1. This invention relates to elevators and more particularly to retiring cam mechanisms for unlatching elevator doors.

In the prior art, retiring cam mechanisms have generally been of a gravity actuated type with a torque motor mounted on the elevator and connected to the mechanism for retiring the same to inoperative position. In devices of this type, the cam is usually mounted on the elevator by a parallelogram linkage which accommodates a swinging or pivotal movement of the cam to its operative and retired positions. Such arrangements have long been regarded as unsatisfactory, due to the uncontrolled gravity action of the cam which not only causes great noise but also necessitates a heavy cam and the use of buffers or shock absorbers which frequently are broken and must be replaced. Furthermore, in the retired position of the cam, it swings on its linkage causing wear and damage to the parts.

A general object of the present invention is to design a retiring cam mechanism for elevators which is spring actuated to operative position and is resiliently maintained in said position without the use of special buffers.

Another object of the invention is to resiliently control the mechanism in the retired as well as the operative position thereof.

Still another object of the invention is to eliminate swinging of the cam by providing means for guiding the latter in rectilinear movement to advance and retired positions.

A further object of the invention is to simplify the construction of the mechanism and eliminate the conventional torque motor and to devise a mechanism which may be retired by a solenoid type motor which may be equipped, if desired, with a conventional dashpot.

Another object of the invention is to devise a retiring cam mechanism such as above described, in which the cam is provided with beveled faces to ride over the door latches in the event that the solenoid, for some reason, becomes inoperative.

Still another object of the invention is to devise a retiring cam mechanism such as above described, in which the cam is provided with beveled faces to ride over the door latches in the event that the solenoid, for some reason, becomes inoperative.

The foregoing and other objects and advantages of the invention will become apparent from a consideration of the following specification and the accompanying drawings, wherein:

Figure 1 is a perspective view taken from the interior of an elevator having a preferred embodiment of the invention applied thereto, the elevator doors being open and portions of the elevator and the elevator shaft being broken away; and

Figure 2 is a side elevational view of the retiring cam mechanism taken from the exterior of the elevator, the doors being closed.

Describing the invention in detail, the novel retiring cam mechanism is illustrated as applied to a conventional elevator 2 operating within a shaft 4 comprising a doorway 6 defined at each side thereof by panels 8. Between the panels 8 is a guide channel 10 for top and bottom doors 12 and 14 connected together in a conventional manner by linkage (not shown) causing the doors to move in unison to open and closed positions. Thus latching of either door in closed position, as hereinafter discussed, latches both doors as will be readily understood by those skilled in the art.

For the sake of simplicity a conventional latch mechanism is diagrammatically shown at 16, said mechanism comprising a latch member 18 pivoted at 20 to a beam 24 connected to the outer panel 8. The member 18 carries a roller 26 and is spring pressed to latched position by a spring diagrammatically indicated at 28. The spring is sealed against a beam 30 defining one side of the shaft 4. At the upper end of the member 18 is formed a lug or projection 32 bearing against a shoe 34 pivotally connected at 35 to a plunger 36 reciprocal within a guide casing 38 which may contain, if desired, conventional switch means (not shown), commonly known in the art as an interlock, for closing the elevator control circuit when the doors 12 and 14 are locked.

As best seen in Figure 2, the bottom door 14 comprises a latch finger or projection 42 engageable with one of a series of teeth 44 in the latch member 18 to lock the doors 12 and 14 in the closed position shown in Figure 2.

It will be understood by those skilled in the art that the door latching mechanism 18 above described is diagrammatically illustrated for the sake of clarity, and any conventional cam actuated latch mechanism may be utilized with the novel retiring cam mechanism hereinafter described.

The retiring mechanism generally designated 44 is shown in advance or operative position in
Figure 1 with the doors 12 and 14 open and the mechanism as shown in Figure 2 is in retired or inoperative position with the doors closed. The mechanism 44 comprises a cam with top and bottom diagonal surfaces 48 and 50 serving as hereinafter described, in connection with the operation of the device. The cam is mounted on one or more rods or plungers 66, each of which is slidable guided within a hollow guide bracket 62 secured as at 58 to a support bar 70 adapted for removable connection in any desired manner as by bolts or rivets 71 to one corner of the elevator 2. The plungers are connected by a bar or bridge 72 which is connected to one or more tension springs 74. The springs are connected to the support bar 70 for urging the cam 46 to advance position.

The cam 46 is retired to inoperative position by a bell-crank lever 76 pivoted at 78 to a fulcrum bracket 79 on the bar 70, said lever having one arm pivotally connected to a lug 80 on the cam 46 and another arm pivotally connected to a link 81, which is pivotally connected to a plunger 82 actuated by a conventional solenoid 33. The solenoid is equipped, if desired, with a conventional dashpot 84 for damping movement of the plunger 82.

In operation of the novel retiring cam mechanism, when the elevator is actuated to the doorways 6 the doors 12 and 14 are locked, and the solenoid 83 retains the cam 46 in retired position until the circuit through the elevator actuating motor (not shown) is broken, whereupon the solenoid is de-energized, and the springs urge the cam 46 to advance position against the roller 26, pivoting the latch member 18 from its engagement with the finger 42, to accommodate opening of the doors 12 and 14 as shown in Figure 1. The bar 72 acts as a stop for the cam 46 and is maintained lightly against the brackets 62 in the advance position of the cam.

With the doors closed, the solenoid is again energized to retire the cam 46 as shown in Figure 2, whereupon the latch member 18 is spring pressed to latched position in engagement with the finger 42, and the switch plunger 38 is actuated to accommodate closing of the elevator control circuit.

In the event that the solenoid fails to operate, the beveled surfaces 48 and 50 of the cam 46 are adapted to ride over the rollers 26 of the various doors, as the elevator operates within the shaft, thereby preventing damage to the parts until the inoperative condition of the solenoid can be corrected.

Thus it will be understood that I have devised a novel retiring cam mechanism in which movement of the cam is resiliently restrained in both the advance and retired position thereof and in which uncontrolled swinging of the cam is eliminated by the provision of means for guiding the same in rectilinear movement throughout its operating cycle. Furthermore, the novel mechanism is so constructed as to accommodate action of the cam by a solenoid rather than a torque motor, thereby simplifying the operation and construction of the device.

It will be understood that I do not wish to be limited by the exact embodiment of the device shown which is merely by way of illustration and not limitation, as various and other forms of the device will, of course, be apparent to those skilled in the art, without departing from the spirit of the invention or the scope of the claims.

I claim:

1. A retiring cam mechanism for releasing
5. A retiring cam mechanism on an elevator for releasing door latches in an elevator shaft comprising a cam adapted in advance position to engage said latches and adapted in retired position to clear said latches, a lever pivoted to the elevator and to the cam for actuation thereof, cooperating guide means carried by the elevator and cam for restraining the latter against other than rectilinear movement during actuation thereof, power means connected to the lever for operation thereof, and spring means connected to the cam for advancing the same after release of said power means.

8. A retiring cam mechanism on an elevator for releasing door latches in an elevator shaft comprising a cam adapted in advance position to engage said latches and adapted in retired position to clear said latches, a guide bracket carried by the elevator, a rod slidably fitted in said bracket, a cam carried by said rod for movement therewith to advance and retired positions, stop means carried by the rod for engagement with the bracket to limit advance movement of the cam, spring means operatively connected to the cam for urging the same to advance position and for urging said stop means against said bracket, and power means carried by the elevator for retiring the cam against the resistance of said spring means.

9. A retiring cam mechanism in the form of a unitary assembly adapted to be mounted on an elevator for releasing door latches in an elevator shaft, said assembly comprising a substantially rigid support structure, a cam moveably mounted thereon, means mounted on said structure for advancing and retiring said cam, and means for connecting said structure to an associated elevator, said assembly being attachable and detachable as a unit with respect to said elevator.

10. A retiring cam mechanism in the form of a unitary assembly adapted to be mounted on an elevator for releasing door latches in an elevator shaft, said assembly comprising a support member, a cam, means carried by said member and cam for guiding the latter in rectilinear movement to advance and retired position, power means mounted on said member and operatively connected to the cam for actuating the same to advance position, and means carried by said member for actuating the cam to retired position after release of said power means.

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