Dec. 6, 1949 E. A. SAHLIN 2,490,652

GUIDE FOR ELEVATORS

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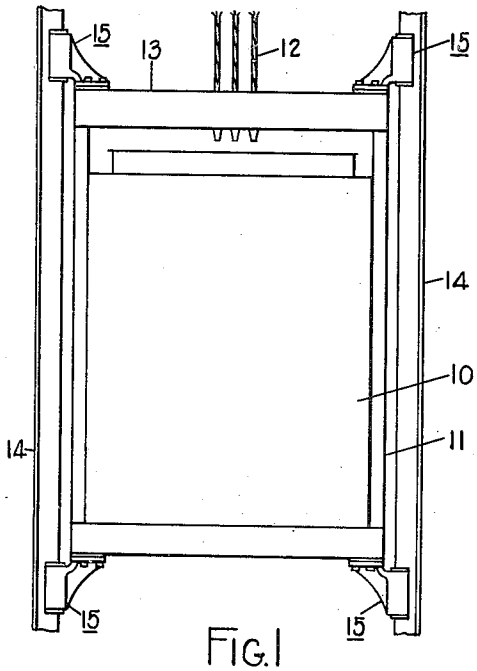


FIG. 1

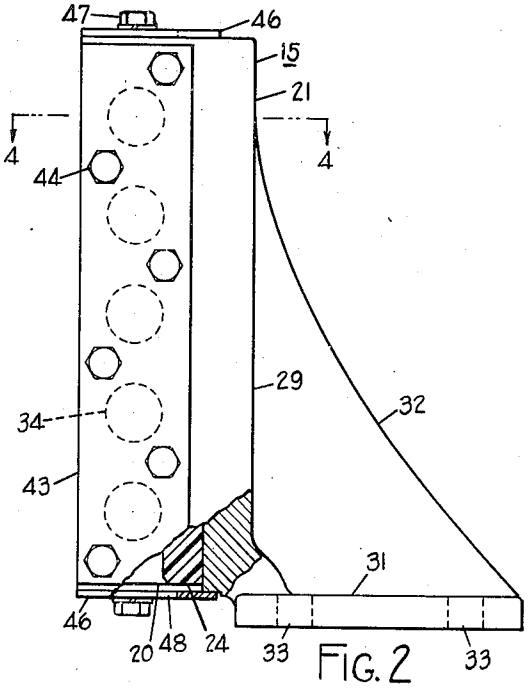


FIG. 2

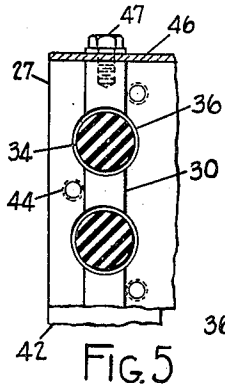


FIG. 5

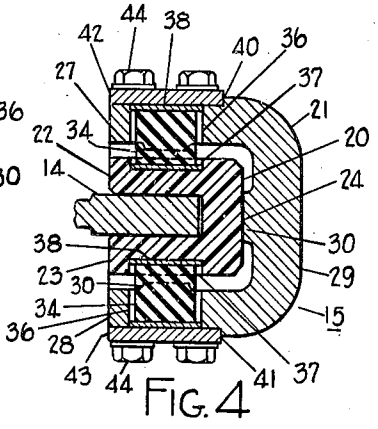


FIG. 4

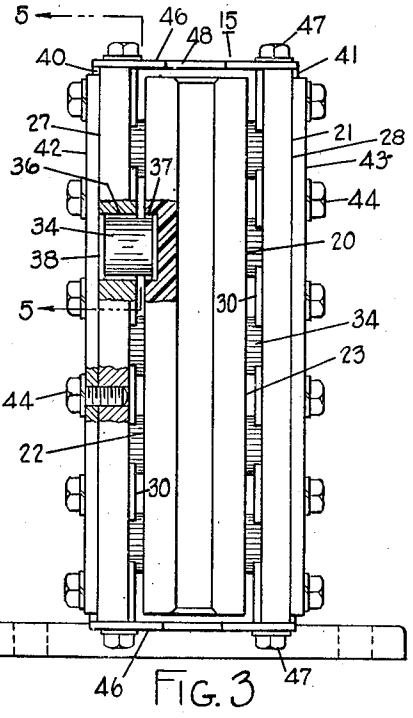


FIG. 3

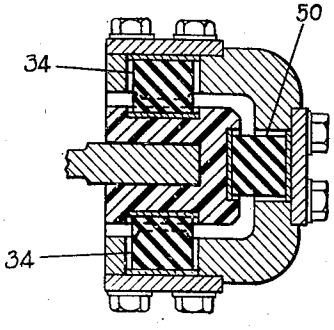


FIG. 6

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GUIDE FOR ELEVATORS

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9 Claims. (Cl. 187—95)

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The invention relates to guides for elevators.

Guide shoes are provided on the elevator car and counterweight for cooperating with the guide rails of elevator installations to guide the car and counterweight in their movement in the elevator hoistway. It is desirable that these guide shoes operate smoothly on the guide rails, notwithstanding imperfect rail joints, rail misalignments and other imperfections and that they are noiseless in operation. There are certain advantages in employing guide shoes of the type which slide on the guide rails. Such guide shoes are usually in the form of gibs of one or more pieces carried in a housing. Guide shoes of this type have been proposed in which resilient means is provided between the gibs and the housings to provide smooth operation with a minimum of noise and reduction in wear. Such guide shoes may be termed flexible guide shoes.

It is the object of the invention to provide a flexible guide shoe of simple construction, in which the cushioning may be readily adjusted and in which the resilient means between the gib and the housing has a high compression ratio.

In carrying out the invention according to the arrangements which will be described, rubber inserts, preferably in the form of plugs, are positioned between the gib and the housing. These plugs may be arranged between the housing and the sides of the gib or between the housing and both sides and back of the gib. It is preferred to utilize an odd number of plugs between the housing and each gib portion for purposes of adjustment. These plugs are compressed when in place to maintain them in contact with the gib at all times as the guide shoe runs over the rail.

Features and advantages of the invention will become apparent from the above statement and from the description which follows and appended claims.

In the drawings:

Figure 1 is a view in elevation of an elevator car and its guide rails, with guide shoes embodying the invention mounted on the car for cooperating with the rails;

Figure 2 is an enlarged view in side elevation, with parts broken away, of a guide shoe embodying the invention in which the rubber plugs are arranged between the housing and the sides of the gib;

Figure 3 is a view of the same in front elevation, with parts broken away;

Figure 4 is a view in section taken along the line 4—4 of Figure 2;

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Figure 5 is a view in section taken along the line 5—5 of Figure 3; and

Figure 6 is a view, similar to Figure 4, of a guide shoe embodying the invention in which the rubber plugs are arranged between the housing and the back as well as the sides of the gib.

Referring first to Figure 1, the elevator car comprises a cab 10 supported in the car framework 11. The hoisting cables 12 are secured to the upper cross member 13 of the car framework. The car is guided on two guide rails 14 by means of four guide shoes 15, mounted two on each side, one at the top and one at the bottom of the car framework. These guide shoes are identical in construction.

Reference may now be had to Figures 2, 3, 4 and 5 wherein the details of one of these guide shoes are shown. The guide shoe comprises a single piece gib 20 arranged in a housing 21. The gib is of a graphite impregnated phenolic material but may be of other suitable material such as cast iron or bronze. Gib 20 is of an elongated construction, U-shaped in cross section and having side portions 22 and 23 for cooperating with the sides of the guide rail 14 and a back portion 24 for cooperating with the face of the guide rail. The housing likewise is of elongated construction, U-shaped in cross section and having side portions 27 and 28 and back portion 29. A longitudinally extending boss 30 is formed on the housing facing the gib on each of the sides and the back. The housing is formed with a base 31 extending at right angles to the back portion 29 and a strengthening rib 32 extending between the base and the back portion. Apertures 33 are provided in the base for receiving the bolts for mounting the guide shoe on the car framework.

In the embodiment shown in Figures 2, 3, 4 and 5 rubber plugs 34 are provided between the sides 22 and 23 of the gib and the sides 27 and 28 of the housing. The back of the gib abuts the boss 30 on the back of the housing. A slight operating clearance is provided between the sides of the gib and the sides of the rail, while considerable operating clearance is provided between the face of the rail and the back of the gib. A clearance space is provided between the sides of the gib and the bosses formed on the sides of the housing. Apertures 36 are provided in the sides of the housing for receiving the rubber plugs. Aligned therewith in the gib are depressions 37 into which the rubber plugs extend. Each rubber plug has a round plate 38 on each end, secured thereto as by vulcanizing. The sides of the housing are

formed with indents on the outside as indicated at 40 and 41 to receive pressure plates 42 and 43. The rubber plugs are of a length such that, before the pressure plates are applied, they extend outwardly beyond the indents in the housing. The pressure plates are secured to the housing by means of screws 44 and when clamped in position compress the plugs against the sides of the gib. The plates 38 on the ends of the plugs are made larger than the rubber portions and the apertures 36 and depressions 37 are of a diameter to receive the plates. This provides clearance between the rubber portions of the plug and the apertures to allow for the bulge in the rubber when the plugs are compressed.

The gib is suspended in the housing by the rubber plugs and is dragged along by the shearing action on the rubber as the guide shoe moves along the guide rail. The ends of the housing are covered by plates 46 the principal function of which is to keep out dirt. These plates are secured to the shoe by means of screws 47 and are provided with slots 48 to fit around the guide rail. Considerable clearance exists between these plates and the ends of the gib. However, these plates act as abutments for the gib to retain them in place under conditions of high friction.

An odd number of plugs is utilized for each side of the gib. This provides a convenient arrangement for adjusting the cushioning while retaining a balanced pressure. Referring to the plugs from top to bottom as first, second, third, fourth and fifth, the removal of the third plug on each side gives a minimum reduction in pressure while retaining two plugs above balanced by two plugs below on each side. Further reduction is obtained by removing two plugs on each side. To retain the balance, the second and fourth plugs are removed from each side. Further reduction is obtained while retaining balance by removing the first, third and fifth plugs on each side, or the second, third and fourth plugs on each side. Still further reduction is obtained by removing the first, second, fourth and fifth plugs on each side. This is an important advantage in that it enables the same shoe to be utilized for installations of a wide range of duties.

While a guide shoe having the plugs pressing against the sides of the gib is satisfactory for certain installations, it is desirable for others to provide plugs between the back of the housing and the back of the gib. Such an arrangement is illustrated in Figure 6. The arrangement of the side plugs 34 is the same as in Figures 2, 3, 4 and 5. Also the back plugs 50 are of the same construction as the side plugs and are mounted in the same manner. It has been found that there may be a fewer number of back plugs, three being satisfactory. The type of car safety brake is a factor which is important in determining whether or not to provide back plugs. For certain types of safeties, operating clearances make the guide shoe with only the side plugs more satisfactory.

The plugs provide effective sound isolation between the rails and the gib housing, thereby minimizing the noise transmitted to the cab as the guide shoes run over irregularities in the rails. In addition, they compensate for errors in mounting the guide shoes. Also, they reduce the impact to the guide rails and car framework while loading. Furthermore the absorption of the various impacts by the rubber minimizes wear.

It is preferred to utilize an oil resistant rubber for the plugs, such as certain of the synthetic rubbers. Rubber of 40 durometer hardness has been found satisfactory. The plugs are compressed an amount equal to the clearance between the gib and the bosses 30. $\frac{3}{32}$'' clearance between each side of the gib and the housing has been found satisfactory for plugs of 1'' diameter and $\frac{3}{4}$'' high, these plugs being compressed $\frac{3}{32}$'' by the pressure plates. $\frac{1}{8}$'' operating clearance and plugs compressed $\frac{1}{8}$'' are preferred for the back of the gib. This compression of the plugs insures their contact with both the gib and the pressure plate, even though the clearance between the gib and housing on the opposite side or at the other rail is completely taken up. Also, this construction allows greater operating clearance for the car brake safety. It has been customary with roll type safeties to allow $\frac{1}{32}$'' operating clearance. With $\frac{3}{32}$'' clearance between each side of the gib and the housing, operating clearance for the safety can be increased to $\frac{1}{8}$'', minimizing the possibility of safety brake wear.

The rubber plugs between the gibs and the housing have the advantage of a high compression ratio. With clearance space between the gib and the housing as illustrated, the force exerted by the plugs builds up very quickly to oppose any force which tends to further compress them, thereby minimizing the possibility of the clearance between the gib and housing being completely taken up.

While the invention has been described as applied to a guide shoe having a single piece gib, it is also applicable to one having a multi-piece gib, as one with separate sides and back. Also the gib may be divided into one or more lengths.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without department 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. A guide shoe for cooperating with a guide rail to guide a movable body in an elevator hoistway, said guide shoe comprising; a gib for contacting the guide rail; a housing for said gib mounted on said body; and a plurality of rubber inserts on each side of said guide rail extending between said housing and said gib.

2. A guide shoe for cooperating with a guide rail to guide a movable body in an elevator hoistway, said guide shoe comprising; a gib for contacting the guide rail; a housing for said gib mounted on said body; and a plurality of rubber inserts extending between said housing and said gib in a compressed state for resiliently supporting said gib.

3. A guide shoe for cooperating with a guide rail to guide a movable body in an elevator hoistway, said guide shoe comprising; elongated gib portions for contacting the sides of the guide rail; an elongated housing for said gib portions mounted on said body, said housing having its sides spaced from said gib portions; and a plurality of rubber plugs extending between said sides of said housing and said gib portions in a compressed state for resiliently supporting said gib portions in said housing.

4. A guide shoe for cooperating with a guide

rail to guide a movable body in an elevator hoistway, said guide shoe comprising; elongated gib portions for contacting the sides of the guide rail, each of said gib portions having a plurality of depressions positioned in spaced relationship longitudinally in the outer surface thereof; an elongated housing for said gib portions mounted on said body, said housing having its sides spaced from said outer surfaces of said gib portions; a plurality of rubber plugs, one for each of said depressions; and means for mounting said plugs in said sides of said housing to extend in a compressed state into the depressions for which they are provided.

5. A guide shoe for cooperating with a guide rail to guide a movable body in an elevator hoistway, said guide shoe comprising; elongated gib portions for contacting the sides of the guide rail, each of said gib portions having a plurality of depressions positioned in equally spaced relationship longitudinally in the outer surface thereof; an elongated housing for said gib portions mounted on said body, the sides of said housing being spaced from said gib portions and having in each side a plurality of apertures of the same number as those in the corresponding gib portion and aligned therewith; a plurality of rubber plugs, one for each of said depressions, extending into the depressions for which they are provided through the corresponding apertures in said housing; and means for compressing said plugs against the gib portions.

6. A guide shoe for cooperating with a guide rail to guide a movable body in an elevator hoistway, said guide shoe comprising; elongated gib portions for contacting the sides of the guide rail, each of said gib portions having a plurality of depressions positioned in equally spaced relationship longitudinally in the outer surface thereof; an elongated housing for said gib portions mounted on said body, the sides of said housing being spaced from said gib portions and having in each side a plurality of apertures of the same number as those in the corresponding gib portion and aligned therewith; a plurality of rubber plugs, one for each of said depressions, extending into the depressions for which they are provided through the corresponding apertures in said housing, said plugs having plates on both ends of larger size than the plugs, fitting into said depressions and apertures; and means for compressing said plugs against the gib portions.

7. A guide shoe for cooperating with a guide rail to guide a movable body in an elevator hoistway, said guide shoe comprising; an elongated gib for contacting the sides and face of the guide rail, each of the portions of said gib contacting the sides of the guide rail having an odd number of depressions positioned in equally spaced relationship longitudinally in the outer surface thereof; an elongated housing for said gib mounted on said body, said housing being spaced from said side contacting portions of the gib and having in each side a plurality of apertures of the same number as those in the corresponding side contacting portion of the gib and aligned therewith; a plurality of cylindrical rubber plugs, one for each of said depressions in said gib, extending into the depressions for which they are provided through the corresponding apertures in said housing, said plugs being of a length to extend beyond the housing; and means for compressing said plugs the amount they extend beyond said housing.

8. A guide shoe for cooperating with a guide

rail to guide a movable body in an elevator hoistway, said guide shoe comprising; an elongated single piece gib of U-shaped cross section for contacting the sides and face of the guide rail, said gib having an odd number of depressions positioned in equally spaced relationship longitudinally along each side in the outer surface thereof and an odd number of depressions positioned in equally spaced relationship longitudinally along the back in the outer surface thereof; a housing for said gib mounted on said body, said housing also being elongated and of U-shaped cross section with operating clearance between the sides of the housing and the corresponding sides of the gib and between the back of the housing and the back of the gib, said housing having in each side a plurality of apertures of the same number as those in the corresponding side of the gib and aligned therewith and in the back a plurality of apertures of the same number as those in the back of the gib and aligned therewith; a plurality of cylindrical rubber plugs, one for each of said depressions in said gib, extending into the depressions for which they are provided through the corresponding apertures in said housing for yieldingly mounting said gib in said housing, said plugs being of a length to extend beyond the housing; and a plurality of pressure plates, one for each side and the back of the housing, for compressing said plugs the amount they extend beyond said housing.

9. A guide shoe for cooperating with a guide rail to guide a movable body in an elevator hoistway, said guide shoe comprising; an elongated single piece gib of U-shaped cross section for contacting the sides and face of the guide rail; a housing for said gib mounted on said body, said housing also being elongated and of U-shaped cross section with operating clearance between the sides of the housing and the corresponding sides of the gib and between the back of the housing and the back of the gib; an odd number of cylindrical rubber plugs for each side and the back of the gib for yieldingly mounting said gib in said housing, each plug having a metal plate of a diameter larger than that of the plug vulcanized to each end, said gib having depressions of a diameter slightly larger than that of said plates positioned in spaced relationship longitudinally along each side and the back thereof facing said housing into which the plugs extend and said housing having apertures of a diameter slightly larger than that of said plates aligned with said depressions in each side and back thereof through which the plugs extend, said plugs being of a length to extend from their said depressions beyond the housing an amount at least equal to said clearance space between the housing and gib where the plugs are respectively located; and a plurality of pressure plates, one for each side and the back of the housing, for compressing said plugs the amount they extend beyond said housing.

ERIC ALBERT SAHLIN.

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