June 29, 1943. M. HONIG 2,323,041

EXTENSIBLE FIRE LADDER AND ELEVATOR

Filed July 18, 1941

FIG. 1

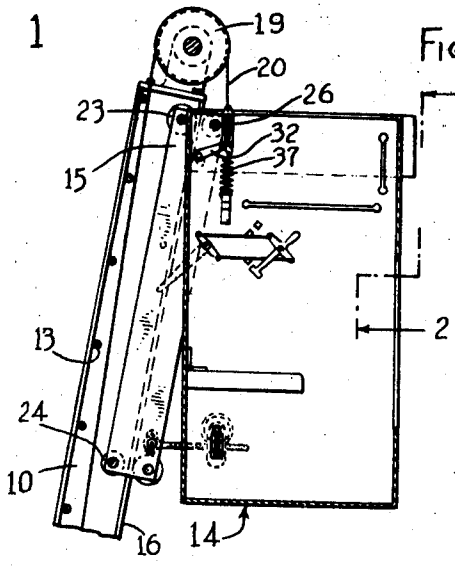


FIG. 2

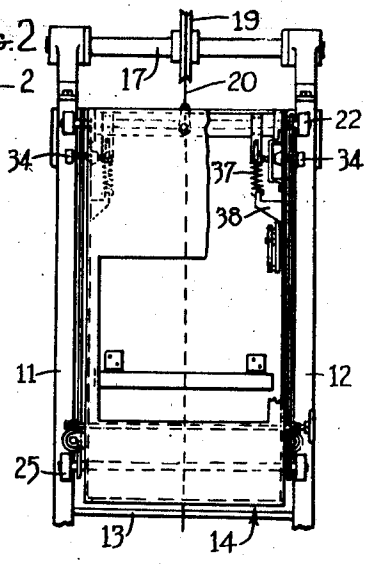


FIG. 3

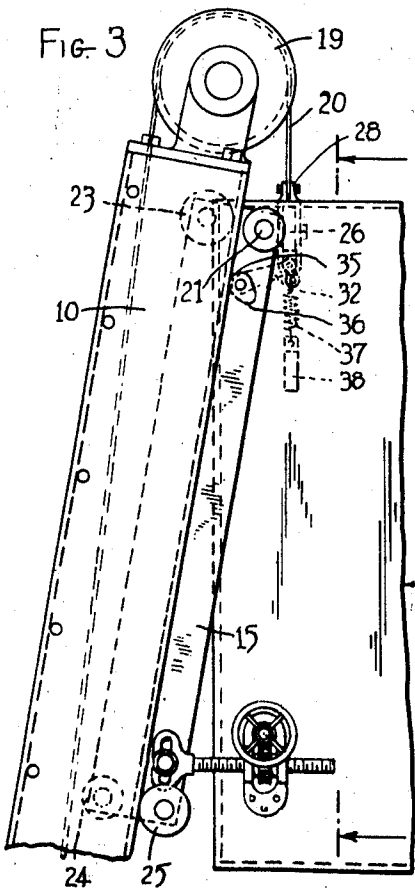
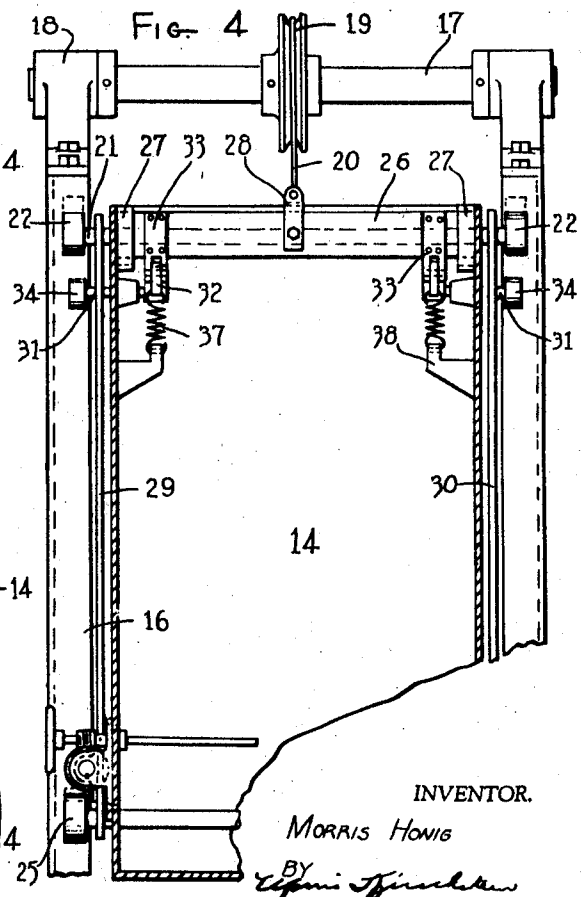


FIG. 4



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EXTENSIBLE FIRE LADDER AND ELEVATOR

Morris Honig, Bronx, N. Y.

Application July 18, 1941, Serial No. 402,897

14 Claims. (Cl. 227—8)

My invention relates to extensible fire ladders and elevators for removing persons from burning buildings.

More particularly my invention is concerned with a safety device for preventing an elevator car from dropping in the event that its operating cable breaks or is unable to hold the car in elevated position.

One of the objects of my invention is to provide a highly improved safety device of the character described which shall be quickly responsive to the failure of the cable supporting the elevator car in raised position.

Another object of my invention is to provide a safety device of the character described which shall be positive in operation, shall comprise relatively few and simple parts, and shall be highly rugged in construction and efficient for the purposes set forth.

Other objects of my invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the claims.

This application is a continuation-in-part of my application Serial No. 301,568 for Extension ladders and elevators, filed October 27, 1939, now Letters Patent No. 2,249,900, dated July 22, 1941.

In the accompanying drawing, in which is shown one of the various possible embodiments of my invention, and wherein similar numbers apply to the same parts throughout the several views,

Fig. 1 is a fragmentary side view in section of an extended fire ladder and elevator embodying my invention;

Fig. 2 is a sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged view of the portion of the apparatus shown in Fig. 1; and

Fig. 4 is a sectional view taken substantially along the line 4—4 of Fig. 3.

The apparatus consists essentially of a plurality of ladder sections extensible relative to one another, the lowermost section of which is swivelled on a suitable platform which may be mounted, as shown in my copending applications Serial No. 301,568 and Serial No. 335,026, upon a fire truck. Suitable means may also be provided as is further disclosed in my said applications to raise or lower the sections and to angularly elevate the ladder.

The uppermost section 10 of the ladder, which is generally similar in configuration to the remaining ladder sections, comprises a pair of U-shaped channels 11 and 12 whose open sides face each other. Rungs 13 are mounted on the forward face of the section and an elevator car 14 slidably underslung at the rear, said car being secured to a truck 15 which runs on the flanges 16 forming a part of the U-shaped channel members 11 and 12.

A shaft 17 which is rotatably secured in a pair of brackets 18 fastened to the top of the section 10 carries a pulley 19. Running on the pulley 19 is a cable 20 which is operated from a suitable hoisting mechanism, such as for example that shown and described in my copending applications and which serves to raise and lower the car 14.

The elevator car 14 is generally rectangular in shape and is pivotally mounted on the truck 15 by means of a shaft 21 secured to the truck and journalled in the upper part of the car 14. The shaft 21 has mounted on its ends outside of the car 14 a pair of rollers 22. These rollers 22 run upon the outside of the flanges 16 which serve as tracks. Upon the inside of the flanges 16 are another pair of rollers 23 which are rotatably mounted upon the truck 15. The lower end of the truck is provided with similar rollers 24 and 25 also running on the flanges 16 in the same manner as the rollers 22 and 23. It is thus seen that the truck 15 together with its rollers 22 through 25 guide the car 14 in its up-and-down movement.

In accordance with my invention I provide means to prevent the car 14 from dropping in the event that the cable 20 breaks. Such means comprises a bar 26 slidably held to the top of the car 14 by brackets 27 disposed at both sides of the car. These brackets are secured to the car and provide a limited vertical movement of the bar 26 with respect to the said car. The cable 20 is secured by a strap 28 to the middle of the bar 26. Since the weight of the car and all of its parts are supported by the bar 26, the bar normally is disposed at its upper limit of movement in the brackets 27. Rotatably secured in each of the side plates 29 and 30 of the truck 15 are a pair of shafts 31 which pass freely through the side walls of the car 14. On the ends of the shafts 31, disposed internally of the car 14, are fixedly mounted lever arms 32 which are pivotally secured to the bar 26 by means of fixtures 33 bolted to said bar and having a lower

slotted depending portion in which the arms 32 lie.

On the portion of the shafts 31 disposed externally of the car 14 are fixedly secured a pair of levers 34. One portion of the levers 34 comprises a rounded sector 35 of comparatively short radius and immediately adjacent this sector 35 is a brake shoe 36. To the outer end of each of the levers 32 is secured one end of a coil spring 37, the other end of which is secured to a bracket 38 mounted on the side of the car 14. Said spring will maintain the levers 32 in contact with the bottoms of the slots in the fixtures 33.

Due to the aforesaid construction it is seen that, in the event that the cable 20 breaks, the springs 37 will draw the bar 26 downward, causing the levers 32 to rotate the shafts 31 in a clockwise direction (as viewed from Fig. 3). This will rotate the levers 34 in a clockwise direction and force the brake shoes 36 against the flanges 16 with a pressure depending upon the strength of the springs 37. The friction between the shoes 36 and the flanges 16 prevents the car from dropping. As long as the cable 20 is unbroken the sector 35 will clear the flanges 16 and not interrupt the normal operation of the car 14.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a member, said lifting cable being directly attached to said member, means to mount said member on said elevator for limited vertical movement relative thereto whereby said elevator is supported from said cable through said member and said means, said member being disposed at one extreme of its limited travel when said cable is supporting said elevator, actuating means to urge said member to the other extreme of its travel, said means being ineffective to move said member against the weight of said elevator when said elevator is suspended from said cable, and braking means adapted to cooperate with said tracks, said braking means being rendered effective upon operation of said actuating means.

2. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a member, said lifting cable being directly attached to said member, means to mount said member on said elevator for limited vertical movement relative thereto whereby said elevator is supported from said cable through said member and said means, said member being disposed at one extreme of its limited travel when said cable is supporting said elevator, resilient means to urge said member to the other extreme of its travel, said means being ineffective to move said member against the weight of said elevator when said elevator is suspended from said cable, and braking means adapted to cooperate with said tracks, said braking means being rendered effective upon operation of said resilient means.

3. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a member, said lifting cable being directly attached to said member, means to mount said member on said elevator for limited vertical movement relative thereto whereby said elevator is supported from said cable through said member and said means and said member is normally maintained at its upper limit of travel, resilient means to urge said member towards its lower limit of travel, said means being ineffective to move said member against the weight of said elevator, friction means adapted to cooperate with said tracks to brake said elevator, and a linkage system interconnecting said member and said friction means, said friction means and said linkage system being so constructed and arranged as to brake said elevator when said elevator is no longer supported by said cable and said resilient means is thereby rendered effective to move said member.

4. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a member, a bracket mounted on said elevator, said member being supported in said bracket for limited vertical reciprocation, said lifting cable being directly attached to said member whereby said elevator is supported by said member and said member is normally maintained at its upper limit of travel relative to said bracket, means to urge said member to its lower limit of travel, said last named means being incapable while said elevator is suspended from said lifting cable to actuate said member, friction means associated with said elevator and adapted to cooperate with said tracks to brake said elevator, and means interconnecting said friction means and said means for urging said member downwardly, said friction means and said interconnecting means being so constructed and arranged that said friction means will be rendered effective to brake said elevator when said cable no longer suspends said elevator and said means for moving said member downwardly becomes effective.

5. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a member, a bracket mounted on said elevator, said member being supported in said bracket for limited vertical reciprocation, said lifting cable being attached to said member whereby said elevator is supported by said member and said member is normally maintained in its upper limit of travel relative to said bracket, means to urge said member to its lower limit of travel, said last named means being incapable while said elevator is suspended from said lifting cable to actuate said member, friction means associated with said elevator and adapted to cooperate with said tracks to brake said elevator, and means interconnecting said friction means and said means for urging said member down-

wardly, said friction means and said interconnecting means being so constructed and arranged that said friction means will be rendered effective to brake said elevator when said cable no longer suspends said elevator and said means for moving said member downwardly becomes effective, said interconnecting means comprising a lever pivotally connected to said member.

6. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a member, a bracket mounted on said elevator, said member being supported in said bracket for limited vertical reciprocation, said lifting cable being attached to said member whereby said elevator is supported by said member and said member is normally maintained in its upper limit of travel relative to said bracket, means to urge said member to its lower limit of travel, said last named means being incapable while said elevator is suspended from said lifting cable to actuate said member, friction means associated with said elevator and adapted to cooperate with said tracks to brake said elevator, and means interconnecting said friction means and said means for urging said member downwardly, said friction means and said interconnecting means being so constructed and arranged that said friction means will be rendered effective to brake said elevator when said cable no longer suspends said elevator and said means for moving said member downwardly becomes effective, said interconnecting means comprising a lever pivotally connected to said member and a brake shoe movable with said lever.

7. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a bar disposed at the top of and extending across said elevator, brackets at both sides of the elevator in which said bar is mounted for limited vertical movement, said lifting cable being directly attached to said bar, a spring at either side of the elevator to urge said bar downwardly, the combined efforts of said spring being insufficient to move said bar downwardly when said elevator is suspended from said cable, and means responsive to the downward movement of said bar when said elevator is no longer supported by said cable to brake said elevator, said last named means comprising a friction device operating against said tracks.

8. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a bar disposed at the top of and extending across said elevator, brackets at both sides of the elevator in which said bar is mounted for limited vertical movement, said lifting cable being directly attached to said bar, a spring at either side of the elevator to urge said bar downwardly, the combined efforts of said spring being insufficient to move said bar downwardly when said elevator is suspended from said cable, means comprising a friction device operating against said tracks to brake said elevator, and a linkage system interconnecting said bar and said friction device.

9. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a bar disposed at the top of and extending across said elevator, brackets at both sides of the elevator in which said bar is mounted for limited vertical movement, said lifting cable being attached to said bar, a spring at either side of the elevator to urge said bar downwardly, the combined efforts of said spring being insufficient to move said bar downwardly when said elevator is suspended from said cable, means comprising a friction device operating against said tracks to brake said elevator, and a linkage system interconnecting said bar and said friction device, said linkage system comprising a vertically slotted fixture associated with said member and a pivotally mounted arm slidably received in said slot, said arm being disposed adjacent the bottom of said slot.

10. For use with an elevator which is suspended from a lifting cable and which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a bar disposed at the top of and extending across said elevator, brackets at both sides of the elevator in which said bar is mounted for limited vertical movement, said lifting cable being attached to said bar, a slotted fixture adjacent each end of said bar, a pair of levers, each of said levers being disposed in one of the slotted fixtures, a pair of shafts on which said levers are fixedly mounted, a brake shoe fixedly mounted on each of said shafts, said brake shoes being adapted to cooperate with said tracks, and a pair of springs mounted under tension between said elevator and said levers, said springs tending to urge said levers to the bottom of said slots and to move said bar to its downward limit of travel, whereby upon breaking of said cable said brake shoes will be urged into effective engagement with said tracks.

11. For use with an elevator which is suspended from a lifting cable and which is pivotally mounted on an elevator truck which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a bar disposed at the top of and extending across said elevator, brackets at both sides of the elevator in which said bar is mounted for limited vertical movement, said lifting cable being directly attached to said bar, a shaft rotatably mounted in said truck, a lever fixedly mounted on said shaft, a brake shoe fixedly mounted on said shaft, said brake shoe being adapted to cooperate with said tracks, said lever being pivotally mounted on said bar, and a spring to move said bar downwardly, said spring being ineffective to move said bar as long as said elevator is suspended from said cable.

12. For use with an elevator which is suspended from a lifting cable and which is pivotally mounted on an elevator truck which moves along tracks, a safety device to prevent said elevator from dropping in the event that said lifting cable no longer supports said elevator, said device comprising a bar disposed at the top of and extending across said elevator, brackets at both sides of the elevator in which said bar is mounted for limited vertical movement, said lifting cable being directly attached to said bar, a shaft rotatably mounted in said truck, a lever fixedly

mounted on said shaft, a brake shoe fixedly mounted on said shaft, said brake shoe being adapted to cooperate with said tracks, said lever being pivotally mounted on said bar, and a spring mounted under tension between said elevator and said lever, said spring being ineffective to move said bar as long as said elevator is suspended from said cable.

13. In combination in an extensible fire ladder, a plurality of elongated members movable along their longitudinal axes relative to one another, a part of each member having rungs associated therewith to form a ladder portion, the ladder portions of the various members cooperating when said members are relatively moved to provide an extensible ladder, said members also having track parts which cooperate when the various members are relatively moved to form an extensible track which extends as far as the ladder, an underslung elevator adapted to ascend and descend said ladder, and means on said elevator for causing said elevator to ride on said extensible track.

14. A fire ladder as set forth in claim 13 wherein each of the members includes a pair of spaced elongated webs having flanges extending from opposite longitudinal edges thereof, the webs on each member being held in spaced parallel relationship by the rungs, said members when the ladder is retracted being relatively nestably disposed with the flanges and webs of adjacent members in juxtaposed relationship, the flanges in the rear of the webs serving as the track parts.

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