

April 9, 1963

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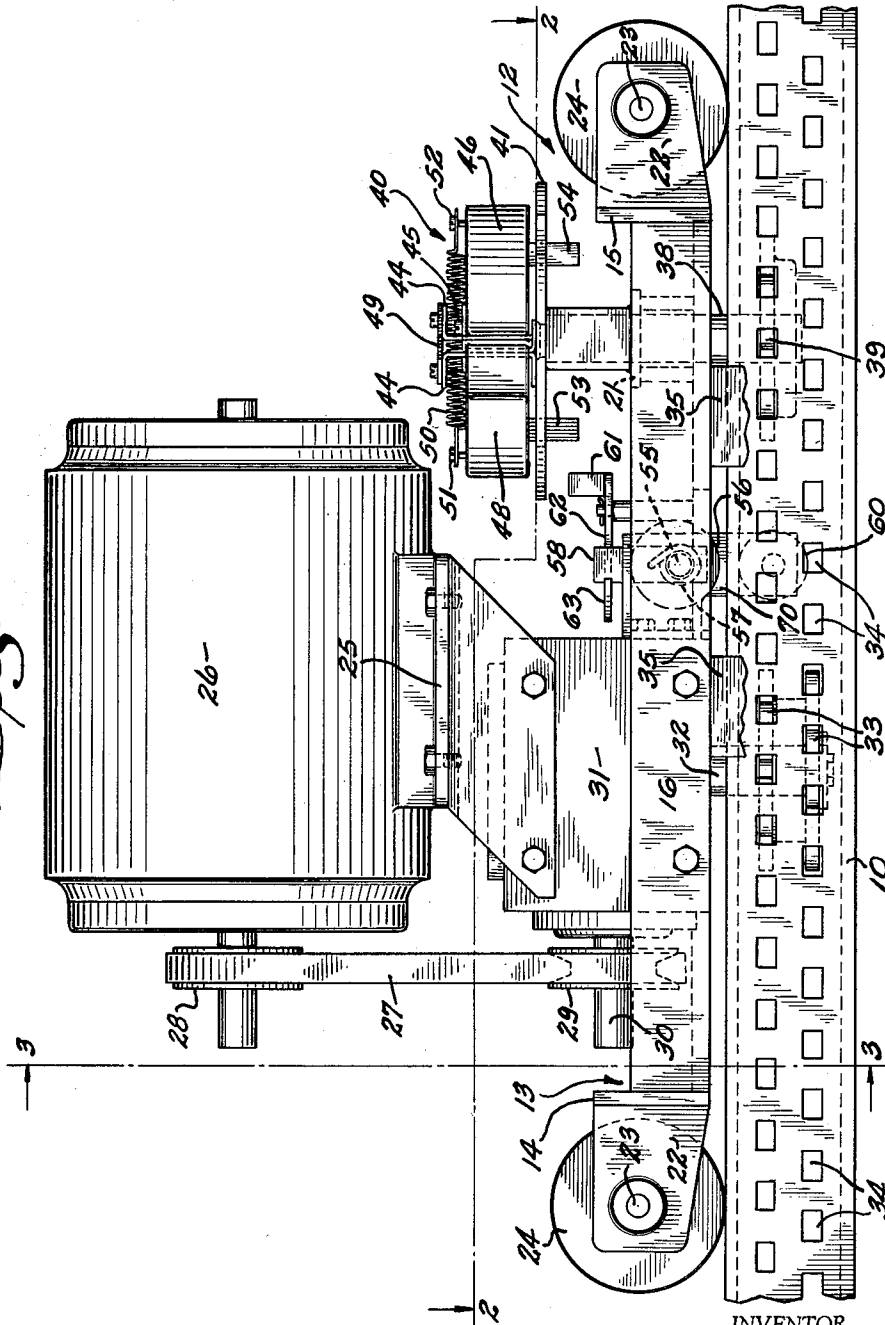
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LIFTS WITH INCLINED TRACK

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3 Sheets-Sheet 1

Fig. 1.



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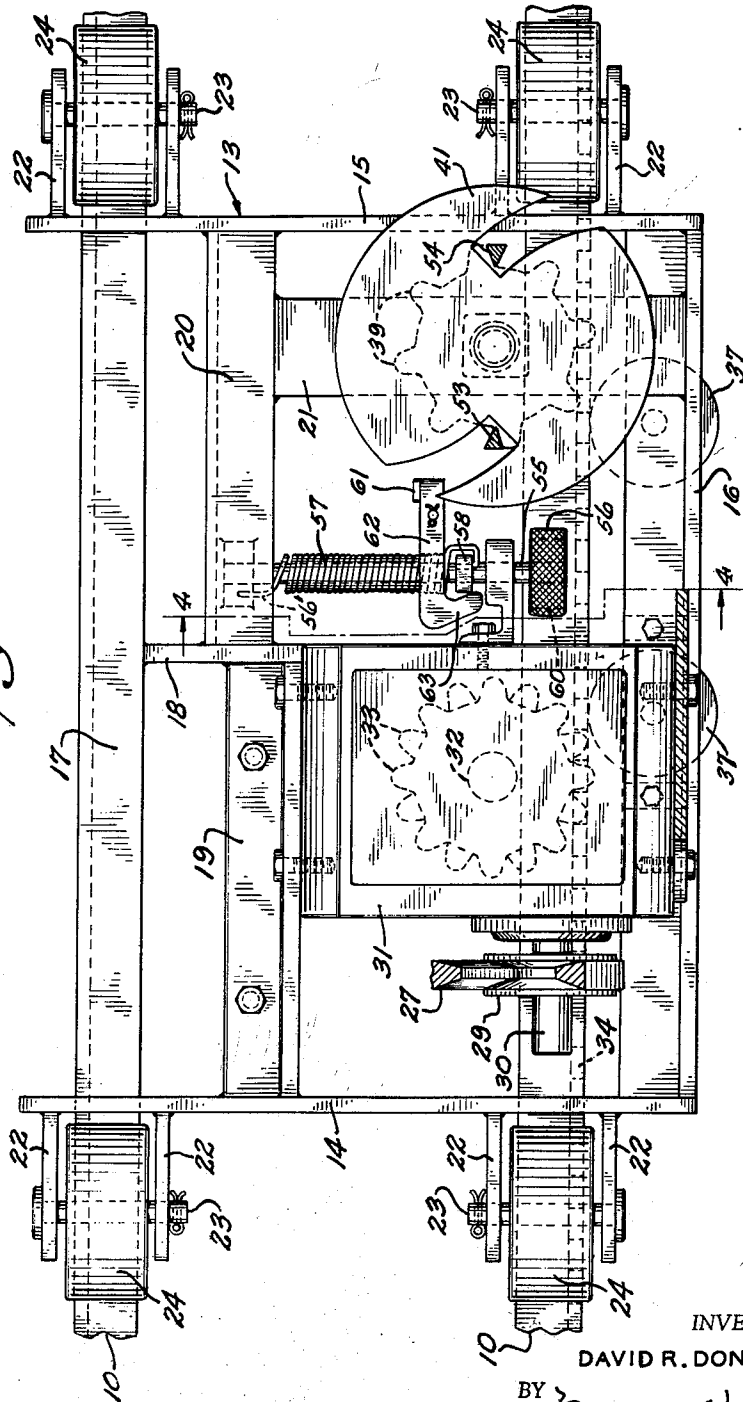
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Fig. 2.



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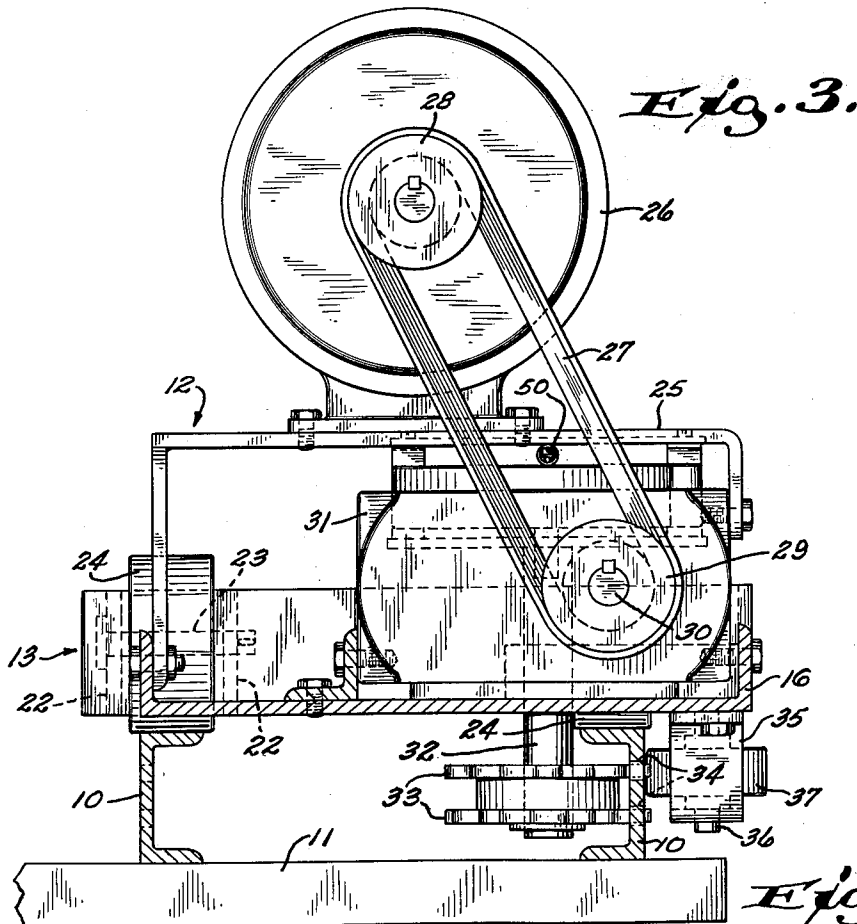
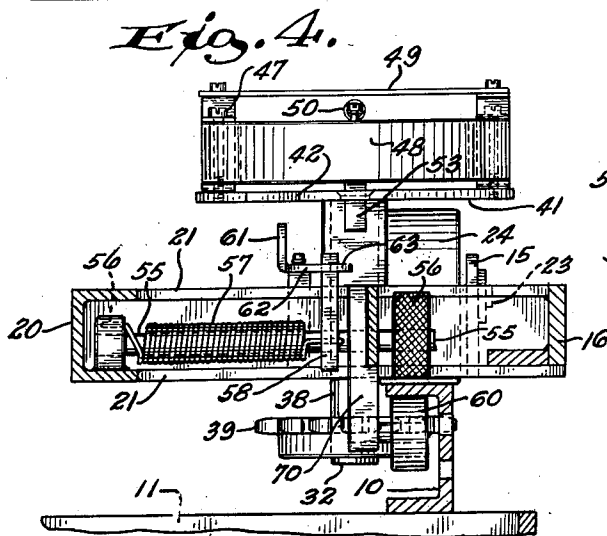
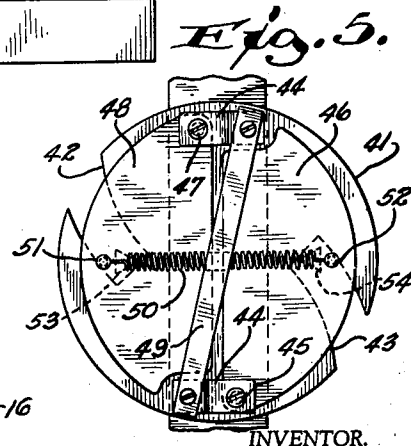
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3 Sheets-Sheet 3



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LIFTS WITH INCLINED TRACK

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7 Claims. (Cl. 187—12)

This invention relates to improvements in lifts with inclined track.

The present invention relates to a lift device which is suitable for general use but which is particularly suitable for the carrying of heart patients and other disabled persons up and down inclines, such as a hillside leading to a lake. With this type of device it is very important to prevent accidents such as might result from some defect in the mechanism, which might allow the carriage to descend unrestrained under the influence of gravity. Such an accident might occur as a result of a break in the main shaft or in a part of the speed reduction mechanism.

It is a general object of the present invention to provide an improved inclined lift which is driven by a positive cog drive engagement with a track, and which is relatively simple to operate and relatively foolproof in construction.

A further object of the invention is to provide a lift having an over-speed safety device which is automatically effective if the descending speed of the carriage exceeds a predetermined maximum.

A more specific object of the invention is to provide in a device of the class described, a centrifugally operated over-speed safety device which automatically triggers out to cause stopping of the carriage if descending speed exceeds a predetermined maximum.

A further object of the invention is to provide a device which is quiet on operation and relatively free from jerks.

A further object of the invention is to provide a device of the class described having an over-speed safety device which is automatically kept in limited motion to prevent the pivots of the safety device from becoming frozen through lack of use. Thus it is always ready to operate should an emergency arise.

With the above and other objects in view, the invention consists of the improved inclined lift, and all of its parts and combinations, as set forth in the claims, and all equivalents thereof. In the accompanying drawings, illustrating one complete embodiment of the preferred form of the invention, in which the same reference numerals designate the same parts in all of the views:

FIG. 1 is a side elevational view of the improved device, parts being broken away and the track being broken away at its ends;

FIG. 2 is a horizontal sectional view thereof taken on the line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 1;

FIG. 4 is a fragmentary view in partial vertical section, taken on the line 4—4 of FIG. 2, showing the safety device and associated parts; and

FIG. 5 is a fragmentary top view showing the governor.

Referring more particularly to the drawing, the numeral 10 designates a pair of tracks which are inwardly facing channels as shown in FIG. 3. These channels may be suitably secured to ties 11, as shown in FIG. 3, and may be mounted on a hillside or other location for use. The carriage designated generally by the numeral 12 comprises a base frame 13 which includes transverse members 14 and 15, a side member 16 preferably in the form of an angle, and another side member 17. In addition there is an intermediate transverse member 18, and intermediate longitudinal frame members 19 and 20,

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there also being a transverse member 21 connecting the member 20 with the frame member 16.

Projecting outwardly from the end members 14 and 15 are pairs of ears 22 which support axle studs 23 on which the wheels 24 are mounted. The wheels are preferably flat wheels which ride on the upper flanges of the channel tracks 10.

Mounted on an elevated supporting stand 25 is an electric motor 26. Through an endless belt 27 on a motor pulley 28, the motor drives a pulley 29 on a shaft 30 of a gear reduction box 31. Depending from the box 31 is a vertical driven shaft 32 which is driven at a predetermined reduced speed. Shaft 32 carries a double cog wheel 33. This comprises vertically spaced cog wheels as shown in FIG. 3 which engage cog openings 34 in the upright web of one of the track members 10 as shown in FIGS. 1 and 3. The carriage is adapted to support a suitable passenger seat (not illustrated).

Depending from the carriage frame member 16 (see FIG. 3) are U-shaped supports 35 each carrying a vertical shaft 36 on which a horizontally disposed roller 37 is supported. The rollers are adapted to ride against the outer face of the vertical web of the apertured track member 10 so as to maintain the cog wheels 33 in engagement with the track holes 34. If it were not for the rollers 37 the carriage could shift laterally relative to the track, and the cog wheels would ultimately get out of engagement with the holes.

Referring now to FIGS. 1 and 4, a shaft 38 is shown which is journaled in a bearing suitably supported on the transverse frame member 1. The shaft is in a vertical position and carries a single cog wheel 39 (see FIG. 4) at its lower end which is positioned to engage the upper row of holes in the adjacent track member. The upper end of the shaft 38 supports the safety control device 40. This includes a disc 41 which is rigid with the upper end of the shaft to rotate therewith. This disc has oppositely disposed curved slots 42 and 43 as shown in FIG. 5. Secured at opposite points to the disc 43 are brackets 44. Pivoted to one end of one bracket as at 45 is a weight 46 and pivoted as at 47 to the opposite end of the other bracket is a weight 48. A bar 49 connects the brackets to one another as shown in FIGS. 4 and 5. A spring 50 is connected at one end as at 51 to the weight 48 and at its other end as at 52 to the weight 46. Thus when the weights tend to swing outwardly by centrifugal force it is against the tension of the spring 50. Depending from the weight 48 and within the slot 42 is a trigger member 53. Depending from the weight 46 and operating in the slot 43 is a trigger member 54.

Suitably supported for rotation adjacent the unit 40 on frame member 20 and on a bracket 70, is a shaft 55 carrying an eccentrically mounted knurled roller 56 at one end, which roller is positioned to be capable, in a certain position of rotation of the shaft 55, of engaging on top of the top flange of the adjacent track member 10. A spring 57 is coiled around the shaft 55 and has one end anchored as at 56' and its other end attached to a vertical lug 58 on the shaft. Also suitably supported on the bracket 70 below the knurled roller 56, to engage the under face of the top flange of the track, is a roller 60.

When the carriage is moving at a normal rate of speed the weights 46 and 48 will swing outwardly very slightly under the influence of centrifugal force. This is due to the rotation of the control member 40 as it is driven by the cog wheel 39 on the shaft 38. If, however, the speed of descent of the carriage should exceed a predetermined maximum, such as three times normal, for example, then the weights 46 and 48 will swing outwardly a sufficient distance so that one or the other of the trigger members 53 or 54 will engage the upstanding trigger plate 61 on the pivoted lever 62. This will move the latching end

63 of the lever into a releasing position with respect to the lug 58, allowing the wound up spring 57 to cause rotation of the shaft 55 to such an extent in a counterclockwise direction, referring to FIG. 1, as to cause the high side of the eccentric wheel 56 to wedge against the top face of the track and cause the track to be tightly gripped between the roller 60 and the eccentric roller 56 to impose a braking force and stop the descent of the carriage.

Operation

In operation, the person to be carried will sit on the seat (not shown) of the carriage 12 and move a suitable control lever (not shown) to start the electric motor 26 in operation in a predetermined direction. Through the belt drive 27 and gear reduction box 31 the double cog wheel 33 on the shaft will be driven at a selected speed to control the movement of the carriage either up or down the tracks. Due to the double cog arrangement, engaging the double row of holes 34, there is a quieter operation, and there is less jerk in starting and stopping. In addition, there is a safety factor with respect to possible breakage of teeth of one of the cog wheels, as there is always the other cog wheel in engagement. The outer horizontal rollers 37 engage the outer face of the apertured track and keep the cog wheels in engagement.

Inasmuch as invalids tend to be overcautious when riding in a device of this type, it is desirable that they have assurance that no accident can take place as a result of breakage of parts. The present invention provides a simple and reliable safety device. While breakage of parts in this type of device is not likely to occur, nevertheless if there were a break in the main shaft 32 or in one of the vital components of the gear box 31, or in any other part which might free the carriage for descent by gravity, the present invention provides means for quickly taking care of such emergency. Should this event occur, the carriage would start descent at an increased speed. The safety control 40, however, is set so that if the speed should approximately triple normal, the weights 46 and 48 on the rotated disc 41, which disc is responsive to the speed of descent, would swing out by centrifugal force a sufficient distance so that one of the trigger members 53 or 54 would hit the trigger plate 61 and cause pivoting of the latch 62 so that its hook end 63 would release the lug 58. The spring 57 will then be free to rotate the shaft a part of a revolution so as to bring the high side of the eccentric wheel 56 to a lowered position into wedging engagement with the top of the track. The track will thus be gripped between the eccentric roller 56 and the lower roller 60 to exert a braking effect. This will cause stopping of the carriage in about 3 inches of movement of the carriage after start of descent at increased speed.

Many safety devices become ineffective because of lack of use. The present device, however, is always rotated during use, by the engagement of the cog wheel 39 with the cog holes of the track. Therefore, the weights 46 and 48 are always subjected to a limited swinging action, just sufficient to keep their pivots from becoming frozen due to rust or for other reasons. Thus, these weights will always be ready for operation should an emergency occur.

It is to be understood that the present invention is not to be limited to the exact details of construction shown and described, for obvious modifications will occur to persons skilled in the art.

What I claim is:

1. In a lift having an inclined cog track and having a carriage movable on said track with a cog wheel drive, releasable braking means on said carriage positioned to coact with said track when released, and additional cog wheel means on the carriage driven by said cog track and including means responsive to the speed of said carriage above a predetermined maximum for releasing said braking means.

2. In a lift having an inclined cog track and having a carriage movable on said track with a cog wheel drive,

releasable braking means on said carriage positioned to coact with said track when released, and additional cog wheel means on the carriage driven by said cog track and including centrifugal force mechanism responsive to the speed of said carriage above a predetermined maximum for releasing said braking means.

3. In a lift having an inclined track with an upright web and having a carriage movable on said track, releasable braking means on said carriage mounted for movement into and out of braking position with respect to said track, means for biasing said braking means to braking position, latching means normally maintaining said braking means in inoperative position, said track web having cog openings, and means including a cog wheel engageable with said cog openings of the web and responsive to the speed of said carriage over a predetermined maximum for tripping said latching means to permit said biasing means to move said braking means to braking position.

4. In a lift having an inclined track which includes an upright web and a flange and said lift having a carriage movable on said track, releasable braking means on said carriage including cooperating rollers for clamping said flange therebetween positioned to clamp said track flange when released, latching means normally maintaining said braking means in inoperative condition, said track web having cog openings, and means including a cog wheel engageable with said cog openings of the web and responsive to the speed of said carriage over a predetermined maximum for tripping said latch to release said braking means.

5. In a lift having an inclined track and having a carriage movable on said track, said track having at least one upright web with cog openings therein and having a top flange projecting from said web, a safety control rotatably mounted on said carriage, a cog wheel on said safety control engaged with the cog openings of said track web for causing rotation of the safety control as the carriage is moved on the track and in accordance with the speed of movement, a braking member supported on said carriage adjacent said track flange and adjacent said safety control for movement into and out of braking engagement with said flange, means normally urging said braking member into braking engagement with said flange, latch mechanism normally coacting therewith to prevent movement of said braking member as a result of said urging, and trigger means on said rotatable safety control movable in response to rotation of the cog wheel at a speed above a predetermined maximum to a position to release said latch mechanism and permit said urging means to move said braking member into braking engagement with said flange.

6. In a lift having an inclined track and having a carriage movable on said track, said track having at least one upright web with cog openings therein and having a top flange projecting from said web, a safety control including a shaft journaled in said carriage, a cog wheel on said safety control shaft engaged with the cog openings of said track web for causing rotation of the safety control as the carriage is moved on the track and in accordance with the speed of movement, a braking member supported on said carriage independently of said safety control shaft and adjacent said track flange and adjacent said safety control movement into and out of braking engagement with said flange, means normally urging said braking member into braking engagement with said flange, latch mechanism supported independently of said safety control shaft and normally coacting with said braking member to prevent movement of said braking member as a result of said urging, and trigger means on said rotatable safety control movable in response to rotation of the cog wheel at a speed above a predetermined maximum to a position to release said latch mechanism and permit said urging means to move said braking member into braking engagement with said flange.

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7. In a lift having an inclined track and having a carriage movable on said track, said track having at least one upright web with cog openings and having a top flange, a safety control rotatably mounted on said carriage, a cog wheel on said safety control engaged with said cog openings of said track web for causing rotation of the safety control as the carriage is moved on the track and in accordance with the speed of movement, a pair of braking members supported on the carriage independently of said safety control but adjacent thereto and adjacent a track flange for relative movement into and out of clamping engagement with said track flange, one of said members being a rotatable eccentric, means normally rotatably urging said eccentric toward clamping position, latch mechanism normally preventing said rotatable movement into clamping position, and trigger means on said rotatable safety control movable in response to rotation of the cog wheel at a speed above a predetermined

maximum to a position to release said latch mechanism and permit said urging means to rotate said eccentric to a position to clamp said flange between said pair of braking members.

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