June 26, 1934. E. C. LEACH ET AL 1,964,067

EXTENSION LADDER

Filed Feb. 6, 1932

Fig. 1.

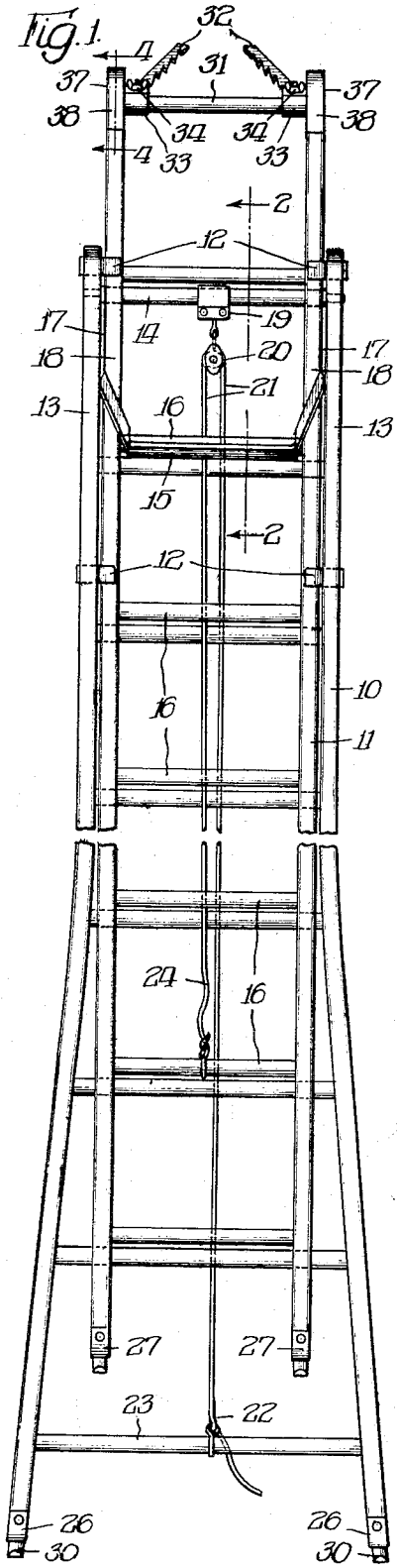


Fig. 4

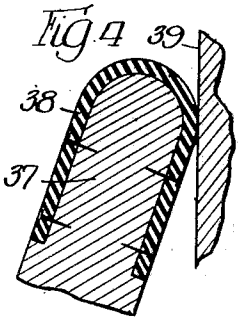


Fig. 3.

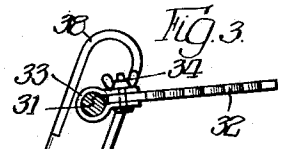


Fig. 2.

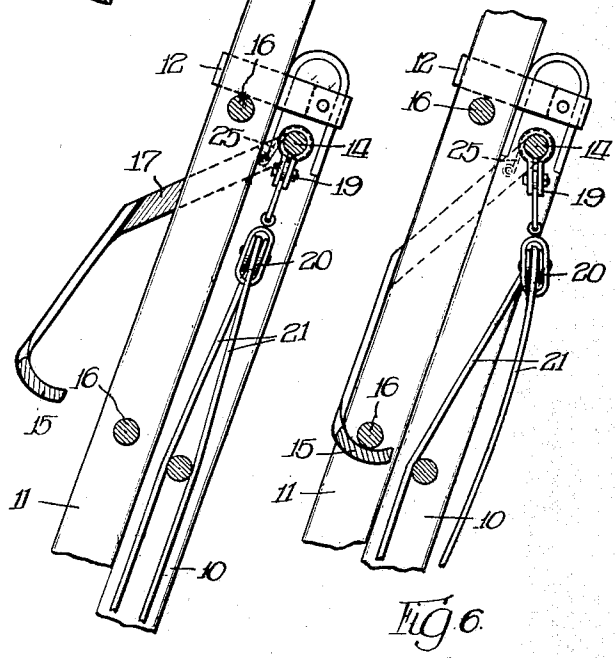


Fig. 5

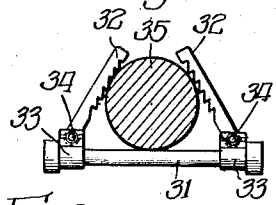


Fig. 6.

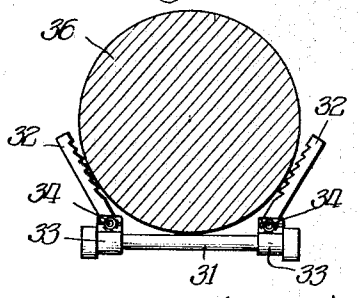


Fig. 8.

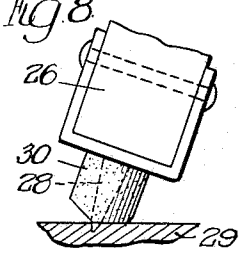
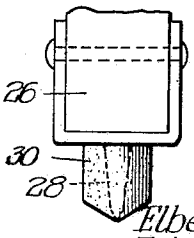


Fig. 7.



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EXTENSION LADDER

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Application February 6, 1932, Serial No. 591,270

2 Claims. (Cl. 228—66)

The principal object of this invention is to provide an improved extension ladder which is much safer to use than the ladders heretofore employed for the same kinds of work.

Another important object of the invention is to provide an improved ladder which, in addition to its safety features, is light in weight, is easy to operate and can be manufactured at small cost.

To extend the improved ladder, it is merely necessary to pull upon a conveniently located rope. The instant the rope is released, a novel locking device automatically acts to hold the upper section of the ladder against descent. To lower the upper section, a slight pull is first given the rope and then the rope is paid out slowly. Should the rope break or get away from the operator, the locking device will immediately function to prevent the upper section from dropping.

When the ladder is extended, slippage at the top is prevented by the action of a novel surface-gripping device which is carried by the upper section, and slippage at the bottom is prevented by the action of another novel gripping device which is built into the feet of the lower section.

While the foregoing statements are indicative in a general way of the nature of the invention, other more specific objects and advantages will be apparent to those skilled in the art upon a full understanding of the construction, arrangement and operation of the parts constituting the improved ladder assembly.

In order that the invention may be readily understood, one embodiment of the same is presented herein by way of exemplification, but it will of course be appreciated that the invention is susceptible of embodiment in other structurally modified forms coming equally within the scope of the appended claims.

In the accompanying drawing:

Fig. 1 is a front view of the improved ladder, showing the same only slightly extended, with the central portions of both sections of the ladder broken away;

Fig. 2 is a fragmentary vertical section, taken on the line 2—2 of Fig. 1, showing the locking device in operation;

Fig. 3 is a similar view, but showing the locking device held out of operation by the application of tension to the rope used in raising or lowering the upper section;

Fig. 4 is a vertical section through one of the upper ends of one of the side members of the sections, taken on the line 4—4 of Fig. 1;

Fig. 5 is a plan view of the upper end of the ladder, showing the way in which the gripper bars are used to hold the ladder firmly with respect to a small diameter pole, the pole being shown in horizontal section;

Fig. 6 is a similar view, showing the way in which the grippers are used to hold the ladder firmly with respect to a large diameter pole;

Fig. 7 is a side view of one of the lower ends of one of the side members of the sections; and

Fig. 8 is a similar view, showing the way in which the rubber encased spikes are adapted to bite into the surface on which the ladder is supported.

The particular ladder structure shown in the drawing includes a lower section 10 and an upper section 11. The upper section is slidably mounted on the lower section and is engaged by two spaced pairs of guide brackets 12 which are secured to the side members 13 of the lower section adjacent the upper end of the latter. The uppermost rung 14 in the lower section is rotatably mounted in the side members 13 and forms a support for a wide inwardly directed trough-like hook 15, which hook is adapted to swing downwardly and inwardly into a supporting position beneath any one of the rungs 16 in the upper section. The hook 15, which is preferably about as wide as the rungs with which it is adapted to engage, is provided at its sides with two upwardly diverging arms 17 which pass closely around the side members 18 of the upper section and are securely clamped at their upper ends to the rung 14.

The rotatable rung 14 also serves as a support for a bracket 19 which carries a pulley 20. The bracket 19 is clamped to the rung 14 adjacent the center of the latter, and the pulley 20, which takes a rope 21, is swiveled to the lower end of the bracket. One end 22 of the rope, which is adapted to be pulled upon or paid out to either raise or lower the upper section of the ladder, may be tied to the lowermost rung 23 of the lower section, while the other end 24 of the rope may be tied to one of the lower rungs of the upper section.

When the hook 15 is in engagement with one of the rungs 16, as shown in Fig. 2, the bracket 19 is disposed at an angle to the longitudinal axis of the lower section of the ladder, with the result that, when tension is applied to the rope 21 during either the raising or lowering of the upper section, as shown in Fig. 3, the free end of the bracket 19 will be pulled down into substantially the plane of the lower section and the hook 15 will be held out away from the rungs 16

in the upper section, thereby permitting free up or down movement of the upper section under the control of the rope.

The feet 26 of the lower section of the ladder and also the feet 27 of the upper section, if desired, may be provided with sharp downwardly projecting spikes 28 (see Figs. 7 and 8) which are adapted to dig into the ground 29 or other supporting surface when the ladder is placed in an upright position and leaned against some object. The spikes 28 are encased within relatively large sponge rubber blocks 30, which blocks completely enclose the spikes and serve as a guard for the same when the ladder is not in use and push back to permit the spike to pierce the ground or other surface when the ladder is stood on end.

The uppermost rung 31 of the upper section of the ladder is preferably provided with a pair of gripper bars 32. The bars are serrated in a saw-tooth formation along their opposed edges and are adjustably mounted on the rung 31 by collars 33 and thumb screws 34. When the screws 34 are loosened, the bars may be swung toward or away from each other and may also be swung up or down to bring them in positions wherein they will best engage with the pole or other object against which the ladder has been placed. After the gripper bars 32 have been moved into the desired position, they may be held against movement by a tightening of the thumb screws 34. In Fig. 5 the bars 32 are shown adjusted to a pole 35 of small diameter, while in Fig. 6 the bars are shown adjusted to a pole 36 of relatively large diameter. If the bars 32 are not needed, as where the ladder is being used only against flat surfaces, the bars may be easily removed from the rung 31.

The upper ends 37 of the side members of the upper section are preferably butted with strips 38 of thick, tough rubber. These strips, which are clearly shown in Fig. 4, prevent the possibility of the ladder marring the surface 39 of the building or other object, minimize skidding or slipping, and also act as insulators.

We claim:

1. In an extension ladder, a lower section, an upper section, a rotatable rung adjacent the upper end of the lower section, a hook fixedly secured to the rotatable rung for engagement with the rungs of the upper section, a bracket also fixedly secured to the rotatable rung in angular relation to the hook, a pulley fastened to the bracket, a rope trained over the pulley and connected at one end to the lower portion of the upper section, the angle of the bracket with respect to the hook being such as to swing the hook out of the path of movement of the rungs of the upper section when tension is placed on the rope while either raising or lowering the upper section, and means for automatically swinging the hook back into the path of movement of the rungs upon the tension on the rope being relieved.

2. In an extension ladder, a lower section, an upper section, a hook pivotally connected with the lower section for swinging movement into interlocked engagement with the bottom of one of the rungs of the upper section to prevent downward movement of the upper section, a spring for normally maintaining the hook in engagement with the rung of the upper section, a rope for raising and lowering the upper section, and means for automatically swinging the hook out of engagement with the rung of the upper section against the resistance of the spring when the rope is placed under tension incident to either the raising or lowering of the upper section, said hook being characterized by a rung-engaging portion which extends beneath the rung in contact with the latter substantially from one side of the upper section to the other.

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