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E. A. SAHLIN

2,308,210

GUIDE FOR ELEVATORS

Filed July 30, 1942

2 Sheets-Sheet 1

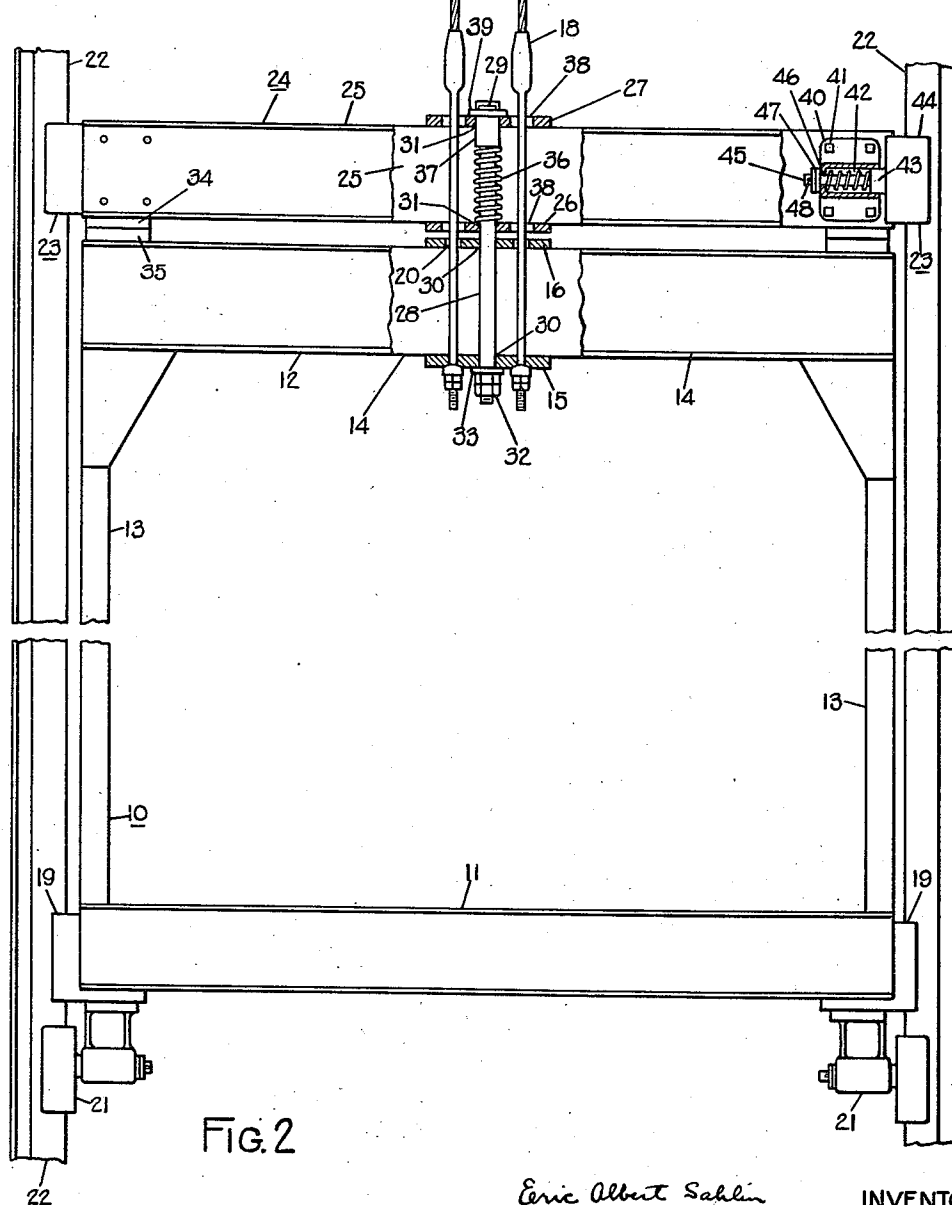
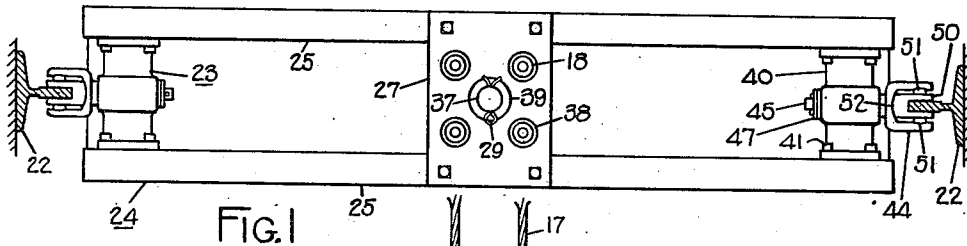


FIG. 2

Eric Albert Sahlin

INVENTOR

BY *Walter B. Bradley*

ATTORNEY

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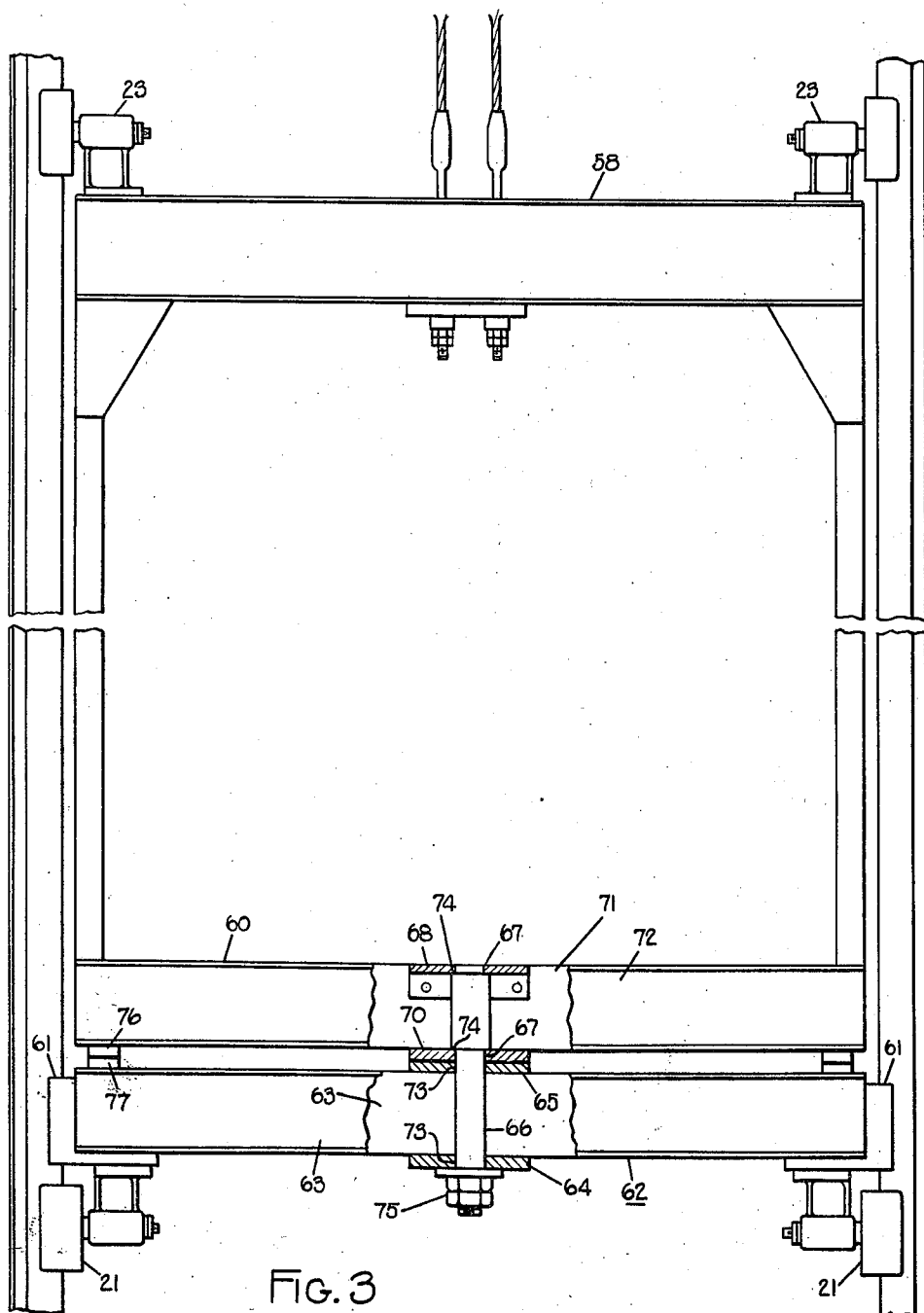


FIG. 3

Eric Albert Sahlin

INVENTOR

BY *Walter G. Bradley*

ATTORNEY

UNITED STATES PATENT OFFICE

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GUIDE FOR ELEVATORS

Eric Albert Sahlin, Harrington Park, N. J., assign-
or to Otis Elevator Company, New York, N. Y.,
a corporation of New Jersey

Application July 30, 1942, Serial No. 452,967

6 Claims. (Cl. 187-95)

The invention relates to guides for the movable bodies of elevator installations.

In elevator installations, each of the movable bodies (elevator car and counterweight) is guided on guide rails extending longitudinally the full length of the hatchway and oppositely disposed with respect to the movable body, one on each side thereof. Guide shoes are carried by the movable body, one on each side thereof, both at the top and the bottom for cooperating with the rail to guide the body. The guide rails are arranged in sections and care is exercised in installing them so that the rails are plumb, with the sections aligned, and so that the opposite rails are aligned with each other. However, the rails are not always properly set and even though installed correctly get out of alignment due to settling of the building or other causes. The guide shoes are constructed to take care of certain of these misalignments. However, where opposite sections of the guide rails are at angles to each other longitudinally of the rails, force is exerted as the body rides over these sections of the rails to twist the framework of the body and also the cab when the body is the elevator car. As a result, the joints and connections of the frame and cab gradually become loosened and eventually the frame and cab become noisy. In addition this force causes excessive pressure between the guide shoes and the guide rails resulting in considerable friction and in the wear of the guide shoes. A twisted frame for the elevator car may also result in misalignment of the door guides to cause the doors to bind during operation.

The object of the invention is to provide a guiding arrangement for the movable bodies of elevator installations which eliminates the transmission of twisting forces to the movable body framework due to longitudinal misalignment of opposite guide rails.

In carrying out the invention according to the arrangements which will be described, illustrated as applied to an elevator car, two guide shoes are mounted on the car frame at one extremity thereof, one for each guide rail. Two other guide shoes, one for each guide rail, are mounted on an auxiliary crosshead pivotally mounted on the vertical center of the car frame at the other extremity thereof. Thus when the car passes a section of the hatchway in which the guide rails are longitudinally misaligned, the auxiliary crosshead swings longitudinally about its pivot to take up the twist which otherwise would be transmitted to the car frame.

Features and advantages of the invention will

be gained from the above description and that which follows and from the appended claims.

In the drawings:

Figure 1 is a schematic plan view of an elevator car frame with guiding mechanism therefor embodying the invention;

Figure 2 is a side view of the same, with parts broken away; and

Figure 3 is a view similar to Figure 2 of another arrangement embodying the invention.

Referring to Figures 1 and 2, 10 designates the framework for an elevator car. This framework comprises a safety plank 11 and a crosshead 12 joined by uprights 13. The crosshead comprises a pair of channel members 14 joined in spaced relation at the bottom by a hitch plate 15 and at the top by a plate 16. The framework is supported by hoisting cables 17 which are connected to the hitch plate through thimble rods 18. Apertures 20 are provided in top plate 16 through which the thimble rods extend.

The car frame is guided at the bottom by a pair of guide shoes 21 secured to the housings of the safety brakes 19 in the ends of the safety plank, one at each side of the framework. These guide shoes cooperate with guide rails 22, one on each side of the car frame, in guiding the car. Guide shoes 23 are provided at the top of the car framework for cooperation with guide rails 22 to guide the car at the upper end. Guide shoes 23 are secured to an auxiliary crosshead 24 arranged above the main crosshead 12 and coextensive therewith. The auxiliary crosshead comprises a pair of spaced channel members 25 joined at the bottom by a plate 26 and at the top by a plate 27. The auxiliary crosshead is pivotally mounted on a vertical shaft 28 extending upwardly from crosshead 12. This shaft is positioned in apertures 30 in plates 15 and 16 and extends through bearing apertures 31 in plates 26 and 27. The lower end of the shaft is threaded to receive lock nuts 32, a washer 33 being arranged between the nuts and plate 15. The channels 25 are joined at their ends by plates 34 extending across the bottom thereof. These plates rest on saddle plates 35 secured to the top of channel members 14 to slidably support the ends of the auxiliary crosshead. These plates take any thrust which may develop between the auxiliary crosshead and the main crosshead. A compression spring 36 is arranged on shaft 28 between plate 26 and an enlarged portion 37 on shaft 28 to maintain the crosshead on saddle plates 35. A cotter pin 39 is provided in the enlarged portion 37 above plate 27 with a washer 39 between the pin and the plate.

Apertures 38 are provided in plates 26 and 27 for the thimble rods, these apertures being ample to allow for any pivotal movement of the auxiliary crosshead with respect to the main crosshead.

Each of the guide shoes 23 comprises a frame 40 extending between channel members 25 and secured thereto as by bolts 41. This frame has a recess 42 for slidably receiving the trunnion 43 on the gib housing 44. A stem 45 extends from the trunnion through an aperture 46 in the frame and is provided with a compression spring to bias the gib housing toward the guide rail. Washers 47 and a pin 48 on the end of the stem retain the gib housing on the frame. The gib 50 comprises an elongated U-shaped member having side guiding members 51, the outer surfaces of which are curved along a longitudinal axis to cooperate with curved recesses in the gib housing. The inner end 52 of the gib is also curved to cooperate with a curved surface on the gib housing. Such arrangement enables a swiveling action of the gib within the gib housing so that the guiding surfaces of the gib may remain in full contact with the surfaces of the guide rail. The guide shoes 21 may be of the same construction.

In operation, when the car reaches a section of the hatchway in which a guide rail on one side is longitudinally misaligned with the guide rail on the opposite side, the mounting of the upper guide shoes on the auxiliary crosshead prevents the transmission of forces to cause twisting of the framework and the cab. Assume that both sections of guide rails indicated in Figure 1 are out of plumb, one deviating to one side of the normal plane of the guide rails and the other deviating to the other side of this plane. As the car runs onto this section of the rail, if the upper guide shoes were mounted directly on the crosshead of the car framework, as in the usual construction, the crosshead would be turned with respect to the safety plank, thereby twisting the car frame out of its normal shape. However, with the three point connection of the guide shoes to the car framework, the auxiliary crosshead sliding on the saddles 35 swings about its pivot. This swing is not transmitted to the main crosshead so that twisting of the car frame is obviated. As the auxiliary crosshead is swung about its pivot the gibs of the upper guide shoes rotate in the gib housings to allow for this movement. If only one rail is out of plumb, the swing of the auxiliary crosshead takes place as above described except that the swing is about the opposite guide rail as a pivot. This causes the pivot shaft 28 also to swing about the opposite guide rail. However, this does not cause any twisting of the car frame but simply results in the auxiliary crosshead assuming an angular relationship with respect to the main crosshead with the car frame slightly tilted due to the movement of the shaft 28.

As the car continues its movement and comes to a section in which the guide rails are plumb, the auxiliary crosshead swings back parallel with the main crosshead and continues in this relationship until another section of the hatchway is reached in which the guide rails are longitudinally misaligned. The net result is that in the movement of the car up and down the hatchway, instead of there being a weaving or twisting of the car frame each time the car comes to a section of rails that are in longitudinal misalignment, the auxiliary crosshead assumes an angular relationship with respect to the main cross-

head each time these misaligned sections are reached so that no twisting forces are transmitted to the framework or elevator cab.

In the arrangement shown in Figure 3, the upper guide shoes 23 are mounted on the crosshead 58. The lower cross member 60 of the car framework does not carry the safety brakes. Instead, the safety brakes 61 are carried by the ends of an auxiliary cross member 62 beneath and coextensive with the cross member 60. The guide shoes 21 for the bottom of the car frame are mounted on the housings for the safety brakes. The auxiliary cross member comprises a pair of spaced channel members 63 joined at the bottom by a plate 64 and at the top by a plate 65. The auxiliary cross member is pivotally mounted on a vertical shaft 66 extending downwardly from cross member 60. This shaft is positioned in apertures 67 in plates 68 and 70 joining the channels 71 and 72 of cross member 60. This shaft extends through bearing apertures 73 in plates 64 and 65. The shaft is held in position on cross member 60 by shoulders 74 formed on the shaft. The lower end of the shaft is threaded and is provided with lock nuts 75 for retaining the auxiliary cross member on the shaft. Opposed plates 76 and 77 are secured to the cross members at the ends thereof and serve to take any thrust which may develop between these cross members including the upthrust when the safety brakes are applied.

In operation, when the car passes a point in the hatchway in which the guide rails are longitudinally misaligned with each other, the auxiliary cross member swings about its pivot in accordance with the misalignment thereby preventing the transmission of twisting force to the car frame. The safety brakes being carried by the auxiliary cross member do not contact the guide rails as these misaligned sections are reached. As the car continues its movement and runs off this section, the auxiliary cross member swings back parallel with cross member 60 and continues in this relationship until another section of longitudinal misalignment of the rails is reached. It is believed that this operation will be understood without further description in view of the detailed description of operation in connection with the arrangement shown in Figures 1 and 2.

While the invention has been described as applied to elevator cars it is also applicable to counterweights and to the movable bodies of other types of elevator installations such as dumbwaiters.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In an elevator installation; a body vertically movable in the elevator hatchway; a pair of oppositely disposed guide rails for said body; a pair of guide shoes at one extremity of said body, one for each guide rail; an additional pair of guide shoes at the other extremity of said body, one for each guide rail; and means mounting said guide shoes on said body to provide a three point connection of the guide shoes to the body.

2. In an elevator installation; a body movable up and down the elevator hatchway; a pair of oppositely disposed guide rails for said body; a

pair of guide shoes, one for each guide rail; means mounting said guide shoes on said body at one extremity thereof; an additional pair of guide shoes, one for each guide rail; and means mounting each of said additional guide shoes on said body at the other extremity thereof to swing about a vertical axis between the guide rails.

3. In an elevator installation; a body movable up and down the elevator hatchway; a pair of opposed guide rails for said body; a pair of guide shoes, one for each guide rail, mounted on said body at one extremity thereof for cooperation with said guide rails; a member extending between said rails at the other extremity of said body; a vertical shaft midway between said guide rails for supporting said member for pivotal movement with respect to said body; and an additional pair of guide shoes, one for each guide rail, mounted on said member for cooperation with said guide rails.

4. In an elevator installation; framework for a body movable up and down the elevator hatchway; a pair of guide rails, one on each side of said framework; a pair of guide shoes secured to the framework at one extremity thereof, one at each side of the framework, for cooperation with said guide rails; a cross member; means mounting said cross member at the other extremity of said framework for pivotal movement about the vertical center thereof; and an additional pair of guide shoes mounted on said cross member, one at each side of said framework, for cooperation with said guide rails.

5. In an elevator installation; framework for a body movable up and down the elevator hatchway, said framework having a lower cross member and an upper cross member; a pair of guide

rails, one on each side of said framework; a pair of guide shoes secured to one of said cross members, one at each end thereof, for cooperation with said guide rails; a vertical shaft secured to the other of said cross members at the center thereof; an auxiliary cross member pivotally mounted on said shaft; slidable means for each end of said auxiliary cross member for taking any thrust that may develop between said auxiliary cross member and said other cross member; and an additional pair of guide shoes mounted on said auxiliary cross member, one at each end thereof, for cooperation with said guide rails.

6. In an elevator installation; framework for a body movable up and down the elevator hatchway, said framework having a lower cross member and an upper cross member joined by up-rights; a pair of guide rails, one on each side of said framework; a pair of guide shoes secured to one of said cross members one at each end thereof, for cooperation with said guide rails; a pivot shaft secured to the other of said cross members and extending vertically therefrom at the center thereof; an auxiliary cross member pivotally mounted on said shaft and coextensive with said other framework cross member; a pair of saddles mounted one on each end of said other framework cross member, a pair of plates, one on each end of said auxiliary cross member, for slidably engaging said saddles; a compression spring on said shaft for maintaining said plates against said saddles; and an additional pair of guide shoes mounted on said auxiliary cross member, one at each end thereof, for cooperation with said guide rails.

ERIC ALBERT SAHLIN.