June 8, 1937. A. A. MATTHEWS 2,083,502

ELEVATOR RAIL GUIDE

Filed Dec. 7, 1934

Fig. 2.

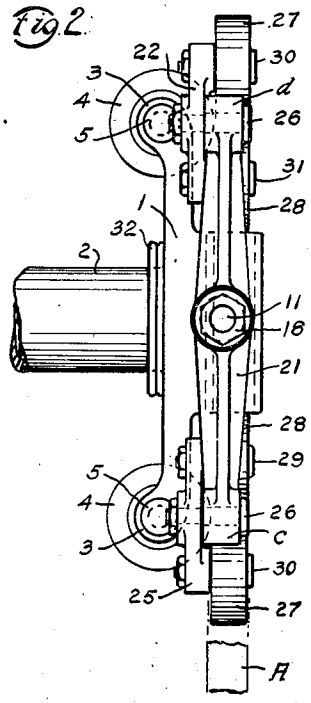


Fig. 1.

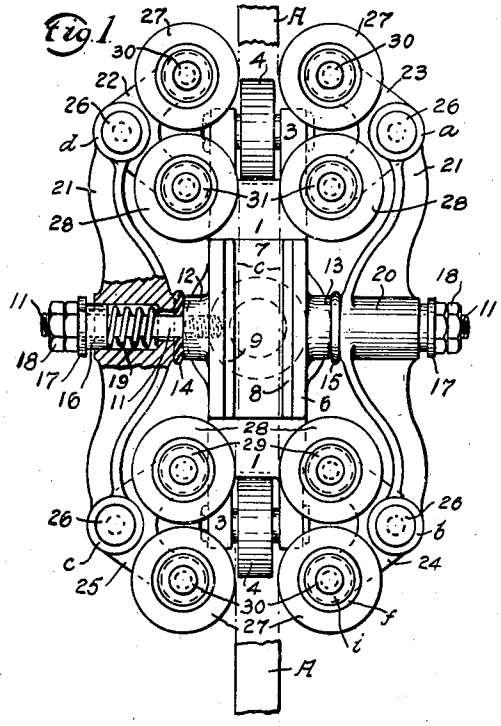


Fig. 4.

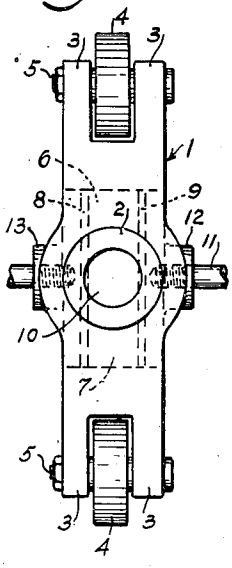


Fig. 3.

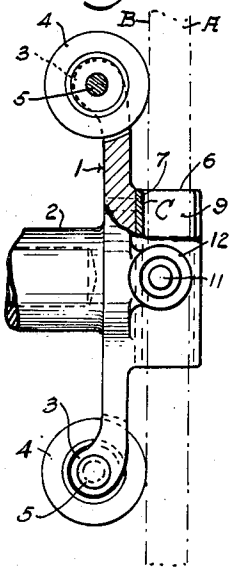


Fig. 6.

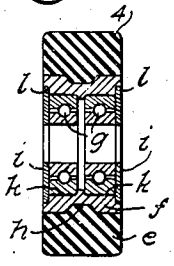
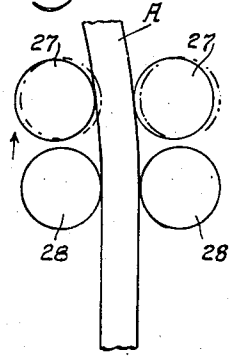


Fig. 5.



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ELEVATOR RAIL GUIDE

Arthur A. Matthews, Brooklyn, N. Y., assignor to Elevator Guide Corporation

Application December 7, 1934, Serial No. 756,379

11 Claims. (Cl. 187—95)

My invention relates to elevator rail guides and more particularly to a roller type of guide that is substantially universally floating during operation of the elevator.

I am aware of some of the various attempts that have been made in the prior art to obtain even, uniform, and more economical operation of elevators by means of improved rails and rail guides, particularly roller guides. Although these attempts constitute some improvement over the old straight sided, square shaped, sliding shoe for guiding elevators, they have not been commercially satisfactory, as evidenced by their absence from the trade and common use.

One of the main difficulties with the square shoe type of guide is that when either it or the guide rail becomes worn, warped, or gets out of alignment in some manner, the elevator is thrown off balance, at least for a portion of its travel. This unbalancing or improper proportioning of the weight causes a side motion of the elevator during operation, which is uncomfortable to the passengers, and more serious still, causes undue wearing and depreciation of the guide and guide rail. Another undesirable characteristic of the straight sided shoe type of guide is that when it gets out of alignment, for any reason, for example when the weight of the car is shifted to one side or to the front or back, a substantial amount of friction between the rail and the guide is effected. This increased friction and increased surface contact area naturally require a greater amount of power for operating the elevator and consequently increased cost of operation. A slight warping or other similar misalignment of the elevator rail will cause one or more of the above described undesirable results.

The original purpose of the roller type of guide was to overcome the disadvantages and limitations of the straight sided shoe type, however, the desired result was not accomplished. Although the substitution of rollers for straight sided shoes did decrease the amount of friction and thereby reduce the operating cost to some extent, the inherent design of these roller type guides including even the more recent roller shoes or guides has been inadequate to meet the normal operating requirements. For example, the design of even the very recent roller type shoes or guides is such that the elevator, when unevenly loaded, as is commonly the case, causes a very large pressure upon one side of the guide and only a slight pressure on the other. This unbalancing of the weight naturally causes increased friction with corresponding increased current consumption as well as uneven and noisy operation of the elevator.

The main reason for the unsatisfactory operation of the old straight sided type of shoe guide and also the more recent roller types is that there is no means provided for automatically adjusting the guide and the elevator to the uneven or unbalanced loading condition. Consequently, the prior art roller guide as well as the square shoe type is pulled over to one side or to the front or back by uneven loading, and the above described undesirable action results.

With the above prior art defects in mind, I have developed an entirely novel type of roller guide that minimizes the disadvantages and limitations of the prior art, as indicated by the following objects of my invention.

An object of my invention is to provide an elevator rail guide that is automatically adjustable to varying and uneven loading of the elevator and to worn, dislocated, or misaligned rails, this adjustment being made in such a manner as to prevent undue friction, noise, and unevenness of operation of the elevator.

Another object of my invention is to provide an elevator guide that is substantially universally floating and which has a plurality of rubber tired ball or roller bearing rollers that resiliently contact the end and sides of the guide rail, thereby effecting smoother, quieter and more economical operation.

A special feature of my rail guide is the positioning of a plurality of ball or roller bearing rollers in such a manner that they are free to oscillate in two directions and thereby compensate for any unevenness or misalignment of the guide rails or unbalancing of the weight of the elevator due to improper loading conditions. As will be explained more in detail hereinafter in connection with the accompanying drawing, my guide comprises two pivotally mounted yokes adapted to oscillate to a limited extent. Each of these yokes has pivotally mounted at its respective ends two or more guide rollers which are individually rotatable and also adapted to oscillate. Each of these rollers is packed with sufficient grease to last the life of the roller and guide, thereby eliminating the common necessity of periodically oiling the guides and the guide rails. My guide operates on dry rails and thereby lessens substantially the maintenance cost and fire hazards.

It is by means of the two resiliently mounted yokes adapted to oscillate in combination with the plurality of rollers resiliently mounted upon

these yokes and capable of rotation and oscillation that enables my elevator rail guide to compensate for variable conditions and thereby provide continuous, uniform, noiseless and economic operation.

The novel features of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation will be clearly understood from the following more detailed description taken in connection with the accompanying drawing in which:

Figure 1 is a front view of my elevator rail guide as it appears from the rail side;

Figure 2 is a side view of the guide shown in Figure 1;

Figure 3 is a fragmentary side view of the guide shown in Figure 1, but with parts removed and partly in section to more clearly illustrate the rail end guiding means;

Figure 4 is a rear view of Figure 3;

Figure 5 is a diagrammatic view illustrating the action of an opposed group of the side rollers upon meeting a warped section of the elevator rail; and

Figure 6 is an enlarged section of one of the ball bearing rubber covered wheels or rollers.

The general construction and appearance of my guide is illustrated in Figures 1 and 2 while the specific arrangement of some of the parts is more clearly understandable from a consideration of Figures 3 and 4. For sake of simplicity and ease of understanding I will therefore start with the latter figures. As shown in Figures 3 and 4 the base frame, generally denoted by 1 and which is of elongate structure, is provided at its opposite ends with bifurcated, out-turned members 3—3. This frame extends, in operation, parallel with the rail A shown by the broken lines in Figure 3. Between the ends 3—3 are located rubber faced wheels or rolls 4, these being of a ball or roller bearing, grease packed type, explained more in detail hereinafter. Each of the rolls is held in its operative position by a headed bolt and nut assembly 5.

The face of the frame 1, which is remote from the rail A, is provided with the usual trunnion 2, for attachment to the elevator in the customary manner. The trunnion may be blind bored, as shown at 10 in Figure 4. In actual operation a coil spring (not shown) is located in the blind bore 10, to hold the guide firmly against the guide rail.

Along a portion of the base frame 1, adjacent the rail A, is provided an integral gibway 6, comprising three sides lined with three bronze sliding gibs, more specifically a bottom gib 7 and two side gibs 8 and 9, which are fixed to their respective operative gibway positions by any suitable means. The gibway slides, as shown in Figures 1 and 3, are so fitted as to leave a clearance C, between the rail sides and end, so that in normal operation, the gib sides 7, 8 and 9 never contact with the rail A, but in the event of a break down of any of the guide rollers, the emergency gib will operate to guide the elevator safely until repair is effected.

Referring now more specifically to Figures 1 and 2, upon the two opposite external sides of the emergency gibway are located aligned threaded bosses 12 and 13 and into these bosses are threaded two aligned yoke shaft studs 11. These studs are threaded at their outer ends to each receive lock nut assemblies, generally denoted by 18, which assemblies and studs resiliently and rotatably support the two yokes 21. Each of the yokes 21 is provided with a central bore 20 in which a stud 11 projects, and a coiled, tensioned spring 19, compressed by a bushing 16. The lower end of the spring 19 rests upon the step of the yoke bore, and the washer and lock nut assemblies 18 complete the operative location of the yoke on the base frame 1. Between the lower face of the yoke and the outer face of each boss 12 and 13, is located a rubber washer 14, which is compressibly acted upon by the spring 19, to cushion both yokes and thereby provide quiet action.

The yokes 21 are provided with bearings *a*, *b*, *c* and *d* on their outer curved extremities. These bearings support, for oscillation, four substantially triangular shaped two-armed roller bearing levers 22, 23, 24 and 25, which are held in said bearings by the four headed bolt and nut assemblies 26. The roller bearing levers 22, 23, 24 and 25 are offset, in assembly, and are provided, at the extremity of each arm, with a bearing 29 to support therein a headed nut and bolt assembly 30 and 31, making a total of eight such assemblies, each assembly carrying ball or roller bearing rubber faced rollers 27 and 28.

The four sets of twin rollers 27 and 28 are mounted on their respective lever arms in such a manner that they lie underneath the yoke arms 21 as shown in Figure 2. By means of the resilient inward thrust of the springs 19 against the compressed washers 14 and 15, these eight rollers are, during operation, in slight resilient contact with the opposite sides of the guide rail, thus contacting it with a firm grip, but at the same time adapted to be moved transversely and vertically to accommodate for any unbalanced load in the elevator or misaligned rail guides.

There is diagrammatically shown in Figure 5, a warped elevator rail and the manner in which my guide operates to accommodate for this condition and thereby prevent any side motion of the elevator. As the guide moves in the direction of the arrow and over the warped portion of the rail, the opposite leading rolls 27 move from the broken line positions to the full line positions. This is accomplished by a slight oscillation of the lever arms 22 and 23 shown in Figure 1, and with a slight compressive action on the rubber threads of the rollers 27 and 28, but without noise and with practically no reaction on the elevator.

One form of my roller construction is shown by the enlarged sectional view in Figure 6. It comprises a cylindrical metallic wheel ring *f* having an annulus *h* cut in the central perimeter thereof and which acts as a kerf for locking thereon a vulcanized rubber wheel tread *e*. The inner surface of ring *f* is stepped by having its surface counterbored from opposite sides as shown at *k*, and countersunk at its outer edges as shown at *e*. The seats formed by *k*—*k* receive from opposite sides and press fitted therein, two ball bearings *g*, which are packed with grease, and then grease-proof closing discs *i* are press fitted in the countersunk portions *l* to close the bearing against loss of grease and entrance of dirt. Ball bearings packed in this manner will run for long periods of time without attention, at least for the life of the rail guide and therefore eliminate the usual periodic oiling necessary with the prior art types of guides.

The four sets of rollers 27 and 28 (see Fig. 1) may be adjusted to their operative positions with the sides of the elevator rails by regulating the

tension upon the coil springs 19 in the stepped bores 20 of yokes 21. This regulation is effected by adjusting the nut assemblies 18—18 threaded upon studs 11. The compression of springs 19 by adjustment of the lock nuts 18, creates a pressure of approximately 600 pounds. This large pressure causes a substantial depression on the rubber washers 14, thus compensating for wear, during operation, of the rubber tread on the four pairs of rollers 27 and 28.

It is to be understood that my invention is not limited to the specific embodiments described above by way of example, but is susceptible to various modifications and changes, all of which come within the purview of the following claims.

What is claimed is:

1. An elevator rail guide comprising a base, two yokes pivotally mounted on said base and adapted to oscillate, and a plurality of rollers located at each end of said yokes, said rollers being pivotally mounted in such a manner that they may rotate and oscillate.

2. An elevator rail guide comprising a base, two yokes pivotally mounted on said base and adapted to oscillate about the center thereof, a lever pivotally mounted at each end of said yokes and adapted to oscillate, and a plurality of rail engaging rollers mounted upon said lever.

3. An elevator rail guide comprising a base, a rotatable but non-oscillating roller mounted at each end of said base, two yokes pivotally mounted on opposite sides of said base, and a plurality of rollers mounted at each end of each of said yokes, said plurality of rollers being adapted to rotate and oscillate.

4. An elevator rail guide comprising a base, an elongated fixed rail gibway formed within and along the central portion of said base but normally out of contact with the elevator rail, a roller mounted at each end of said base, and two yokes pivotally mounted on opposite sides of said gibway, each of said yokes having mounted thereon a plurality of rail engaging rollers.

5. The combination with an elevator guide rail of a rail guide comprising a frame, a fixed rail receiving gibway on said frame having a plurality of gib plates, the dimensions of said gibway being such that it does not contact said rail during normal operation, a plurality of spaced opposing rollers located at the respective extremities of said frame and being mounted for resilient pivotal action on said frame, and means for adjusting the resilient mounting of said latter rollers.

6. An elevator rail guide comprising a frame, two yokes resiliently and pivotally mounted on opposite sides of said frame, each of said yokes having a stepped bore therein, a coil spring located within each of said bores, a stud extending through each of said bores from each side of said frame in opposite axial alignment, a bushing resting upon one end of each of said coil springs, and an adjustable lock nut assembly on the outer end of each of said studs, whereby adjustment of said lock nuts will vary the tension on said spring and vary the distance between said pivotally mounted yokes.

7. An elevator rail guide comprising a frame, two yokes pivotally mounted on opposite sides of said frame, each of said yokes having a bearing on each of its ends, and a lever arm pivotally and resiliently mounted within each of said bearings, each of said lever arms rotatably supporting a pair of aligned rail side engaging rollers.

8. A roller guide shoe for elevator guide rails comprising a frame, means on said frame for attaching the guide shoe to an elevator, a rocker arm positioned on each side of said frame and a roller positioned at each end of each of said rocker arms, the arms being pivotally mounted on said frame intermediate their ends and spaced apart to form a roller gibway therebetween suitable for contacting the side faces of the elevator guide rail, and a roller positioned at each end of said frame for contacting one end face of said guide rail.

9. A roller guide shoe for elevator rails comprising a frame, means on said frame for attaching the guide shoe to an elevator, a rocker arm resiliently mounted on each side of said frame, a rocker attached to each end of each of said rocker arms, at least one roller mounted on each of said rockers, said rocker arms and rockers being so positioned that a rail receiving roller gibway is formed longitudinally along said frame and between said rollers.

10. A roller guide shoe for elevator guide rails comprising a frame, means on said frame for attaching the guide shoe to an elevator, a rocker arm resiliently mounted on each side of said frame, a rocker attached to each end of each of said arms, at least one roller mounted on each of said rockers, said rocker arms and rockers being so positioned that a rail receiving gibway is formed longitudinally along said frame between said rollers, said rollers being adapted to engage the side faces of said guide rail, and a roller mounted at each end of said frame at substantially right angles to said other rollers to engage one of the end faces of said guide rail.

11. A roller guide shoe for elevator rails comprising a frame, means on said frame for attaching the guide shoe to an elevator, a rocker arm pivotally mounted intermediate its ends on each side of said frame, a roller mounted on each end of each of said rocker arms for engaging the side faces of the elevator rail, a roller mounted on each end of said frame for engaging the end face of the elevator rail, said side face engaging rollers and said end face engaging rollers being so positioned that a rail receiving roller gibway is formed longitudinally along said frame between said rollers.

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