A. MAGNUSON.

LUBRICATING APPARATUS.

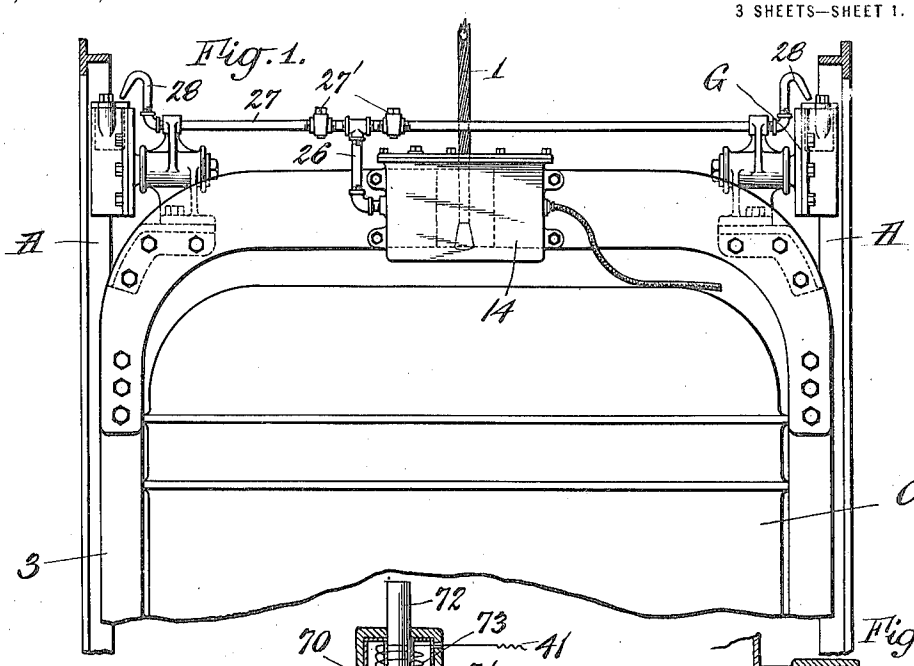
APPLICATION FILED FEB. 9, 1911.

1,162,794.

Patented Dec. 7, 1915.

3 SHEETS—SHEET 1.

Fig. 1.



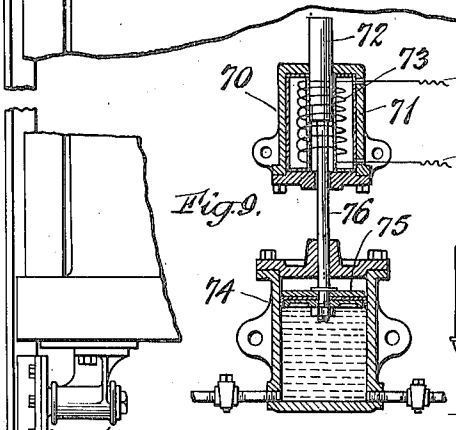


Fig. 9.

Fig. 11.

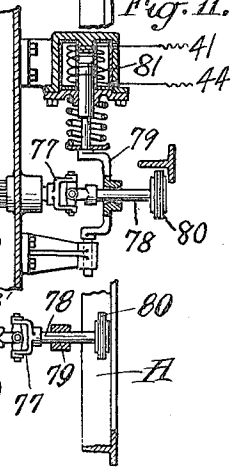


Fig. 10.

Fig. 2.

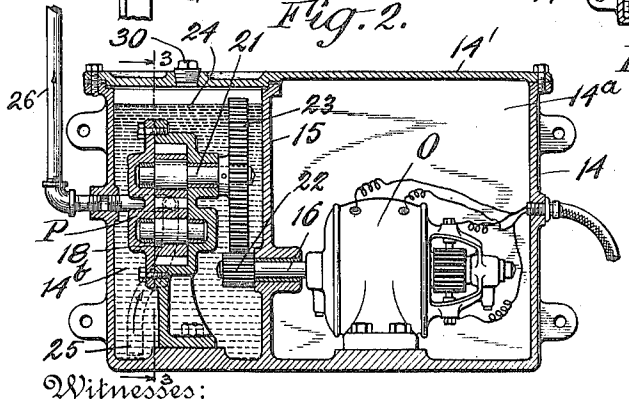
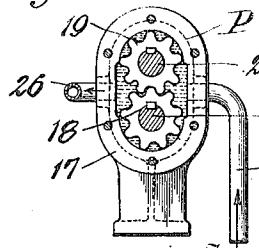


Fig. 3.



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3 SHEETS—SHEET 2.

Fig. 4.

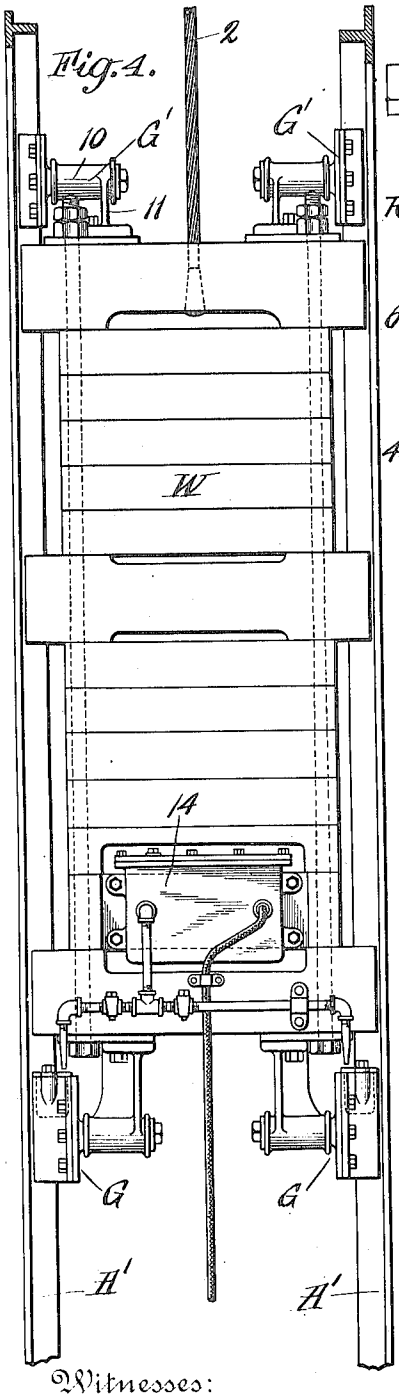


Fig. 7.

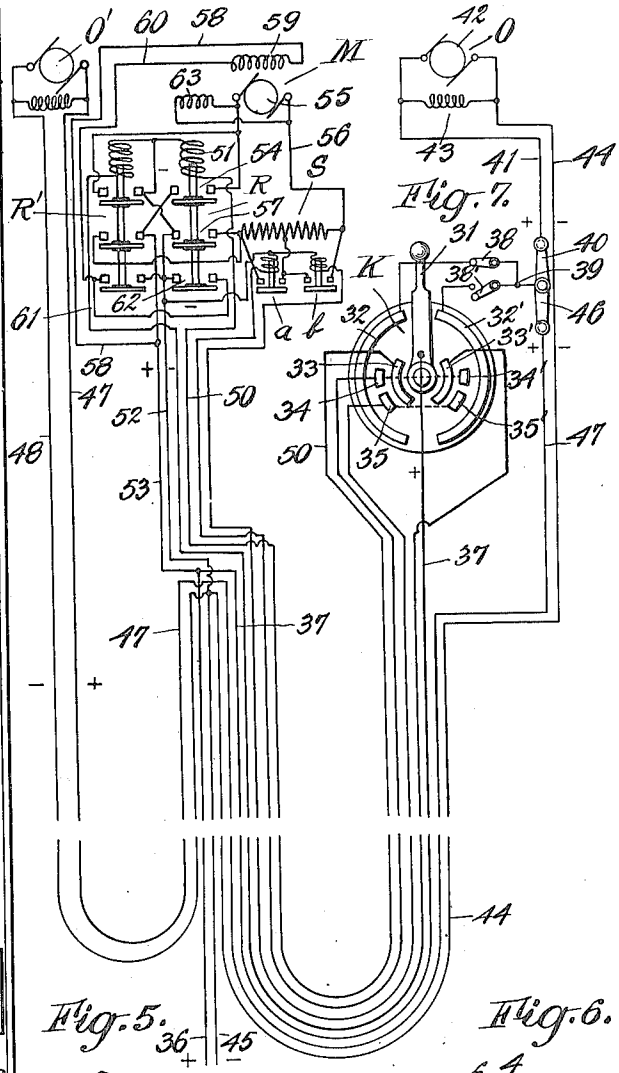


Fig. 5.

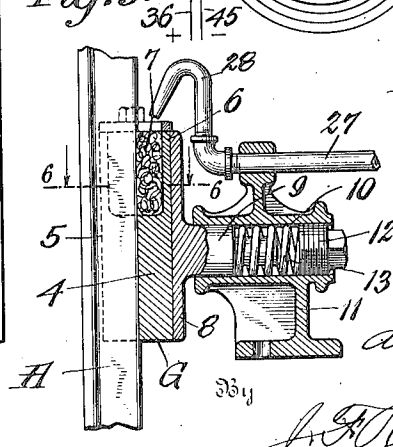
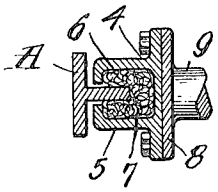


Fig. 6.



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LUBRICATING APPARATUS.

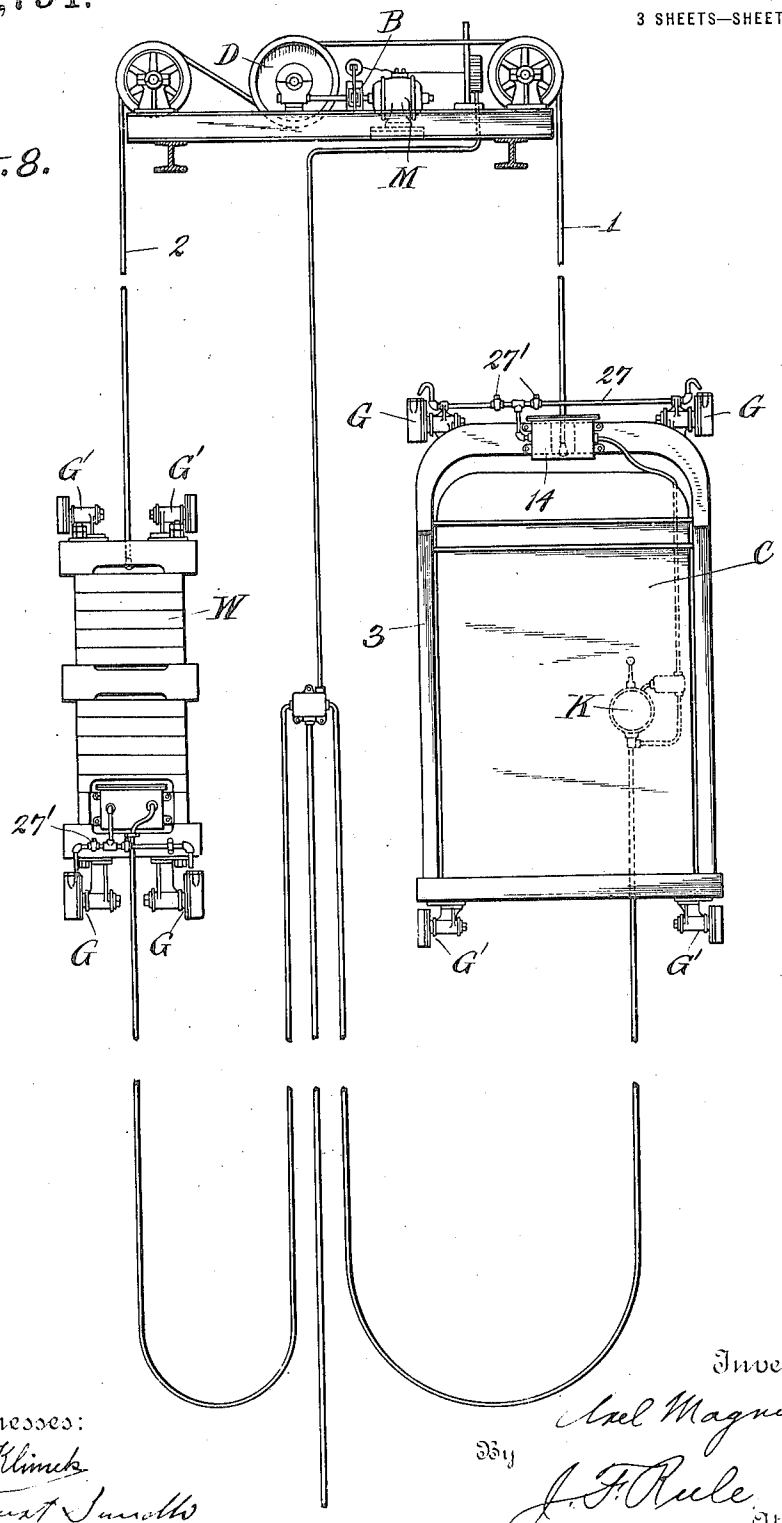
APPLICATION FILED FEB. 9, 1911.

1,162,794.

Patented Dec. 7, 1915.

3 SHEETS—SHEET 3.

Fig. 8.



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UNITED STATES PATENT OFFICE.

AXEL MAGNUSON, OF LYNDHURST, NEW JERSEY, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

LUBRICATING APPARATUS.

1,162,794. Specification of Letters Patent. Patented Dec. 7, 1915.

Application filed February 9, 1911. Serial No. 607,540.

To all whom it may concern:

Be it known that I, AXEL MAGNUSON, a citizen of the United States, residing at Lyndhurst, in the county of Bergen and State of New Jersey, have invented new and useful Improvements in Lubricating Apparatus, of which the following is a specification.

My invention relates to lubricating apparatus for lubricating the stationary guides of elevators or other hoisting apparatus.

With the elevators in constant use the stationary guides for the cars and counterweights require frequent lubrication, and where the usual method of doing this by hand is employed, much time and labor is required. This is especially true with high speed elevators having a high rise.

An object of the present invention is to provide means for automatically lubricating the guide rails and thereby dispensing with the labor required by hand lubrication.

A further object of the invention is to provide means for automatically supplying a lubricant to the guides only at such time as the elevator is in operation, and cutting off the supply while the elevator is at rest.

Other objects of the invention and the exact nature thereof will appear hereinafter. The scope of the invention is defined in the appended claims in which are set forth the novel combinations of elements.

In the accompanying drawings—Figure 1 is a fragmentary elevation view of an elevator car with my invention applied thereto; Fig. 2 is a part sectional elevation showing a motor and pump for supplying lubricant to the guide rails; Fig. 3 is a detail view of a pump; Fig. 4 is an elevation of a counterweight and guides with my invention applied thereto; Fig. 5 is a detail view of a guide and lubricating means; Fig. 6 is a sectional view as indicated by the line 6—6 of Fig. 5; Fig. 7 is a diagrammatic view of the electric motors for the hoisting apparatus and lubricating devices, and the circuits for said motors; Fig. 8 is a diagrammatic view of an elevator system embodying my invention; Figs. 9, 10 and 11 show modifications of the means for forcing the lubricant through the pipes.

My invention is herein shown as applied to a well-known form of electric elevator comprising a car C, a counterweight W, an electric motor M, a hoisting drum D geared to the motor, a brake B, and cables 1 and 2 connecting the car and counterweight respectively to the hoisting drum. The car frame 3 is provided with upper guides G and lower guides G′ coöperating with stationary guide rails A. Each guide G, as shown in detail in Figs. 5 and 6, comprises a block 4 formed with flanges 5 extending on opposite sides of the guide rail A. The upper end of this block is hollowed out to form a cup 6 in which may be placed absorbent material 7 such as cotton waste or felt to hold a lubricant. Secured to the block 4 is a plate 8 provided with a stem 9, extending into a socket 10 formed in a bracket 11, the latter being secured to the car frame 3. A screw plug 12 in the end of the socket 10 forms an adjustable abutment for a coil spring 13 bearing against the stem 9.

The lubricant is automatically supplied to the guides by means of a small pump and motor carried by the car. The pump and motor are preferably placed within a casing 14 bolted to the car frame 3. Within the casing 14 is a partition 15 seperating the casing into two compartments 14^a and 14^b in which are located the motor O and the pump P respectively. The motor O as shown is a small shunt wound electric motor having a drive shaft 16 extending through the partition 15 and journaled therein. Any suitable form of pump P may be employed, and I have shown a well known form of gear pump comprising a casing 17 in which are located intermeshing gears 18 and 19 keyed to shafts 20 and 21 journaled in the casing 17. A spur gear pinion 22 secured to the motor shaft 16 meshes with a gear wheel 23 pinned to the shaft 21. Within the compartment 14^b is a supply of oil or other lubricating material 24. A pipe 25 extends from a point near the bottom of the compartment to the intake side of the pump casing. A pipe 26 extends from the pressure side of the pump and is connected to a horizontal pipe 27 leading to the guides G on the car frame. Nozzles 28 are connected to the ends of the pipe 27 in position to discharge oil into the oil cups 6 in the guides. When the motor O is running the oil is drawn through the supply pipe 25 into the pump and pumped through the pipes 26 and 27 to the guides G. The casing 14 has a removable

cover 14′, the latter being provided with a removable plug 30 for convenience in replenishing the supply of lubricating material. Obviously the supply pipes might be extended also to the lower car guides G′ but the supply through the upper guides G is ordinarily sufficient to keep the guide rails well lubricated. Plugs 27′ may be adjusted to either throttle or entirely cut off the supply of lubricant to any one or more of the guides as may be desired. The guide rails A′ for the counterweight are lubricated in the same manner as the car guide rails. The lower and upper guides G and G′ secured to the counterweight are substantially like the upper and lower car guides respectively. The lower guides for the counterweight as herein shown are supplied with a lubricant from the casing 14 secured to the counterweight, within which casing is located a motor and pumping mechanism like that shown in Fig. 2.

In Fig. 7 is shown diagrammatically an ordinary system of electrical control for the hoisting motor M and in combination therewith, means for controlling the auxiliary motors O and O′ which operate the pumps on the car and counterweight respectively. This controller mechanism comprises a manual controller K within the car, reversing switches R and R′, starting resistance S and relays *a* and *b*. The controller K comprises a contact lever 31 movable into engagement with the stationary contacts 32, 33, 34, 35, 32′, 33′, 34′, 35′. If the lever 31 is moved for example to the left, it first engages the stationary contact 32 and establishes circuits for the motors O and O′ between the plus and minus wires designated + and −, respectively, and connected to a suitable source of current supply. The circuit for the motor O may be traced from the plus wires 36, 37, switch lever 31, contact 32, switch 38 to junction 39, from thence through switch 40, conductor 41 to the motor O, and in parallel through the armature 42 and field winding 43 of the motor to the minus wires 44 and 45. The motor O therefore operates the pump to supply oil to the car guides. A parallel circuit is at the same time established which may be traced from the junction 39 through the switch 46, conductor 47 to the motor O′ on the counterweights and through said motor to the minus wires 48 and 45 so that the motor O′ is also started to supply oil to the counterweight guides. The controller lever 31 next engages the contact 33 and establishes a circuit from the plus wires 36, 37, through car switch lever 31, contact 33, conductor 50, magnet coil 51 of reversing switch R to minus wires 52 and 45. The reversing switch R is therefore operated to establish circuits for the armature and field winding of the hoisting motor M. The armature circuit is by way of plus wires 36, 53, switch contacts 54, armature 55, conductor 56, starting resistance S, switch contacts 57 and minus wires 52, 45. The motor field circuit is through conductors 36, 53, 58, field coil 59, wires 60, 61, switch contacts 62 and minus wires 52, 45. The brake coil 63 at the same time receives current to lift the brake shoes, and the hoisting motor is started, for example in a direction to lift the car. When the controller lever 31 is moved onto contact 34 a circuit is closed through the magnet coil of the relay *a* and the latter operates to short-circuit a section of the starting resistance S and accelerate the motor in a well known manner. The controller lever 31 finally engages the contact 35 and establishes a circuit for the relay *b*, causing the latter to operate and short-circuit the remainder of the starting resistance, and permit the motor to accelerate to full speed. When the controller lever is returned to central position the circuits are opened and the motors M, O and O′ brought to rest. If the controller lever is moved to the right to engage the contacts 32′, 33′, 34′ and 35′, the hoisting motor M will be operated in the reverse direction and lower the car. The motors O and O′ will not at this time be operated, provided the switch 38′ is left open as shown. One of the switches 38 and 38′ is preferably left open as the operation of the auxiliary motors during the operation of the hoisting motor in one direction is usually sufficient to keep the car and counterweight guides well lubricated. Both the switches 38 and 38′ may be closed, however, if desired, and the motors O and O′ operated whenever the motor M is running. Switches 40 and 46 are provided in the circuits of the motor O and O′ respectively, so that either or both of said motors may be disconnected whenever desired.

Fig. 9 shows a modification in which electromagnets are substituted for the motors O and O′. The electromagnet 70 comprises a magnet frame 71, a core 72, and a coil 73. The lubricant is contained in a cylinder 74, and pressure is applied to the lubricant by means of a piston 75, connected by a piston rod 76 to the magnet core. The circuit connections for the magnet coils 73 are the same as described for the motors O and O′, so that the magnets will be energized and force the lubricant to the guides only while the car is being operated.

In Figs. 10 and 11 is shown another modification. The pump P is here inclosed in a casing 14ᵉ which may be carried by the car or counterweight. The pump is geared to a shaft 16′ connected by a universal joint 77 to a shaft 78 journaled in a rod 79. The latter is operated by an electro-magnet 81 to move the friction pulley 80 into contact with the guide rail A when the magnet

circuit is closed at the controller K. When the car is in motion the pulley 80 is rotated by its frictional contact with the stationary guide rail and the pump P is operated.

It will be seen from the foregoing description that in the several forms of the invention shown, a lubricating system is provided which is entirely automatic in operation and supplies oil to the guides only while the elevator is operating, or during certain periods of its operation, so that the lubricant is supplied only at such times and in such quantities as the varying conditions of operation require.

It will be understood that the particular form of hoisting motor and controlling mechanism herein disclosed is shown merely by way of illustration, as the present invention may readily be adapted for use with other forms of electric or other hoisting mechanism. The circuits for the motors O and O′ might obviously be controlled by any of the usual forms of car controllers in use with electric, hydraulic, and other elevators, the changes necessary to connect the circuits of the motors to such controllers being within the province of the skilled mechanic. Any suitable source of current supply may be employed. The circuits for the motors O and O′ and the magnets 70 might obviously be controlled entirely independently of the hoisting apparatus if desired, an ordinary switch being employed to close the motor circuits whenever it is desired to lubricate the guides. It will also be understood that various specifically different forms of lubricant forcing devices other than those shown might be employed and would come within the scope of the present invention.

Various changes in the details of construction and arrangements of parts other than those herein suggested might be made by those skilled in the art without departing from the spirit and scope of the invention, and I wish therefore not to be limited to the particular construction shown.

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

1. In an elevator, in combination, a vertically movable member, guiding means therefor, mechanism for conveying a lubricant to the guiding means, and electrically controlled automatic means for intermittently supplying a lubricant under pressure to said conveying mechanism.

2. In an elevator, in combination, a device to be lifted and lowered, guiding means for said device, a pump carried by said device for automatically and intermittently delivering a lubricant to the guiding means, and electroresponsive means for operating and controlling the pump.

3. In an elevator, the combination with a device to be lifted and lowered, of a guide therefor, electrically controlled means automatically to supply a lubricant to said guide and adjustable means to throttle the flow of lubricant to the guide.

4. In hoisting apparatus the combination with stationary and movable guides, of electrically controlled automatic means for intermittently supplying a lubricant to the guides.

5. In hoisting apparatus, the combination of stationary guide rails and co-acting movable guides, and electrically controlled means for automatically supplying a lubricant to the guide rails at intermittent periods corresponding with the periods of operation of the hoisting apparatus.

6. In hoisting apparatus, the combination with stationary and movable coöperating guides, and electrically controlled means for automatically supplying lubricating material to the guides during predetermined periods in the operation of the hoisting apparatus.

7. In an elevator, the combination of guides, and electrically controlled means for automatically supplying a lubricant to the guides while the elevator is running.

8. In an elevator, the combination of guides, and electrically controlled automatic means for conveying lubricating material to the guides during either a portion of or all of the time the elevator is running, and cutting off the supply while the elevator is at rest.

9. In an elevator, the combination with stationary guide rails, of a vertically movable member, guides carried by said member and coöperating with the guide rails, a receptacle carried by said member and adapted to contain a lubricant, and electrically controlled means for automatically feeding the lubricant from said receptacle to the guide rails intermittently at intervals corresponding to the movement of said movable member.

10. In an elevator the combination with guides, of an electrically operated pump, means for conveying a lubricant from the pump to the guides, and means for automatically operating the pump while the elevator is running.

11. In an elevator, the combination with guides, of mechanism for supplying a lubricant to said guides, controlling means for the elevator, and means operated in conjunction with said controlling means for controlling the operation of said mechanism.

12. In an elevator, the combination with the guide rails, of a pump for supplying lubricant to said rails, an electric motor for operating said pump, and a single controller for said elevator and motor.

13. In an elevator, the combination with guides, of a motor, means operated by the

motor for supplying a lubricant to the guides, and a car controller controlling the operation of said motor.

14. In an elevator, the combination with a pump, of an electric motor for operating the pump, a controlling circuit for said motor, and a car controller controlling said circuit.

15. In hoisting apparatus, the combination with stationary guides, of a movable member, an electrically operated pump carried by said member, a pipe extending from the pump into position to supply a lubricant to the guide, and automatic means for intermittently operating the pump.

16. In hoisting apparatus, the combination with stationary guides, of a member movable between the guides, a casing carried by said member, a pump and electric motor within the casing, automatic means for effecting an intermittent operation of the pump and motor, and means for conveying a lubricant from the pump to the guides.

17. In an elevator, the combination with a car and counterweight, of guides for the car and counterweight, a pump and motor carried by the car, a pump and motor carried by the counterweight, means for conveying lubricating material from the pumps to the guides, and a car controller controlling the operation of said motors.

18. In an elevator, the combination of a load carrying device, guiding means therefor, mechanism for lubricating said guiding means, and electroresponsive means for automatically actuating said lubricating mechanism while the load carrying device is being lifted or lowered.

19. In an elevator, the combination of guide rails for the car and counterweight, electrically operated lubricating means for said guides, and means for controlling automatically a circuit to said lubricating means.

20. In an elevator, in combination, guide rails, lubricating means for said rails, and electro-responsive means automatically to effect the operation of said lubricating means when the elevator is in motion.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

AXEL MAGNUSON.

Witnesses:
RANSOM E. WILCOX,
AUGUST SUNDH.