

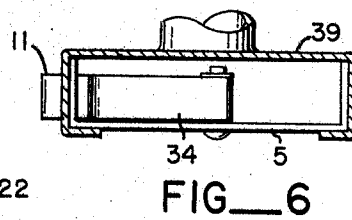
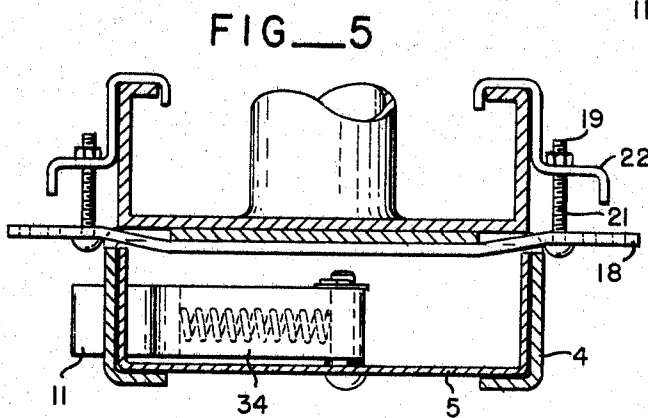
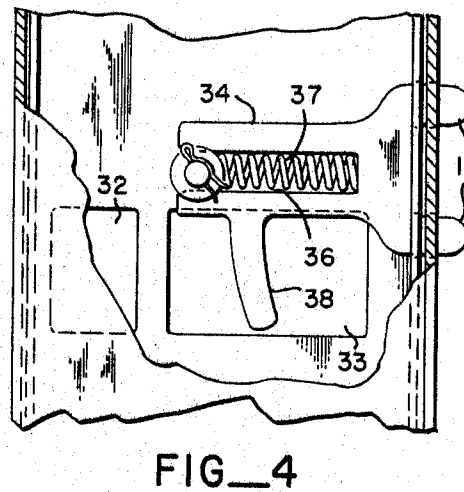
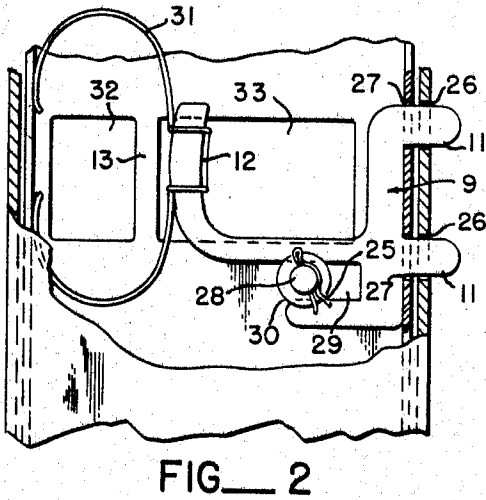
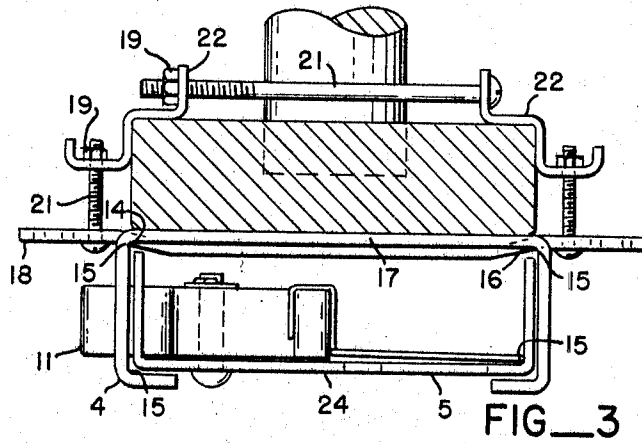
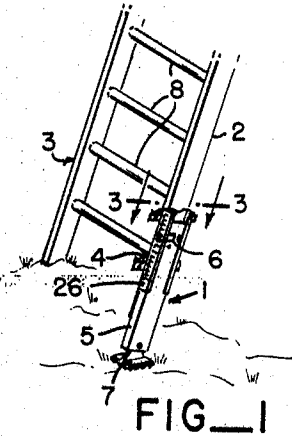
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3,484,814

LADDER LEVELER

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3,484,814

LADDER LEVELER

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12 Claims

ABSTRACT OF THE DISCLOSURE

A ladder leveler for connecting to the rail of a ladder having a mechanism for locking and unlocking an extendible leg located internal to the leveler accessible through holes therein and operable in response to a gripping force applied between the leg and locking mechanism.

BACKGROUND OF THE INVENTION

This invention relates to ladder levelers and more specifically to an improved release mechanism for unlocking and adjusting an extendible leg of a leveler.

Ladder levelers are attached to the side rails of ladders to enable a ladder to stand on a non-level supporting surface. A leveler normally includes an extendible leg which, when extended from the ladder rail to the non-level surface, enables the ladder to stand in a customary manner. When a ladder is set up over a non-level surface, the leg of the leveler is adjusted until the rungs of the ladder are level, i.e. parallel to the horizon, thereby readying the ladder for its normal use.

The leveling operation is cumbersome if in adjusting the leg it is necessary to exert a force on the ladder as well as on the leveler in order to operate the release mechanism which frees the extendible leg. The difficulty arises in attempting to balance the ladder while at the same time adjusting the length of the leveler leg.

The leveler of the present invention employs a novel release mechanism which is operated without interfering with the balancing of the ladder. The release mechanism provides a grip which is used to extend the leg while the release mechanism is activated. The release mechanism is located internal to the leveler thereby minimizing the possibility of accidental release of the leg. The particular structural arrangement of the leveler components provides strength and reliability and a minimum of parts is required thereby making it relatively simple for manufacture and highly economical.

It is accordingly an object of the present invention to improve in ladder levelers the mechanism for releasing the extendible leg of the leveler to facilitate its adjustment.

Other objects, such as providing a leveler of improved construction and providing a release mechanism unlikely to be accidentally activated, will be apparent from the description of the invention read in view of the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present ladder leveler and its method of use may be had by reference to the detailed description which follows and from the accompanying drawings wherein:

FIGURE 1 is a perspective view of a wooden ladder having the present leveler attached to a rail thereof;

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FIG. 2 is a left elevational view of the leveler viewed through a cut-away portion of the leveler base member;

FIG. 3 is a cross-sectional view of the ladder and leveler of FIG. 1 showing the leveler from the right in top plan view along lines 2-2;

FIG. 4 is a left elevational view of another embodiment of a leveler release mechanism with a portion of the base member cut away;

FIG. 5 as seen from the right is a plan cross-sectional view of the embodiment of the leveler shown in FIG. 4 illustrating its attachment to a metal ladder; and

FIG. 6 illustrates an embodiment of the present leveler having the release mechanism of FIGS. 4 and 5 wherein the leveler is an integral part of the ladder rail.

DESCRIPTION OF THE INVENTION

The present ladder leveler indicated generally as 1 in FIG. 1 is shown attached to rail 2 of a wood ladder 3. The leveler comprises base member 4, extendible leg 5 and release mechanism 6. The leg is slidably supported by the base to permit foot 7 to be adjusted a distance from rail 2 such that the ladder stands with its rungs 8 parallel to the horizon, i.e. stands level. The release mechanism includes slide member 9 (FIG. 2) having at least one pin 11 rigidly connected thereto, which is normally maintained inserted into slots in the base and leg by an appropriate bias spring thereby locking the leg to the base. Trigger 12 is used to move slide 9 against the force of the bias spring thereby unlocking the leg as the holding pin 11 is withdrawn from the slots. The trigger together with stop 13 provide a grip which is used to extend the leg while it is unlocked from the base. Once the leg is extended the desired distance, the trigger is released and the bias spring urges the pins into the slots thereby once again locking the leg to the base and readying the ladder for use.

Referring now to FIG. 3, base member 4 is formed from a metal sheet or plate into a four-sided channel, a C-channel, by bending the plate at four corners 15. Holes 14 and 16 are cut into the closed side of C-channel 4, i.e. side 17, to accommodate clamping bar 18. Base 4, and therefore the leveler, can be attached to a ladder such as that shown in FIG. 1 by such means as nuts and bolts 19 and 21 and brackets 22. It is preferable that at least two clamping bars 18 be used and that they be located generally at the positions shown in FIG. 1.

U-shaped channel 5 is the extendible leg to which foot 7 is pivotally mounted. The channel member is inserted within the four sides of base member 4 and is capable of being slid along the longitudinal axis of the base as long as it is not locked thereto. Preferably, U-channel or leg 5 is orientated so its closed side, side 24, covers the open side of the base, i.e. the side opposite side 17 thereby retaining the release mechanism internal to the leveler. This construction enables the closed side of the U-channel-leg to serve as a guard or shield to prevent accidental release of the leg.

Extendible leg 5 is locked to base 4 by pins 11 inserted through slots in both the leg and base. The base has a row of vertically aligned slots 26, best seen in FIG. 1, through any one of which the pins may be inserted. Leg 5 has at least one slot 27 through which a pin may be inserted. It is preferable, although not necessary, that two holding pins be employed. FIG. 2 illustrates an embodiment having two pins 11 extending through two

slots 27 in leg 5 into two slots 26 in base 10. Naturally, it is necessary to align the slots in the base and leg relative to each other to permit the pins to be inserted there-through.

Referring now to FIG. 2, pins 11 are formed from extensions on slide 9. The slide is internal to the leveler located between the closed sides of the U-channel leg and the C-channel base and is supported by post 28, washer 30 and cotter pin 25. Post 28 is rigidly connected to the leg. The slide straddles post 13 by virtue of groove 29. The post, washer and cotter pin secure the slide to the leg while permitting it to slide transversely to the leg along the path defined by groove 29 and pins 11.

Extension 12 on slide 9 is the trigger used to insert and withdraw pins 11 from the slots in the leg and base. Leaf spring 31 is inserted between an inside wall of U-channel 5 and the trigger. The leaf spring maintains the holding pins inserted into the slots in the base and leg thereby locking the two together.

Holes 32 and 33 cut into the closed side of U-channel 5 define stop 13 from the material separating the two holes. The holes are located opposite the trigger and at a distance from it such that the pins are removed from the slots in the base a distance sufficient to unlock the leg from the base when the trigger is pulled toward the stop. While the leg is unlocked, the stop and trigger serve as a grip for sliding the leg to the desired extended position.

Another embodiment of the release mechanism is shown in FIG. 4. Components common to the embodiments in FIGS. 3 and 4 have the same designations. In FIG. 4, slide 34 straddles post 28 by virtue of groove 36. Coil spring 37 is inserted into groove 36 between the post and the slide. The release mechanism functions substantially the same as that shown in FIG. 3 with the coil spring normally maintaining pins 11 on slide 34 in the slots in the base and leg. Extension 38 on the slide forms the trigger for this embodiment. When trigger 38 is pulled toward stop 13 the pins are withdrawn from the slots in the base a distance sufficient to unlock the leg. Again, stop 13 and trigger 38 comprise a grip for extending the leg. Upon release of the trigger, the coil spring forces the pins into the slots in the base and leg, assuming of course the slots in the leg and base are aligned opposite each other.

FIG. 5 is a plan view of the ladder leveler shown in FIG. 4 but attached to a metal ladder rather than the wooden ladder of FIG. 1. Brackets 22 in FIG. 5 are the same brackets used to attach the leveler to the wooden ladder in FIG. 3. The shape of the brackets enables them to be orientated so they can be used with ladders having cross-sections generally similar to the cross-sections of the ladders in FIGS. 3 and 5. Inverting the left-hand bracket in FIG. 3 permits it to be used in the manner of the right-hand bracket in FIG. 5. The leveler, brackets and other clamping apparatus comprise a portable kit suited for use with a variety of ladders of different construction.

The ladder leveler of the present invention may be incorporated directly into the rail of a metal ladder. Such a construction could be accomplished by the configuration shown in FIG. 6. There, rail 39 also serves the function of the C-channel base member 4 described above. The structure and operation of the leveler incorporated in the ladder is otherwise substantially the same as the above described embodiments.

It is believed that the invention is clearly understood from the foregoing description of the illustrated embodiments. Changes in the details of construction may be resorted to without departing from the spirit of the invention and it is accordingly my intention that no limitations be implied and that the hereto annexed claims be given the broadest interpretation to which the employed language fairly admits.

I claim:

1. A ladder leveler comprising:

a base member adapted for connection to the rail of a ladder,

an extendible leg slidably supported by said base, holding means for locking said leg to said base to prevent sliding therebetween, and

release means operatively connected to said holding means for unlocking said leg enabling the position of said leg to be adjusted relative to said base, said release means being between said leg and said base whereby said leg serves as a guard to prevent accidental release of said leg and positioned on said leg to provide a grip for sliding said leg when unlocked.

2. A leveler according to claim 1 wherein said release means is positioned on said leg to provide a grip for sliding said leg when unlocked.

3. A leveler according to claim 1 wherein said holding means includes at least one pin suited for insertion through slots in said leg and said base.

4. A leveler according to claim 3 wherein said release means includes a slide connected to said pin and supported for movement transverse to said leg for withdrawing and inserting said pin through said slots.

5. A ladder leveler comprising:

a base member adapted for connection to the rail of a ladder,

an extendible leg slidably supported by said base, holding means for locking said leg to said base to prevent sliding therebetween, and

release means operatively connected to said holding means for unlocking said leg enabling the position of said leg to be adjusted relative to said base,

said release means operable in response to a force applied between said release means and said leg, said holding means including at least one pin suited for insertion through slots in said leg and said base, said release means including a slide connected to said pin and supported for movement transverse to said leg for withdrawing and inserting said pin through said slots,

and wherein said release means is mounted between said leg and base and further includes a trigger connected to said slide accessible through at least two holes in said leg with the portion of said leg separating said holes defining a stop whereby said leg is locked and unlocked in response to a force applied between said trigger and stop.

6. A leveler according to claim 5 wherein said release means further includes bias means for maintaining said pins inserted into said slots.

7. A leveler according to claim 6 wherein said bias means includes a leaf spring connected between said leg and said slide and wherein said leveler further includes a foot pivotally mounted on said leg.

8. A leveler according to claim 6 wherein said bias means includes a coil spring positioned between said leg and said slide.

9. A ladder leveler comprising:

a C-channel base adapted for connection to the rail of a ladder,

a U-channel leg slidably mounted within the four sides of said base with the open side of said U-channel adjacent the closed side of said C-channel,

a post rigidly connected to the closed side of said leg between the closed sides of said U- and C-channels, a slide supported by said post to enable sliding thereof transverse to said leg,

pins connected to said slide for locking said leg to said base when inserted into slots therein,

a stop formed by at least two holes cut into the closed end of said U-channel leg,

a trigger connected to said slide positioned relative to said stop such that said leg and base are unlocked

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when said trigger is moved transverse to the leg toward said stop.

10. The leveler of claim 9 further including means for connecting said leveler to the rail of a ladder, said means including invertible brackets usable with ladders of different cross-sectional shapes. 5

11. The leveler of claim 9 further including a leaf spring positioned between said leg and said slide to maintain said pins in said slots.

12. The leveler of claim 9 wherein a groove in said slide accommodates a coil spring anchored to said leg 10

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for urging said slide transverse to said leg for maintaining said pins in said slots.

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