said

rope-wheel, a latch on said latch member for engaging said lug to lock said latch member and wheel together, and a lever for engaging said latch to unlock said wheel and latch member.

7. The combination with the rotatable contact-carrying member of a controlling-switch and an operating rope-wheel rotatably mounted on the shaft of said contact-carrying member, of a spring acting between said wheel and member to move said wheel and member relative to each other, a casing for said member, and a spring acting between said member and casing to move said member relative to said casing.

In witness whereof I have hereunto set my hand this 22d day of January, 1904.

PHILIP J. DARLINGTON.

Witnesses:

PAUL MULLER,

ROGER H. BUTTERWORTH.