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2,936,849

LADDER LEVELERS

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FIG 1.

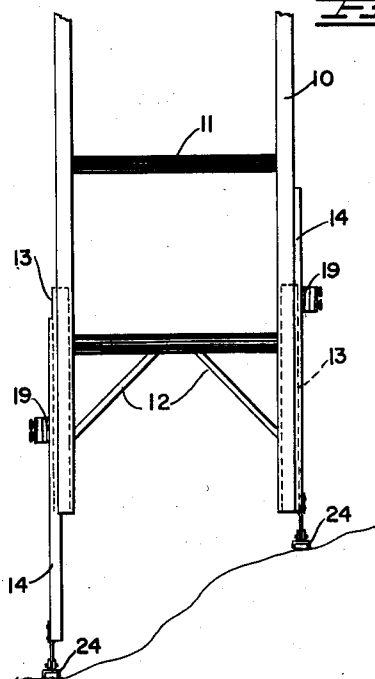


FIG 2.

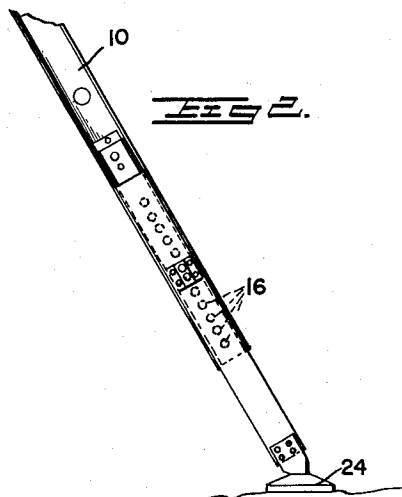


FIG 3.

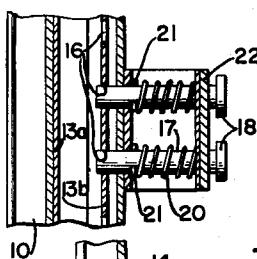
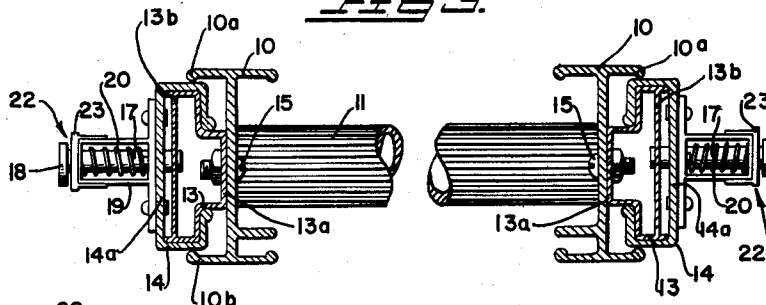
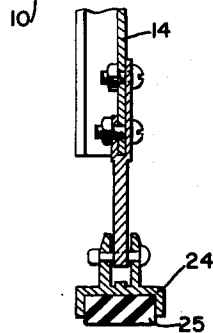


FIG 4.



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LADDER LEVELERS

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1 Claim. (Cl. 182—204)

This invention relates to ladder levelers. More particularly, it concerns ladder levelers of the type in which adjustable extensions are carried upon the bottom of the side rails of ladders so that such ladders may be retained in a substantially vertical plane even when used on uneven ground or on different levels of interior floors or stairs.

Field of invention

One of the major causes of accidental injuries and deaths incurred by falls from ladders is due to the lack of stable or firm footing of such ladders on uneven ground or other irregular surfaces. Thus, failure to align a ladder vertically may cause the user's weight to make the ladder slide on the surface against which it is leaning, and fall to the ground. Manufacturers and designers of ladders have recognized these dangers and have taken steps to render ladders less dangerous for industrial and household users. One development of this type has been the provision of adjustable extension devices mounted at the bottom of ladder rails that permit the ladder to be retained in a vertical plane upon a stable footing regardless of the ground on which it is placed. While such adjustable extensions or ladder levelers have been generally effective, most ladder levelers heretofore devised have possessed inherent defects or disadvantages.

Perhaps the foremost of these disadvantages has been the absence of a sufficiently strong fastening arrangement whereby the extensible portion of the ladder leveler may be positively locked against sliding movement with respect to the ladder rails, and further, such a latching arrangement whereby the possibilities of the latch becoming unlatched while the ladder is in use are adequately diminished. To some extent, the solutions to these problems have been solved by such structures as are shown in U.S. Patents 409,711 and 2,458,076. However, many ladder levelers heretofore constructed have been so structurally complex as to require a complete revamping of the lower portion of the ladder rails to which these levelers are fixed. Also, they have often been difficult to adjust or to manipulate, so that the psychological effect on the ladder user has been to ignore the many safety advantages of the levelers rather than take the time and trouble required to use or adjust the levelers.

Another outstanding disadvantage of ladder levelers which have been devised in the past is the lack of a sufficiently strong mounting means by which the leveler may be affixed to the bottom of the ladder side rail, and which will permit an unobstructed guide along which the extensible portion of the leveler may be adjusted. In many of the ladder leveler constructions heretofore conceived, the extensible portion is arranged in sliding engagement with a guide plate or the like, which is in turn screwed or bolted to the ladder rails; see, for example, U.S. Patents 1,179,391 and 2,599,117. An undesirable feature incorporated in many prior constructions, is that the bolts or screws by which the guide portion of the

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levelers are attached to the ladder rails are disposed in the guide ways of the guide plate and thus exposed to the sliding portion of the extensible component of the leveler. Such prior constructions necessitate an exceedingly accurate setting of the screws or bolts and often interfere with manipulation of the adjustable component of the leveler.

Although ladder levelers of this type have been made and sold for many years, there are many more ladders without them than with them, because of the above mentioned disadvantages, and also the high costs necessary in the production of an adequately strong and safe leveler. The need for a satisfactory ladder leveler is brought out by the history of accidents associated with improperly footed ladders, as well as the many attempts by ladder manufacturers and designers to develop such levelers.

Objects

A principal object of the present invention is the provision of new and improved ladder levelers of the adjustable extension type adapted for mounting at the base of ordinary ladders. Further objects include:

I. The provision of ladder levelers which are so designed that they can be fabricated from light metal and still be structurally strong and safe.

II. The provision of ladder levelers which possess great strength, and yet which can be very easily assembled or disassembled and mounted or demounted from the ladder side rails.

III. The provision of ladder levelers which are secured in their adjusted position by double spring biased pins, providing an exceptionally strong latching means for positioning the adjustable component of the leveler relative to the ladder rails.

IV. The provision of ladder levelers which have latching means that can be operated in a few seconds to adjust the ladder to new locations, but which are at the same time virtually safe from accidental disengagement.

V. The provision of ladder levelers which have an extensible foot component telescopically adjustable with respect to a stationary tubular mounting component, the slidably engageable surfaces of which are virtually unobstructed except by pin latching means for securing the adjusted foot portion.

VI. The provision of ladder levelers which have a double pin locking arrangement and a pin disengaging component by which both pins may be simultaneously withdrawn or disengaged.

Other objects and further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. It should be understood, however, that the detailed description, while indicating preferred embodiments of the invention, is given by way of illustration only, since it will become apparent to those skilled in the art from this description, that various changes and modifications can be made without departing from the spirit and scope of this invention.

General description

According to the present invention, the aforementioned objects are accomplished by forming a ladder leveler from two fabricated telescopically engageable parts, the inner or smaller of these parts being particularly adapted to be bolted to the outside side rail of an ordinary ladder, and having evenly spaced holes in its outside surface and along the longitudinal center line thereof, while the outer of these members is adapted to telescope over the tubular mounting member and is provided with at least two latching pins spaced a distance equal to the spacings of the holes in the mounting member, by which the inner and outer members may be locked or anchored in their desired relative positions.

A more complete understanding of the new and improved ladder levelers of this invention and their method of use may be had by reference to the accompanying drawings in which:

Fig. 1 is a front elevation of a ladder equipped with the ladder levelers of this invention, and further showing their adaptability to uneven ground;

Fig. 2 is a side elevation of the arrangement shown in Fig. 1;

Fig. 3 is an enlarged fragmentary cross sectional view of a ladder equipped with the ladder levelers of this invention; and,

Fig. 4 is an enlarged fragmentary front sectional view of a ladder equipped with a ladder leveler of this invention, taken along the longitudinal center line of the side rail of the ladder.

Detailed description

The ladder levelers of this invention are adapted to be mounted on each side of a standard ladder having I-shaped side rails 10 and the usual rungs 11. Braces 12 may be provided between the lower portion of the side rails and the lowermost rung of the ladder to lend stability to this portion of the ladder; however, these braces are optional and are not needed, nor do they form a part of this invention. While the ladder shown in the drawings is of the type fabricated from extruded metal sections with which the ladder levelers are preferably used, it is to be understood that the ladder levelers of this invention are adaptable to other types of ladders, such as ordinary wooden ladders or the like.

The ladder levelers basically include a substantially T-shaped tubular mounting member 13 and extension members or channels 14 of C-shaped cross section for telescopically engaging the tubular mounting member. As can be seen, the member 13 and channel 14 are of such size that they nest within the side extensions 10a and 10b of side rails 10. This creates a semi-enclosure for the ladder levelers so that they are protected against damage when the levelers are in a closed position for moving or storage.

The base portion 13a of the tubular mounting member 13 is provided with holes therein to receive bolts 15 extending through corresponding holes in the ladder side rails 12 to enable securing of the tubular mounting member to the ladder side rails. The outwardly facing walls 13b which runs parallel to bottom 13a of the tubular mounting member is provided with holes 16 spaced equidistantly and extending along the longitudinal center line thereof.

In order to latch or anchor the extension channel 14 from movement with respect to the tubular mounting member 13, and thus the ladder rail 12, latch pins 17 having heads 18 are provided on the side rail channels. The latch pins are retained in guide members 19, which are in turn secured to outside web 14a of the channels 14. The pins extend through aligned holes in the two walls of the pin guide and in the web of the extension channel 14 and are spaced at a distance exactly equal to the spacing of the holes 16 in the tubular mounting member 13. Helical compression springs 20 are provided about the latch pins 17 to urge them normally inwardly into engagement with the holes in the tubular mounting member 13. The helical springs 20 abut at one end against the inside of the pin guide 19 and at the other end against cotter keys 21 or the like extending radially through the pins 17 to function in the manner described.

A pin lifting channel 22 of substantially U-shaped cross sectional configuration is positioned over the latch pin guide 19 and under the latch pin heads 18, as shown in Fig. 3 of the drawings. The pin lifting channel 22 is formed having a very slight laterally projecting bead 23, which facilitates manually grasping the pin lifting channel 22 to simultaneously lift or disengage the latch pins 17 from the holes 16 in the tubular mounting member

13. Thus, it is readily observed that the latch pins 17 are very easily disengaged to adjust the side rail channels 14 with respect to the tubular mounting member, and yet the double pin arrangement renders the latching device very safe from accidental unlatching thereof.

As shown in Fig. 4 of the drawings, the extension channels 14 are provided at their bottom with safety feet 24 having a rubber or otherwise resilient and frictional pad 25.

Method of use

The new and improved ladder levelers of this invention are mounted to the ladder side rails 12 by first separating the tubular mounting member 13 and the leveler extension channels 14. The mounting members are then secured to the ladder side rails 12 by placing the base portion 13a against the ladder side rail and centered in the face and in line of the side rail itself. The lower end of the mounting member and the lower end of the ladder side rail are in even or matched relation. Bolts 15 are then inserted through matching holes in the ladder side rail 12 and the mounting member 13, and drawn tight. While the bolts 15 are a preferred means of attaching these members together, it is apparent that many other types of securing means could be used, such as, for example, rivets, spot welds and the like.

After the tubular mounting members 13 have been secured to the ladder side rails 12, the extension channels 14 are then slid telescopically into position over the tubular mounting members. When the channel members 14 have been partially telescoped upwardly on the tubular mounting members 13, the latch pins, being urged inwardly by the springs 20, will engage the lower end of the mounting member to prevent further upward movement. At this point, the latching pins are lifted or disengaged by manually grasping the beaded lifting channel 22 and simultaneously pulling both of the latching pins from engagement with the mounting member 13. Having disengaged the latching pins 17, the leveler side extension channels 14 may be then slid upwardly until they reach the desired position. The latch pins 17 are then released to be urged by springs 20 inwardly into corresponding holes 16 in the mounting member 13. It will be noted that both of the latching pins 17 engage holes 16 to equally support the load of the ladder on the ladder levelers, thus to lend added strength to the assembly. Further, the double latching pin arrangement of this invention functions to give the user an indication of maximum positions of the extension channels 14 with respect to the tubular mounting member 13. This latter function is brought about by the fact that so long as both pins 17 are in their normal or inward position, the user is assured that they engage holes 16 in the mounting member 13, and hence, are in a safe position for use. If, however, the uppermost of the latching pins fails to move inwardly when the lifting channel 22 has been released, the user is then made aware that the lower of the mounting pins is engaging the uppermost hole 16 in the tubular mounting member. Knowing this, the user may then disengage the latch pins and slide the side rail channels 14 downwardly until both pins engage holes or are urged inwardly under the influence of the springs 20. The reverse of this operation, of course, applies when the lower pin fails to engage the bottommost hole 16 in the mounting member 13.

When a ladder equipped with the ladder levelers of this invention is used on even ground, the side rail channels 14 should be adjusted such that the latch pins engage in the two uppermost holes 16 in each tubular member 13 placed on each side of the ladder. This arrangement or adjustment lends optimum strength to the assembled ladder and ladder levelers. On uneven ground or floors the extension channels 14 can be ad-

justed to any desired position within the range of holes 16 in the tubular members 13 mounted on both sides of a ladder being used.

Conclusions

From the foregoing description, it becomes apparent to one familiar in the ladder art that the new and improved ladder levelers of this invention effectively accomplish the objects hereinbefore set out, as well as many others. The unique manner in which the ladder levelers of this invention are secured to an ordinary ladder side rail gives great strength to such an assembly, as well as permitting an unobstructed sliding arrangement between the telescoping extension channels and tubular mounting members. Moreover, the double acting latch pin feature of the new and improved ladder levelers gives an abundance of strength to the latch, as well as insuring against accidental disengagement of the double pin latch while the ladder to which the levelers are secured is in use. Of equal importance is the fact that the levelers are adjusted to any position within their limit by a simple and quick operation even though they possess very stable and safe construction. While the double latching pin arrangement thus affords the ladder user an indication of maximum leveler positions, it is to be observed that this arrangement lends still another important safety feature. For example, in the event one using a ladder equipped with the levelers of this invention fails to move the latching pins 17 into the holes 16, the pins merely abut the outwardly facing wall 13b of the member 13 and the extension channels 14 remain unlatched. However, when the user applies his weight to the first rung 11 of the ladder, this downward pressure causes a slight downward movement of the ladder, and correspondingly, the member 13 permits the latching pins 17 to engage automatically the holes 16 under the influence of springs 20. This arrangement, thus, reduces the need for reliance on the human element to insure completely safe operation of the new ladder levelers.

The unique arrangements referred to above, as well as other features incorporated in the new and improved ladder levelers described in this specification greatly advance the feasibility of marketing such devices and make

safer the use of ladders on uneven ground or on other irregular surfaces, and hence reduce the great number of accidents incurred thereby.

I claim:

- 5 A ladder leveler adapted to be mounted to the bottom outside side rail surfaces of a ladder comprising: a tubular mounting member having a base portion and an enlarged top portion, said base portion defining an inwardly facing wall for attachment to the ladder side rail, said top portion defining an outwardly facing wall and having a plurality of evenly spaced holes along the longitudinal center line thereof; an elongated extension member of continuous C-shaped cross-sectional configuration throughout its length for telescopically engaging the enlarged top portion of said tubular mounting member; at least two headed latching pins spaced equally with respect to the evenly spaced holes in said tubular mounting member; means for guidingly supporting said latching pins coaxially aligned with holes in the web of said extension member; spring means on each latching pin for independently urging each latching pin inwardly toward said tubular mounting member for engagement with a hole in said mounting member; and a pin lifting channel positioned between the heads of said latching pins and said pin guiding means for simultaneously retracting said pins away from said tubular mounting member.

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