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2,860,386

LATCHES FOR COUNTERBALANCED DOORS

Filed July 2, 1956

3 Sheets-Sheet 1

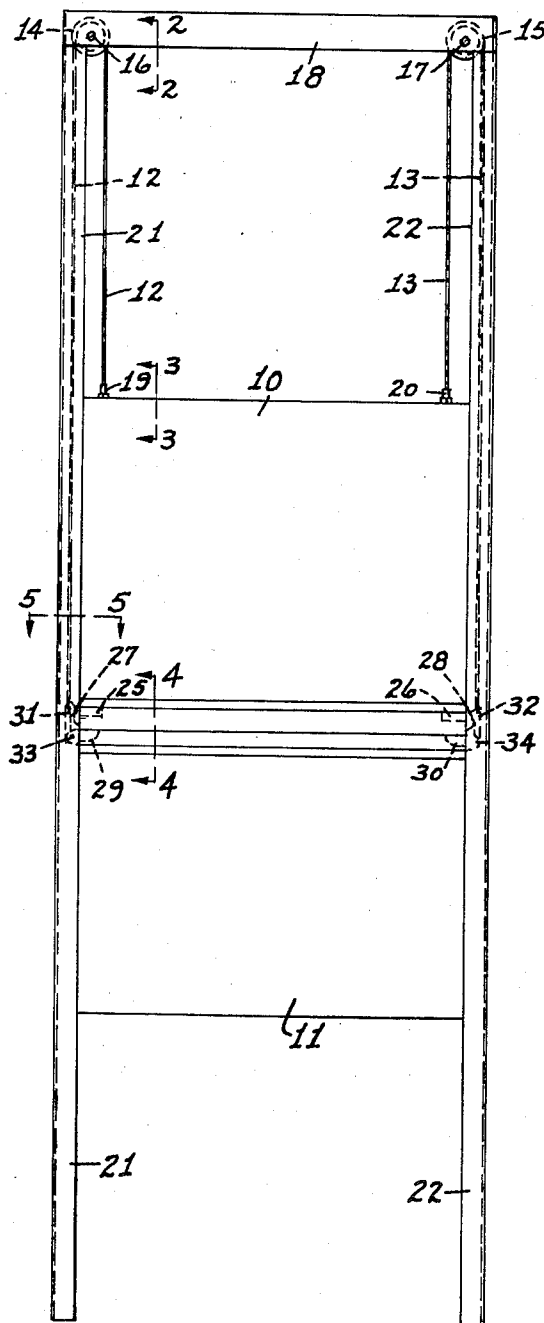


FIG. 1.

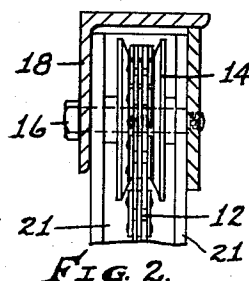


FIG. 2.

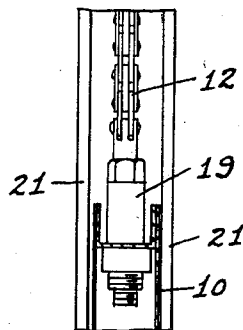


FIG. 3.

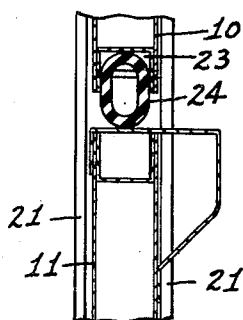


FIG. 4.

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3 Sheets-Sheet 2

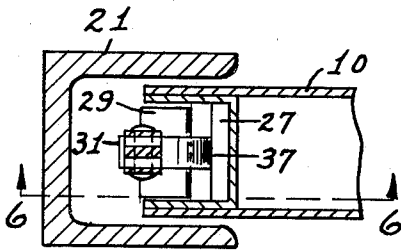


FIG. 5.

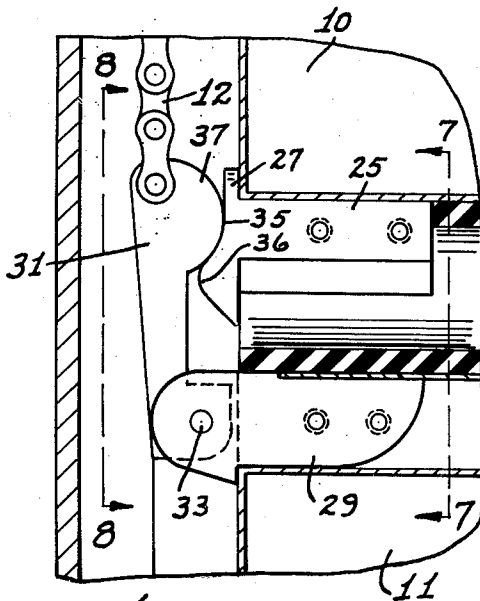


FIG. 6.

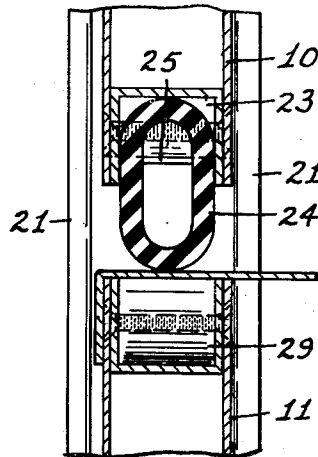


FIG. 7.

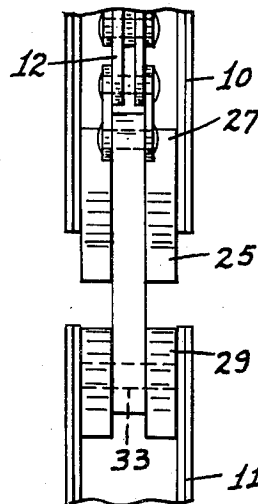


FIG. 8.

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3 Sheets-Sheet 3

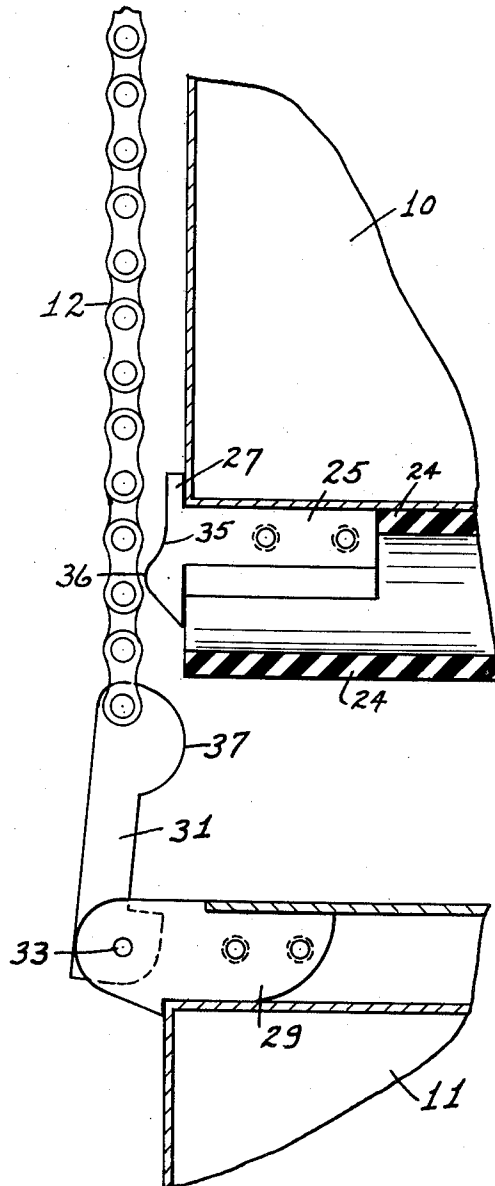


FIG. 9.

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1

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LATCHES FOR COUNTERBALANCED DOORS

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Application July 2, 1956, Serial No. 595,335

4 Claims. (Cl. 20—19)

The latches described herein and shown in the accompanying drawings are adaptable for use in connection with counterbalanced doors of the type used for dumbwaiters and freight elevator doors, and are adapted to be used with either manual or motor operated doors.

Counterbalanced doors are each composed of an upper and a lower section, each section thereof being movable vertically between suitable vertically-disposed guide members, with the sections being connected together by flexible chains running over sheaves and with the sections operating oppositely from each other in the opening and closing movements thereof.

The principal object of the present invention is the provision of a latching mechanism with parts thereof being secured to the upper and lower door sections and engaging in such manner as to be automatic in their latching and unlatching actions.

A second object is the provision of a latching mechanism for counterbalanced doors in which the weights of the door sections provide the necessary friction of the latch parts to provide positive action therebetween.

A third object is the provision of an automatic latching mechanism which permits the use of a safety type astragal in connection with the door sections, and with the safety type astragal providing means eliminating serious injury to the operator of the doors.

Further objects and particular advantages of the invention will become more apparent in the course of the following description, and that which is new will be pointed out in the appended claims.

In order that the invention and the operation thereof may be more fully understood and appreciated, we will now take up a detailed description thereof in which the same will be more fully set forth, reference being made to the accompanying drawings, in which:

Figure 1 is a shaft side elevation of a counterbalanced door having latches embodying the principles of the invention.

Figure 2 is a detail section, taken on line 2—2 of Figure 1, and showing one of the sheave members and the connecting chain.

Figure 3 is a detail section through the top edge of the door showing the connection of the chain thereto, as taken on line 3—3 of Figure 1.

Figure 4 is a detail section through the meeting rails of the upper and lower door sections and showing the safety astragal therebetween, as taken on line 4—4 of Figure 1.

Figure 5 is a cross-sectional detail through one edge of the door and its guide rail, taken on line 5—5 of Figure 1.

Figure 6 is an elevational detail of the latching mechanism, taken on line 6—6 of Figure 5, and showing the door sections in latched position.

Figure 7 is a detail vertical section through the meeting rails and the astragal member, with the same being taken on line 7—7 of Figure 6.

2

Figure 8 is a detail side elevation of the latching mechanism, taken from line 8—8 of Figure 6.

Figure 9 is a detail elevation similar to that shown in Figure 6, but with the sections of the door being shown in unlatched condition.

Like characters of reference designate like parts throughout the several views of the drawings.

In order that the construction of the invention may be more fully understood, we will now take up a more detailed description thereof, in which the same, together with the operation thereof will be more fully and comprehensively set forth.

Referring now to the drawings in detail, numerals 10 designate the upper door section, and numerals 11 designate the lower door section. The sections are operatively connected by means of flexible chains 12 and 13 with each being secured to a respective side of the door and running over respective sheaves 14 and 15, as shown in Figure 1. The sheaves are journaled on respective axles 16 and 17 through a common header 18, as indicated in Figure 2. One end of chain 12 is secured into a chain fastener 19 which is secured through the upper edge of the upper door section 10, while chain 13 is secured into a chain fastener 20 which is also secured through the upper edge of the upper door section 10 as shown in Figures 1 and 2.

The door sections are mounted for vertical movement between guides 21 and 22, as indicated in Figures 1 and 5, and with the guides being of such length to provide for the full travel of the door sections, and with the same being adapted to be secured to elevator shaft walls in a suitable manner (not shown).

A channel 23 is formed by the lower edge of the upper door section, into which we provide an astragal member 24 and which is preferably formed of a neoprene and asbestos combination and provides a safety means against an operator or other person being seriously injured should a hand be caught between the sections in the closing movements of the door.

The latching mechanism comprises keeper members 25 and 26, one of each being secured to each lower corner of the upper door section with a portion thereof lying against the bottom edge of the door section in channel 23, and with upwardly-extending portions 27 and 28 fitting against the respective vertical edges of the door.

Hinge members 29 and 30 are secured at the upper corners of the lower door section and provide means for pivotally mounting the keeper-engaging members 31 and 32 by means of respective pins 33 and 34, as more clearly shown in Figures 6, 8 and 9.

The respective latching parts are alike and the description of one set thereof is deemed sufficient for the parts on both edges of the door sections.

The keeper member 25 has a cam surface forming a concave portion 35 and a convex portion 36 formed thereon, with the same providing for engaging contact with the cam surface on portion 37 of the keeper-engaging member. Chains 12 and 13 each have one end thereof secured into a respective keeper-engaging member 31 and 32 and thereby connecting the lower door section with the upper door section.

It will be noted, by referring to Figure 9, that while the latching members 25 and 31 are disengaged, the keeper-engaging members 31 are positioned in alignment with the respective sheave 14 by means of the chain 12. With the approaching closing movements of the door sections, the cam surface 37 of the keeper-engaging member 31 rides outwardly over the convex surface 36 of the keeper 25, and with further closing movement of the surface 37, the same seats in the concave surface 35 of the keeper 25, as shown in Figure 6. The latches at each edge of the door sections operate simultaneously.

3

It will be noted there are no manual means required to operate the latches as the same are operated solely by the movements of the door sections. In the opening movements of the doors, the upper section moving upwardly and the lower section moving downwardly, the surfaces 37 of the keeper-engaging member 31 rides downwardly out of register with the concave surface 35 and outwardly and downwardly over the convex portion 36 of the keeper 25. The latching parts are held in the position shown in Figure 6 when the doors are closed by reason of the tension on chain 12.

The method of providing the engaging surfaces 35, 36 and 37 in the latch parts provide means for slowing the closing motion of the door sections by means of the friction provided therebetween upon their engagement.

The present latching arrangement is suitable for counterbalanced doors for different purposes such as counterbalanced dumbwaiter doors and counterbalanced freight elevator doors, regardless of the sizes of the doors.

The invention is shown in its presently preferred form, but it is desired that it be understood that minor changes may be made therein, insofar as the changes therein may fall within the scope of the appended claims and the spirit of the invention.

What we claim and desire to secure by Letters Patent of the United States, is:

1. In combination with a counterbalanced door composed of an upper door section and a lower door section, a latching device located at each vertical edge of the door, a keeper secured at each vertical edge of the upper door section, a hinge member secured at each vertical edge of the lower door section, a keeper-engaging member pivotally secured to each of the hinge members, with the keeper-engaging members being adapted to engage the respective keepers, with the door sections being connected together by means of door chains, with one end of each of the door chains being secured to a respective keeper-engaging member, and with the engaging surfaces of the keeper and the keeper-engaging members being in the form of cams,

4

2. In a latching device for counterbalanced doors said doors consisting of an upper section and a lower section, a keeper member having a convex and a concave cam surface and located at the vertical edges of the upper door section, a keeper-engaging member having a cam surface substantially coinciding with the concave surface of the keeper member, with the keeper-engaging member being pivotally secured to a hinge member secured to the lower door section, and with the engagement of the cam surface of the keeper engaging member with the concave surface of the keeper member providing latching means for the door sections.

3. A latching device for counterbalanced doors said door consisting of an upper section and a lower section, said latching device being composed of a keeper member secured at the vertical edge of the upper door section, a hinge member secured at the vertical edges of the lower door section, a keeper-engaging member pivotally secured to the hinge member, and with the keeper-engaging member automatically engaging the keeper member upon the closing of the door sections.

4. In a counterbalanced door composed of a pair of oppositely movable upper and lower sections, said sections being connected by flexible chains running over respective sheaves, a latching mechanism comprising a keeper member secured to the lower edge of the upper section, a hinge member secured to the lower section at each vertical edge thereof, a keeper-engaging member pivotally secured to each of the hinge members and adapted to engage the respective keeper members upon the closing of the door sections, and with the flexible chains being secured to the lower door section through the keeper-engaging members.

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