

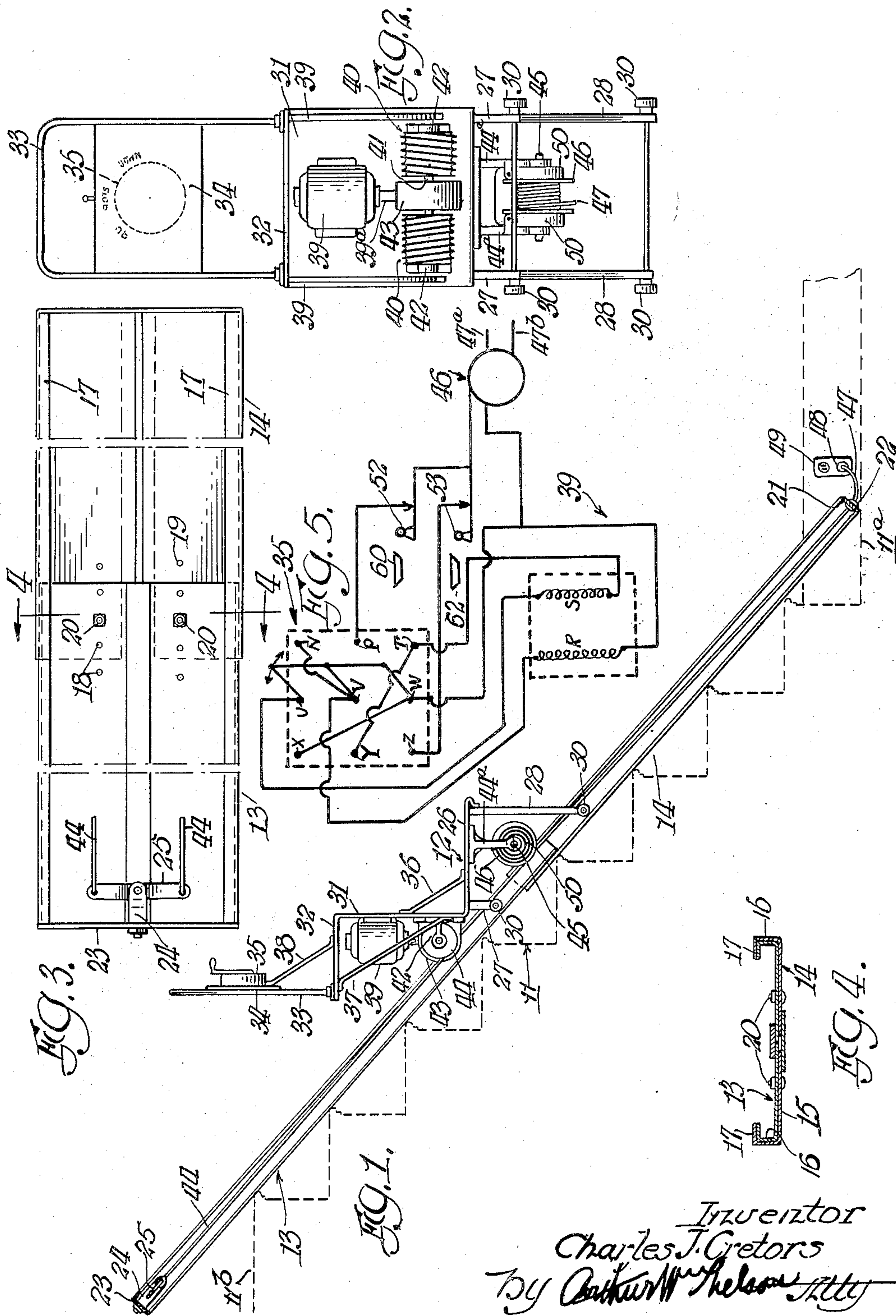
Oct. 31, 1950

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2,528,265

ELEVATOR MECHANISM

Filed Dec. 28, 1948



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UNITED STATES PATENT OFFICE

2,528,265

ELEVATOR MECHANISM

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Application December 28, 1948, Serial No. 67,597

12 Claims. (Cl. 187—12)

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This invention relates to improvements in elevator mechanisms and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The invention is more especially concerned with mechanisms of the kind employed in connection with stairways, whereby persons may ride instead of walk up and down such stairways.

One of the objects of the present invention is to provide a simple trouble-free and relatively inexpensive mechanism, which is especially adapted for use with a stairway in a dwelling whereby persons may ride instead of walking up or down the stairway.

Another object of the invention is to provide mechanisms of this kind including a carriage which may be caused to travel in either direction of the stairway by the person riding the same, and which will automatically stop when it reaches the end of its travel.

Furthermore, it is an object of the invention to provide a carriage and an inclined runway therefor, which carriage is movable in either direction of the runway, by means of a cable arrangement fixed at one end to the upper end of the runway and operatively wound upon a motor driven drum structure mounted on the carriage, whereby the mechanism may be assembled as a unit for application to a stairway, without the necessity of altering or rebuilding the stairway.

Also, it is an object of the invention to provide in an elevator mechanism of this kind a simple runway for application to the stairway, which may be adjusted in length to accommodate the length of the stairway with which it is to be used.

The above mentioned objects of the invention, together with others, and with the advantages thereof, will more fully appear as the specification proceeds.

In the drawing:

Fig. 1 is a view in side elevation of the carriage of the mechanism when in the course of its travel in one direction of the associated runway and which appears in longitudinal section in an inclined position upon the front edges of the step treads of a stairway.

Fig. 2 is a view in front elevation of the carriage appearing in and on the scale of Fig. 1.

Fig. 3 is a top plan view of the runway.

Fig. 4 is a transverse vertical sectional view through the runway, as taken on the line 4—4 of Fig. 3.

Fig. 5 is a diagrammatic view of the form of electrical circuit that may be advantageously employed with the improved mechanism.

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In general, the improved mechanism includes an inclined runway adapted to engage upon and be fixed to the front margins of treads of the steps at one side of a stairway. This runway is made in end to end telescopic sections whereby its length may be adjusted to that of the stairway with which it is used. At opposite sides of the runway are longitudinal tracks, upon which a carriage is operatively engaged for guided movement in either direction of the runway.

The carriage includes a horizontally disposed platform for occupancy by the person riding the mechanism. Mounted on and extending transversely of the carriage is a pair of suitably journaled drums driven by an associated reversible motor and associated with each drum is a cable, one end of which is disposed upon the associated drum for a winding thereon and an unwinding therefrom. The other ends of both cables are operatively secured to the ends of an equalizing bar pivotally mounted upon and extending transversely of the upper end of the runway, whereby the cables adjust and evenly tension themselves.

Also, mounted on the carriage is a reel, upon which may be wound and unwound the conductors for supplying current to the motor as the carriage travels the runway, which conductors may be plugged into the socket of a conventional outlet located adjacent the foot end of the runway. This reel is of the conventional automatic type, including a spring mechanism, which pays out the conductors as the carriage travels up the runway and winds or reels the same in as the carriage travels down the runway. No claim is made to such a reel per se, as reels of this kind are available in the open market. Also, mounted on the carriage in a position convenient for the rider, is a suitable switch whereby the carriage may be started to travel the runway in either direction thereon and then stop automatically when it has reached the end of its travel in either direction.

Referring now in detail to that embodiment of the invention illustrated in the drawing, the improved elevator mechanism includes, in a general sense, an inclined runway for supporting engagement upon the front margins of the step treads of a stairway 11, with which the mechanism is used, and a carriage 12 adapted for guided travel longitudinally of the runway in either direction.

The runway is preferably made in longitudinally telescopic sections namely an upper end section 13 and a lower end section 14. Each runway section, which is made of suitably formed

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sheet metal, is of a channel cross section and includes a bottom wall 15, upright side flanges 16—16 and inturned flanges 17—17 that overhang and are parallel with the associated margins of the bottom to form a track at each side of the runway. The runway is narrower than the step treads of the stairway and it is disposed at one side of the stairway, thus leaving the other side of the stairway open for foot traffic.

The lower end of the upper end section 13 is telescoped in the upper end of the lower end section 14 and in the bottom of both sections, at the telescoping ends thereof, are longitudinally spaced holes 18 and 19, which are adapted to register with each other and to receive a bolt 20 or the like, whereby the runway may be adjusted in length to fit it to the particular stairway. When the runway is in place on a stairway, the lower end of the lower section engages the bottom landing 11a for the stairway, and the upper end of the upper section projects somewhat beyond the upper landing 11b for the stairway, and longitudinally spaced portions of the runway are engaged on the front margins of the step treads and secured thereto, as by screws (not shown) that pass through the bottom of the runway sections and extend into said margins.

The side flanges 16, at the bottom end of the lower sections, are connected together by a tie 21 and centrally therein is an insulation bushing 22, for the passage of a current conductor (later mentioned) therethrough.

The side flanges 15—16, at the upper end of the upper section, are connected together by a similar tie 23, and secured centrally thereto is post 24, the inner end of which extends into the runway. An equalizing bar 25 is pivoted at its center to the inner end of the post so that said bar may swing about its pivotal connection with the post in a plane parallel but above the bottom of the runway. The purpose of this equalizer bar will more fully appear later.

The carriage 12 includes a generally rectangular horizontally disposed platform 26 for the occupant to stand upon, and at the front and rear ends of said platform are pairs of short and long legs 27—28 respectively. The bottom ends of said legs are provided with outwardly spaced rollers 30, which run on the tracks of the runway and are overhung and confined against displacement by the flanges 17—17.

At the front of the platform is an upright wall 31, which terminates in a forwardly extending subplatform 32. At the forward end of the subplatform is an upright inverted U-shaped, hand hold 33 for the occupant, and opposite upright sides of said hand hold are connected by a cross panel 34. On this cross panel is mounted a switch 35 within convenient reach of the occupant of the platform 26 to control the motor for moving the carriage and which will be later described.

The upright wall 31 is braced from the platform 12 by members 36, the subplatform 32 is braced from the upright wall 31 by members 37, and the hand hold 33 and panel 34 are jointly braced from the subplatform 32 by the members 38.

Mounted centrally on the front face of the upright wall 31 and disposed beneath the subplatform is a reversible electric motor 39, the armature shaft 39a of which is disposed in a vertical plane.

Below said motor is located a pair of laterally spaced sheaves or drums 40—40 mounted on a cross shaft 41 that is journaled at its ends in brackets 42 mounted on and projecting forward-

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ly from said wall 31. Disposed on the shaft 41 between said drums, is a suitable speed reducing gear set 43, into which the armature shaft 39a of the motor extends to operatively drive the drums at a suitably slow speed and in one direction or the other, according to the direction in which the motor 39 is caused to run.

The drums 40—40 are helically grooved in opposite directions for a winding and an unwinding from one end of a pair of cables 44, the other ends of said cables being operatively attached to opposite ends of the equalizing bar 25.

Depending from the underside of the platform 26 is a pair of laterally spaced brackets 44a, in which is journaled a cross shaft 45, upon which is mounted a reel 46 arranged midway between opposite sides of the platform. This reel is for the support of an electric cord 47, which includes a pair of current conductors 47a—47b, as appears in Fig. 5. One end of the cord 47 is provided with a plug 48 that may be plugged into a conventional socket or outlet 49 of a current supply. The other end of this cord is wound upon the reel and disposed between the shaft 45 and the brackets 44a are helical springs 50. Suitable means are provided for electrically connecting the reel with the motor 39 through the switch 35. When the carriage 12 moves upwardly of the runway, the cord 47 is paid out from the reel and the spring 50 is unwound and when the carriage moves downwardly of the runway, the springs cause the reel to wind up the cord.

In Fig. 5 is illustrated diagrammatically the circuit for the mechanism, which is as follows:

35 is a triple pole double throw drum type controller mounted on the side of the panel 34. The handle on top of this controller has a neutral position in the center and is moved forward to move the carriage up the stairs and backward to move the carriage down the stairs.

52 and 53 are small single pole single throw switches having small rollers on the ends of the actuating arms. These switches are mounted side by side on the bottom of the carriage so that one of the rollers will strike against a beveled piece of steel 60 fastened to the track at one end of the travel and the other roller will strike against a beveled piece of steel 62 at the other end of travel. When the roller engages this beveled piece of steel, the arm is moved, breaking the circuit in the direction in which the carriage is moving. If the controller is then moved to the opposite direction, the current will flow through the other limit switch and the carriage will move in the opposite direction.

39 is a reversing motor. This motor is also mounted on the carriage and drives a gear reducer carrying two steel drums on which the flexible cable for moving the carriage is wound, as before explained.

In switch 35, contacts U, V, W are the center or common contacts. When switch is connected on one side, the contacts are in pairs as follows: UN, VP and WT. On the other side, the pairs are connected as follows: UX, VY and WZ.

Hook-up of switch 35 is as follows: T to line reel, motor starting field S and to Y; P to switch 52. N to V. W to motor running field and to X. V to motor running field R and to N. U to motor starting field S. Z to switch 53. Y to T. X to W.

The line or power source is fed into the line cord reel, which is attached to carriage and makes possible a flexible connection. The reel stationary connections (electrical) are hooked up as follows: one connection to T of switch 35 and the other connection to roller switches 52 and 53.

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While I have shown and described a reversing motor as the means of driving the drum 40—40 in forward and reverse, it will be understood that other drive and reverse means may be used. For example, an unidirectional motor may be used and a suitable reverse gear be provided in association with the speed reducing gear set 43, a control therefor being positioned for convenient operation by the operator. However, a reverse gear is so well known, it has not been thought necessary to illustrate it. Thus, while drive and reverse may be obtained in the manner just described, the reversing motor arrangement first described is the preferred form.

In general, it will be observed that all electrical and mechanical parts are mounted on the carriage. The only parts, other than the carriage, consist of the steel tracks, to the upper ends of which the lift cables are attached by means of an equalizing bar and the electric supply line, which is an ordinary rubber covered cable, which may be plugged into a conventional wall receptacle.

While in describing the invention I have referred in detail to the form, construction and arrangement of the parts involved, the same is to be considered only in the illustrative sense and therefore I do not wish to be limited thereto, except as may be specifically set forth in the appended claims.

I claim as my invention:

1. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage having members for guided travel longitudinally of said rails, drum means journaled on said carriage, means on the carriage for driving the drum means in either direction, cable means operatively attached at one end to the upper end of the inclined runway, and at its other end operatively disposed upon said drum means for a winding upon or an unwinding therefrom to take up or to pay out said cable means.

2. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage having members for guided travel longitudinally of said rails, drum means journaled on said carriage, a reversible motor on the carriage for driving the drum means in either direction, cable means operatively attached at one end to the upper end of the inclined runway, and at its other end operatively disposed upon said drum means for a winding upon or an unwinding therefrom to take up or to pay out said cable means, means for starting the motor and for causing it to run in either direction.

3. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage having members for guided travel longitudinally of said rails, drum means journaled on said carriage, a reversible motor on the carriage for driving the drum means in either direction, cable means operatively attached at one end to the upper end of the inclined runway, and at its other end operatively disposed upon said drum means for a winding upon or an unwinding therefrom to take up or to pay out said cable means, means for starting the motor and for causing it to run in either direction, and means operative as the carriage reaches the end of its travel in either direction on the runway for automatically stopping the motor.

4. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage having members for guided travel longitudinally of said rails, a pair of drums arranged

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transversely of and journaled on said carriage, a reversible motor on said carriage for driving said drums, a cable for each drum, means providing an equalizer at the upper end of the inclined runway and to which one end of each cable is operatively attached, the other end of each cable being operatively disposed upon the associated drum for a winding upon and an unwinding therefrom to take up or to pay out said cables, means for starting the motor to run in either direction, and means operative as the carriage reaches the end of its travel in either direction on the runway for stopping the motor.

5. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage having members for guided travel longitudinally of said rails, a pair of drums arranged transversely of and journaled on said carriage, means on said carriage for driving said drums in either direction, a cable for each drum, means providing an equalizer at the upper end of the inclined runway and to which one end of each cable is operatively attached, the other end of each cable being operatively disposed upon the associated drum for a winding upon and an unwinding therefrom to take up or to pay out said cables, and means for controlling the direction of rotation of said drums.

6. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage including a horizontally disposed platform and having members for guided travel longitudinally of said rails, upright means rising from that end of the platform facing the upper end of the runway, drum means journaled on said upright means, a reversible motor on said carriage for driving said drum means in either direction, cable means operatively attached at one end to the upper end of the inclined runway and at its other end operatively disposed upon said drum means for a winding upon and an unwinding therefrom to take up or to pay out said cable means, means for starting the motor and causing it to run in either direction, and means operative as the carriage reaches the end of its travel in either direction for stopping the motor.

7. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage including a horizontally disposed platform and having members for guided travel longitudinally of said rails, upright means rising from that end of the platform facing the upper end of the runway, drum means journaled on said upright means, a reversible motor on said carriage for driving said drum means in either direction, cable means operatively attached at one end to the upper end of the inclined runway and at its other end operatively disposed upon said drum means for a winding upon and an unwinding therefrom to take up or to pay out said cable means, and means for starting the motor and causing it to run in either direction.

8. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage including a horizontally disposed platform and having members for guided travel longitudinally of said rails, upright means rising from that end of the platform facing the upper end of the runway, a pair of drums arranged transversely of and journaled on said upright means, a reversible motor on said carriage for driving said drums, a cable for each drum, means providing an equalizer at the upper end of the inclined runway and to which one end of each cable is operatively attached, the other end of each

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cable being operatively disposed upon the associated drum for a winding upon and an unwinding therefrom to take up or to pay out said cables, means for starting the motor and causing it to run in either direction, and means operative as the carriage reaches the end of its travel in either direction on the runway for stopping the motor.

9. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage having members for guided travel longitudinally of said rails, drum means journaled on said carriage, a reversible motor on the carriage for driving the drum means in either direction, cable means operatively attached at one end to the upper end of the inclined runway, and at its other end operatively disposed upon said drum means for a winding upon or an unwinding therefrom to take up or to pay out said cable means, current conductors for supplying electric energy to said motor, a reel carried by the carriage and upon which said conductors are mounted, said reel paying out the conductors in one direction of movement on the runway and reeling in said conductors in the other direction of movement of said carriage on the runway, means for starting the motor and causing it to run in either direction, and means operative as the carriage reaches the end of its travel in either direction for automatically stopping the motor.

10. Elevator mechanism embodying therein an inclined runway including laterally spaced rails, a carriage including a horizontally disposed platform and having members for guided travel longitudinally of said rails, upright means rising from that end of the platform facing the upper end of the runway, a second platform extending from said upright means and facing toward the upper end of said runway, drum means journaled on said upright means beneath said second platform, a reversible motor carried by said upright means and positioned between said drum means and said second platform, a hand

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rail rising from said second platform, cable means operatively attached at one end to the upper end of the inclined runway and at its other end operatively disposed upon said drum means for a winding upon and an unwinding therefrom to take up or to pay out said cable means, means for starting the motor and causing it to run in either direction, and means operative as the carriage reaches the end of its travel in either direction for stopping the motor.

11. Elevator mechanism embodying therein an inclined runway with laterally spaced rails, each having vertically spaced apart upper and lower flanges, a carriage having members at each side thereof movable on said rails and confined between the upper and lower flanges thereof, a pair of drums extending transversely of and journaled on said carriage, an equalizer bar mounted on and extending transversely of the upper end of said runway, cables, each wound at one end upon associated drums and each operatively attached at the other end to said equalizer bar.

12. A runway structure for an elevator mechanism, including a plurality of end to end, inclined telescopic runway sections, each section being of a channel cross section and having a rail at each side thereof, each overhung at least in part by an inwardly extending flange spaced vertically above the same, means for operatively securing said runway sections together, a cross bar connecting the upper end of the sides of the upper section, and a second cross bar connecting sides of the lower end of the lowermost of said sections.

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