United States Patent

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[54] **LADDER AND SUPPORT BRACKET THEREFOR**
11 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **182/206,** 182/214
[51] **Int. Cl.** **E06c 1/36**
[50] **Field of Search** 182/206, 214, 93, 129

[56] **References Cited**

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ABSTRACT: A support arm for a ladder including mounting structure on one end of the arm rotatable relative to the latter about an axis extending transversely of the arm. The mounting structure is adapted for securement to the upper end of a ladder and the mounting structure and arm include structure for releasably locking the arm against rotation relative to the mounting structure in one direction past a predetermined position of rotation of the arm. In addition, spring means is operatively connected between the arm and the mounting structure yieldingly urging the arm to swing in the aforementioned one direction relative to the mounting structure and the free end of the arm includes clamp structure for clamping engagement with a portion of a building structure against which the upper end of the associated ladder is leaned.

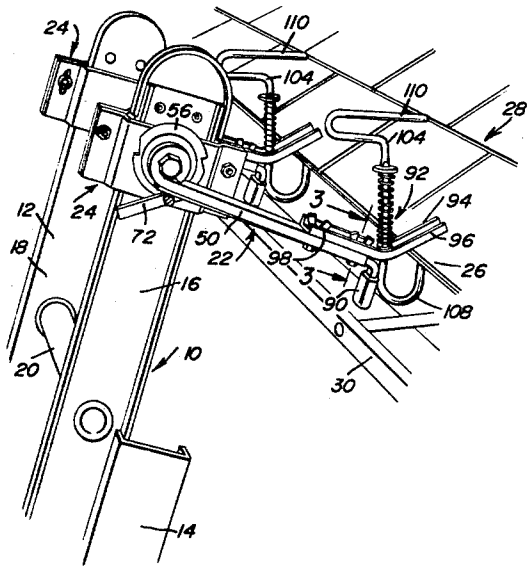


Fig. 1

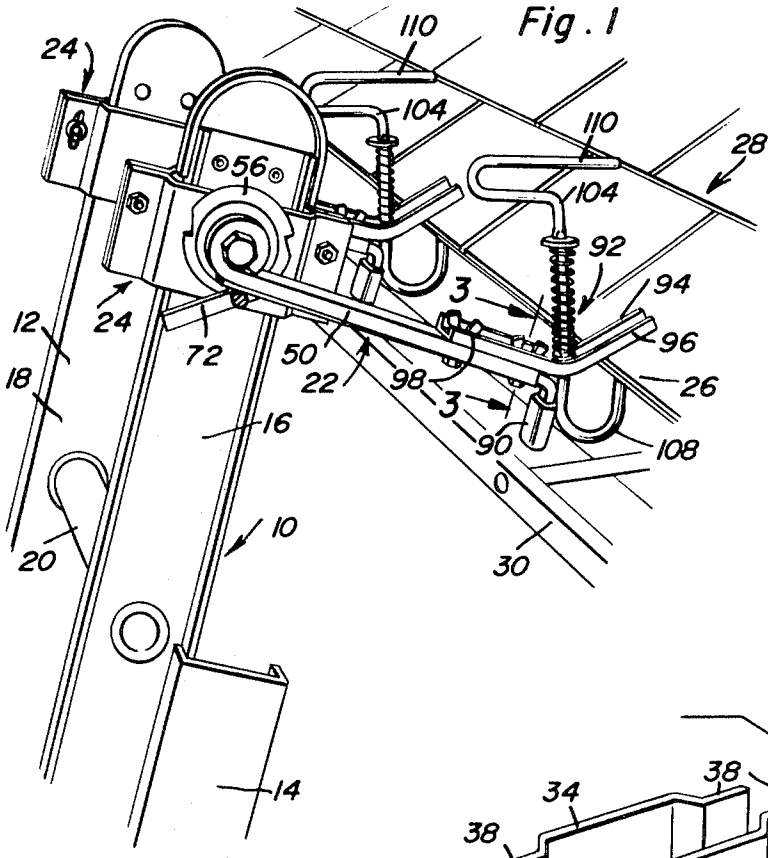


Fig. 3

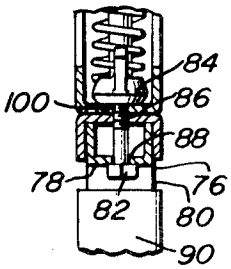


Fig. 2

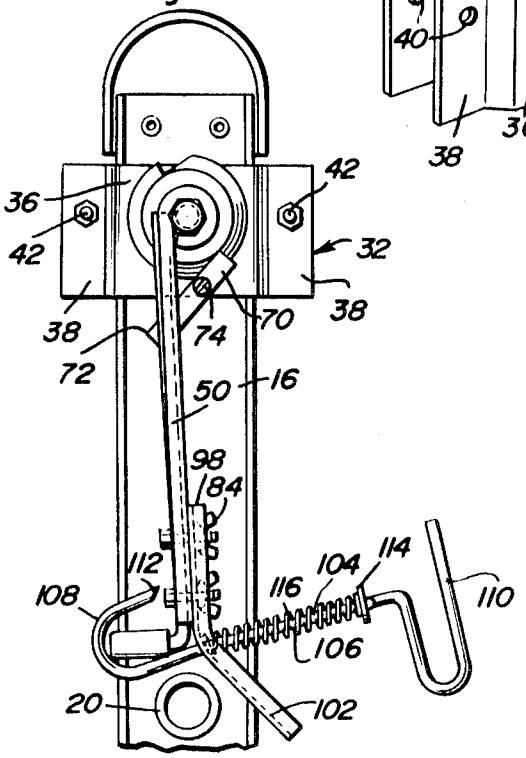
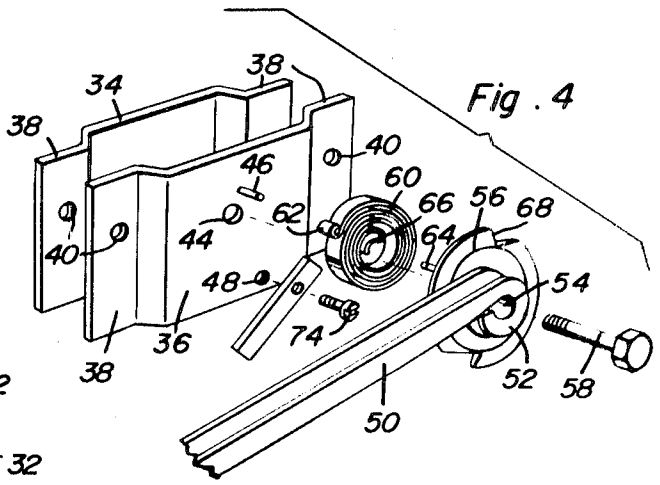


Fig. 4



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LADDER AND SUPPORT BRACKET THEREFOR

This application comprises a continuation-in-part of my copending U.S. application Ser. No. 736,042, filed June 11, 1968 for "Ladder and Support Bracket Therefor, now U.S. Pat. No. 3,486,580.

The support bracket of the instant invention has been specifically designed to be utilized in pairs and each bracket supports an arm therefrom for swinging movement about a horizontal axis extending transversely of the arm and generally paralleling the rungs of the associated ladder. The arms are spring-urged and tend to swing downwardly at their free ends which extend toward the building structure against which the associated ladder is to be leaned. In this manner, with the free ends of the arms biased downwardly upon the building structure against which the ladder is leaned, a predetermined force is applied to the free ends of the arms urging each of them into frictional contact with the building structure and there is accordingly less chance of the ladder sliding laterally relative to the building structure from which the upper end of the ladder is supported.

Means is provided whereby the pivotable support arms may be latched in inoperative positions and the free ends of the support arms include improved clamp structures by which the free end of each support arm may be clamped to a suitable portion of the building against which the associated ladder is leaned.

By utilizing pivoted spring-urged support arms on the upper end of a ladder, the load of the ladder leaning against a building structure is evenly distributed between the two support arms and thus it is impossible for the total load of the leaning ladder against the building structure to be concentrated at one point such as on a gutter which might be damaged by such a concentration of forces thereon.

It is accordingly the main object of this invention to provide a support arm structure for a ladder and to be utilized in supporting the upper end of the ladder from an associated building structure in a manner such that the load represented by the upper end of the ladder leaning against the building structure will be evenly distributed upon the building structure through the free ends of the support arms.

Another object of this invention is to provide a support arm structure for ladders in accordance with the immediately preceding object and which will function to maintain a pair of contact areas in which the support arms bear evenly downwardly upon the building structure against which the ladder is being leaned so as to reduce the possibility of a ladder which is vibrated or twisted from sliding relative to the building structure against which it is leaned.

Still another object of this invention is to provide a support arm structure for a ladder that may be readily attached to substantially all types of ladders.

Another object of this invention is to provide a support arm structure for a ladder whose structural and operational features will evenly distribute the load of the upper end of the associated ladder leaning against a building structure to two areas of contact between the support arm structure and the associated building structure and thus reduce the possibility of damaging any part of the building structure against which the ladder is leaned.

A final object of this invention to be specifically enumerated herein is to provide a support arm structure for a ladder which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other object and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a fragmentary perspective view of the upper end of a conventional form of extension ladder upon which the support arm structure of the instant invention is mounted with the latter being utilized to support the upper end of the ladder from the roof edge of a building structure;

FIG. 2 is a side elevational view of the ladder with the support arm structure mounted thereon secured in a retracted position;

FIG. 3 is a fragmentary enlarged sectional view taken substantially upon the plane indicated by the section line 3—3 of FIG. 1; and

FIG. 4 is a fragmentary exploded perspective view of one of the support arm structures.

Referring now more specifically to the drawings the numeral 10 generally designates a conventional form of extension ladder including an upper ladder section 12 and a lower ladder section 14 from which the upper section 12 is slidably supported. The upper section 12 includes a pair of opposite side rails 16 and 18 interconnected by means of a plurality of vertically spaced rungs 20 secured therebetween and the support arm structure of the instant invention is generally referred to by the reference numeral 22 and is illustrated in FIG. 1 as including a pair of support arm assemblies referred to in general by the reference numerals 24 mounted on the upper ends of the side rails 16 and 18 of the upper section 12.

The support arm assemblies 24 are illustrated as being utilized to support the upper end of the ladder 10 in horizontally spaced relation relative to the lower edge 26 of a roof structure referred to in general by the reference numeral 28 and from which a horizontally outwardly projecting gutter 30 is supported.

Each of the support arm assemblies 24 includes a mounting bracket referred to in general by the reference numeral 32 including a pair of channel-shaped members 34 and 36 including opposing opposite side generally parallel mounting flanges 38. Each pair of opposing mounting flanges 38 include a pair of registrable apertures 40 and a pair of threaded fasteners 42 are utilized to draw the pairs of flanges 38 together with the fasteners 42 extending through the apertures 40 and so as to clampingly mount the mounting bracket 32 on the corresponding ladder side rail.

The channel-shaped member 36 includes a central aperture 44, a centrally disposed laterally outwardly projecting abutment pin 46 and a threaded aperture 48.

A support arm 50 is provided and includes a base end portion 52 having a transverse bore 54 formed therethrough. The base end portion 52 further includes a centrally apertured disc 56 which is mounted on the base end portion 52 with its aperture registered with the transverse bore 54 and a threaded pivot fastener 58 is secured through the base end portion 52 and the disc 56 in order to pivotally support the base end portion 52 of the arm or lever 50 from the channel-shaped member 36. However, a coil spring 60 is provided and its outer end defines a sleeve portion 62 which is slipped over the anchor pin 64 which projects laterally outwardly from the side of the disc 56 remote from the base end portion 52. In addition, the inner end portion 66 of the spring 60 is anchored relative to the pin 46 whereby when the spring 60 is tensioned the arm 50 will be urged in a clockwise direction as viewed in FIGS. 1, 2 and 4 of the drawings.

The outer periphery of the disc 56 includes a pair of diametrically opposite detent notches 68 in which the end portion 70 of a pivoted lever 72 supported from the channel-shaped member 36 by means of a pivot fastener 74 may be selectively engaged to limit rotation of the arm 50 under influence of the spring 60 in two positions rotated 180° apart.

By seating the end portion 70 in one of the notches 68 in the manner illustrated in FIG. 2 of the drawings, the arms 50 may be retained in inoperative positions. Of course, when the end portion 70 is seated in the other notch 68, the arm portion 50 will extend outwardly from the upper end of the ladder 10.

The outer end portion of the arm 50 is generally channel-shaped in transverse section and an L-shaped abutment

member 76 including a long leg 78 and a short leg 80 has its long leg 78 secured within the outer end of the arm 50 by means of a plurality of headed fasteners 82 and associated thumbscrews 84. The arm 50 includes a plurality of longitudinally spaced appertures 86 with which a plurality of longitudinally spaced apertures 88 formed in the long leg 78 may be selectively registered in order to secure the abutment member 76 in various extended positions relative to the free end of the arm 50 with the headed fasteners 82 secured through pairs of registered apertures 86 and 88. Further, the depending short leg 80 of the abutment member 76 has a resilient covering 90 secured thereto.

A clamp assembly referred to in general by the reference numeral 92 is also supported from the outer end portion of the arm 50 by means of the fasteners 82 and thumbscrews or wing nuts 84. The clamp assembly 92 includes an elongated channel-shaped member 94 including relatively angulated opposite end portions 96 and 98. The end portion 98 has a plurality of longitudinally spaced apertures 100 formed therethrough in which the fasteners 82 may be received and in this manner the end portion 98 of the elongated channel-shaped member is secured to the free end of the arm 50 with the end portion 96 projecting outwardly from the terminal end of the arm 50.

The outer surface of the bight portion of the end portion 96 defines a jaw face 102 and a generally J-shaped member 104 is provided and includes a shank portion 106 having a backturned portion 108 on one end and a transverse handle 110 on the other end. The shank portion 106 is slidably received through a bore (not shown) provided therefor in the bight portion of the elongated channel-shaped member 94 at the juncture of the end portions 96 and 98 thereof and the free end of the reversely bent or back- turned portion 108 includes a sharpened terminal end 112. In addition, an abutment washer 114 is disposed at the end of the shank portion 106 remote from the backturned portion 108 and a compression spring 116 is disposed on the shank portion 106 between the abutment washer and the bight portion of the elongated channel-shaped member 94. Accordingly, the backturned end portion 108 with its sharpened terminal end 112 is urged upwardly as viewed in FIG. 1 of the drawings by the compression spring 116 and toward the jaw face 102. The shank portion 106 is rotatably received through the bight portion of the elongated channel-shaped member 94 and accordingly, the J-shaped member 104 may be rotated 108 degrees from the position thereof illustrated in FIG. 1 of the drawings to the position thereof illustrated in FIG. 2 of the drawings.

When it is desired to support the upper end of the ladder 10 from the roof structure 28, the upper section 12 of the ladder 10 is extended the desired distance and the ladder is leaned toward the roof structure so that the jaw faces 102 will contact the lower edge 26 of the roof structure 28. Then, a person mounts the ladder 10 and engages each of the J-shaped members 104 by the handle 110 thereof and urges the handle 110 downwardly from the position thereof illustrated in FIG. 2 of the drawings and rotates the J-shaped member 104 180 degrees after which the J-shaped member 104 may be allowed to be urged upwardly under the influence of the spring 116 to the position thereof illustrated in FIG. 1 of the drawings with the sharpened terminal end portion 112 of the J-shaped member 104 engaging the underside of the lower edge 26 of the roof structure 28. Thereafter, the person setting the ladder 10 may pull upwardly on each of the handles 110 in order to bite the sharpened terminal end portions 112 into the undersurface portions of the lower edge 26 of the roof structure 28.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

We claim:

1. A support arm for a ladder, said support arm including means at one end portion for attachment to a ladder with the other end portion projecting outwardly from the ladder, said other end portion of said support arm including releasable clamp means for clampingly engaging a portion of a structure toward which said ladder is leaned, said clamp means on the other end portion of said lever including means defining a jaw face facing in one of the directions in which said other end portion of said lever may be swung, means defining a movable jaw spaced from and opposing said jaw face and supported from said other end portion for shifting said movable jaw toward and away from said jaw face, said means defining said movable jaw including a generally J-shaped member defining an elongated shank provided with a backturned end portion on one end, said backturned end portion defining said movable jaw, said shank being rotatably and longitudinally slidably supported from said other end portion of said arm.

2. The combination of claim 1 wherein said means at said one end portion of said arm includes means for pivotally supporting said one end portion of said arm from said ladder for swinging about an axis extending transversely of said arm.

3. The combination of claim 1 wherein said clamp means further includes resilient means connected between said other end portions of said arm and said means defining said movable jaw urging the latter toward said jaw face.

4. The combination of claim 1 including resilient means connected between said other end portion and said J-shaped member urging the latter in a direction with the other end of said shank disposed forwardmost.

5. A bracket for a ladder, said bracket including clamp means for securing the bracket to a ladder, a lever, said lever including a base portion and an arm portion, means pivotally mounting said base portion on said clamp means for a pivotal swinging of the corresponding arm portion, resilient means engaged between the clamp means and the lever for biasing said lever in a rotational path about the means pivotally mounting the base portion of the lever, and cooperating stop means on said clamp means and the lever for selectively maintaining said lever in an inoperative position and in a building engaging position against the biasing force of the resilient means, the end of said lever remote from said base portion including releasable clamp means for clampingly engaging a portion of a structure toward which said ladder is leaned.

6. A support arm for a ladder, said arm including mounting means on one end thereof rotatable an axis extending transversely of said arm and adapted for securement to a ladder, said mounting means and said arm including means operative to releasably lock said arm against rotation in one direction relative to said mounting means past a predetermined position of rotation of said arm, said other end of said arm including a jaw jaw face facing in the opposite direction, a generally J-shaped jaw including a shank portion including a reversely curving terminal end at one end thereof, said shank portion being slidably rand rotatably received through said other end of said arm with said reversely curving terminal end disposed outwardly of said jaw face, and means operatively connected between said shank and said other end of said arm yieldingly urging said shank in a direction to shift said reversely curving portion toward said face.

7. The combination of claim 6 wherein said jaw face is carried by a member removably secured on said other end of said arm.

8. The combination of claim 6 including means connected between said arm and said mounting means yieldingly urging said arm in said one direction.

9. In combination, a ladder including upper and lower end portions with the upper end portion including a side thereof adapted to be leaned toward an elevated support, such as the drip edge of a roof, a support arm carried by said upper end portion and projecting generally horizontally outwardly of said one side of said ladder, the outer end of said support arm including an upwardly inclined angulated terminal end section having an undersurface adapted to abuttingly engage the

upper surface of said drip marginal edge portion of a pitched roof, a generally J-shaped clamp member including an upstanding shank portion whose lower end terminates downwardly in a backturned end portion, said clamp member having its shank portion rotatably and slidably supported from said arm a spaced distance from the outer terminal end of said terminal end section, means yieldingly biasing said shank portion upwardly relative to said support arm, the free end of said backturned end portion being positionable to oppose the underside of the outer end of said terminal end portion and the underside of an inwardly spaced portion of said support arm in opposite 180° rotated positions of said shank portion.

10. The combination of claim 9 wherein said arm has its base end remote from said upwardly angulated terminal end section pivotally supported from said ladder for oscillation about horizontal axis extending transversely of said arm.

11. The combination of claim 9 wherein said ladder includes a pair of upstanding side rails between which a plurality of vertically spaced generally horizontal rungs are secured, said ladder including a pair of said support arms, said support arms being supported from and projecting outwardly from corresponding side rails of said ladder.