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D. L. LINDQUIST

GUIDE FOR ELEVATORS

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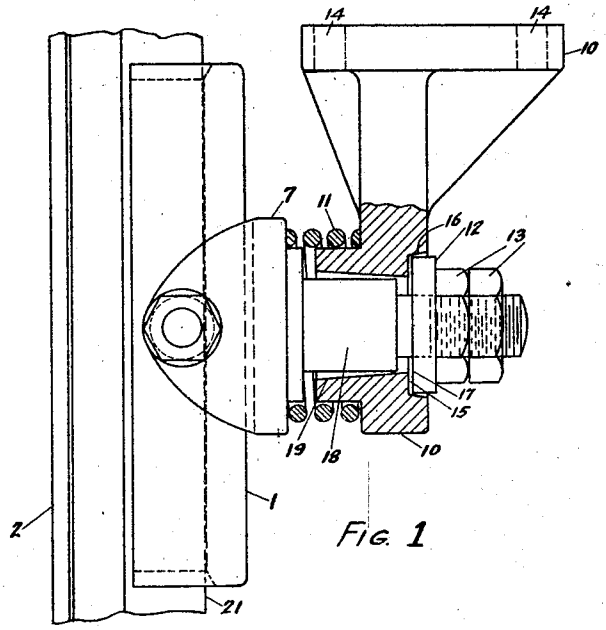

FIG. 1

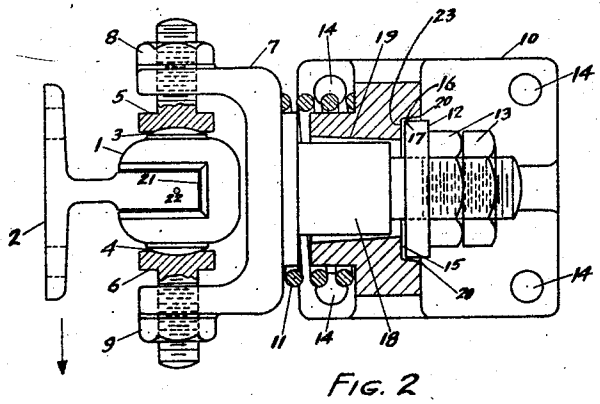

FIG. 2

Inventor

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By his Attorney

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UNITED STATES PATENT OFFICE.

DAVID L. LINDQUIST, OF HARTSDALE, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

GUIDE FOR ELEVATORS.

Application filed October 27, 1923. Serial No. 671,213.

To all whom it may concern:

Be it known that I, DAVID L. LINDQUIST, a subject of the King of Sweden, residing in Hartsdale, in the county of Westchester and State of New York, have invented a new and useful Improvement in Guides for Elevators, of which the following is a specification.

My invention relates to guides for elevators.

The object of my invention is to provide a mounting which will permit the guide shoe to automatically align itself with the guide rail so that there will at all times be substantially uniformly distributed pressure on any contacting surfaces irrespective of any irregularities that may exist in the alignment of the guide rail.

The principle of construction employed to attain the stated purpose, resides, on the one hand, in the provision for freedom of angular movement by the guide shoe support in any direction about a center within the rail, and, on the other hand, in the connection of the guide shoe support with the car in such manner as to permit the support to adjust itself angularly in all directions in its connection with the car and to be extended or retracted as the car moves away from or toward the guide rail. This angular adjustment of the shoe support in its connection with the car, from a central position is, in a preferred form of the invention, resiliently opposed by a spring or the like which tends to restore the shoe support to its central position in its connection with the car.

An embodiment of the invention is shown by way of example in the accompanying drawing and will be described in detail. In said drawing:

Figure 1 is a side view and Figure 2 is a bottom view of my guide shoe mounting, each view being partly in section.

Similar numerals refer to similar parts in both figures.

The guide shoe 1 is arranged to have operative engagement with, and to travel on, the guide rail 2, the latter being mounted in the elevator shaft in any approved way. The guide shoe 1 is provided with two spherical shaped projections 3 and 4, diametrically opposite on either side of the shoe, and presented outwardly to be engaged by spherical cupped recesses in the heads of aligning bolts 5 and 6. The spherical projections and recesses referred to are of equal radii with a common center within the rail. These aligning bolts are mounted in the yoke 7, and held in place by nuts 8 and 9. The guide shoe support thus constituted is yieldingly held in bracket 10 by means of spring 11 on one side and collar 12 and nuts 13 on the other side. The bracket 10 is adapted to be fastened to the elevator car frame by bolts or other means through holes 14 in the bracket. The arrangement shown is for a lower guide shoe on the elevator car. By reversing the bracket, the same parts can be used for the upper guide shoe.

The guide shoe 1 is shown in contact with the edge 21 of the guide rail 2, the spring 11 being compressed slightly and the collar 12 being so adjusted by nuts 13 that a slight clearance is left between this collar and the bracket 10 as shown at points 15. This position of the collar in reference to the bracket is a position that the parts may assume during the travel of the car. If the distance between the car and the guide rail becomes less during any part of the travel of the car, the spring 11 will be further compressed, leaving a greater clearance between the collar 12 and the bracket 10; and if the distance becomes greater, the spring will expand, reducing the clearance between the collar and the bracket until collar 12 seats on the bottom surface of recess 16.

The ball and socket connection between the guide shoe 1 and the guide shoe support permits rotation between the guide shoe and guide shoe support, within certain limits, in any direction and at the same time maintains uniformly distributed contact pressure between the guide shoe and the guide rail. Since any pressure exerted between the rail and the elevator car must be transmitted through the ball and socket joint and since the center of rotation of the guide shoe 1 lies at point 22 within the confines of the rail itself, it is apparent that the pressure between the rail surfaces and the guide shoe will be substantially uniformly distributed over the bearing surfaces.

Assuming that at a certain point in the length of the rail, its mounting is such that it is displaced in the direction of the arrow, Fig. 2, while the bracket 10 remains in the position shown in the drawing, the guide shoe will rotate in its ball and socket joint

and the guide shoe support will rock or pivot in the bracket 10 so that its axis through barrel 18 will be at an angle to the axis of the tapered hole 19. If this rocking is sufficient, the edge 17 of collar 12 will bear against the surface of the seat 16 at the point 23, while at the same time the spring 11 will be compressed to a greater degree on the lower side, Fig. 2, and to a less degree on the upper side. This results in force opposing the rocking movement without materially changing the total spring pressure exerted by spring 11.

From the above description, it is seen that I have provided a guide shoe construction and mounting in which the guide shoe follows the rail throughout its length with its bearing surfaces effective throughout their area so that the wear is evenly distributed over the bearing surface. The guide rail may be twisted out of line with the elevator car in a horizontal plane and also bent in a vertical plane but in either case, the guide shoe will maintain uniform contact with the guide rail. The shoe is free to respond to any irregularity in the guide rail.

By the use of my guide shoe mounting quiet and smooth operation of the elevator is secured. The friction and wear of the parts in sliding engagement are minimized, loss of power is reduced, and satisfactory life obtained. Its construction is compact and lends itself to easy renewals of the wearing parts.

I claim:

1. A guide for elevators comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon, and means angularly movable in any direction about a center within the rail, for supporting the guide shoe from the car.

2. A guide for elevators, comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon, and means having a pivotal connection with the car and angularly movable on said guide shoe in any direction about a center within the rail, for pivotally supporting the guide shoe from the car.

3. A guide for elevators, comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon, and means having a resilient pivotal connection with the car, and angularly movable on said guide shoe in any direction about a center within the rail, for supporting the guide shoe from the car.

4. A guide for elevators, comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon, having diametrically opposite spherical surfaces of equal radii from a common center within the guide rail, a member having spherical surfaces concentric with those of the guide shoe and in engagement therewith for angular movement in any direction about the center of curvature within the rail, and a connection for supporting said member from the car.

5. A guide for elevators, comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon, having diametrically opposite spherical surfaces of equal radii from a common center within the guide rail, a member having spherical surfaces concentric with those of the guide shoe and in engagement therewith for angular movement in any direction about the center of curvature within the rail, and a resiliently yielding pivotal connection for supporting said member from the car.

6. A guide for elevators, comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon, means connected with said guide shoe and angularly movable thereon in any direction about a center within the rail, and a connection, permitting movement of the car toward and away from said rail, for supporting said means and guide shoe from the car.

7. A guide for elevators comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon, means connected with said guide shoe and angularly movable thereon in any direction about a center within the rail, and a resilient connection permitting movement of the car toward and away from said rail, for supporting said means and guide shoe from the car.

8. A guide for elevators, comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon and means having an extensible pivotal connection with the car and angularly movable on said guide shoe in any direction about a center within the rail, for pivotally supporting the guide shoe from the car while permitting movement of the car toward and away from said guide rail.

9. A guide for elevators, comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon and means supporting the guide shoe and pivotally connected with the car for angular motion in any direction.

10. A guide for elevators, comprising in combination with the elevator guide rail, a guide shoe adapted to travel thereon, having outwardly presented diametrically opposite spherical surfaces with equal radii from a common center within the guide rail, a member having spherical surfaces concentric with those of the guide shoe and adjustable inward to bring them into engagement therewith to effect the mounting of said member upon said guide shoe for angular movement thereon in any direction about the center of curvature within the rail, and a connection for supporting said member from the car.

11. An elevator guide comprising in combination with the elevator guide rail, and the guide shoe traveling thereon, a yoke supporting said shoe and having an extension, a bracket carried by the car and having a perforation through which the extension of said yoke passes, a collar secured on the outer end of said extension and adapted to seat against the outer face of said bracket, and a compression spring confined between the inner face of said bracket and the arms of said yoke.

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

DAVID L. LINDQUIST.