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3,276,543

DETACHABLE FOOT SUPPORT FOR LADDERS

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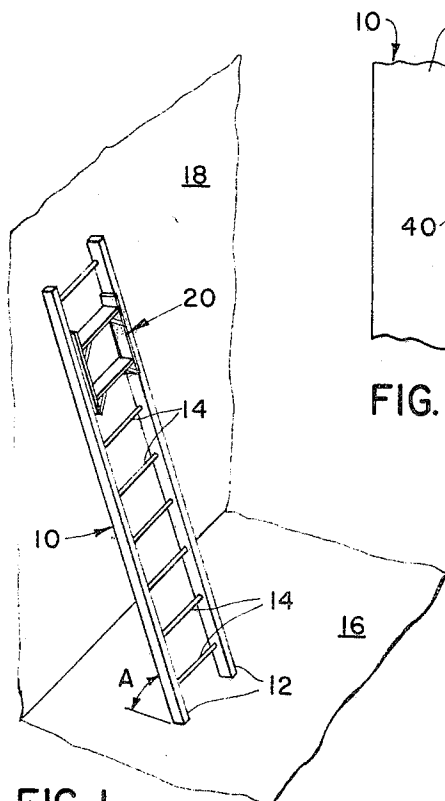


FIG. 1

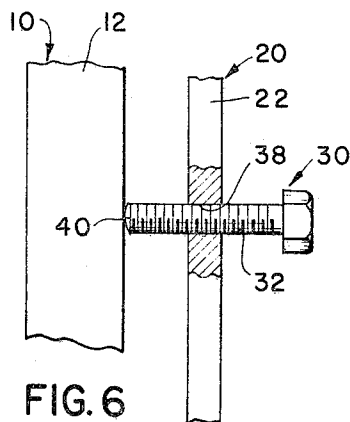


FIG. 6

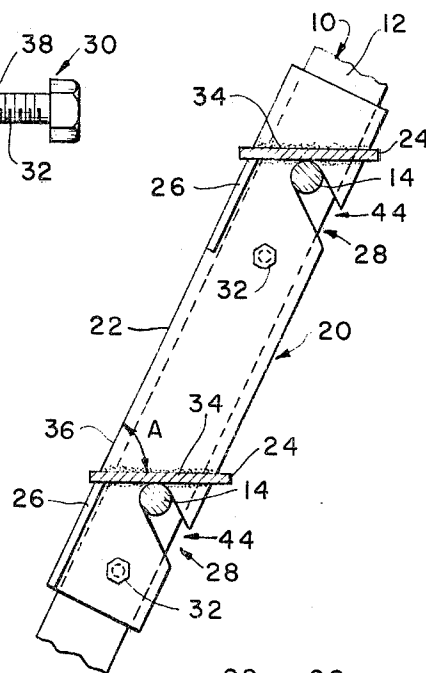


FIG. 3

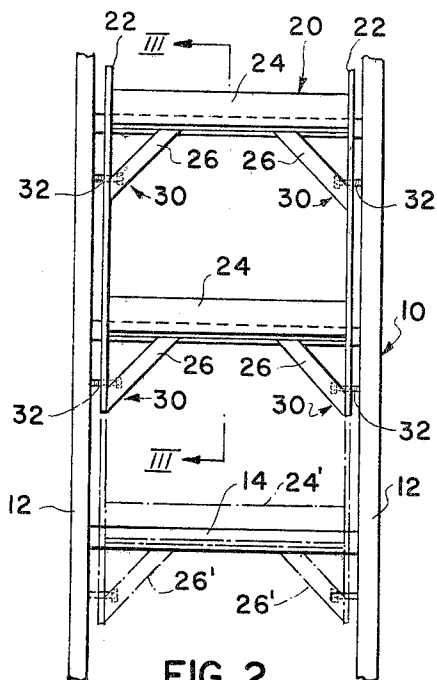


FIG. 2

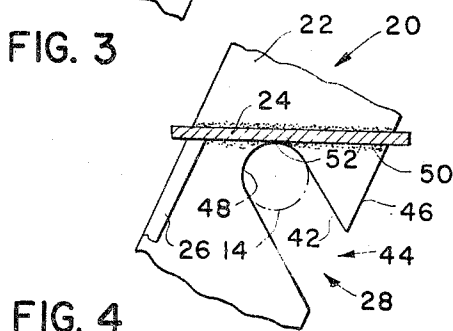


FIG. 4

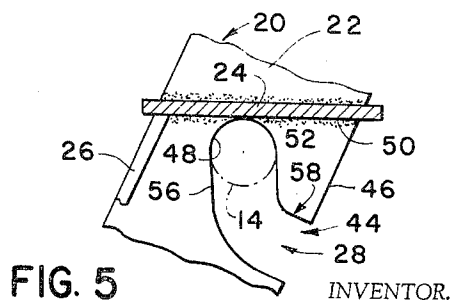


FIG. 5

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DETACHABLE FOOT SUPPORT FOR LADDERS

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3 Claims. (Cl. 182-122)

This invention relates to foot supports for ladders, and more particularly to improved foot supports for ladders having round rungs.

The primary object of the present invention is to provide means for converting the round rungs of a conventional ladder to flat steps which, as is known, are more comfortable and more safe to stand on than are the round rungs. Hence, a person is able to stand on the converted ladder for longer periods of time.

Another object of the invention is to provide an improved foot support which is considerably more easily detached and hence, easily moved to any desired level on the ladder.

Still another object of the invention is to provide an improved foot support wherein at least two flat steps are employed whereby a person may position himself at any of two levels on the ladder.

A further object of the invention is to provide an improved foot support having flat rungs which are inclined relative to the side rails of a ladder on which they are employed so as to promote positioning of the ladder at a safe ladder angle.

Still another object of the invention is to provide an improved foot support having means for adjusting the width of the foot support to correspond to the width of the ladder upon which it is used and which firmly secures the foot support to the ladder thereby preventing movement of the foot support laterally of the ladder.

Still another object of the invention is to provide an improved ladder support which is relatively inexpensive to manufacture; which is relatively light in weight thereby easily moved, attached to or detached from the ladder; and which is of rugged construction thereby capable of withstanding rough usage.

In accordance with the present invention, there is provided an improved foot support for converting the round rungs of a conventional ladder to flat steps. The foot support comprises a pair of side plates between which is secured a plurality of spaced plate means. The plate means extend transversely between the side plates and provide flat supporting surfaces upon which a person may stand comfortably. Each of the plate means preferably are inclined upwardly so that the angle between the plate means and the front edges of the side plates above the plate means is about 70°. The inclination of the plate means is such that when placed on a ladder and positioned substantially parallel with the ladder supporting surface, the ladder will be inclined at what is considered to be a safe ladder angle. Hence, the present foot support promotes positioning of the ladder at a safe ladder angle.

Slot means are provided in the side plates below each end of each plate means. The slot means preferably have their uppermost edge flush with the lower face of the adjacent plate means, the arrangement being such that each plate means will be in line contact with a rung along its entire length. Hence, the slot means cooperate in pairs to receive a rung of a conventional ladder. The foot support preferably is supported by at least two rungs of the ladder upon which it is placed.

Means also is provided for adjusting the width of the foot support to correspond to the width of the ladder upon which it is placed. This means also provides for firmly securing the foot support in position on the ladder so as to prevent lateral movement of the foot support relative to the ladder.

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The present foot support preferably is fabricated from aluminum so as to be relatively lightweight and is of an all welded construction. Alternatively, the present foot support may be fabricated from any suitable materials of construction, such as, steel, wood or suitable plastic materials.

The above and other objects and advantages of the present invention will become apparent from the following detailed description by reference to the accompanying drawings, in which:

FIGURE 1 is an isometric view illustrating a ladder having round rungs on which is provided the foot support of the present invention;

FIG. 2 is a front view of the present foot support shown mounted on the ladder of FIG. 1;

FIG. 3 is a cross-sectional view, taken along the line III-III, further illustrating the present foot support;

FIG. 4 is a fragmentary cross-sectional view illustrating slot means provided in the present foot support;

FIG. 5 is a fragmentary cross-sectional view, similar to FIG. 4, illustrating an alternative embodiment of the slot means; and

FIG. 6 is a fragmentary front view, with portions cut away to show details, illustrating a means for adjusting the width of the present foot support.

Referring now to FIG. 1, there is illustrated a conventional ladder 10 composed of a pair of side rails 12 and spaced round rungs 14. The ladder 10 is shown resting on a supporting surface 16, such as the ground or the like, and leaning against a vertical surface 18, such as the wall of a building or the like. The angle between the side rails 12 and the supporting surface 16 is indicated at A and preferably comprises about 70°. This angle is considered to be a safe ladder angle.

Mounted near the top of the ladder 10 is the foot support 20 of the present invention.

Referring now to FIGS. 2 and 3, the foot support 20 comprises side plates 22 and a plurality of plate means 24 which extend transversely between the side plates 22 and are secured at each of their ends to the side plates 22 preferably by means of welding. Although not illustrated, the upper surface of each of the plate means 24 may be provided with a non-skid surfacing as is conventional. Diagonal brace members 26 secured to the plate means 24 and the side plates 22 provide reinforcement for the plate means 24.

In FIG. 2, there is illustrated in dash-dot outline, an extension of the foot support 20 to include an additional plate means 24'. The foot support 20, thus may be fabricated with more than two of the plate means 24 each functioning to provide a flat step.

As can best be seen in FIG. 3, the side plates 22 each is provided with slot means 28 to be hereinafter more fully described, which cooperate in pairs to receive a rung 14 of the ladder 10. The foot support 20 of the present invention preferably is supported by at least two of the rungs 14 of the ladder 10.

As can best be seen in FIGS. 2 and 3, the foot support 20 is provided with adjustment means 30, preferably in the form of bolts 32, for adjusting the width of the foot support to correspond to the width of the ladder 10. The adjustment means 30 also provides for firmly securing the foot support 20 in position on the ladder 10 thereby preventing lateral movement of the foot support 20 with respect to the ladder 10.

Plate Means 24

Referring now, in particular to FIG. 3, the plate means 24 preferably comprises a generally rectangular plate whose upper surface 34 provide flat supporting surfaces upon which a person may stand comfortably. Furthermore, the upper surface 34 may be provided with a

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non-skid surface as is conventional with step-type ladders. As illustrated in FIG. 3, each of the plate means 24 are inclined. That is to say, the angle, indicated at A, between the upper surface 34 of the plate means 24 and the front edge 36 of the side plates 22 above the plate means 34 is approximately 70°. Hence, when the present foot support 20 is placed on the ladder 10, the person using the ladder 10 normally will incline the ladder so that the plate means 24 are horizontal and generally parallel to the supporting surface 16. Thus, the inclination of the plate means 24 promotes the placing of the ladder 10 at a safe ladder angle.

Adjustment means 30

Referring now to FIGS. 2 and 6, each of the adjustment means 30 preferably comprises, as stated above, a bolt 32 which is threaded in an opening 38 provided in the side plate 22. The head of the bolt 32 preferably resides in the region between the side plates 22 so that it may easily be reached for turning the same and so as to not increase the width of the foot support 20 beyond the outer faces of the side plates 22. As can best be seen in FIG. 2, the bolts 32 preferably are positioned in pairs and are coaxially aligned. This arrangement is preferred so as to prevent force couples which would arise in the event the opposed bolts 32 were not coaxially aligned. It is preferred that one of the bolts 32 be provided on each of the side plates 22 in order that the foot support 20 may be centered between the side rails 12. However, it should be noted that it is within the scope of the present invention that the bolts 32 be provided only on one of the side plates 22 so that when the bolts 32 are moved outwardly toward the side rails 12 the opposite side plate 22 will be displaced into surface engagement with the adjacent side rail 12 of the ladder 10. As can be seen in FIG. 6, the outboard end 40 of the bolt 32 will be moved into engagement with the inner face of the side rail 12.

Slot means 28

Referring now to FIGS. 3 and 4, and in particular to FIG. 4, the slot means 28 comprises a generally U-shaped inclined slot 42 which is cut in the side plate 22 as to have a rung receiving opening 44 in the rear edge 46 of the side plate 22. The slot 42 is inclined upwardly toward the plate means 24 and has an upper peripheral edge 48 which preferably is semicircular so as to correspond to the round rung 14 illustrated in dash-dot outline.

The slot 42 preferably extends upwardly at least to the level of the lower face 50 of the plate means 24 so that, as illustrated in FIG. 4, the upper peripheral edge 48 will be tangent at point 52, with the lower face 50 of the plate means 24. This is desirable since the lower face 50 now will be in line contact with the rung 14 along the entire length of the plate means 24. It should be evident that now the full weight of a person standing on the foot support 20 will be supported by both the rungs 14 with which the foot support 20 is engaged. Hence, a person's weight is distributed among a plurality of the rungs 14 rather than being supported on one rung as is conventional.

It will be noted in FIGS. 3 and 4, that the rung receiving openings 44 of the slot means 28 are below the plate means 24 and the rung 14. Hence, in the event the bolts 32 are not tightened down, the foot support 20 is not likely to become detached from the rungs 14 since the foot support 20 must be purposely elevated in order that the rungs 14 may pass out through the rung receiving openings 44 of the slot means 28.

The slot means of the present foot support 20 may take the alternative configuration illustrated in FIG. 5 wherein corresponding numerals will be employed to identify corresponding parts already described. As can

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be seen in FIG. 5, the side plate 22 is provided with slot means 54 composed of a first portion 56 which extends perpendicularly from the plate means 24 and a communicating second portion 58 which is angled with respect to the first portion 56 and which extends perpendicularly toward the rear edge 46 of the side plate 22. The first portion 56 includes the peripheral edge 48 and is tangent at a point 52 to the lower face 50 of the plate means 24. Inadvertent detachment of the foot support 20 from the rungs 14 of the ladder 10 is again prevented since the foot support 20 must be purposely elevated in order that the rungs 14 may pass out through the rung receiving openings 44 of the slot means 54.

Although the invention has been illustrated in connection with certain specific embodiments, it will be readily apparent to those skilled in the art that various changes in form and arrangement of parts may be made to suit requirements without departing from the spirit and scope of the invention.

I claim as my invention:

1. A foot support for a ladder composed of a pair of parallel side rails and spaced round rungs, comprising: spaced side plates, a plurality of spaced plate means extending between and secured to said side plates for providing flat supporting surfaces; the depth of said side plates and said spaced plate means being substantially equal to the depth of said parallel side rails; and slot means, one each formed in each of said side plates below the level of each of said plate means for receiving a rung of said ladder, each of said slot means being inclined from the rear edge of the side plate upwardly toward the plate means and terminating at least at the level of the lower face of said plate means and centrally thereof whereby each plate means is in line contact with a rung of the ladder; said foot support being supported by at least two of the rungs of said ladder.

2. The foot support of claim 1 including bolts carried by said side plates and engageable with the side rails of said ladder for preventing movement of said foot support laterally of said ladder, said bolts being positioned in close proximity to the lower face of said spaced plate means.

3. A ladder attachment for a ladder composed of a pair of parallel side rails and spaced round rungs, comprising: spaced side plates; at least two spaced plate means extending between and secured to said side plates for providing flat supporting surfaces; the depth of said side plates and said spaced plate means being substantially equal to the depth of said parallel side rails; slot means, one each formed in each of said side plates below the level of each of said plate means for receiving a rung of said ladder, each of said slot means being inclined from the rear edge of the side plate upwardly toward the plate means and terminating at at least the level of the lower face of the plate means and centrally thereof whereby each plate means is in line contact with a rung of the ladder; said ladder attachment being supported by at least two rungs of said ladder; and at least two bolts, one each extending through and threadedly engaged with each of said side plates, said bolts being movable laterally of said side plates into engagement with the side rails of said ladder whereby said ladder attachment is prevented from moving laterally of said ladder.

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