

Feb. 7, 1928.

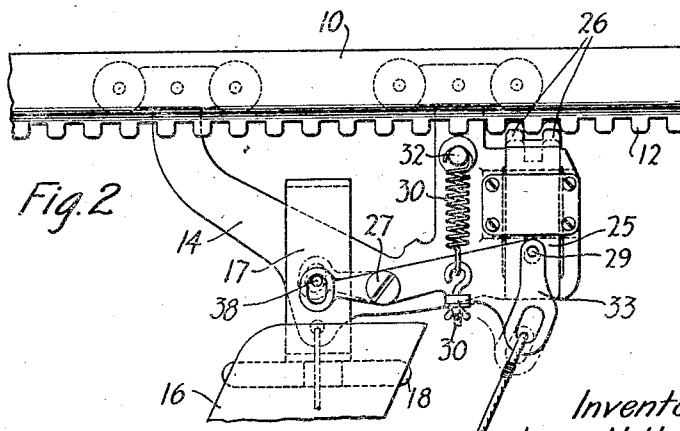
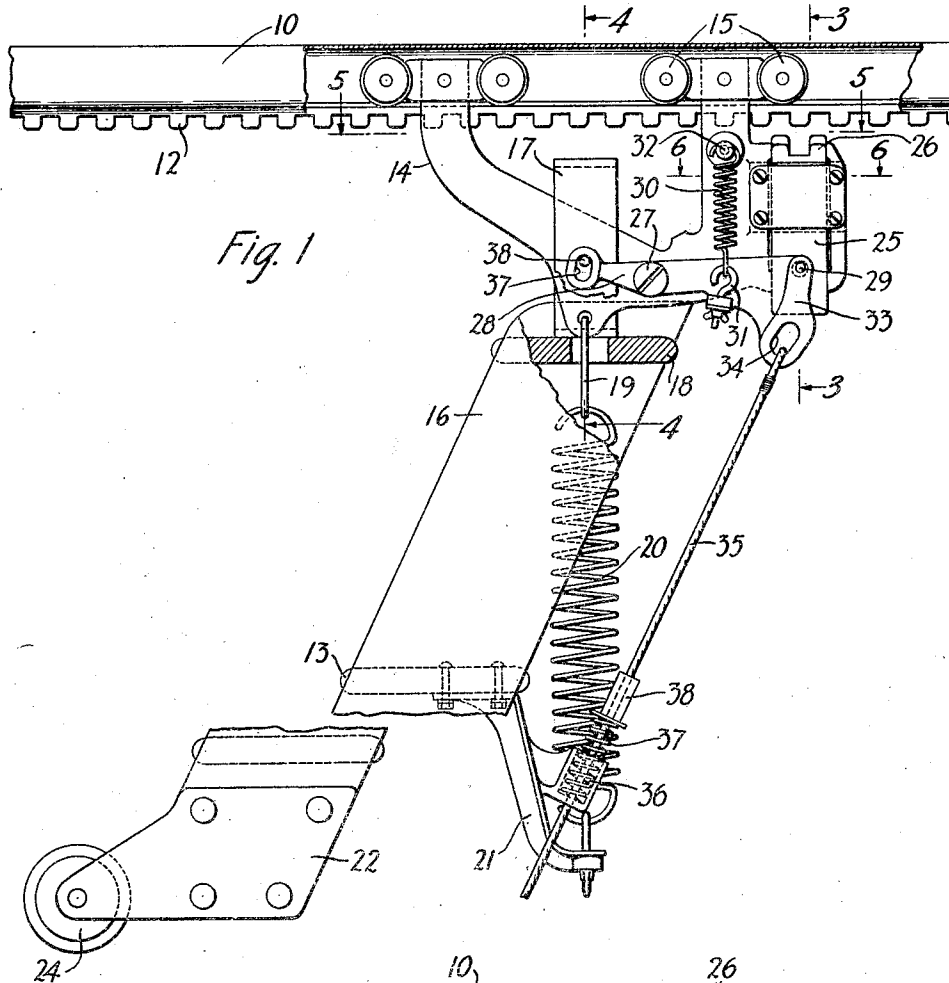
1,658,192

L. N. HAMPTON

BRAKE FOR ROLLING LADDERS

Filed Sept. 3, 1926

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3

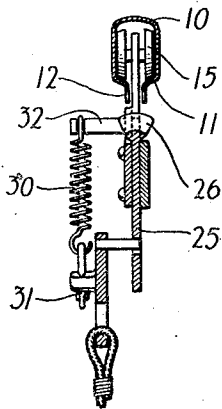


Fig. 4

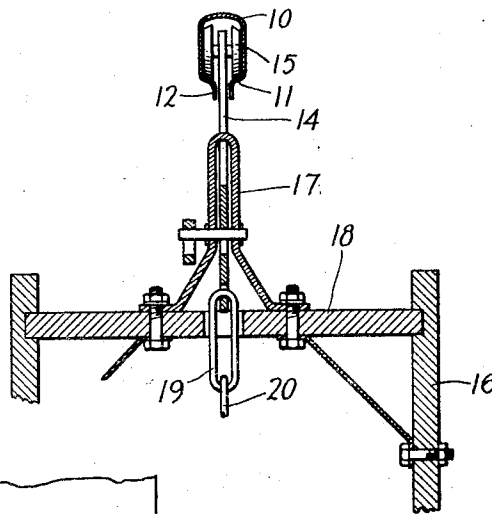


Fig. 5

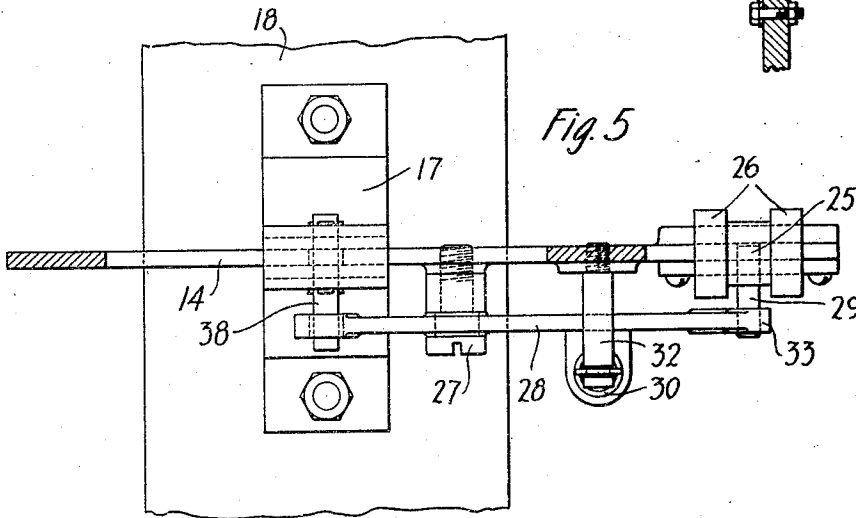
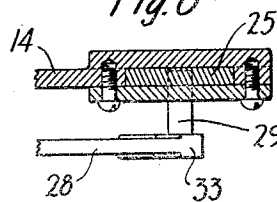


Fig. 6



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UNITED STATES PATENT OFFICE.

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BRAKE FOR ROLLING LADDERS.

Application filed September 3, 1926. Serial No. 133,355.

This invention relates to locking means for rolling carriages and particularly to load actuated brakes therefor.

It is one object of the present invention to positively lock a rolling carriage against movement upon placing a load thereon.

Another object of the invention is to avoid injury to the locking mechanism should the load be applied before the carriage has come to a full and complete stop.

A further object of the invention is to permit the lock to be released without removing the load from the carriage.

It is common practice in stores, telephone exchanges and the like to install rolling ladders which enable clerks and service men to readily reach normally inaccessible places. These ladders are usually provided at their lower ends with wheels which ride over the floor while their upper ends are supported on a carriage movably hung from a suspended track. Such facilities render readily accessible the upper shelves in a store or upper portions of the mechanism of a telephone exchange. To eliminate the danger attendant to the use of such ladders it has been customary to provide friction brakes which engage the wheels on either the carriage or ladder or which, in some instances, engage the track or floor. These friction brakes, while proving more or less effective, are not wholly reliable as through wear and the application of varying loads, they are likely to slip, thus rendering the ladder unstable.

In accordance with certain features of this invention a traveling carriage is suspended from an overhead track and carries a spring actuated detent which is provided with teeth for engaging teeth on the track. Both the teeth on the track and those on the detent are slightly rounded at their outer ends, so that, should the detent be actuated before the carriage has come to a full and complete stop, injury to the parts will be avoided. In order to further insure against too rapid engagement of the teeth, a counter weight is provided which acts to retard the acceleration of the detent actuating spring. The weight carrying element, in the present instance a ladder, is resiliently suspended from the carriage in such a manner that the detent is normally held out of engagement with the track, thus enabling the

device to be readily moved into the desired position. Upon application of a weight to the ladder, the detent becomes free to engage the track so as to lock the device against further movement.

Another feature of the invention is the manually operated releasing device by which the detent may be withdrawn from engagement with the track without necessitating the removal of the weight.

In the drawings:—

Figure 1, is a fragmentary side view of a ladder supported on a carriage constructed in accordance with this invention, and showing the lock released.

Figure 2, is a view similar to Figure 1, showing the detent in locking position, and illustrating in dot and dash lines, the detent manually released.

Figure 3, is a vertical sectional view taken on line 3—3 of Figure 1,

Figure 4, is a vertical sectional view taken on line 4—4 of Figure 1,

Figure 5, is a horizontal sectional view taken on line 5—5 of Figure 1, and

Figure 6, is a detailed horizontal sectional view taken on line 6—6 of Fig. 1.

Referring to the drawings in detail, the track 10 comprises an elongated inverted channel section provided along the lower edges of its side walls with inwardly extending flanges 11 having their inner edges turned down and provided with teeth 12 having rounded corners.

A carriage comprising an approximately U-shaped body 14 is suspended from the track on wheels 15, and supports the upper end of a ladder 16 as more fully explained, hereinafter.

Straddling one end portion of the carriage member 14 is an inverted U-shaped yoke 17, the lower ends of the legs of which diverge and are attached to the top step 18 of the ladder 16. It will thus be seen that a flexible connection between the ladder and carriage is provided which permits of limited vertical movement of one relative to the other.

Secured to and hanging from the same end of the carriage member 14 is a link 19 which projects through an opening in the top step 18 and supports the upper end of a tension spring 20. The lower end of this spring is

adjustably connected to a bracket 21 which is rigidly attached to the step 13 of the ladder 16. It will thus be seen that the ladder is yieldably suspended relative to the carriage, and that when a weight sufficient to overcome the tension of the spring is applied, the ladder will move downwardly until the yoke 17 engages the carriage member 14.

In order to facilitate movement of the ladder, the lower ends of its side pieces are equipped with plates 22 formed with extensions 23 near the outer ends of which are mounted wheels 24. By thus offsetting the support of the lower end of the ladder, the effect on the carriage mechanism of a weight applied thereto is increased by the lever action.

Slidably mounted in guide ways at the end of the carriage member opposite to that on which the ladder is hung is a vertically movable detent or bolt 25, the upper end of which is provided with teeth 26 for engaging the teeth 12 of the track 10. The upper ends of the teeth are slightly rounded as clearly illustrated in the drawing so as to avoid breakage should the detent be raised while the carriage is in motion.

Pivoted to the carriage at 27 is a lever 28 carrying adjacent one end a pin 29 for engagement with the walls of a slot formed in the detent 25. One end of a tension spring 30 is adjustably connected at 31 to the lever 28 and at its opposite end is connected to the carriage by a stud 32 in such a manner as to yieldably force the detent upwardly toward the track. The end of the lever which is connected to the detent 25 is thickened as at 33, Fig. 5, to sufficiently weight the lever to prevent too rapid acceleration of the upward movement of the detent. The effect is to prevent the positive engagement of the detent with the track when the carriage is moving rapidly and to produce a positive lock when the carriage slows down. Thus the detent is forced upward against the track with a slow acceleration so that when the carriage is moving rapidly the rounded teeth of the detent and track engage with a ratchet action which slows down the carriage until the speed is low enough to permit positive engagement of the teeth. The brake may therefore be applied while the carriage is in motion without injury to the mechanism.

Formed near the end of the lever 28 opposite that to which the detent is connected is a slot 37 for the reception of a pin 38 attached to the yoke 17 and extending through a slot in the carriage member 14. Under normal conditions, that is with no weight applied to the ladder, the yoke 17 is held up under the influence of the spring 20 with the pin 38 engaging the upper end wall of the slot 37. The power of the spring 20, being greater than that of the spring 30,

it will be apparent that the lever will be held in such position that the detent 25 is withdrawn and the ladder is free to move along the track. As soon as a weight sufficient to overcome the tension of the spring 20 is applied to the ladder 16, the yoke 17 will move downwardly carrying with it the pin 38, thus permitting the lever 28 to rock under the influence of the spring 30. Such rocking movement of the lever will force the detent 25 upwardly, thereby causing the teeth 26 to engage the teeth 12 of the track. Due to the pin and slot connection between the yoke 17 and lever 28, and the fact that the detent 25 is yieldably urged upwardly by the spring 30, it will be readily seen that should a weight be applied to the ladder before it has come to a complete stop, the teeth 26 will ratchet over the teeth 12 and breakage will be avoided. The thickened portion 33 of the lever is provided with an opening 34 in which one end of a rope 35 is secured. This rope extends downwardly through a plurality of guides 36, only one of which is shown, by which it is held within easy reach of a person on the ladder. The uppermost guide 36 is provided with a socket for the reception of the lower end of a compression spring 37, the upper end of which bears against a stop 38 clamped to the rope 35. In this manner the rope is normally retained in such a position that the lever 28 is free to move on its pivot and danger of binding and sticking of the rope in the guides 36 is overcome. By pulling the rope 35 the detent 26 may be drawn down as shown in dot-dash lines in Fig. 2, so that the ladder can be moved while there is a weight on it.

What is claimed is:

1. A device of the class described comprising a track having a rack formed integrally thereon, a ladder associated therewith, a carriage, a detent for engagement with the rack, a lever pivoted to the carriage and connected to the detent, means to yieldably urge the detent into contact with the rack, a yoke movably associated with the carriage, a ladder suspended from the yoke, yieldable means to hold the ladder elevated with respect to the carriage, and means carried by the yoke for engagement with the lever when the ladder is in the elevated position to withdraw the detent from contact with the rack.

2. A device of the class described comprising a track, a ladder associated therewith, a carriage, a detent for engagement with the track, a lever pivoted to the carriage and connected to the detent, means to yieldably urge the detent into contact with the track, a yoke movably associated with the carriage, a ladder suspended from the yoke, yieldable means to hold the ladder elevated with respect to the carriage, means carried by the yoke for engagement with the lever when

the ladder is in the elevated position to withdraw the detent from contact with the track, and means to manually withdraw the detent from engagement with the track.

3. A device of the class described comprising a track having a rack formed integrally therewith, a yoke suspended from rollers cooperating with said track, a ladder resiliently suspended from said yoke, a lever pivoted on said yoke, a spring connection between said yoke and said lever constructed and arranged to force one end of said lever upward, a toothed latch cooperating with said rack pivoted on said one end of said lever and moving through a guide formed in said yoke, a pin controlled by said ladder cooperating with the other end of said lever arranged to normally prevent the engagement of said latch with said rack, said resilient connection between said ladder and said yoke being so arranged that upon application of a weight to said ladder said pin will move downwardly and thus allow movement of said ladder to allow engagement of said latch with said rack, and additional means for moving said latch out of engagement with said rack while said ladder is weighted.

4. A device of the class described comprising a track, a carriage movable on said track, latching means for engagement with said track, yieldable means for actuating said latching means, and means to normally prevent the operation of said yieldable means and to permit the operation of said yieldable means upon the application of a weight to said carriage, said latching means being constructed and arranged to positively operate only when said weighted carriage in moving along said track has come down to a predetermined speed.

5. A device of the class described comprising a track, a carriage movable on said track, latching means for engagement with said track, yieldable means for actuating said latching means, and means to normally prevent the operation of said yieldable means and to permit the operation of said yieldable means upon the application of a weight to said carriage, said latching means being constructed and arranged to act as a ratchet when said weighted carriage is moving along said track, and thus gradually break the speed of said carriage until a predetermined speed is reached whereupon said latch will positively operate to prevent the further movement of said carriage.

6. A device of the class described comprising a track having a rack formed in-

tegrally therewith, a yoke suspended from rollers cooperating with said track, a ladder resiliently suspended from said yoke, a lever pivoted on said yoke, a spring connection between said yoke and said lever constructed and arranged to force one end of said lever upward, a toothed latch cooperating with said rack, pivoted on one end of said lever and moving through a guide formed in said yoke, a pin controlled by said ladder cooperating with the other end of said lever arranged to normally prevent the engagement of said latch with said rack, said resilient connection between said ladder and said yoke being so arranged that upon application of a weight to said ladder, said pin will move downwardly and thus allow movement of said lever to allow engagement of said latch with said rack, the teeth on said rack being so constructed and arranged that positive engagement between said latch and said rack will be made only when the speed of said weighted ladder and said yoke along said track has been reduced to a predetermined point.

7. A device of the class described comprising a track, having a rack formed integrally therewith, a yoke suspended from rollers cooperating with said track, a ladder resiliently suspended from said yoke, a lever pivoted on said yoke, a spring connection between said yoke and said ladder constructed and arranged to force one end of said lever upward, a toothed latch cooperating with said rack pivoted on said one end of said lever and moving through a guide formed in said yoke, a pin controlled by said ladder cooperating with the other end of said lever arranged to normally prevent the engagement of said latch with said rack, said resilient connection between said ladder and said yoke being so arranged that upon application of a weight to said ladder said pin will move downwardly and thus allow movement of said lever to allow engagement of said latch with said rack, the teeth of said latch and the teeth of said rack being so constructed and arranged that upon movement of said weighted ladder and said yoke along said track, said latch will act as a ratchet and gradually break the speed of the ladder down to a predetermined point before positive engagement between said latch and said rack is made.

In witness whereof, I hereunto subscribe my name this 2nd day of September, A. D. 1926.

LEON N. HAMPTON.