July 24, 1934. R. C. SMITH 1,967,332

SUPPORTING ROLLER DEVICE

Filed Dec. 9, 1932

FIG. 1.

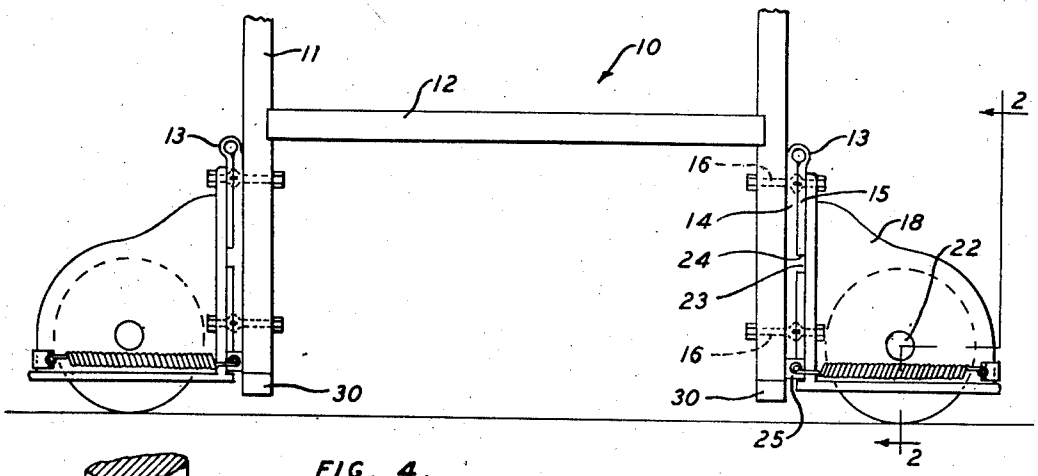


FIG. 4.

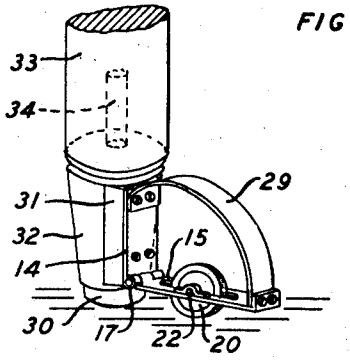


FIG. 2.

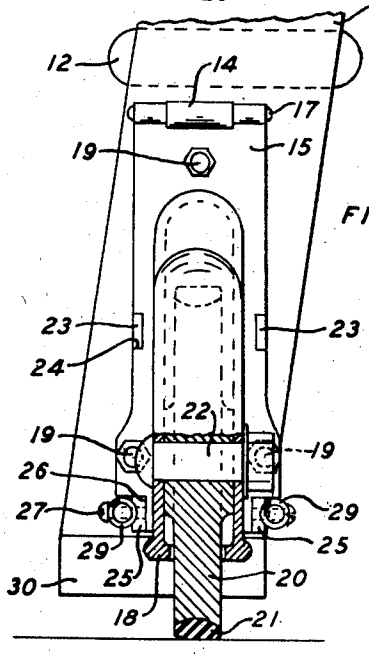
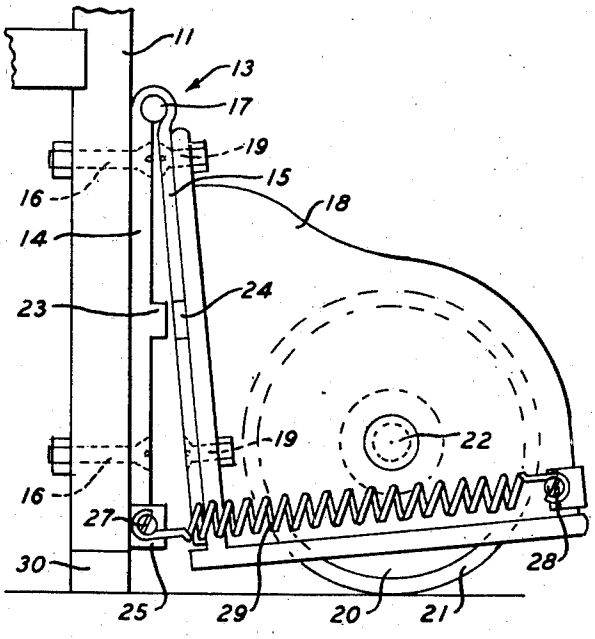


FIG. 3.



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SUPPORTING ROLLER DEVICE

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2 Claims. (Cl. 228—61)

This invention relates to supporting roller devices and more particularly to an automatic safety roller device to be applied to a safety ladder, or the like which is to be readily movable when empty or partially loaded and immovable when carrying more than a predetermined weight of loading.

An object of the invention is to provide an automatic safety ladder of simple, sturdy and reliable construction which can be easily moved and is provided with means to prevent catching of garments thereon.

With the above and other objects in view the invention comprises a roller mounted in pivotal means attached to each foot of a ladder so that the roller may assume an operative position in which it supports the ladder when empty or partially loaded or may be pivotally moved out of its operative position when the load on the ladder surpasses a predetermined limit, and resilient or elastic means which tend to hold the roller yieldingly in its operative position and to return it thereto after having been displaced therefrom.

Other objects and features of the invention will appear from the following detailed description taken in connection with the appended drawing, wherein like parts are distinguished by identical reference numerals and in which

Fig. 1 is a broken view in front elevation of one embodiment of the invention in operative position as applied to the lower end of a rolling ladder;

Fig. 2 is a broken view thereof on an enlarged scale in end elevation and partly in vertical transverse section on the line 2—2 of Fig. 1;

Fig. 3 is a detached broken view on an enlarged scale of the right hand end of Fig. 1 showing the roller in its inoperative position, and

Fig. 4 is a detached broken view in perspective of a modified form of the invention.

In the embodiment shown in Figs. 1; 2 and 3, a ladder of any approved construction generally indicated by the reference numeral 10 has two sides 11 and a series of cross treads or rungs 12 supported thereby of which only the lowest is shown, the remainder of the ladder and the means of supporting the upper end thereof being not pertinent to this invention.

On the outside of the bottom end of each of the sides 11 is firmly attached a flat strap hinge 13 comprising a pair of complementary leaves 14 and 15 which are pivotally joined by the pin 17. The leaf 14 is rigidly attached to the ladder side 11 by any approved means such as bolts 16, and constitutes a base member for the device as a whole.

On the outer face of the leaf 15 is rigidly mounted a housing 18 attached to the leaf by any approved means herein shown as bolts 19. A roller or wheel 20 of any approved design, herein shown as provided with a rubber tire 21, is mounted within the housing 18 for free rotation on an axle 22 carried by the housing.

The leaf 14 is formed on its sides about midway of its length with a pair of integral up-turned lugs 23, which, when the hinge 13 is closed, fit into a pair of complementary notches 24 formed in the sides of the leaf 15. The leaf 14 is also formed at the bottom ends of its sides with a similar pair of lugs 25 adapted to coact with corresponding notches 26 formed in the leaf 15 at the bottom end thereof.

In each lug 25 is rigidly mounted a pin or screw 27 and on each side of the housing 18 is rigidly mounted a corresponding pin or screw 28. A tension spring 29 is fastened at one of its ends to each screw 27 and at its other end to a corresponding pin or screw 28.

To the bottom end of each side of the ladder is attached a friction member or other analogous device, herein shown as a rubber block 30 cemented or otherwise attached to the ladder.

In operation a ladder thus equipped, whose upper end may be movably supported in any convenient and suitable way, will roll freely sidewise on the wheels 20 when not loaded, the springs 29 being so proportioned and tensioned as to hold the casings 18 in the operative position shown in Fig. 1 in which they support the ladder when there is no appreciable load thereon. However, the springs 29 are also so made and proportioned that when a load equivalent to an appreciable fraction of the weight of a user is placed on the ladder, as for instance when a user places one foot on the lowest rung 12 and begins to transfer his weight thereto from the floor, the springs 29 will yield allowing the housings 18 to assume the inoperative position shown in Fig. 3.

The friction block 30 is then brought into contact with the floor and holds the ladder firmly in place against slipping in any direction.

When the load is removed from the ladder, the tension of the springs 29 will return the parts to the operative position shown in Fig. 1 thus lifting the ladder itself and therewith raising the friction blocks 30 from the floor and restoring the ladder to mobility on the wheels 20.

When the parts are in the operative position shown in Fig. 1 the hinge pin 17 is protected against shearing strain by the lugs 23 and 25 coacting with the notches 24 and 26 respectively

whereby any relative lateral movement of the leaves 14 and 15 is prevented. The lugs 23 and 25 may further be bevelled outwardly at their outer ends to guide the leaf 15 into place as the parts return from the positions of Fig. 3 to the positions of Fig. 1.

In the modified form and application shown in Fig. 4, a mounting block 31 may be made integral with the lower end 32 of the ladder or may be attached thereto by any approved means. On the flat vertical outer face of the block is fastened a hinge 13 having leaves 14 and 15 pivotally joined at 17. A wheel or roller 20 is rotatably mounted in a slot in the leaf 15 on an axle 22 carried by the leaf 15. A compression spring 29 urges the leaf 15 continually outwardly and downwardly. The lower portion 32 of the ladder end may be pivotally attached to the main portion 33 thereof as for example on a vertical pin 34 rigidly attached to the portion 32 and rotatable in a corresponding socket in the main portion 33, thus giving a caster action to the whole.

It will be evident that the housing 18 in Figs. 1, 2 and 3, and the spring 29 in Fig. 4 are effective guards for the roller in each instance so that it is possible to shift the ladder along with the foot without danger of catching the hem of an overall, trouser leg or long skirt in the wheel and its bearings.

It will be evident that the embodiment of the invention herein shown is illustrative merely and may be modified and changed in many ways and details without departing from the spirit and scope of the invention as limited only by and pointed out in the appended claims.

What is claimed is:

1. In a safety ladder, a hinge, means to fasten one leaf of the hinge to a foot of the ladder, a roller mounted on the other leaf of the hinge to swing therewith, a spring to maintain the two leaves of the hinge yieldingly in such relative position as will render the roller operative to support the ladder and to return the same to such position after having been displaced therefrom and a pair of rigid lugs formed on one hinge leaf to receive the other hinge leaf therebetween when the hinge is closed.

2. In a safety ladder, a hinge, means to fasten one leaf of the hinge to a foot of the ladder, a pair of lugs formed on one leaf of the hinge to embrace the other leaf therebetween when in closed position, a housing mounted on the free leaf to swing therewith, a roller mounted in the housing to swing therewith, and a spring positioned on each side of the housing and attached at one end to the housing and at the other end to the fixed leaf of the hinge to hold the hinge yieldingly closed.

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