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EQUALIZING BASE SUPPORT FOR LADDERS

Filed June 22, 1959

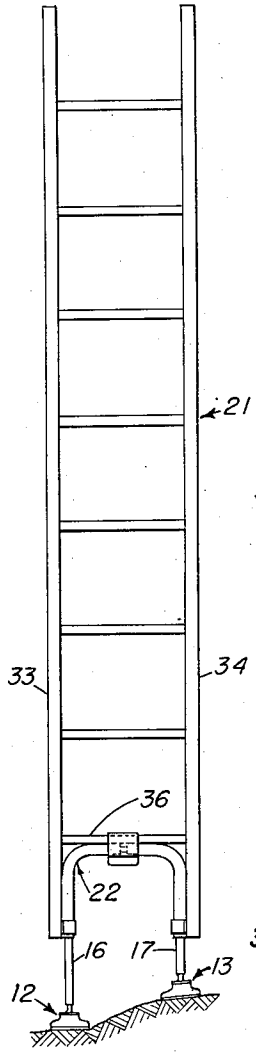



FIG.-1

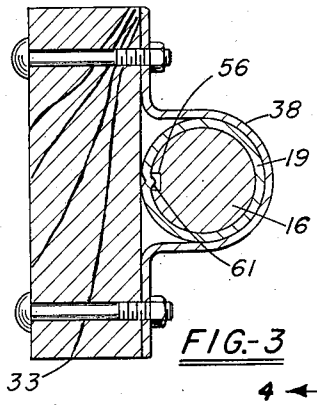



FIG.-3

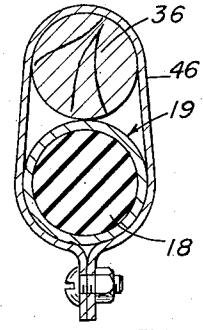



FIG.-4

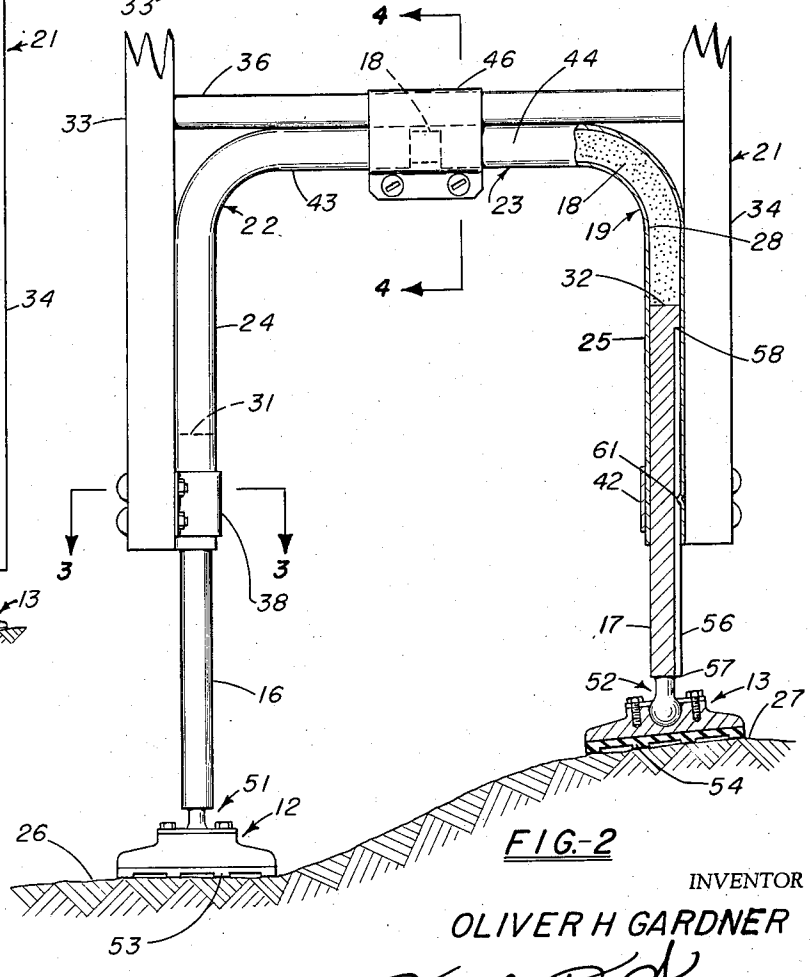



FIG.-2

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# EQUALIZING BASE SUPPORT FOR LADDERS

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6 Claims. (Cl. 182—202)

The present invention relates to equalizing base supports and particularly to adjustable supports for holding a ladder upright on unlevel surfaces.

An object of the present invention is to provide a ladder support automatically self-adjusting to uneven and unlevel surfaces and fully and minutely self-accommodating throughout a wide range of adjustment and self-stabilizing to support the ladder positively and safely on such surfaces for use.

A further object of the present invention is to provide a support of the character described and adapted to existing styles and types of ladders for use as either an integral part of an attachment, the support being easy, certain and safe to operate, simple to manufacture, and formed of inexpensive and rugged parts for a long and useful life thereof.

The invention possesses other objects and features of advantage, some of which of the foregoing will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of this specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

With reference to said drawings:

Figure 1 is a front elevation of a ladder and equalizing base support therefor constructed in accordance with the present invention.

Figure 2 is a fragmentary front elevation partly in cross-section of the ladder and equalizing base support on an enlarged scale.

Figure 3 is a cross-sectional view on a further enlarged scale taken substantially on the plane of line 3—3 of Figure 2.

Figure 4 is a cross-sectional view taken substantially on the plane of line 4—4 of Figure 2.

The equalizing base support for ladders of the present invention consists briefly of ground engaging means providing laterally spaced ground supports **12** and **13**, a pair of vertically extending reciprocally mounted ladder supporting members **16** and **17** connected to the spaced ground supports **12** and **13**, and elastic core member **18** and channel **19** therefore supporting and guiding the core member **18** for longitudinal reciprocation when the core member is in a normally substantially uncompressed state, the core member **18** being connected to the ladder supporting members **16** and **17** for joint reciprocation to an adjusted position accommodating the ground supports **12** and **13** to particular ground elevations, the ladder supporting members **16** and **17** and channel **19** cooperating to place the core member **18** under predetermined compression when weight is applied simultaneously to the ground supports **12** and **13**, as when the ladder **21** is rested thereon, the core member **18** being formed of a material and functioning when under this predetermined compression to expand into a frictional grip with the channel **19** to support the ladder supporting members **16** and **17** in



their adjusted position as aforementioned. Preferably the material of the core member **18** is rubber, either natural or synthetic, or an elastic, flowable plastic material having frictional qualities similar to natural rubber.

As an important feature of the present invention the channel **19** and reciprocating mounting for the members **16** and **17** are here unitarily associated in an inverted U-shaped ladder mounting member or fixture **22** having a tubular mid-section **23** and providing laterally spaced vertically extending guides **24** and **25** for the ground supported members **16** and **17**, the rubber core **18** being here mounted for reciprocation in the tubular mid-section **23** and connected to the members **16** and **17** for joint reciprocation therewith. Preferably, the inverted U-shaped member **22** is tubular throughout so as to provide vertically extending end cylinders for the guides **24** and **25** and in conformity, the members **16** and **17** are shafts dimensioned for sliding therein. The rubber core **18** is here elongated to fill the space between the upper ends **31** and **32** of the shafts **16** and **17** and may be bonded thereto for joint reciprocation therewith to the adjusted position accommodating the shafts to particular ground elevations such as elevations **26** and **27** illustrated in Figure 2. The shaft ends **31** and **32** function as pistons to place the core **18** under compression when the ladder is rested thereon, thereby compressing the core **18** into frictional grip with the internal wall **28** of the tubular member **22** to support the shafts **16** and **17** in their adjusted position.

The equalizing base support of the present invention is adapted for integral combination with, or as an attachment to, a conventional ladder. In either case the support is preferably mounted at the side rails **33** and **34** and lowermost rung **36** of the ladder **21**, the tubular mid-section **23** being attached at the underside of the lowermost rung **36** and the vertically depending guides **24** and **25** being attached at the inside faces of the side rails **33** and **34**. Where the support is constructed as an attachment, as here shown, the U-shaped fixture may be secured to the adjacent ladder parts by one or more brackets. In order to accommodate the attachment to ladders of different widths, the fixture **22** may be split into two L-shaped parts mounted to provide the inverted U-shaped form. Guide **24** is here secured by bracket **38** to one side rail **33** of the ladder for supporting the guide vertically at the inner face of the rail **33** below the lowermost ladder rung **36**. Guide **25** is similarly secured by bracket **42** to the other side rail **34** of the ladder with the guide vertically disposed at inner face of the rail **34**. Guides **24** and **25** are here formed with inwardly turned tubular end portions **43** and **44** and a bracket **46** is adapted for connection to the lowest rung **36** and for securing the tubular end portions **43** and **44** in opposed alignment at the underside of the rung **36** for housing the elongated rubber core **18** for reciprocation. As will be understood bracket **46** is formed to accommodate different lateral spacings of the L-shaped members to fit ladders of different widths.

Preferably, the feet members **12** and **13** are attached to the lower end of shafts **16** and **17** by ball-socket connections **51** and **52**, as depicted in Figure 2, to better accommodate the feet **12** and **13** to uneven ground and rubber pads **53** and **54**, as here shown, or spikes or the like, may be attached to the under sides of feet **12** and **13** for a better grip with the supporting surfaces.

Also in addition to the bonding attachment of the rubber core **18** to the ends **31** and **32** of the shafts **16** and **17**, some means is preferably provided for locking the extensible shafts **16** and **17** against complete withdrawal from their sleeve housings **24** and **25**. As here shown in Figures 2 and 3 each of the shafts **16** and **17** is provided with a keyway **56**, which extends from adja-

cent the lowermost end 57 of the shaft to an end shoulder 58 adjacent the opposite end of the shaft and each of the housings 24 and 25 are indented to provide an internal lug 61 which fits in the keyway 56 and engages end shoulder 58 so as to prevent complete withdrawal of the shafts.

The ladder with the attached equalizing base support may be positioned where desired on the ground and while the ladder is at least partially supported by the user it is swung to a desired upright position as illustrated in Figure 1. In this operation the core member 18 slides freely through its tubular guide while the shafts 16 and 17 reciprocate to accommodate the footing to uneven ground elevations. This free sliding reciprocating action will occur so long as weight is not simultaneously applied to the opposite ends 31 and 32 of the core member. When the ladder is placed in its desired position, the manual support is withdrawn so that the weight of the ladder is taken on the shafts 16 and 17 which in turn applies pressure to the opposite ends of the rubber core causing the latter to expand into gripping action with the internal surfaces 28 of the tubular guide therefor thus automatically locking the legs.

Where a gap is provided between the guide and portions 43 and 44 as here shown, portions of the rubber core extruded, so to speak, into the gap also aid in locking up the assembly. Preferably ample clearance in the order of .005 to .010 inch is provided between the core 18 and its guide to obtain the desired free sliding reciprocation of the core in the guide. This sizing is important in that the core must run freely under one condition and to respond to compression forces to expand into a lock-up position under other conditions. The more weight applied to the ladder, the more the locking force—hence safety increases with applied weight. Thus as the user steps on to the lower rung 36 of the ladder, the base support becomes even more firmly locked up.

I claim:

1. An equalizing base support for ladders comprising, ground engaging means providing laterally spaced ground supports, a pair of vertically extending reciprocally mounted ladder supporting members connected to said spaced ground supports, an elastic core member and channel therefor supporting and guiding said core member for longitudinal reciprocation, a predetermined clearance being provided between said core member and channel when said core member is in a normal substantially uncompressed state affording full sliding reciprocation of said core member, said core member being connected to said ladder supporting members for joint reciprocation to an adjusted position accommodating said ground supports to particular ground elevations, said ladder supporting members and channel cooperating to place said core member under predetermined compression when weight is applied simultaneously to said ground supports as when the ladder is rested thereon, said core member being formed of a material and functioning when under said compression and cooperating with said clearance to expand and fill said clearance and move into a frictional grip with said channel to support said ladder supporting members in their adjusted position as aforementioned, said frictional grip being substantially directly proportional to the weight placed upon said ladder supporting members.

2. An equalizing base support for ladders comprising, ground engaging means providing laterally spaced ground supports, a pair of vertically extending reciprocally mounted ladder supporting members connected to said spaced ground supports, a rubber core member and channel therefor supporting and guiding said core member for longitudinal reciprocation a predetermined clearance being provided between said rubber core member and channel when said core member is in a normal substantially uncompressed state affording free sliding reciprocation of said core member, said core member being connected to said ladder supporting members for joint reciprocation to an adjusted position accommodating said ground supports to particular ground elevations, said ladder supporting members and channel cooperating to place said core member under compression when weight is applied simultaneously to said ground supports as when the ladder is resting thereon, said core member functioning when under said compression and cooperating with said clearance to expand and fill said clearance and move into a frictional grip with said channel to support said ladder supporting members in their adjusted position as aforementioned, said frictional grip being substantially directly proportional to the weight placed upon said ladder supporting members.



3. An equalizing base support for ladders comprising, an inverted U-shaped ladder mounting member having a tubular mid-section and providing laterally spaced vertically extending guides, a pair of vertically extending ground supported members carried by said guides for vertical reciprocation, a rubber core mounted for reciprocation in said tubular mid-section and connected to said members for joint reciprocation therewith, a predetermined clearance being provided between said rubber core and U-shaped member when said rubber core is in a normal substantially uncompressed state affording free sliding reciprocation of said rubber core to an adjusted position accommodating particular ground elevations, said members functioning to place said core under compression as when the ladder is rested thereon thereby compressing said core said core member functioning when under said compression and cooperating with said clearance to expand and fill said clearance and move into a frictional grip with the internal wall of said tubular mid-section to support said members in their adjusted position as aforementioned, said frictional grip being substantially directly proportional to the weight placed upon said ground supported members.

4. An equalizing base support for ladders comprising, an inverted U-shaped tubular ladder mounting member providing laterally spaced vertically extending end cylinders, a pair of ground supported shafts mounted for reciprocation in said cylinders, an elongated rubber core mounted in said member between the upper ends of said shafts for joint reciprocation therewith, a predetermined clearance being provided between said rubber core and said cylinders when said rubber core is in a normal substantially uncompressed state affording free sliding reciprocation in said cylinders, an elongated rubber core dating said shafts to particular ground elevations, said shafts functioning to place said core under compression as when the ladder is rested thereon thereby compressing said core, said core functioning when under said compression and cooperating with said clearance to expand and fill said clearance and move into a frictional grip with the internal wall of said member to support said shafts in their adjusted position, said frictional grip being substantially directly proportional to the weight placed upon said ladder supporting members.

5. In combination with the side rails and lowermost run of a ladder, an equalizing base support comprising, an inverted U-shaped fixture having a tubular mid-section attached to said ladder at the under side of said lowermost rung and providing vertically depending guides attached at the inside faces of said side rails, a pair of ground supported members carried by said guides for vertical reciprocation, a rubber core mounted for reciprocation in said tubular mid-section and connected to said members for joint reciprocation therewith, a predetermined clearance being provided between said core, said U-shaped fixture and said guides when said core is in a normal substantially uncompressed state affording free sliding reciprocation of said core member to an adjusted position accommodating particular ground elevations, said members functioning to place said core under com-

pression as when the ladder is rested thereon thereby compressing said core, said core functioning when under said compression and cooperating with said clearance to expand and fill said clearance and move into a frictional grip with the internal wall of said tubular mid-section to support said members in their adjusted position, said frictional grip being directly proportional to the weight placed upon said ladder supporting members.

6. An equalizing base support attachment for ladders comprising, a first guide and bracket adapted for securing to one side rail of a ladder and for supporting said guide vertically at the inner face of said rail below the lowest ladder rung, a second guide and bracket adapted for securing to the other side rail of said ladder and for supporting said second guide vertically at the inner face of said other rail below said lowest ladder rung, said guides being formed with inwardly turned tubular end portions, a bracket adapted for connection to said lowest rung and for securing said tubular end portions in opposed alignment at the under side of said rung, a pair of vertically extending ground supported members carried by said guides for vertical reciprocation, an elongated rubber core mounted for reciprocation in said tubular end portions and connected to said members for joint reciprocation therewith, a predetermined clearance being provided between said core and said tubular end portions when said core is in a normal substantially uncompressed state, affording free sliding reciprocation of said core to an adjusted position accommodating particular ground elevations, said members functioning to place said core under compression as when the ladder is rested thereon thereby compressing said core, said core being formed of a material and functioning when under said compression and cooperating with said clearance to expand and fill said clearance and move into a frictional grip with the internal wall of said tubular end portions to support said members in their adjusted position, said frictional grip being substantially directly proportional to the weight placed upon said ladder supporting members.



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