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GUIDING MEANS FOR DOORS

Filed April 14, 1932

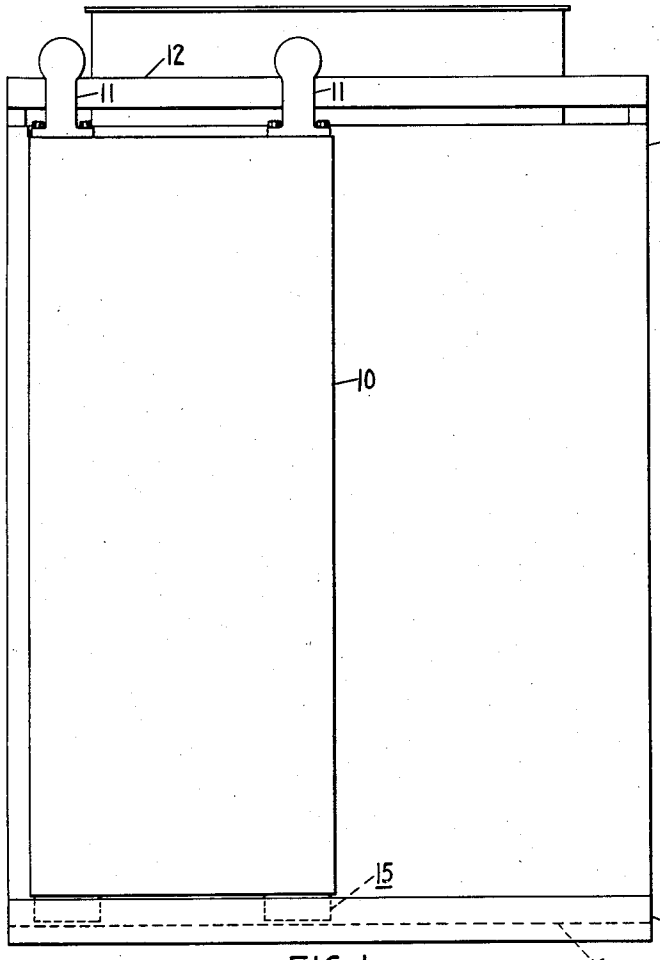


FIG. 1

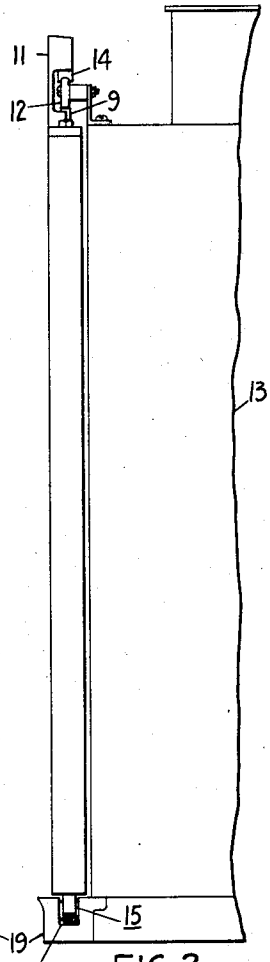


FIG. 2

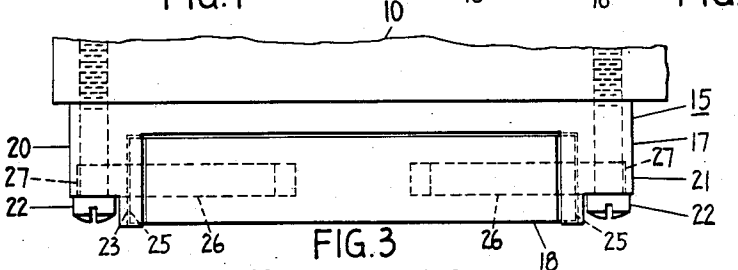


FIG. 3

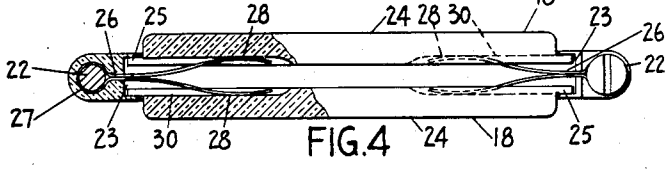


FIG. 4

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GUIDING MEANS FOR DOORS

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4 Claims. (Cl. 16—93)

The invention relates to guiding means for doors and especially for horizontally sliding doors used in elevator installations.

It is customary in elevator installations using horizontally sliding doors to support the doors from their tops. This is usually done by providing guide tracks for the doors and suspending the doors from these tracks through the intermediary of hangers secured to the tops of the doors. The hangers are usually provided with rollers or similar means which rest upon the track to guide the doors in their opening and closing movements.

It is also customary, with such arrangements, to provide additional guiding mechanism for the doors at the bottom. Such guiding mechanism is usually in the form of a channel shaped track in the door sill into which guide means secured to the bottom of the door extend.

The present invention is directed to such guiding mechanism for the bottoms of horizontally sliding doors.

It has been found, in many elevator installations in which sliding doors are provided, that the guiding mechanism at the bottom of the doors is noisy, both during operation of the doors and while the doors are stationary, that considerable friction is present in the guiding mechanism, adding to the force necessary to operate the doors, and that the guiding mechanism wears rapidly, necessitating early replacements.

Some of this trouble is due to misalignment of the overhead track with the guide channel beneath the door. When such misalignment exists, the guide means depending from the door into the channel bear against one side of the channel and, with the kind of guide means heretofore in use, cause a scraping noise as operation of the door takes place. Also, the friction between the guide means and channel causes rapid wear to take place. Noise and wear may also be caused by rough spots in the channel, occasioned either in the manufacture of the parts or in the lodgement of foreign particles in the channel, and by warping of the door.

Where the door is on the elevator car, another cause of wear and noise may be present in misaligned guide rails for the car, occasioned either in the initial installation or later settling of the building. Such condition causes a shock to be transmitted to the car as it passes the point of misalignment, this shock in turn causing the guide means to strike against the side of the channel. Also, the cars in some installations are caused to vibrate due, for example, to vibrations in the hoisting machinery and roping, resulting in the production of rattling noises by the guide means in the channels. Air currents in the hatchway are another cause of such rattling noises, both in the case of car doors and hatchway doors. These air currents cause transverse movements of the doors to take place, with the resultant striking of the guide means against the sides of the channels.

The invention has for its principal object the elimination of all of the above and similar undesirable effects. More specifically, the object of the invention is to provide guiding mechanism, for the bottoms of horizontally sliding doors, which is noiseless, has a minimum of friction and operates with a minimum of wear.

One feature of the invention resides in the provision of guide means, for operation in the guide channel for the bottom of a horizontally sliding door, which acts automatically to compensate for ordinary warping of the door, misalignment of the overhead track with the channel and irregularities in the channel and the like, without being noisy in operation and without increasing the friction and wear of the guiding mechanism.

Another feature of the invention resides in the provision of guide means, for operation in the guide channel for the bottom of a horizontally sliding door, which acts to cushion any vibration transmitted through the doors themselves, or through the cars where the doors are arranged on the cars, and thus eliminates the rattling noise of the guiding mechanism incident to such vibrations.

Another feature resides in the provision of guide means, for operation in the guide channel for the bottom of a horizontally sliding door, which is of simple yet sturdy construction, which may be cheaply manufactured and installed and which admits of ready replacement at small cost.

Still another feature resides in the provision of guide means, for operation in the guide channel for the bottom of a horizontally sliding door, in which the parts of the guide means remain intact, regardless of whether the guide means is in or out of the channel, thus permitting the removal of the door, as in the case of servicing, without the guide means coming apart.

Other features and advantages will be apparent from the following description and appended claims.

In the drawing:

Figure 1 is a front view of a horizontally sliding door arranged on an elevator car, illustrating the arrangement of guide means in the guide

channel for the bottom of the door in accordance with the invention;

Figure 2 is a side view of the same;

Figure 3 is an enlarged detail of the guide means; and

Figure 4 is a plan view of the same, with parts broken away.

Referring to Figures 1 and 2, a single section door has been illustrated. The door, designated 10, is supported by hangers 11 operating on a track 12 supported by the framework of the elevator car 13. The top of the track is illustrated as rounded and the hangers are illustrated as provided with supporting sheaves 14 resting on the track and having grooves of a radius slightly larger than that of the top of the track, thus maintaining the door in the desired position at the top. Up thrust rollers 9 prevent the door from leaving the track.

The bottom of the door is provided with guide means, designated as a whole as 15, extending into the channel 16 provided in the sill 19. One of these guide means, hereinafter referred to as guide shoes, is illustrated for each end of the door. It is to be understood, however, that a single guide shoe may be provided and arranged at the center of the door, if desired.

Reference may now be had to Figures 3 and 4, which illustrate the details of the preferred embodiment of the guide shoe. The shoe is illustrated as out of the channel. The shoe comprises a support 17 and a pair of gibs 18. The support is formed with two end portions 20 and 21. These end portions are provided with holes through which extend screws 22 for securing the support to the bottom of the door. The end portions are formed with oppositely disposed, vertically extending slots 23.

The gibs 18 are alike. Each of these gibs is formed with an outwardly projecting body portion 24 and lips 25 at the ends extending into the slots 23. The gibs are biased for outward movement within the support by means of springs 26 extending inwardly of the support from the end portions 20 and 21. Each spring is formed with a circular portion 27 which fits into an enlargement of the hole for securing screw 22. The screws extend through the circular portions of the springs in securing the shoe to the door. Each spring terminates in two ends 28 which are in the form of spring leaves. These leaves extend into slots 30 formed in the backs of the body portions of the gibs.

To insert the shoe in the channel, the gibs are squeezed together, against the force of springs 26, sufficiently to permit the shoe to enter the channel. Assuming that the door is just being installed, the hangers are off the door so that the guide shoes may be readily inserted in the channel. The hangers are then run on the track and secured to the door.

The width of the support 17 is less than that of the channel. In actual practice, it is usual to provide a channel one-half of an inch in width. It is suitable for such width of channel to have the support three-eighths of an inch in width. With the shoe in the channel, therefore, there is clearance between the support and the channel so that the gibs are forced outwardly by the springs from the sides of the support into engagement with the sides of the channel. Assuming perfect alignment of the overhead track with the channel, the body portions of the gibs extend outwardly one-sixteenth of an inch from the sides of the support, with the channel and support of the dimensions assumed above. The remainder of the body portions of the gibs is within the support, thus providing ample allowance for wear. The springs 26 act through slots 30 to maintain the gibs in their correct positions in the support under operating conditions.

It is preferred to utilize material for the gibs which has a low coefficient of friction, both static and kinetic, and requires little force to move in the channel, which wears well and does not wear the channel, and which stands up under oily and soapy water conditions. A composition of graphite and a phenolic compound with a suitable filler, such as wood pulp, has been found satisfactory. This material, in addition to having the characteristics mentioned above, has valuable sound-deadening qualities.

In operation, upon movement of the door taking place, the guide shoe slides along in the channel. The contact is between the outer faces of the gibs and the sides of the channel. In case an obstruction is met, such as a slight irregularity in the channel, the springs yield to permit the shoe to pass the obstruction without undue friction or noise. In case there is a misalignment between the upper track and channel, the springs yield to automatically compensate for this misalignment without affecting the operation of the door, provided the clearance allowed between the support and the side of the channel is not completely taken up. In a similar manner, the guide shoe allows for the ordinary warping of the door which might take place in practice.

In case of the existence of forces causing vibration of the car, the springs act to cushion this vibration and thus eliminate any rattling of the guide shoe in the channel as an incident thereto. In case of the existence of forces tending to cause vibration of the door, the springs again act to cushion this vibration and prevent any rattling noise of the shoe in the channel. In other words, the door is indirectly connected to the gibs by means of springs which allow the door to float and thus eliminate the direct transmission of vibration.

The guide shoe is of a very simple and yet sturdy construction. The parts of the shoe remain intact whether on or off the door, thus facilitating installation and replacement. It is to be noted that in case of replacements, it will usually be sufficient to simply replace the gibs alone, which may be done at small cost. The fact that the parts of the shoe remain intact, regardless of whether the shoe is in or out of the channel, permits the removal of the door, as in the case of servicing, without the shoe coming apart.

Although the shoe has been described as applied to the door on an elevator car, it is to be understood that it is also applicable to hatchway doors.

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 drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In an elevator door assembly in which the door is supported from the top for horizontal sliding movement and in which means are arranged in the sill beneath the door to provide a channel

extending in the direction of movement of the door, a guide shoe for operation in said channel to guide the door at the bottom, said guide shoe comprising a non-metallic guide member, a support for said member secured to the bottom of the door and extending downwardly into said channel, said support being of a width less than that of said channel, resilient means for moving said member outwardly into engagement with one side of said channel, and means for maintaining the parts of said shoe in assembled relation upon its removal from said channel.

2. In an elevator door assembly in which the door is supported from the top for horizontal sliding movement and in which means are arranged in the sill beneath the door to provide a channel extending in the direction of movement of the door, a guide shoe for operation in said channel to guide the door at the bottom, said guide shoe comprising a support secured to the bottom of the door and having end portions extending downwardly into said channel, said support being of a width less than that of said channel, a pair of oppositely disposed elongated gibs arranged in said support between said end portions, a pair of springs held in each of said end portions, each spring being formed with a pair of leaves extending between said gibs and acting to force the gibs into yielding engagement with the sides of said channel, said gibs being formed with slots into which said leaves extend, stops formed on the ends of said gibs, and stops formed on said end portions in the paths of movement of the stops on the gibs to be engaged thereby when said shoe is out of said channel whereby the parts of the shoe are maintained in assembled relation when the shoe is removed from said channel.

3. A sliding door guide adapted to move within a guide groove, said door guide comprising, a recessed body member arranged to be fixedly attached to the door for moving along the door guide groove, guide members movably mounted within said recessed body member adjacent the sides of the latter, said body member serving to support said guide members, said guide members having flattened exterior surfaces for engaging the sides of the guide groove, and resilient means interposed between said body member and said guide members for urging the latter outwardly and into engagement with the sides of the guide grooves, said body member and said guide member having cooperable elements arranged to limit the outward movement of said guide members.

4. A sliding door guide adapted to move within a door guide groove of lesser width than the thickness of the door, said guide comprising a relatively narrow body member arranged to be fixedly attached to the bottom edge of the door for projecting downwardly from the door and into the guide groove, said body member having a receiving recess therein extending inwardly from the outer wall thereof, a gib member slidingly mounted in said receiving recess for movement transversely of said body member and door, said gib member having an outer flattened surface for slidingly engaging the side of the guide groove, a resilient spring element for urging said gib member outwardly into engagement with the guide groove for guiding the door in its movement, and interlocking elements provided on said gib member and said body member for prohibiting their complete separation under the expansive action of said spring element.

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