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H. T. HART ET AL

2,385,276

HOIST

Filed Oct. 5, 1944

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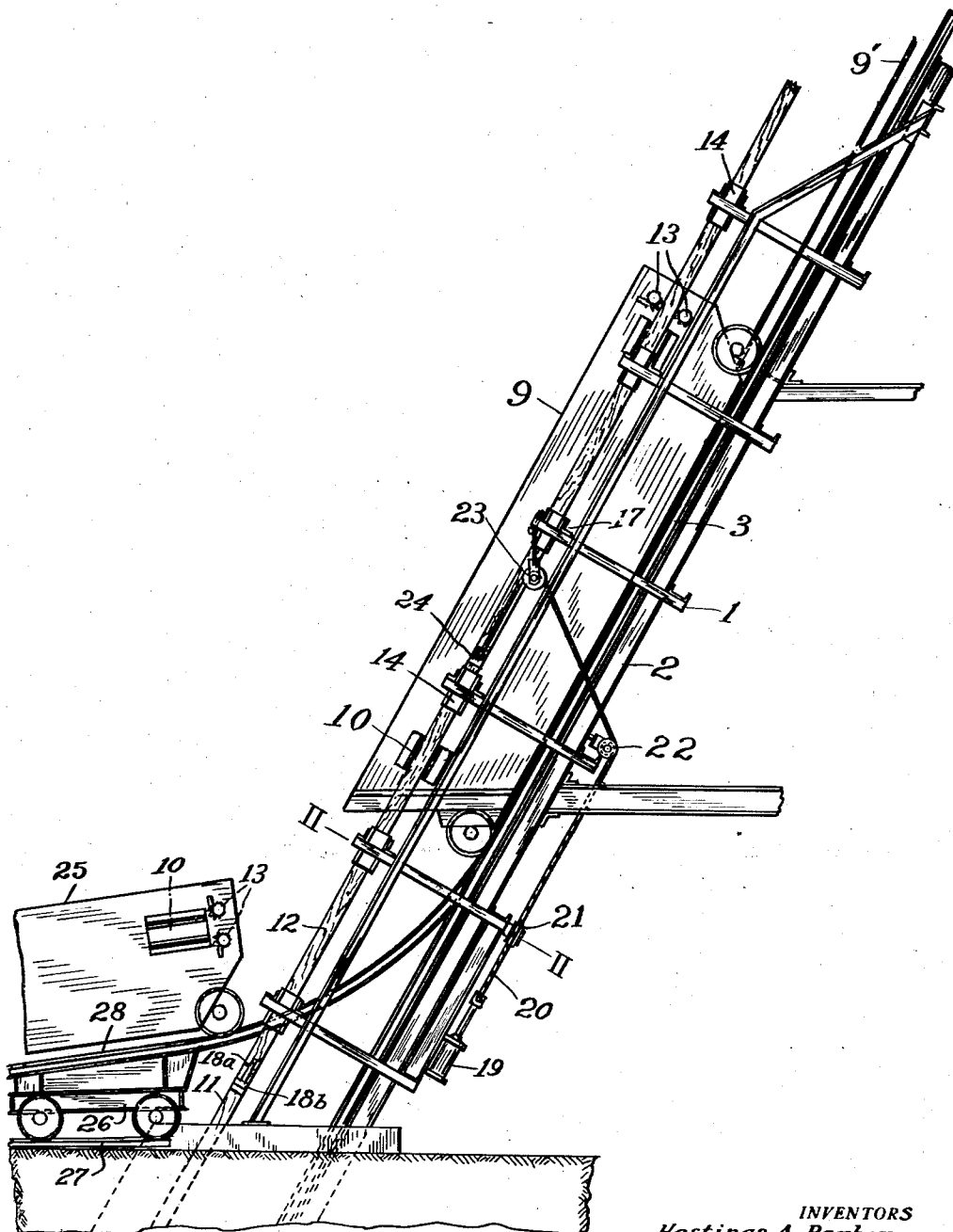


Fig. 1.

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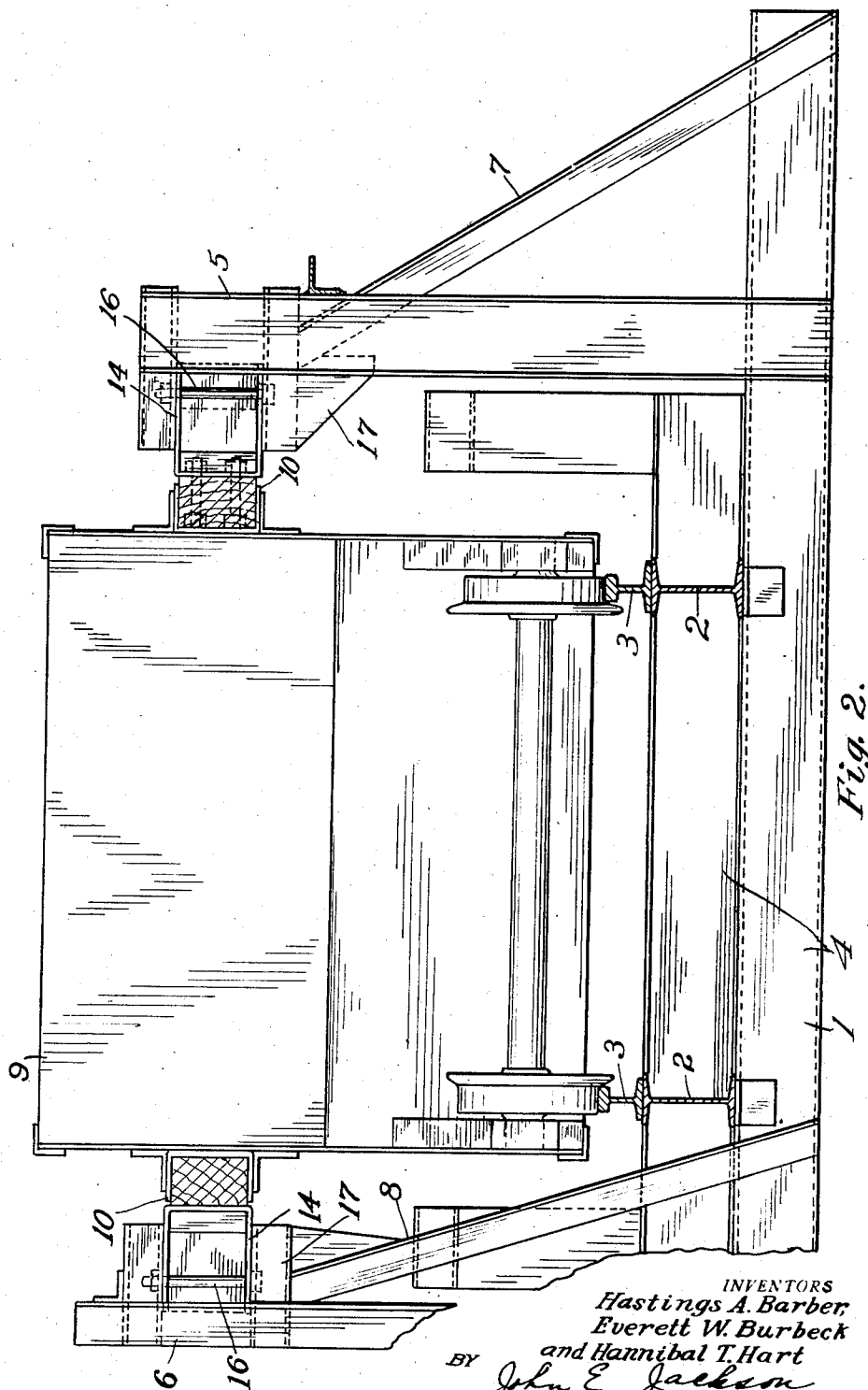
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4 Sheets-Sheet 3

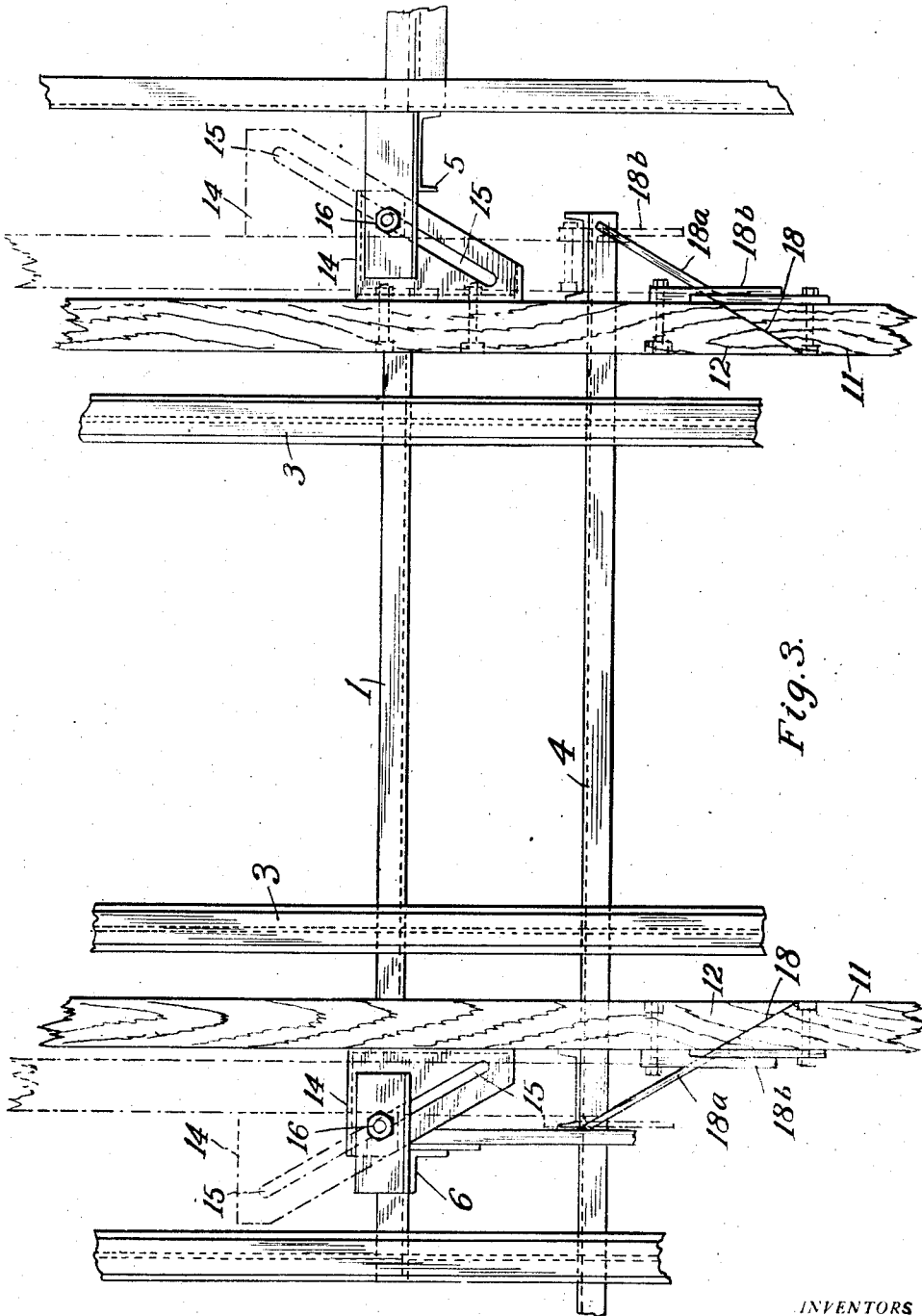


Fig. 3.

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4 Sheets-Sheet 4

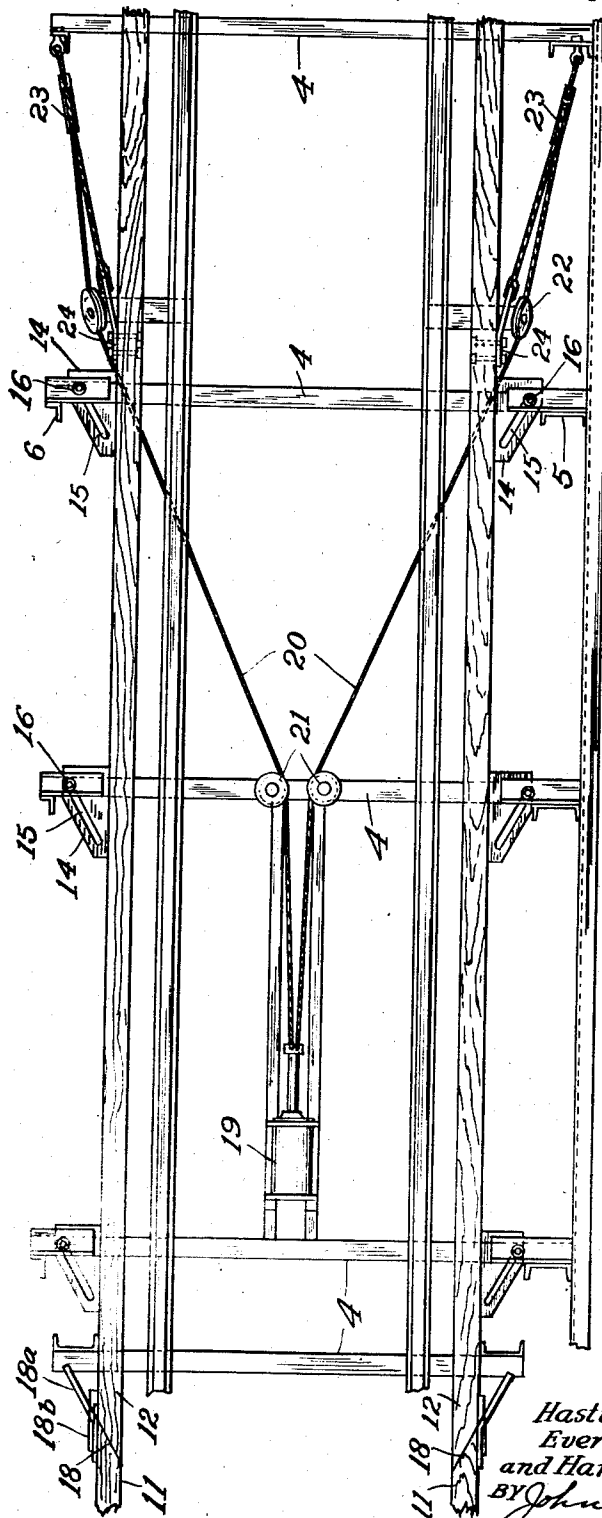


Fig. 4.

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HOIST

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Application October 5, 1944, Serial No. 557,352

8 Claims. (Cl. 187-95)

This invention relates to a hoisting device and more particularly to novel retractable safety guides for hoisting cars.

One of the objects of the invention is to increase the safety of hoists by providing means whereby safety guides for the hoist cars may be made continuous and yet allow removal of the cars.

Another object of the invention is the provision of retractable guide means whereby cars such as skips and cages on a hoisting device may be quickly and safely interchanged.

These and further objects of the invention will appear in the following description.

In hoisting devices such as elevators and inclined trackways, such as are used in mines, it is frequently necessary to exchange a material-carrying car, such as a skip, for a cage for carrying personnel, and vice versa. Conventional hoists such as inclined mine hoists employ longitudinal fixed safety guides paralleling the track, such guides being received in guiding means on the car and being engaged by safety dogs on the car, which hold the car in position in the event of failure of the car lifting means, such as a cable. The presence of such guide engaging means and safety dogs on the sides of the car has made it impossible to continue the longitudinal safety guides through the station at which the cars are changed, since the changing of the cars is most conveniently done by moving it out of its normal path at such station, in a line lying generally at an angle to the normal path and in a plane containing the line of such normal path. During parts of the car changing operations, therefore, and during passage of a car through such car changing station, the cars have been supported only by the hoisting means such as a cable, which is obviously dangerous. Should the cable break while the car is at such location, the car would gain such momentum before the safety dogs contacted the next guide section that the safety dogs and guide rail would be severely stressed and might themselves fail.

The present invention makes it possible to continue the safety guide rails on a hoisting device of the type described continuously from top to bottom, whereby the car will be held by them should the cable or other hoisting means break, regardless of the position of the car. Such continuous guide rails are made possible, while still providing a station for the changing of cars in the manner described, by making a section or sections of such guide rails retractable to clear the guide engaging means and safety dogs on

the cars, so that when the guides are retracted the cars may be removed in a direction substantially at right angles to the guides. The invention will be more fully understood by reference to the accompanying drawings, in which:

Figure 1 is a view in side elevation of a portion of an inclined hoist;

Figure 2 is a view in cross section taken along the line II-II of Figure 1;

Figure 3 is a fragmentary view in plan of a portion of the guide means at the joint between the fixed guide means and the retractable guide means; and

Figure 4 is a plan view of a portion of the hoist trackway, showing the means whereby retraction of the guide means is effected.

The hoisting device described is an inclined mine hoist employed for raising ore to the surface and for carrying personnel to and from various levels in the mine. It should be understood, however, that the invention finds utility in various other types of hoists and elevators, either vertical or inclined, wherein the cars are exchanged or removed. The hoist illustrated consists of the inclined skip and cage road made up of a framework indicated generally at 1, said framework having longitudinal I-beam members 2, upon the tops of which are carried tracks 3. Cross members 4 are attached at intervals to the I-beams 2, and have attached thereto, as shown in Figure 2, right and left upright members 5 and 6, respectively, and brace members 7 and 8, respectively. Member 8 is attached to cross member 4 interiorly of the base of the upright member 6, since in the particular design illustrated, the hoist framework 1 abuts against that of another hoist located to the left of it.

Car 9, which is an ore-carrying skip, runs upon tracks 3, as shown, and is raised and lowered by hoisting mechanism (not shown), acting through the medium of cable 9' attached to the forward end of the car. As shown in Figures 1 and 2, car 9 is provided with U-shaped guide receiving members 10 at the forward and rear ends thereof, within which are received the longitudinally extending safety guide rails. The fixed portions of such rails, above and below the car changing location are designated 11, and the retractable portion of the guide rails intermediate the fixed portion are designated 12. Portions 11 of the safety guide rails are supported in fixed position relative to tracks 3 and car 9 on uprights, which may be similar to uprights 5 and 6, or any other suitable supports. The retractable sections 12 of the safety guide rail are supported

on uprights 5 and 6 by means of brackets 14 suitably attached to the guide rail (see Figures 2 and 3), said brackets having an angular slot 15 therein through which projects vertical pin 16 which is fixed to support 17 on the uprights 5 and 6. The direction and lengths of the angular slot 15 are chosen so that when retractable guide 12 is moved in a direction up the incline parallel to tracks 3, they are also moved outwardly in a direction away from car 9 sufficiently to clear completely guide receiving members 10 and pivoted safety dog members 13, which engage the top and bottom surfaces of the guide rail when the guide rail is in normal operative position.

In order to insure that the ends of the retractable guide rail 12 will match up with the corresponding ends of the fixed guide rails 11 there are provided cooperating guide means at each joint, one such means attached to the end of the retractable guide portion 12, providing an eye portion 18^b, and the other such means, attached to the end of the fixed guide 11, providing a tongue 18^a, running through the eye of 18^b to allow the retractable guide rail 12 to move freely into and out of normal position. The joint 18 between fixed and retractable guide portions is made on a bevel, as shown in Figure 3, which is parallel to the direction of movement of the retractable guide.

Retraction of guides 12 from the normal operative position, wherein they form prolongations of fixed guides 11, to the inoperative spaced position, wherein they clear guide engaging means 10 and dogs 13 whereby the removal of the skip or cage in the manner described may be effected, is accomplished, in the particular embodiment shown, by means of fluid motor 19 attached to the bottom of the hoist framework centrally thereof as shown in Figure 4. Connected to the forward end of the piston rod of motor 19 is a cable 20 which runs over guide pulleys 21 attached to the bottom of the hoist framework, over pulleys 22, likewise attached to the bottom of the framework, but further up the hoist, over pulleys 23 attached to right and left vertical members 5 and 6 in the plane of guides 12, and thence to clip-like members 24 affixed to the rear of guides 12. It is readily apparent that admission of fluid under pressure to the forward end of motor 19 effects a downward pull on cable 20, which in turn pulls guides 12 upwardly through means 24. As previously explained, such upward movement of guides 12 likewise accomplishes their retraction laterally.

In the embodiment shown, the retractable guide rails 12 are so located with respect to a particular mine level that ore skip 9 attached to the hoist may be exchanged for cage 25, stored at that particular level.

Such operation is carried out as follows:

Car 9 is located as shown in Figure 1, with the guide receiving means 10 and dogs 13 lying well within the ends of the retractable guide portion 12. Guides 12 are then retracted so as to clear means 10 and 13 on the car 9. An auxiliary car 26, running on tracks 27 (of the same gauge as tracks 3) at the particular mine level shown, and carrying on its top tracks 28 (likewise of the same gauge as tracks 3), having curved forward portions and beveled rear portions, is advanced to the right (Figure 1) so that the curved forward portions of tracks 28 contact tracks 3. Car 9 is then lowered upon tracks 28. Hoisting

cable 9' is then disconnected, and car 9 is then allowed to roll down track 28 to a side track.

Personnel carrying cage 25 is then pushed along track 27 onto track 28 to the position shown in Figure 1. Cable 9' is then connected to the forward end of cage 25, whereupon the cage is drawn up onto the tracks 3 so as to completely clear the forward ends of rails 28. Car 26 is then withdrawn. Safety rails 12 are then advanced into operative relationship with guide receiving means 10 and safety dogs 13 of cage 25. After such operation the hoist cage is ready for use for carrying men up to the surface or down into the mine as desired. The change from 15 hoist cage to skip is accomplished in a similar manner.

Having thus fully described the novel retractable guide means for hoisting devices, we desire to claim as new the following:

20 1. In a hoisting device comprising a car, means for raising and lowering the car, guide means paralleling the normal path of travel of the car, said car having means projecting therefrom, said projecting means including guide engaging means on the car cooperating with the guide means to maintain the car in its normal path of travel, at least a part of the guide means projecting past a part of the guide engaging means on the car, the improvement which comprises retractable 25 guide means at least as long as the length of the means projecting from the car, said retractable guide means in its normal operative position engaging and cooperating with the guide engaging means on the car, and means mounting the retractable guide means for retraction from its normal operative position in a direction in a direction away from the guide engaging means sufficiently for it to clear the car and the guide engaging means, whereby a car positioned at the 30 retractable guide means may be moved out of its normal path of travel when the retractable guide means is retracted.

2. In a hoisting device comprising a car, means 35 for raising and lowering the car, fixed guide means paralleling the normal path of travel of the car, said car having means projecting therefrom, said projecting means including guide engaging means on the car cooperating with the 40 guide means to prevent substantial movement of the car in a direction at right angles to its normal path of travel, at least a part of the guide means projecting past a part of the guide engaging means on the car, the improvement which comprises retractable guide means at least as long 45 as the length of the means projecting from the car, said retractable guide means in its normal operative position engaging and cooperating with the guide engaging means on the car and forming a prolongation of the fixed guide means, and means mounting the retractable guide means for retraction from its normal operative position in a direction away from the guide engaging means sufficiently for it to clear the car and the guide 50 engaging means, whereby a car positioned at the retractable guide means may be moved out of its normal path of travel when the retractable guide means is retracted.

3. In a hoisting device comprising a car, means 55 for raising and lowering the car, guide means paralleling the normal path of travel of the car, said car having means projecting from the side thereof, said projecting means including guide engaging means on the car cooperating with the 60 guide means to prevent substantial movement

of the car in a direction at right angles to its normal path of travel, at least a part of the guide means projecting toward the car past a part of the guide engaging means on the car, the improvement which comprises retractable guide means at least as long as the length of the means projecting from the car past a portion of the guide means, said retractable guide means in its normal operative position engaging and cooperating with the guide engaging means on the car and forming a prolongation of the fixed guide means, and means mounting the retractable guide means for retraction from its normal position in a direction away from the car and the guide engaging means sufficiently for it to clear the guide engaging means, whereby a car positioned at the retractable guide means may be moved out of its normal path of travel when the retractable guide means is retracted.

4. In a hoisting device comprising a car, means for raising and lowering the car, fixed guide means on opposite sides of and parallel to the normal path of travel of the car, said car having means on both sides thereof projecting from the sides, said projecting means including guide engaging means on the car cooperating with the guide means to prevent substantial movement of the car in a direction at right angles to its normal path of travel, at least a part of each guide means projecting toward the car past a part of the guide engaging means on the car, the improvement which comprises oppositely located retractable guide means, each retractable guide means being at least as long as the length of the means projecting from the car on its respective side past a portion of the guide means, said retractable guide means in their normal operative positions engaging and cooperating with the guide engaging means on the car and forming prolongations of the fixed guide means, and means mounting the retractable guide means for retraction from their normal position in directions away from the car and the guide engaging means sufficiently for it to clear the guide engaging means, whereby a car positioned at the retractable guide means may be moved out of its normal path of travel when the retractable guide means are retracted.

5. In a hoisting device comprising a car, means for raising and lowering the car, fixed guide means on opposite sides of and parallel to the normal path of travel of the car, said car having means on both sides thereof projecting from the sides, said projecting means including guide engaging means on the car cooperating with the guide means to prevent substantial movement of the car in a direction at right angles to its normal path of travel and safety dogs for engagement with the guide means to prevent falling of the car upon failure of the means for raising and lowering of the car, at least a part of each guide means projecting toward the car past a part of the guide engaging means and safety dogs on the car, the improvement which comprises oppositely located retractable guide means, each retractable guide means being at least as long as the total effective length of the guide engaging means and the safety dogs on its respective side projecting past a portion of the guide means, said retractable guide means in their normal operative positions engaging and cooperating with the guide engaging means and the safety dogs on the car and forming prolongations of the fixed guide means, means mounting the retractable guide means for retraction from their normal positions in a direction away from the

car and the guide engaging means and safety dogs sufficiently for it to clear such projections, and means for retracting the retractable guide means, whereby a car positioned at the retractable guide means may be moved out of its normal path of travel when the retractable guide means are retracted.

6. In a hoisting device comprising a trackway having one end higher than the other, a car running on said trackway, means for raising and lowering the car on the trackway, guide means paralleling the trackway, said car having means projecting therefrom, said projecting means including guide engaging means on the car cooperating with the guide means to maintain the car from substantial movement at right angles to the trackway, at least a part of the guide means projecting past a part of the guide engaging means on the car, the improvement which comprises retractable guide means at least as long as the length of the projecting guide engaging means on the car, said retractable guide means in its normal operative position engaging and cooperating with the guide engaging means on the car, means mounting the retractable guide means for retraction from its normal operative position in a direction away from the guide engaging means sufficiently for it to clear the car and the guide engaging means, said mounting means comprising supports for the retractable guide means, a bracket attached to the guide means at each support, each bracket having an upwardly and outwardly directed slot therein, and a pin fixedly positioned on each support and projecting through the slot in the corresponding bracket, whereby movement of the retractable guide means upwardly along the trackway effects its retraction from the car and the guide engaging means.

7. In a hoisting device comprising a car, means for raising and lowering the car, guide means paralleling the normal path of travel of the car, said car having means projecting therefrom including guide engaging means on the car cooperating with the guide means to maintain the car in its normal path of travel, at least a part of the guide means projecting past a part of the guide engaging means on the car, and means at a position located along the path of travel of the car for removing the car from its normal path of travel in a direction angularly thereto, the improvement which comprises retractable guide means at the car removing position, said retractable guide means in its normal operative position engaging and cooperating with the guide engaging means on the car, and means mounting the retractable guide means for retraction from its normal operative position in a direction away from the guide engaging means sufficiently for the car and guide engaging means to clear it when the car is moved away from its normal path, and means for retracting the retractable guide means.

8. In a hoisting device comprising inclined tracks, a car running on the tracks, means for raising and lowering the car on the tracks, fixed guide means on opposite sides of and parallel to the tracks, said car having means on both sides thereof projecting from the sides, said projecting means including guide engaging means on the car cooperating with the guide means to prevent substantial movement of the car at right angles to the tracks and safety dogs for engagement with the guide means to prevent falling of the car upon failure of the means for raising

and lowering of the car, and means at a position located along the tracks for removing the car from the tracks in a direction angular thereto, the improvement which comprises retractable guide members at the car removing position, said retractable guide means in their normal operative positions engaging and cooperating with the guide engaging means on the car and forming prolongations of the respective fixed guide means, means mounting the retractable guide means for retraction from their normal operative position in directions away from the guide engaging means sufficiently for them to clear the guide engaging means, said mount-

ing means comprising supports for the retractable guide means, a bracket attached to such guide means at each support, each bracket having an upwardly and outwardly directed slot therein, and a pin fixedly positioned on each support and projecting through the slot in the corresponding bracket, whereby movement of the retractable guide means upwardly along the tracks effects their retraction from the car and the guide engaging means.

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