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2,691,479

LADDER SHOE

Filed March 9, 1953

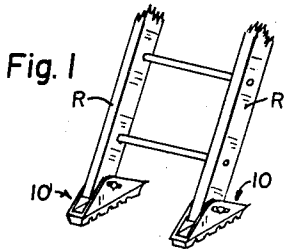


Fig. 1

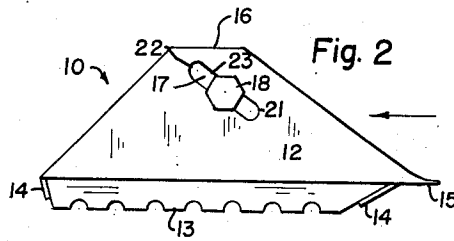


Fig. 2

Fig. 3

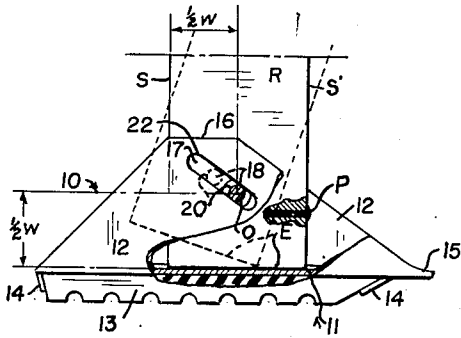
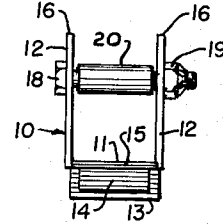


Fig. 4

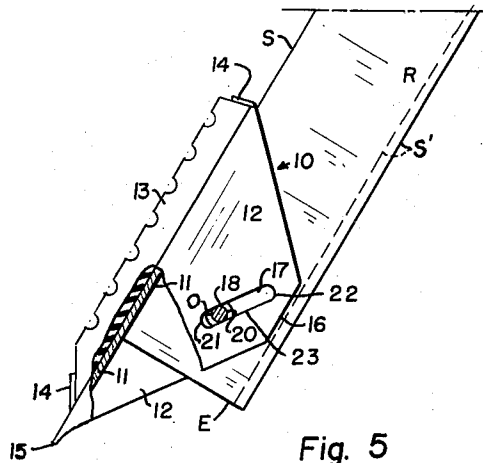


Fig. 5

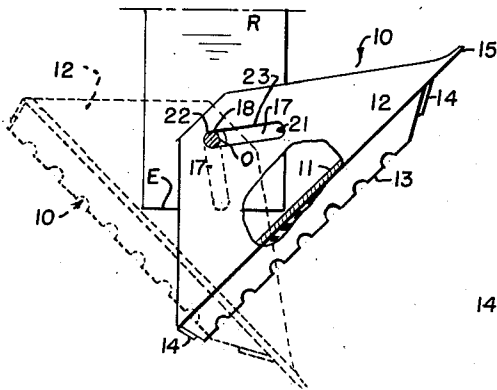


Fig. 6

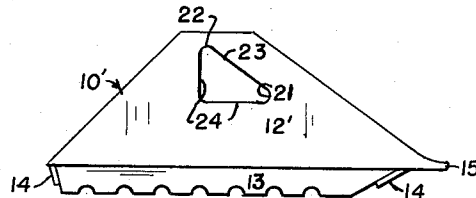


Fig. 7

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LADDER SHOE

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2 Claims. (Cl. 228-62)

1

This invention relates to anti-slipping ladder shoes of the class illustrated and described in the Patent No. 1,973,226, issued September 11, 1934, to C. W. Rose et al., the principal object of the invention being to provide an improved ladder shoe construction which is especially adapted to be mounted upon a substantially squared-end ladder rail base without the necessity of rounding the base.

The conventional ladder shoe, such as illustrated and described in the above Rose patent, is formed as a body, U-shaped in section, which is adapted to embrace the base of a ladder rail and thereby provide a structure or shoe whereon each ladder rail rests when mounted upright for use. The underside of this U-shaped body carries an anti-slip pad or tread upon which the shoes, and ladder rails mounted therein, rest so as to prevent slipping of the shoes and the supported ladder rails. In addition, the shoes carry pointed prongs or spikes at one end thereof for resting the ladder against surfaces, such as snow or ice, over which the pads would otherwise slip. The attachment of each shoe to the base of a ladder rail is by a transverse pin or bolt which forms a pivot to permit the shoe to be rotated from a flat position where the tread is in use with the ladder upright at any given angle, to an upright position extended in line with the ladder rail, where the spike is in use, and there is normally an auxiliary locking device on the ladder rail to hold the shoe in the spike position.

Heretofore, the base of each ladder rail has been rounded to permit this rotation of the shoe, and since ladders are ordinarily made with squared rail bases, it is necessary to carefully round the bases as a step in the installation of a pair of shoes upon a ladder. In many instances, this rounding operation is a difficult chore, especially where an individual does not have the proper tools for so shaping the base of a rail. Moreover, it is desirable to insert a rivet or pin through the rail, transversely of and below the pivot bolt, to resist splitting of the ladder rail, and the insertion of such a rivet through a rounded base is not desirable. It follows that there has been a definite need for a type of ladder shoe which may be used with a substantially square-end ladder rail and my improved ladder shoe was conceived and developed to meet this need.

Other objects of my invention, in providing a new and improved ladder shoe which is adapted for use with a substantially squared-end ladder

2

rail base, are: (a) to avoid the necessity of rounding the end of the ladder rail bases of a conventional ladder in order to install the shoes; (b) to provide a construction in which the connecting pivot bolt passes through the ladder rail a sufficient distance above the end of the base to greatly lessen the tendency towards splitting the end of the ladder rail and to permit a rivet or pin to be inserted through the rail transversely to and below the bolt to further lessen the tendency for the rail end to split and to hold the bolt in position even if a portion of the rail becomes removed because of such splitting; (c) to provide a self locking pivot bolt which adjustably holds a shoe upon the ladder base with any desired degree of tightness or looseness; (d) to provide a construction which permits the ladder rail base to rest directly upon the bottom of the shoe and not upon the pivot bolt whenever the shoe is positioned for use of the tread; (e) to provide an automatic locking and wedging action of the shoe against the ladder rail when the shoe is rotated to direct the spike downward for use and which eliminates the necessity for an additional locking device to hold the shoe in the spike-using position; and (f) is a simple, economical improvement which will not add to the cost of a conventional ladder shoe and which is rugged and durable in use.

With the foregoing and other objects in view, all of which more fully hereinafter appear, my invention comprises certain novel constructions, combinations and arrangements of elements and parts as hereinafter described and as defined in the appended claims and illustrated, in preferred embodiment, in the accompanying drawing in which:

Figure 1 shows a perspective view of the lower portion of a ladder to which a pair of my improved ladder shoes are attached.

Figure 2 is a side elevation of my improved shoe with a mounting pin carried therein.

Figure 3 is an end elevation of the same as viewed from the indicated arrow 3 at Fig. 2.

Figure 4 is a side elevation of the shoe similar to Fig. 2, but showing the shoe attached to the base of a ladder rail with portions of the shoe broken away to show elements otherwise hidden from view and with broken lines indicating an alternate position of the ladder rail.

Figure 5 is similar to Fig. 4 but showing the ladder shoe rotated to the side of the ladder rail to position the spike downwardly for supporting the ladder upon the spike and with portions broken away to show elements otherwise

3

hidden from view and with a broken line to illustrate the fact that a narrower ladder rail can be used.

Figure 6 is similar to Fig. 2 but shows the ladder shoe suspended from the end of a ladder rail for rotating the shoe about the end of the rail, portions of the shoe being broken away to illustrate elements otherwise hidden from view and with broken lines indicating an alternate position of the shoe.

Figure 7 is a side elevation similar to Fig. 2 but showing a modified form of my improvement.

Referring more particularly to the drawing, the body 10 of a shoe is formed as a plate folded to a U-shaped cross section to provide a rectangular bottom 11 and upstanding trapezoidal side walls 12 which lie in spaced parallelism rising from opposing edges of the bottom. The transverse spacing between the walls 12 is slightly greater than a ladder-rail thickness so that the base of a ladder rail R may be inserted between the side walls, and the length of the bottom 11 is preferably approximately twice the width of the ladder rail R to provide a stable footing upon which the ladder may rest.

A rectangular corrugated tread 13 is attached to the underside of the bottom 11 in any suitable manner, as by rivets, not shown, and by end shields 14, and this pad is of rubber or similar resilient, non-slip material which is ideally adapted for resting the ladder against smooth surfaces such as a varnished floor. A sharpened transverse edge or spike 15 is formed by an extended end of the bottom 11, and the body 10 may be rotated about the base of the ladder rail to direct the spike 15 downwardly, parallel with the ladder rail axis to support the ladder upon a surface such as snow or ice where the footpad 13 would not operate efficiently to prevent slipping.

The side walls 12 are suitably shaped as truncated triangles with the side edges of each wall inclined to converge to a short apex or top edge 16 near the central portion of the unit. A centrally disposed inclined slotted aperture or slot 17 extends through each side wall 12 in transverse spaced registration and in mutual alignment with its mating slot in the opposing side wall, the inclination thereof being towards the bottom 11 in the direction of the spike 15 end of the bottom 11.

A bolt 18, having a self locking nut 19, extends through the slots 17. It is contemplated that the base of the ladder rail R will be interconnected with the shoe body by passage of the bolt 18 through an orifice O in the ladder rail R above its base edge E as hereinafter described, and that this orifice will be suitably defined and reinforced by a sleeve 20 which is transversely embedded in the ladder rail. The self-locking nut 19 may be tightened or loosened to adjust the pressure of the walls 12 against the sides of the ladder rail to any desired degree. This combination has special utility where a wooden ladder is used under conditions where the thickness of the ladder varies responsive to variations in humidity.

The slots 17 are inclined to any desirable angle between 30 and 45 degrees which will permit a locking or wedging action between the side S of the ladder rail and the shoe bottom 11 when the shoe is rotated about the bolt 18 to turn the spike downwardly as hereinafter described. The length and location of the slots 17 above the bottom 11 of the shoe is determined by the width of the ladder rail to which the shoe 10 is at-

4

tached. Where the shoes are made as units for attachment to ladder rails of various widths, the slot proportions are for an average rail, but in a manner which permits the shoe to be used with a narrower rail, as hereinafter described, or with a wider rail by simply narrowing the rail at the base to average size.

The rail R is illustrated as being of average width at Figs. 4, 5, and 6 and in such a rail the center of the orifice O, through which the bolt 18 passes, is located a distance of one half the rail width from the side edge S against which the bottom 11 of the shoe rests when rotated to spike using position and a distance of one-half the rail width from the base edge E as clearly indicated by the dimensions $\frac{1}{2}W$ at Fig. 4. With such proportioning, there is a substantial length of rail between the bottom edge E and the orifice O to resist shearing forces of the bolt against the rail end, to permit a rivet or pin P to be inserted through the base below, and transversely of the orifice O to thereby hold the base against checking or splitting and to prevent the bolt 18 and sleeve 20 from falling out of position as a result of such checking should any occur.

The slots 17 are located in the side walls 12 above the bottom 11 of the shoe at a point which permits the bolt 18 to move to a position a short distance above the lower end 21 of the slot 17 whenever the shoe is used in the flat position and with the end of the rail E bearing against the bottom edge 11 as at Fig. 4, or whenever the shoe is rotated to the spike-using position and the side of the rail S bears against the bottom 11 as at Fig. 5. It is desirable to have the lower end of this slot 21 extend a short distance below the limiting positions of the bolt 18, above defined, in order to provide operative clearances and to allow some leeway if the orifice O is not accurately located. It is to be noted that where a narrower than average rail is used, the location of the orifice with respect to the side S and edge E, is not changed, but that the orifice O is offset with respect to the side of the rail S' opposite the side S as indicated by the broken line at Fig. 5.

The upper end 22 of each slot 17 is at a distance above the bottom 11 sufficient to permit the bottom 11 to move away from the base edge E or side edge S and to easily swing about the corners at the bottom of the ladder rail when the bolt 18 is against the top ends 22 as clearly indicated at Fig. 6. With such freedom of positioning it follows that the base edge E of the ladder will bear against the bottom 11 of the shoe whenever the shoe is in a flat position with the ladder either perpendicular or inclined as indicated by the broken lines at Fig. 4.

When the shoe is rotated to the spike-using position, and the ladder is mounted upright so that its weight is transmitted downwardly to the shoe through the bolt 18, the bolt 18 bears against the upper surface 23 of the slot to wedge the sides of the rail against the bottom 11 of the shoe. By keeping the angle of inclination more than approximately thirty degrees with respect to the bottom of the shoe, this wedging action will hold the bottom 11 against the rail edge S as long as the weight is downward on the shoe, but will permit the shoe to be easily released for rotating it to the flat position.

The outward edge 23 of the slot 17 is in essence the effective acting surface which provides the aforescribed wedging action, therefore, Fig. 7 illustrates a modified construction of the opening

5

wherein the slot is enlarged to a triangular orifice which includes a bottom end 21, a top end 22 and top edge 23 as hereinbefore described. The shape of the remaining portion of the orifice formed by the edges 24 may be varied to any desired form without affecting the operative functioning of the opening, but such alteration of the slot would require a large bolt head or washer to prevent the bolt head from slipping through the altered slot.

While I have illustrated and described many details of construction, alternatives and equivalents will occur to those skilled in the art which are within the scope and spirit of my invention; hence it is my desire that my protection be not limited to the details herein illustrated and described, but only by the proper scope of the appended claims.

I claim:

1. A ladder shoe adapted to be pivotally and shiftably attached to the base of a ladder rail upon a bolt projecting through the ladder rail above its base edge, including a bottom carrying an anti-slip tread on its underside and a spike at one end thereof, a pair of parallel side walls upstanding from said bottom and spaced apart sufficiently to receive the ladder rail base therebetween and relatively aligned apertures in the side walls through which said attaching bolt extends, said apertures being elongated to permit shifting of the shoe upon the bolt and having an outer

6

edge and inclined relative to the plane of the bottom and downwardly toward the spike end of said bottom, whereby to wedge the bottom against a longitudinal edge of the rail when the bottom section is rotated to direct the spike downwardly.

2. The combination with a ladder rail having a bolt projecting therethrough in its base portion but substantially above the base-edge of the rail, of an anti-slip shoe having a bottom section with a non-slip tread along its under side, a spike at one end of the bottom section and parallel side walls upstanding from said bottom and adapted to embrace the base of the ladder rail, and side walls including aligned apertures through which said bolt extends for connection of the shoe to the ladder rail base, said apertures being elongated and inclined relative to the plane of the bottom and downwardly toward the spike end thereof whereby to permit the shoe to swing about the ladder base when the bolt is at one limit of the apertures and to wedge a longitudinal edge of the ladder rail against the bottom of the shoe at the other limit of the apertures

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,897,840	Greene	Feb. 14, 1933
1,973,226	Rose	Sept. 11, 1934