July 24, 1923.

A. J. JOHNSON

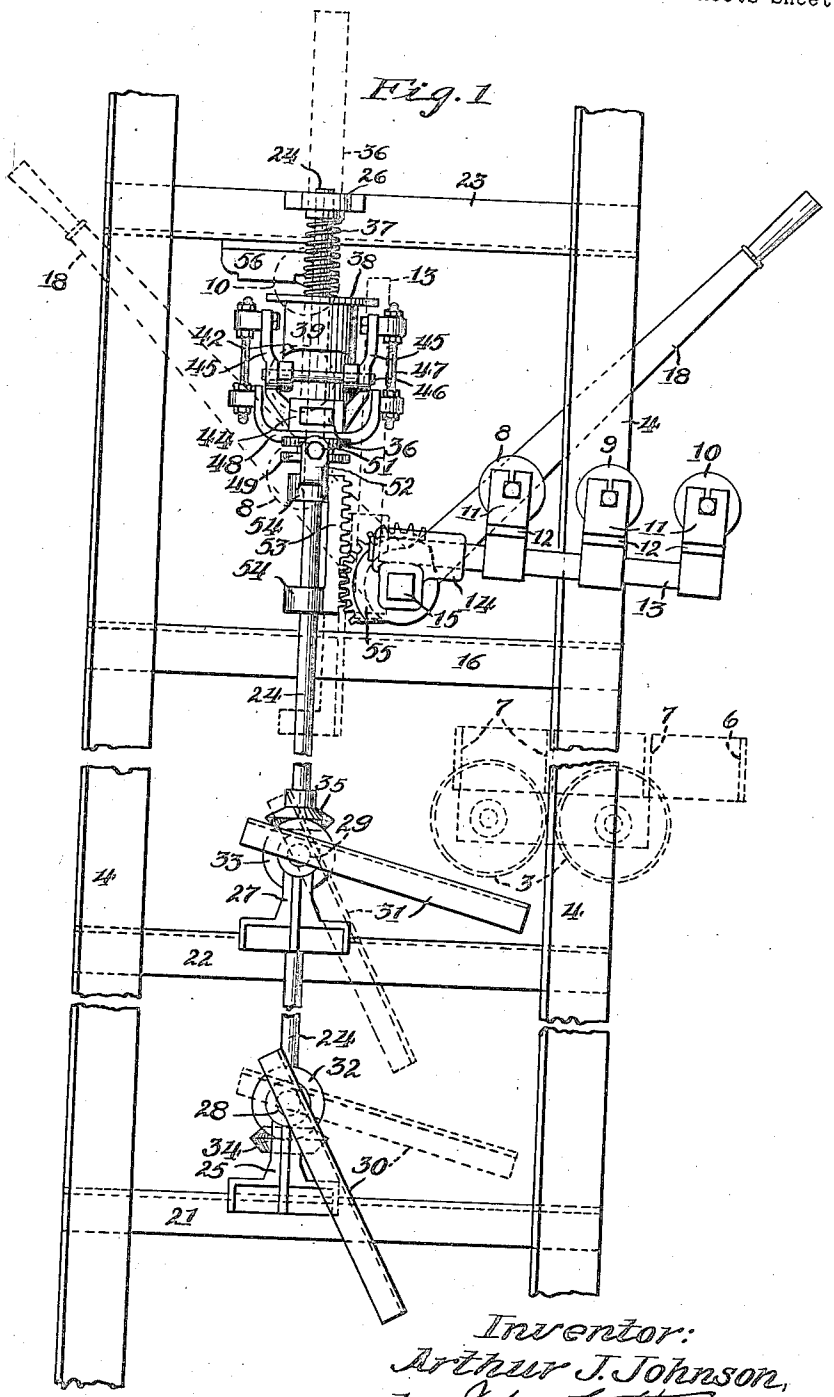
1,462,507

EMERGENCY CONTROLLER FOR ELEVATORS

Filed March 15, 1921

2 Sheets-Sheet 1

Fig. 1



Inventor:
Arthur J. Johnson,
by John E. Stryker
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2 Sheets-Sheet 2

Fig. 2

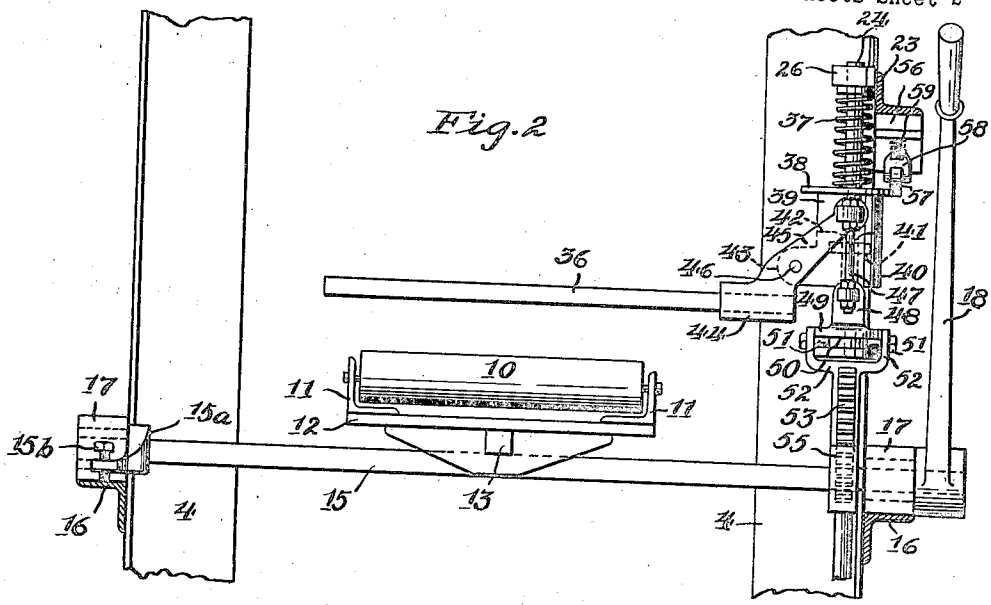
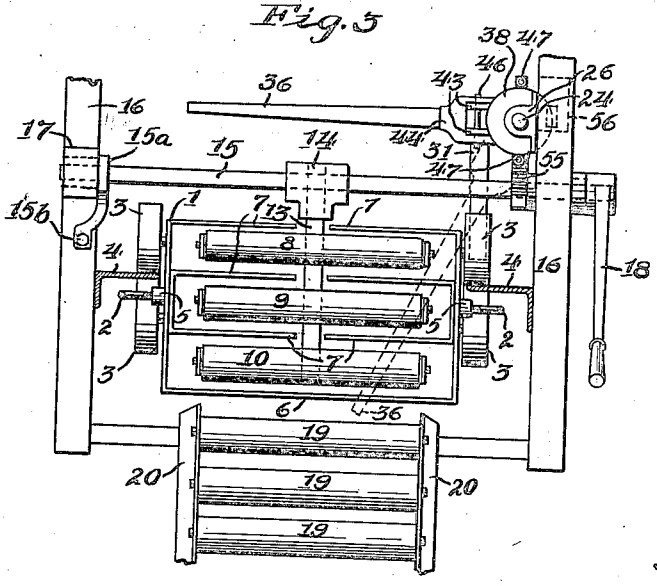
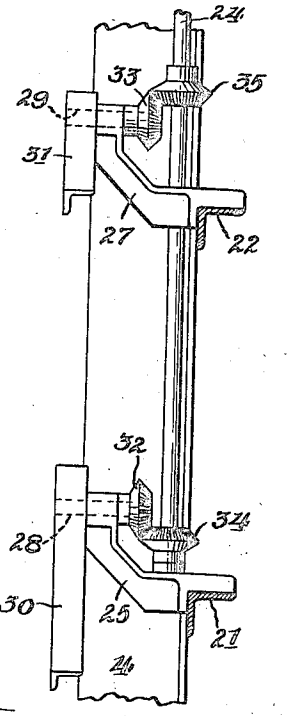


Fig. 3





Inventor:
Arthur J. Johnson,
by: John E. Stryker
his Attorney.

Patented July 24, 1923. 1,462,507

UNITED STATES PATENT OFFICE.

ARTHUR J. JOHNSON, OF ST. PAUL, MINNESOTA, ASSIGNOR TO STANDARD CONVEYOR COMPANY, A CORPORATION OF MINNESOTA.

EMERGENCY CONTROLLER FOR ELEVATORS.

Application filed March 15, 1921. Serial No. 452,582.

To all whom it may concern:

Be it known that I, ARTHUR J. JOHNSON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented new and useful Improvements in Emergency Controllers for Elevators, of which the following is a specification.

My invention relates to improvements in emergency controllers for elevators.

In freight elevators of the type wherein a series of elevator trays, carried by endless chains, are arranged to automatically deliver packages to suitable discharge stations, damage to packages and the elevator is likely to result when a package, for any reason, is detained on the discharge station.

It is my object to obviate this difficulty by providing a novel and efficient controller that will stop the elevator motor when a package is detained on the discharge station.

More particularly it is my object to provide, in a device of this kind, a sweeper arm which will oscillate over the discharge station and is connected with a switch in the elevator motor circuit in a manner to actuate said switch to stop said motor when the sweeper arm meets an obstruction on the discharge station.

A further object of my invention is to provide a device of this kind that may be applied to an elevator wherein the discharge stations are removable from the path of the elevator trays.

Other objects of my invention will appear and be more fully pointed out in the following specification and claims.

Referring to the accompanying drawings Figure 1 is an elevation of my device together with the adjacent frame members of an elevator of common type, the position of one of the elevator trays being indicated in dotted lines; Fig. 2 is an elevation of the same as viewed from the right of Figure 1 and Fig. 3 is a plan view of the same showing an elevator tray in the position it occupies when passing the discharge station.

The elevator illustrated in the drawings is of the type having a series of trays 1 which are carried by endless chains 2 (Fig. 3) and provided with pairs of wheels 3 journalled on the ends of the trays. As shown in Fig. 3, these wheels 3 roll upon opposite faces of guide angles 4 of the elevator frame, the chain 2 being connected by bosses 5 at the middle of each of the ends of the elevator trays 1. The trays 1 are grid-like and formed in two sections connected by a bar 6. The inwardly projecting bars 7 of the tray are arranged to pass between adjacent rollers of the discharge station.

The discharge station consists of three rollers 8, 9 and 10 journalled in the upwardly projecting ends of clip angles 11 and said clip angles are rigidly secured to the upper surface of transverse bars 12, mounted on a beam 13. This beam is connected at one end by a casting 14 to a beam 15 which passes through a square hole in said casting and is supported at its ends on horizontal angles 16 of the elevator frame. The beam 15 is journalled near its ends in bearings 17 which are secured in suitable manner to the upper surface of the angles 16 and one end of said beam projects through one of the bearings 17 to receive a hand lever 18. An arm 15^a is fast on the beam 15 adjacent to one of the bearings 17 and said arm curves outward over the upper surface of the supporting angle 16 and is provided with a set screw 15^b which impinges against said upper surface. This arm and set screw is provided to form an adjustable stop for the discharge station. The hand lever 18 is fast on the end of the beam 15 and is provided to rotate said beam 15 so as to turn the discharge station rollers 8, 9 and 10 to a position where said rollers are in a substantially vertical plane. This removes the discharge station from the path of the elevator trays and makes it possible, in an elevator having a plurality of discharge stations, to select the station which will receive the packages. In Fig. 3 a section of rollers 19, mounted between side rails 20, is shown in position for receiving packages in the usual manner from the rollers 8, 9 and 10 of the discharge station.

My controller proper is mounted upon a series of angle irons 21, 22 and 23 which are fastened at their ends to the guide angles 4 of the elevator frame. A vertical shaft 24 is journalled at its ends in brackets 25 and 26, respectively, and has an intermediate bearing in a bracket 27.

These brackets are severally secured to the angle irons 21, 23 and 22 and the brackets 25 and 27 project inward toward the elevator trays and are provided with bearings for horizontal shafts 28 and 29. A pair of arms 30 and 31 are rigidly secured to the inner ends of the shafts 28 and 29 while bevelled gears 32 and 33 are fast on the outer ends of said shafts. Gears 34 and 35 are keyed to the shaft 24 to mesh with the gears 32 and 33, respectively.

The arms 30 and 31 are angle irons connected in suitable manner, near their upper ends, to the inner ends of the shafts 28 and 29 and arranged at such an angle on said shaft that their lower ends project into the path of the adjacent wheels 3 of the elevator trays 1. As a tray passes downward from the discharge station the wheel 3 first comes in contact with the arm 31 and moves said arm downward to the dotted line position shown in Figure 1. This, through the shaft 29, gears 32 and 35, shaft 24, gears 34 and 32 and shaft 28, moves the arm 30 to its dotted line position. As the tray continues downward from the arm 31 the wheel 3 on said tray strikes the arm 30 (now in its dotted line position) and moves said arm back to its full line position (Figure 1). This movement, as will be readily understood, also returns the arm 31 to its full line or starting position and turns the shaft 24 in the opposite direction. Thus, the shaft 24 is given an oscillating movement about its axis, as the trays move downward from the discharge station.

Means for transmitting the above described oscillating motion of the shaft 24 to a sweeper arm 36 consist of the following mechanism. A clutch, comprising two members 39 and 40, is mounted on the shaft 24 to disconnect the sweeper arm 36 from said shaft when said arm meets an obstruction on the discharge station. A coiled spring 37, surrounding the upper part of the shaft 24, beneath the bearing 26, impinges against the lower surface of said bearing and against the upper surface of a flange 38 which is formed on the upper member 39 of the clutch. This member 39 is generally cylindrical in shape and the shaft 24 passes through a suitable axial bore in said member. The lower member 40 of the clutch is similarly bored to receive the shaft 24 and is free to revolve on said shaft but is secured against longitudinal movement thereon by a collar 41 which is fast on said shaft and is free to rotate in a suitable recess in said member of the clutch. Interlocking cam surfaces 42 are formed on the upper and lower ends, respectively, of the members 40 and 39 and the member 39 is free to move longitudinally on the shaft 24 but secured against rotation on said shaft by a suitable key (not shown). The member 40 is further formed with a pair of ears 43 which support the arm 36. This arm 36 is carried in a socket 44 which is formed intergral with a pair of levers 45 and the ears 43 and levers 45 are perforated to receive a wrist pin 46 upon which said levers are free to pivot. The upper ends of the levers 45 are pivotally connected with a pair of substantially vertical bolts 47 and the lower ends of said bolts are pivotally fastened in the upper ends of a yoke 48. This yoke is formed integral with a casting 49 having an annular groove 50 formed therein. The shaft 24 fits loosely in a suitable central bore in the casting 49 and a pair of stud bolts 51 are rigidly held in the upper end of a second yoke 52 and project into the annular groove 50, fitting loosely therein. The yoke 52 is formed integral with a rack 53 and said rack is provided with bearings 54 on the shaft 24. Meshing with the rack 53 is a gear segment 55 which is rigidly mounted on the beam 15 adjacent to one of the horizontal angles 16.

A switch 56, connected by suitable wiring with the elevator motor (not shown) is mounted on the under side of the horizontal angle 23 and adapted to be actuated by a roller 57 mounted on the switch bar 58 and arranged to roll upon the upper surface of the flange 38. A spring 59 is provided to hold the roller 57 on the bar 58 in contact with the flange 38. The switch 56 is connected with the elevator motor so that when the bar 58 is moved upward against the action of the spring 59, the motor will be stopped.

Operation.

In the normal operation of the elevator, trays carrying boxes pass downward between and around the rollers 8, 9 and 10 and the packages which these trays deposit on said rollers move by gravity away from the discharge station and are delivered to the desired point by the rollers 19. Each tray, after depositing its load on the discharge station rollers 8, 9 and 10, continues downward until one of its wheels 3 strikes the arm 31 and moves said arm to the dotted line position (Figure 1). This, as described above, turns the shaft 24 and the upper member 39 of the clutch (being keyed to said shaft) is also turned. By reason of the intermeshing cam surfaces 42 and the downward pressure of the spring 37, this turning motion is transmitted to the lower member 40 of the clutch which carries the arm 36. The bolts 47, being connected to the levers 45, turn and rotate the casting 49 which is free to rotate between the ends of the yoke 52. Thus, the arm 36 is swept over the discharge station to the dotted line position shown in Fig. 3. The elevator tray after passing the arm 31, continues downward until it strikes the arm 30 (said arm

being now in the dotted line position) and moves said arm to the full line position (Figure 1). This turns the shaft 24 in the opposite direction and by means of the clutch under the action of the spring 37 moves the arm 36 back to its full line position (Figure 3).

If any obstruction causes a package to remain on the discharge station so as to block the passage of succeeding elevator trays, the arm 36 in sweeping over the discharge station will strike said retarded package and stop the elevator through the following coaction of the parts. Upon striking an obstacle the arm 36 is stopped in its oscillating motion and as the shaft 24 is further rotated by the arm 31, the torque transmitted from the member 39 to the member 40 of the clutch becomes sufficient to over-come the resistance of the spring 37 in holding the cam surfaces 42 in mesh and the member 39 moves upward against the action of said spring, thus, actuating the switch 56 to stop the motor before the tray that has tilted the arm 31 reaches the arm 30. As soon as the obstruction has been removed from the discharge station, the arm 36 moves to its normal position, allows the member 39 to move downward into engagement with the member 40 and permits the spring 59 to move the switch 56 to operating position.

When it is desired to remove a discharge station from the path of the elevator trays the lever 18 is moved to the dotted line position (Figure 1). This turns the beam 15 and gear segment 55 and the latter gear, being in mesh with the rack 53, draws the vertical rods 47 downward by means of the yoke 48, moves the levers 45 to a horizontal position on the pin 46 and raises the arm 36 and discharge station to the substantially vertical position shown in dotted lines in Figure 1. Thus, the arm 36 is moved out of the way when the adjacent discharge station is not in use.

Having described my invention what I claim as new and desire to protect by Letters Patent is:

1. In combination with an elevator carrying a tray, a substantially vertical shaft revolubly supported on the elevator frame, arms mounted on said frame and projecting into the path of said tray, gearing connecting said arms with said shaft, an arm connected with said shaft and arranged to be moved horizontally over a discharge station of said elevator and a switch adapted to be actuated when the motion of said arm is arrested by an obstacle on said discharge station.

2. In a controller for an elevator having a series of trays, a shaft supported on the elevator frame, arms mounted on said frame and projecting into the path of said trays, gearing connecting said arms with said shaft, a clutch on said shaft, a sweeper arm connected with said clutch and arranged to be moved horizontally over a dischareg station of said elevator by said shaft and a switch adapted to be actuated when the motion of said sweeper arm is arrested by an obstacle on said discharge station, said switch being in circuit with the elevator motor.

3. In a controller for an elevator having a tray, a vertical shaft supported on the elevator frame, means mounted on said frame and projecting into the path of said tray for imparting oscillating motion to said shaft, an arm connected with said shaft and arranged to be moved horizontally above a discharge station of said elevator and a switch adapted to be actuated when the motion of said arm is arrested by an obstacle on said discharge station.

4. In an elevator having a series of trays, a frame, a shaft supported in said frame, arms mounted on said frame and arranged to be tilted by the passage of elevator trays, means operative to turn said shaft when said arms are tilted, a sweeper arm connected with said shaft and arranged to be moved horizontally over a discharge station of said elevator, a switch mounted on said frame and means connecting said switch with said sweeper arm whereby said switch will be actuated when the motion of said arm is arrested by an obstacle on said discharge station.

5. In an elevator having a series of trays, a frame, a shaft supported on said frame, arms mounted on said frame and arranged to be tilted by the passage of elevator trays, means operative to turn said shaft when said arms are tilted, a two part clutch mounted on said shaft, a sweeper arm connected to one member of said clutch and arranged to be moved horizontally over a discharge station of said elevator, a switch mounted on said frame and means connecting said switch with the other member of said clutch whereby said switch will be actuated when the motion of said sweeper arm is arrested by an obstacle on said discharge station.

6. In an elevator having a series of trays, a frame, a shaft supported on said frame, a two part clutch mounted on said shaft, one member of said clutch being slidable longitudinally on said shaft and the other member being revoluble on said shaft, a sweeper arm connected to the revoluble part of said clutch and arranged to be moved horizontally over a discharge station of said elevator, a switch mounted on said frame and arranged to be actuated by longitudinal movement of the slidable member of said clutch, meshing cam surfaces on the members of said clutch, a spring to hold said surfaces in

mesh and to allow said slidable member of said clutch to actuate said switch when said sweeper arm is arrested by an obstacle on said discharge station and means for imparting oscillating motion to said shaft.

7. In an elevator having a tray, a frame, a shaft supported on said frame, arms mounted on said frame and arranged to be tilted by the passage of said elevator tray, means operative to turn the shaft when the arms are tilted, a two part clutch mounted on said shaft, one member of said clutch being slidable longitudinally on said shaft and the other member being revoluble on said shaft, a sweeper arm connected to the revoluble member of said clutch and arranged to swing horizontally over a discharge station of said elevator, a switch mounted on said frame and arranged to be actuated by longitudinal movement of the slidable member of said clutch, meshing cam surfaces on the adjacent faces of said clutch and a spring to hold said surfaces in mesh and to allow the slidable member of said clutch to be moved to actuate said switch when said sweeper arm is arrested by an obstacle on said discharge station.

8. In an elevator having a tray and removable discharge stations, a frame, a shaft supported on said frame, arms mounted on said frame and arranged to be tilted by the passage of said elevator tray, means operative to turn the shaft when the arms are tilted, a clutch mounted on said shaft, one member of said clutch being slidable longitudinally on said shaft, and the other member being revoluble on said shaft, a sweeper arm connected to the revoluble member of said clutch and arranged to swing horizontally over a discharge station of said elevator, a switch mounted on said frame and arranged to be actuated by longitudinal movement of the slidable member of said clutch, meshing cam surfaces on the contacting faces of said clutch, a spring to hold said surfaces in mesh and to allow said slidable member of said clutch to actuate said switch when said sweeper arm is arrested by an obstacle on said discharge station and means for removing a discharge station and said sweeper arm simultaneously from the path of said elevator tray.

9. In a controller for an elevator having a tray and discharge stations, a vertical shaft revolubly supported on the elevator frame, means mounted on said frame and projecting into the path of said tray for imparting oscillating motion to said shaft, a sweeper arm connected with said shaft and arranged to be moved horizontally over a discharge station, a switch adapted to be actuated when the motion of said sweeper arm is arrested by an obstacle on said discharge station, a lever connected to said discharge station, to be manipulated to remove said station from the path of said elevator tray and means for removing said sweeper arm from the path of said elevator tray.

10. In a controller for an elevator having a series of trays and discharge stations, a vertical shaft revolubly supported on the elevator frame, means mounted on said frame and projecting into the path of said trays for imparting oscillating motion to said shaft, an arm connected with said shaft and arranged to be moved horizontally above a discharge station, a switch adapted to be actuated when the motion of said arm is arrested by an obstacle on said discharge station and means for simultaneously removing a discharge station and said sweeper arm from the path of the elevator trays.

11. In a controller for an elevator having a tray and a discharge station, an arm adapted to be oscillated over said station, means for imparting oscillating movement to said arm, and a switch adapted to be actuated when the motion of said arm is arrested by an obstacle on said station.

12. In a controller for an elevator having a tray and a discharge station, an arm adapted to be oscillated over said station, means operated by said tray for imparting oscillating movement to said arm, and a switch adapted to be actuated when the motion of said arm is arrested by an obstacle on said station.

In testimony whereof, I have hereunto signed my name to this specification.

ARTHUR J. JOHNSON.