

C. S. GILBERT.
SAFETY APPLIANCE FOR ELECTRIC ELEVATORS.
APPLICATION FILED DEC. 28, 1908.

936,116.

Patented Oct. 5, 1909.

Fig. 1.

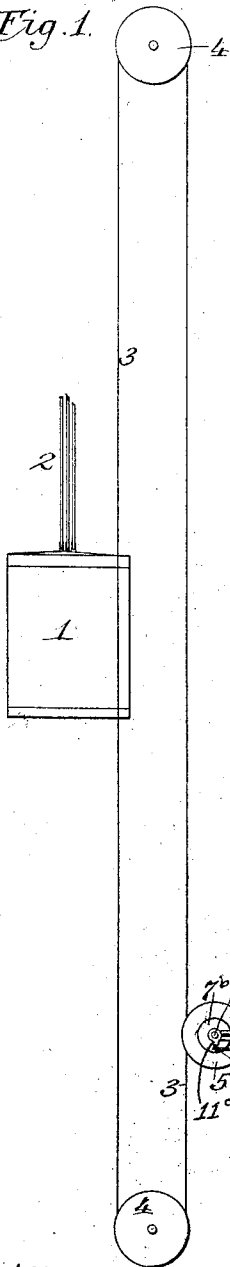


Fig. 2.

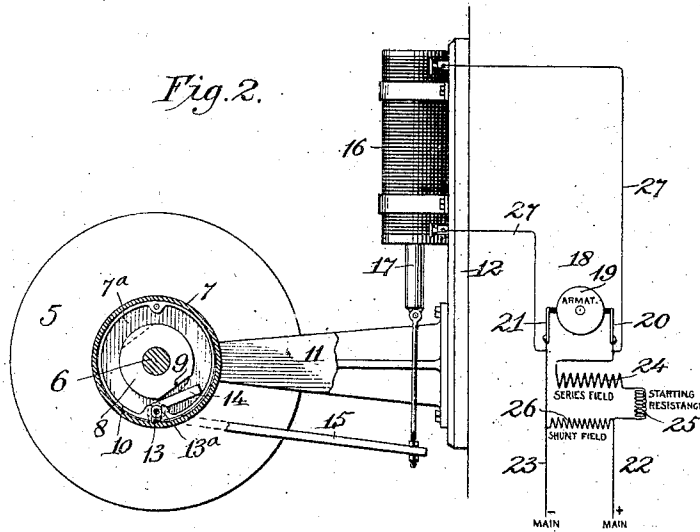
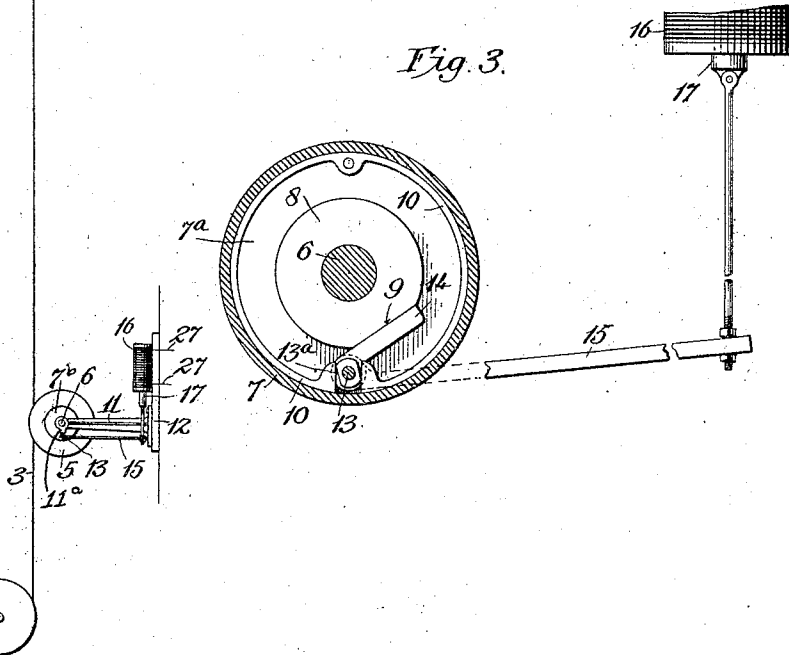


Fig. 3.



Witnesses,

Alberta Richards

Helen Nicholson Harid

Inventor,

Clarence S. Gilbert,

by G. H. W. Howard

Attorneys.

UNITED STATES PATENT OFFICE.

CLARENCE S. GILBERT, OF ST. JOSEPH, MISSOURI.

SAFETY APPLIANCE FOR ELECTRIC ELEVATORS.

936,116.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed December 28, 1908. Serial No. 469,685.

To all whom it may concern:

Be it known that I, CLARENCE S. GILBERT, of the city of St. Joseph, in the county of Buchanan and State of Missouri, have invented certain Improvements in Safety Appliances for Electric Elevators, of which the following is a specification.

This invention has for its object to provide, in connection with a simple mechanical braking device operated electrically, mechanism for preventing the starting and stopping means of an elevator driven by an electrical motor, from being moved in either direction after the electric current has been cut off until the armature of said motor has ceased to revolve.

To this end the invention comprises a wheel rotatable by the hand rope, or other means, on the shaft of which wheel is mounted a clutch device adapted to hold the shaft from creeping or twining when the elevator is running and stop the same in some undesirable position in its travel. The clutch mechanism is operated by a solenoid or electro-magnet connected in shunt with the armature of the operating motor which energizes said solenoid as long as the armature rotates, thereby holding the clutch in active position and serving as a brake for the shaft and the wheel thereon.

With these and other objects in view, the invention consists of the novel construction, combination and arrangement of parts hereinafter described and claimed and illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic view of a part of an elevator with my invention applied. Fig. 2, an enlarged sectional view of the clutch in inactive position, the solenoid magnet and the electrically operating devices connected to the solenoid illustrated diagrammatically; and Fig. 3, a similar view of the clutch in operative position on a larger scale.

Like reference characters are used for the same parts in all the figures.

In the drawing, the numeral 1 indicates an elevator car attached to the usual hoisting cables 2. Passing through the elevator car 1 from top to bottom is the ordinary hand rope 3, by means of which the car is started and stopped. The hand rope 3 is stretched as usual between two wheels 4 at opposite ends of the elevator shaft, and near the bottom of said shaft, or at any convenient point, it is wound around a pulley 5 fastened on a

shaft 6 which latter may or may not operate mechanism of the usual type for starting and stopping the elevator motor, which in this instance is an electric motor.

Fixed on the shaft 6 is a cylindrical drum 7 with a separate closed end 7^b containing a collar 8 also fixed on said shaft and having a circular periphery flattened or notched on one side as at 9. The collar 8 is of less diameter than the interior of the drum and in the space 7^a thus formed is placed a circular split ring 10 arranged to be expanded when necessary into contact with the drum and prevent its rotation.

The shaft 6 is supported in a bearing attached to a bracket 11 mounted on a base 12 secured preferably to some fixed support. Pivoted in an extension 11^a of the bracket 11 is a pin 13 with one end 13^a flattened on opposite sides and extended into the space 7^a in the drum between the ends of the split ring 10 which bear against the said flattened sides of the aforesaid pin 13. Affixed to the pin 13 within the drum is a finger 14 provided with a flat side, or other suitable surface capable of being drawn into contact with the periphery of the collar 8 when the pin is rocked. The outer end of the pin 13 carries a relatively long arm 15 which when moved in one direction rocks the pin and forces the finger against the collar, and when the flattened side 9 thereof is opposite the finger, said pin, because of its greater range of movement, presses the split ring against the inner surface of the drum and prevents the rotation of the latter.

Rigidly secured to the base 12 is a solenoid magnet or electro-magnet 16, the core or armature 17 of which is attached to the end of the arm 15 to rock the same. When the magnet is energized, it moves the arm or lever in the direction to expand the split ring and force the finger 14 into contact with the collar; and when deenergized, the split ring contracts and the finger falls away from said collar, either by gravity, the resiliency of the ring, or by a supplemental spring.

The solenoid magnet is energized from the electric motor 18, which operates the elevator, in a manner now to be described.

The armature 19 and brushes 20 and 21 of the motor are connected to the mains 22 and 23 through the series field winding 24 and the usual starting resistance 25. The shunt field winding is indicated by 26. Connected in shunt with the armature 19 of the motor

by wires 27 is the solenoid magnet 16, primarily energized from the same source of power as the motor, the voltage of which magnet depends on the counterelectro-motive force of said motor armature. The solenoid magnet 16, as previously stated, being in shunt with the armature 19, it will continue to receive energy therefrom after the main circuit through the motor is cut off until the armature ceases its rotation. It will, therefore, be understood that as soon as a current of sufficient strength passes through the solenoid magnet, sometimes called plunger magnet, 16, the core 17 thereof will be drawn into the magnet, and, through the connection between said core and the arm or lever 15, the pin 13 will be rocked, forcing the finger against the collar 8 and expanding the split-ring 10.

When the motor 18 is at rest, the clutch mechanism is in the position represented in Fig. 2 with the finger 14 resting against the inner surface of the drum 7 out of contact with the flat side 9 of the collar 8, and the solenoid core 17 projecting from the magnet. As soon as the hand rope is drawn in either direction, the pulley 5 will be turned to the right or left for about one-half a revolution, the direction in which the pulley rotates being immaterial to the action of the device. The shaft 6 with the drum 7 and collar 8 also turn with the pulley, so that the curved portion of the collar is brought opposite the finger 14, see dotted lines in Fig. 2. This movement of the shaft 6 throws the electric current through the driving motor 18, energizing the same and causing it to operate the elevator, and at the same time, vitalizing the solenoid magnet through the shunt circuit from the armature. The core 17 will be then drawn into the magnet, and, through the connection described, cause the finger 14 to bear firmly on the circular periphery of the collar 8 to hold the wheel against creeping or twining from any undue cause. When it is desired to stop the elevator, the hand rope is operated in the proper direction, thereby returning the collar to its normal position, as in Fig. 2; and as the solenoid is still energized by the rotating armature, the finger 14 will be drawn against the flattened side 9 of the collar and the split-ring forced

into contact with the drum by the flattened portions on the pin 13, thus holding the clutch in rigid position until the armature ceases revolving. By this means, the pulley 5 is held stationary and the hand rope rendered immovable until the motor armature comes to a stop, thereby preventing sudden reversing of the elevator and a too rapid change in direction of travel thereof, both of which causes endanger the motor and the cables.

The starting resistance will preferably be any one of the well known types which gradually cuts out resistance as the motor increases in speed and when full power has been reached all resistance will be eliminated.

Having thus described the invention, what is claimed is:—

1. In an electrically driven elevator, an apparatus for the purpose described, which consists in the combination of a motor, a starting rope, a pulley over which the starting rope is wound, a clutch brake to affect the rotation of the pulley, a solenoid, to control the brake, the solenoid being energized through a shunt circuit from the armature of the motor, substantially as specified.

2. An electrical attachment to control the movement of the starting rope of an elevator, which consists in the combination of a motor, a pulley over which the starting rope is wound, a clutch brake adapted to hold the starting rope through the medium of the pulley and clutch brake, a solenoid adapted to operate the clutch brake, the said solenoid being energized by a shunt circuit from the armature of the motor, substantially as specified.

3. An attachment for an electrically operated elevator, to prevent accidental movement of the starting rope, which consists of a pulley oscillated by the said starting rope, a clutch brake for the pulley and a solenoid for operating the clutch brake, combined with an electric motor which operates the elevator, the said solenoid being energized by a shunt circuit from the armature of the said motor, substantially as specified.

CLARENCE S. GILBERT.

Witnesses:

J. C. ALBRIGHT,
M. R. CRAWFORD.