Jan. 7, 1941. W. F. EAMES 2,228,227

GUIDING MEANS FOR ELEVATORS

Filed April 18, 1939

Fig. 1.

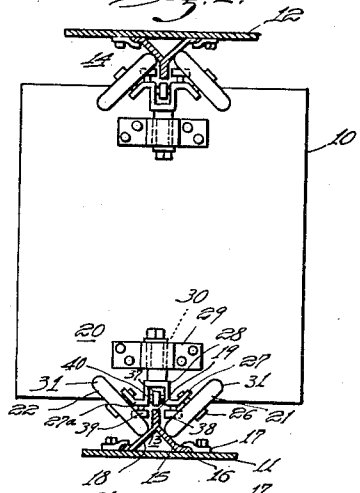


Fig. 2.

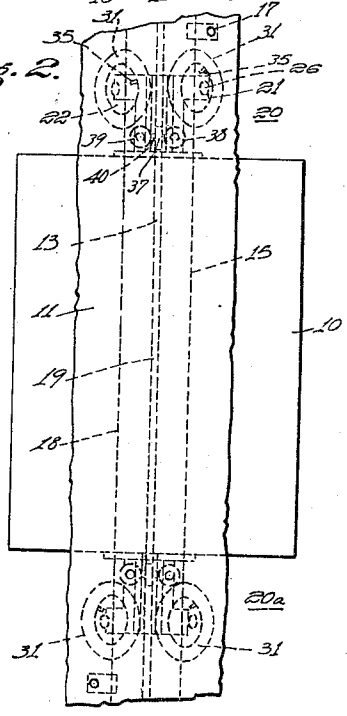


Fig. 3.

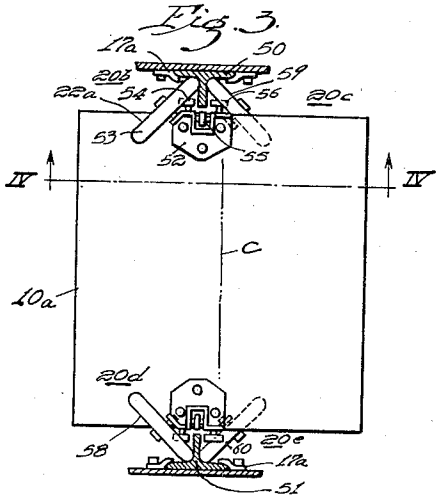
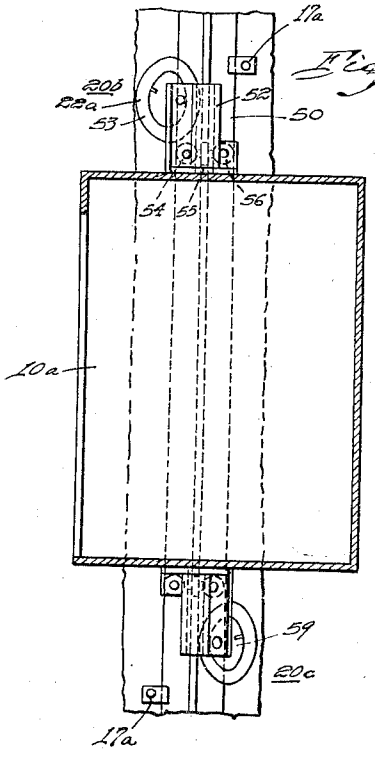


Fig. 4.



WITNESSES:

E. C. Reiding

Birney Hines

INVENTOR

William F. Eames.

BY

G. C. Sattzman

ATTORNEY

Patented Jan. 7, 1941

2,228,227

UNITED STATES PATENT OFFICE

2,228,227

GUIDING MEANS FOR ELEVATORS

William F. Eames, Westfield, N. J., assignor to Westinghouse Electric Elevator Company, Bloomfield, N. J., a corporation of Illinois

Application April 18, 1939, Serial No. 268,508

4 Claims. (Cl. 187—95)

My invention relates to elevator guide means and more particularly to the guide rails and to the guide devices mounted on the car for cooperation with the guide rails.

One object of my invention is to provide a guide means for an elevator car which shall eliminate all vibration and rumble in the operation of the car.

Another object is to provide a guide mechanism for elevator cars in which pneumatic-tired wheels may be used for guiding the car.

A further object is to provide improved forms of guide rails for cooperation with pneumatic-tired guide wheels in order to secure practically noiseless operation of the car.

A still further object is to provide an arrangement of pneumatic-tired guide wheels and guide rails with reference to the car which will decrease the cost of manufacture, installation and maintenance of the elevator guide means.

It is also an object to provide a combination of pneumatic-tired guide wheels, cooperating guide rails and auxiliary limiting guide devices which will limit sideway movement of the car if the tires get soft or, during emergency stopping, if uneven application of the safety jaws to the guide rails tends to cause the car to be deflected excessively.

For a better understanding of my invention, reference may be had to the accompanying drawing, in which:

Figure 1 is a top plan view of an elevator installation equipped with my improved guide means;

Fig. 2 is a view in side elevation of the guide means and the elevator car illustrated in Fig. 1;

Fig. 3 is a top plan view of an elevator embodying a modification of the guide means shown in Fig. 1; and

Fig. 4 is a view taken along the lines IV—IV of Fig. 3.

Referring more particularly to Figs. 1 and 2 of the drawing, I have illustrated an elevator car 10 as disposed in a hatchway represented by segments of the side walls 11 and 12. A pair of guide rails 13 and 14 are disposed one on each side of the car for guiding the car in its up and down operation in the hatchway. The guide rail 13 is of Y-shape in cross section and its arm 15 is provided with a flange 16 disposed to rest against the side wall of the hatchway and to be secured thereto by means of a plurality of clips and bolts 17. The arm 18 of the rail is provided with a similar flange secured to the hatchway wall by similar clips so that the guide rail will be firmly held in position with its stem portion 19 extending toward the car. The guide rail 14 is of the same shape as the guide rail 13 and is secured to the opposite side wall 12 in the same manner.

A guide assembly 20 comprising a pair of guide wheels 21 and 22 is mounted on the top of the car in position to engage the guide rail 13. The wheel 21 is rotatably mounted by means of an axle bolt 26 on the outer end of an arm 27 disposed on a spider 28, the inner portion of which is mounted in a bracket 29 firmly secured to the top of the car. The axle 26 of the wheel 21 may be provided with suitable sleeve bearings, roller bearings or ball bearings as desired to decrease the friction of rotation of the wheel. The rear portion of the spider 28 may be mounted in a sleeve 30 of a suitable resilient material in the bracket 29 to permit a slight play or "give" between the guides and the car so as to reduce the amount of vibration and noise of operation of the car.

The wheel 22 is similar to the wheel 21 and is mounted upon an opposite arm 27*a* forming a part of the spider 28.

As shown in the drawing, each of the wheels 21 and 22 is provided with a pneumatic tire 31. The wheels are disposed at angles to the side of the car so as to bear directly upon the outer faces of the arms 15 and 18 of the guide rail. The mounting of the wheels should be such that they are positioned at approximately right angles to each other so that their tires will engage the outer guiding faces of the Y arms 15 and 18 between them and thus guide the car along the rail.

As shown in Fig. 2, each of the tires is provided with a valve 35 by means of which it may be inflated and maintained at the proper pressure. Although any suitable sized pneumatic tire may be used, a tire of about twelve inches in diameter will be found to be preferable in the majority of installations.

At times the pneumatic tires on the guide wheels may get soft or fail to maintain their full working pressure. It is also possible that the braking jaws (not shown) for stopping the car in an emergency operation may grip the rails unevenly and cause the car to deflect sideways excessively. In order to prevent any excessive deflection or sideway movement of the car, I have provided each assembly 20 of the pneumatic wheels with a group of auxiliary rollers 37, 38 and 39 to limit the lateral movements of the car. The roller 37 is mounted below the wheels 21 and

22 in the lower central part of the spider 28 by means of an axle pin 40 disposed across the arms 27 and 27a. The roller 38 is rotatably mounted on the outer face of the arm 27 and the roller 39 is rotatably mounted on the outer face of the arm 27a. As shown in the drawing, the stem of the guide rail 13 is provided with a bearing surface parallel to the car and with two bearing surfaces at right angles to the car. The roller wheels 37, 38 and 39 are disposed just out of touch with the bearing surfaces on the stem. This distance should be such that the roller wheels will not touch the guide rail as long as the car is supported in its correct position by the pneumatic wheels, but when the tires get soft or some force is applied to the car sufficient to overcome the pressure of the pneumatic tires and move the car a predetermined distance out of its correct vertical line of travel, then the auxiliary rollers will engage the stem of the guide rail and limit the out-of-position movement of the car to a predetermined amount.

As indicated in the drawing, a similar guide assembly 20a is mounted on the bottom frame of the car to engage the guide rail 13, and like guide assemblies are disposed on the opposite side of the car to engage the guide rail 14 so that the car will be accurately guided along the guide rails as it is operated in its hatchway.

By the foregoing description it is seen that I have provided an improved guiding means for an elevator car in which pneumatic-tired wheels may be used to eliminate all vibration and rumble in the operation of the car in the hatchway.

Referring now to the modification shown in Figs. 3 and 4, it will be found that the guide rails 50 and 51 are of T-shape in cross section with their stem portions extending toward the car 10a and their flanges secured to the side walls of the hatchway by suitable clips and bolts 17a. It will also be observed that the rails are located at a point to the left of the center of gravity C of the car.

In the modification shown, the guide assembly 20b on the top of the car embodies a pneumatic-tired wheel 22a rotatably mounted on a fixed supporting bracket 52. The wheel is disposed at an angle to the side of the car so that its periphery or tire 53 will engage the inner angular guiding face of the rail disposed away from the center of gravity of the car. A plurality of auxiliary limiting rollers 54, 55 and 56 are mounted below the wheel 22a in the bracket 52 to extend toward the three guiding faces on the stem portion of the rail. The rollers are disposed just out of touch with but close enough to the stem portion of the rail to limit the side sway of the car to a predetermined amount if it should become unbalanced by reason of a shift in its loading or softness of the pneumatic tire.

The guide assembly 20c underneath the car is like the guide assembly 20b just described and is mounted in position to engage the inner corner guiding face of the rail 50 disposed toward the transverse center of gravity of the car. Similar guide assemblies 20d and 20e are disposed on the opposite side of the car to engage the guide rail 51 in a like manner so that the top wheels 22a and 58 bear against the sides of the rails away from the center of gravity of the car and the bottom wheels 59 and 60 bear against the sides of the rails facing toward the center of gravity of the car. Hence, as illustrated in Fig. 3, with the center of gravity of the car disposed at the right of the guide wheels, the weight of the car will cause the upper wheels 22a and 58 to bear against the left sides of the rails and the lower wheels 59 and 60 to bear against the right sides of the rails to guide the car accurately along the path it should travel in its operation in its hatchway. If the car tends to move or sway sideways out of its correct position because of soft tires, unequal loading or uneven application of the safety jaws, the auxiliary rollers on the guide assemblies will limit the movement to a predetermined small amount to insure safe operation of the car at all times.

By this construction, it will be seen that I have provided an improved pneumatic wheel guiding means for an elevator car which will eliminate the noise and rumble in the operation of the car and which will at the same time decrease the number of parts and therefore the cost of construction, installation and maintenance of the pneumatic roller guide wheels.

Although I have illustrated and described only two adaptations of my invention, it is understood that changes therein and further modifications thereof may be made without departing from the spirit and scope of my invention.

I claim as my invention:

1. A guiding mechanism for an elevator car operable in a hatchway comprising a guide rail to be attached to the wall of the hatchway, said rail having a pair of guiding faces disposed at an angle to each other in the direction of the car and a stem portion extending between the guiding faces toward the car, said stem portion having guiding surfaces on its sides and front, a base member to be mounted on the car adjacent to the guide rail, a spider, means for resiliently supporting the spider on the base member, a pair of pneumatic-tired wheels rotatably mounted on the spider at approximately right angles to each other to cause their tires to engage the angular guiding faces of the guide rail between them, and a plurality of rollers rotatably mounted on the spider just out of contact with but close enough to the stem of the guide rail to prevent excessive sideway movement of the car.

2. A guiding mechanism for an elevator car operable in a hatchway comprising a guide rail having a pair of guiding faces disposed at an angle to each other and a stem portion extending between the guiding faces toward the car, a base member disposed on the car adjacent to the guide rail, a spider, means for resiliently supporting the spider in the base member, a pair of pneumatic-tired wheels rotatably mounted on the spider at approximately right angles to each other to cause their tires to engage the angular guide faces of the guide rail between them, and additional limiting devices mounted on the spider just out of contact with, but close enough to the stem of the guide rail to limit excessive sideway movement of the car to a predetermined amount.

3. A guiding mechanism for an elevator car operable in a hatchway comprising a guide rail of Y shape in cross-section with the stem of the Y extending toward the car, a base member disposed on the car adjacent to the guide rail, a spider rotatably mounted on the base member, a pair of pneumatic-tired wheels rotatably mounted on the spider at approximately right angles to each other to cause their tires to engage the outer faces of the arms of the Y shaped guide rail between them, and limiting means mounted on the spider just out of contact with but close enough to the Y stem of the guide

rail to limit sideway movement of the car to a predetermined amount.

4. A guide mechanism for an elevator car operable in a hatchway comprising a guide rail of Y shape in cross-section having the stem portion of the Y extending toward the car, a base member mounted on the car adjacent the guide rail, a pair of pneumatic tired wheels rotatably mounted on the base member at approximately right angles to each other to cause their tires to engage the outer faces of the arms of the Y-shaped rail between them, and a plurality of rollers mounted on the base member just out of contact with, but close enough to the stem of the guide rail to limit sideway movement of the car to a predetermined amount.

WILLIAM F. EAMES.