

- [54] LADDER WITH CLAMP EQUIPPED WALL ENGAGING BRACKET
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- [52] U.S. Cl. .... 182/206; 182/214
- [51] Int. Cl.<sup>2</sup> ..... E06C 1/36
- [58] Field of Search ..... 182/206, 214, 93, 107, 182/108

[56] **References Cited**

UNITED STATES PATENTS

3,486,580	12/1969	Nameche	182/206
3,603,431	9/1971	Nameche	182/206
3,853,202	12/1974	Jarboe	182/206

FOREIGN PATENTS OR APPLICATIONS

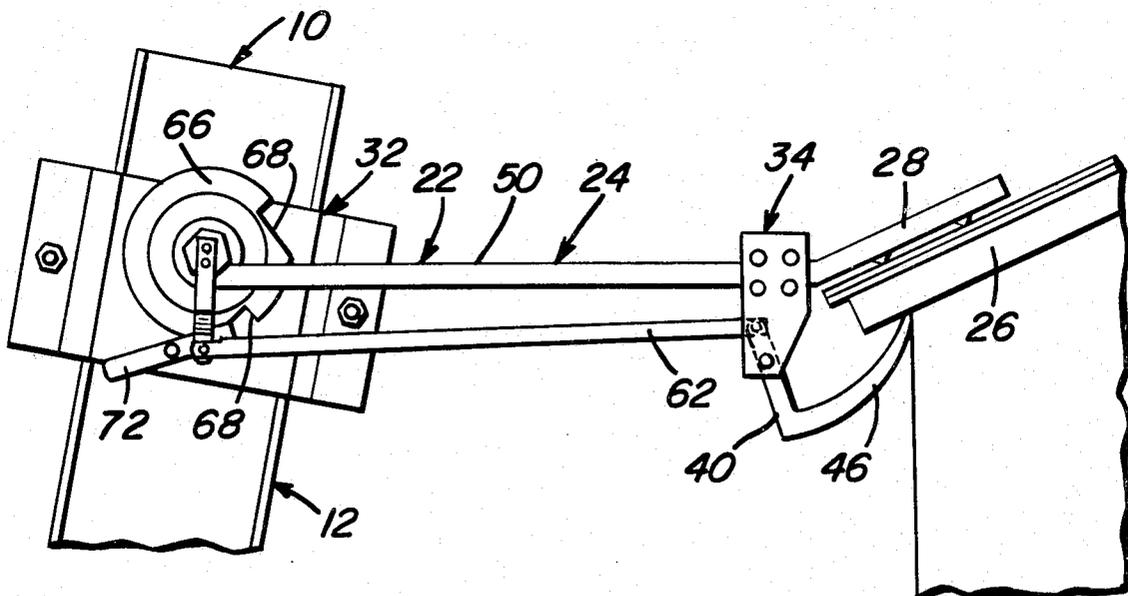
903,147	7/1949	Germany	182/93
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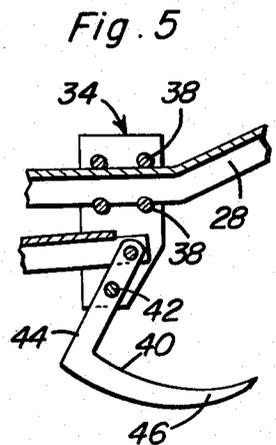
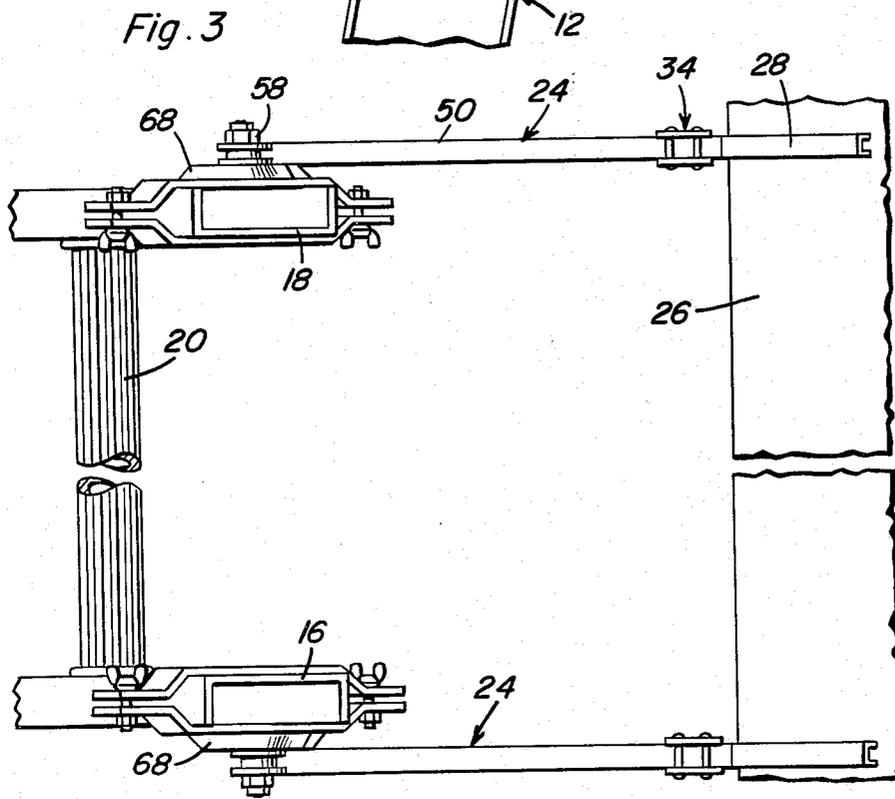
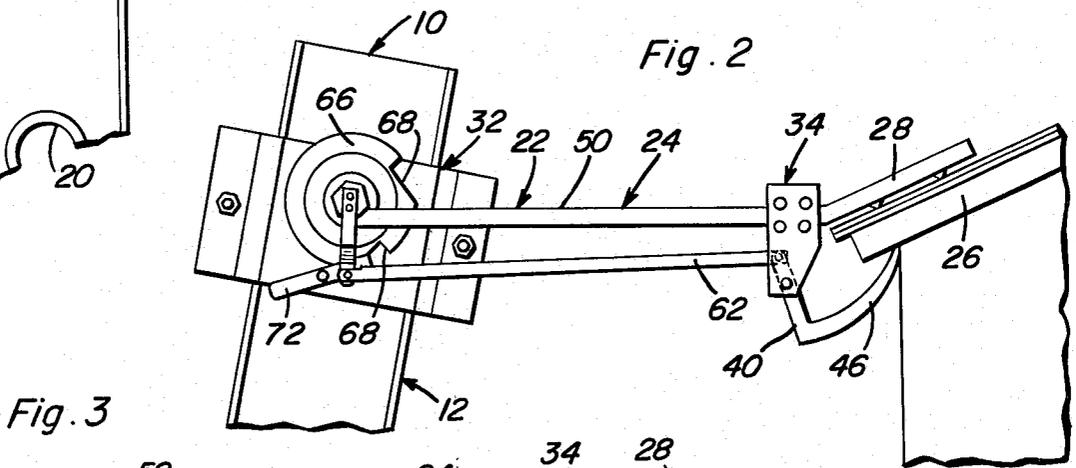
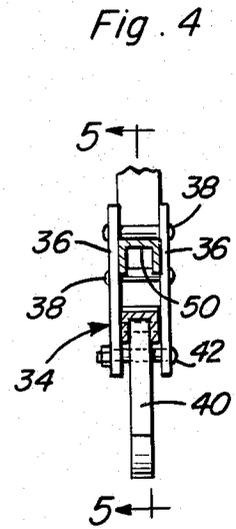
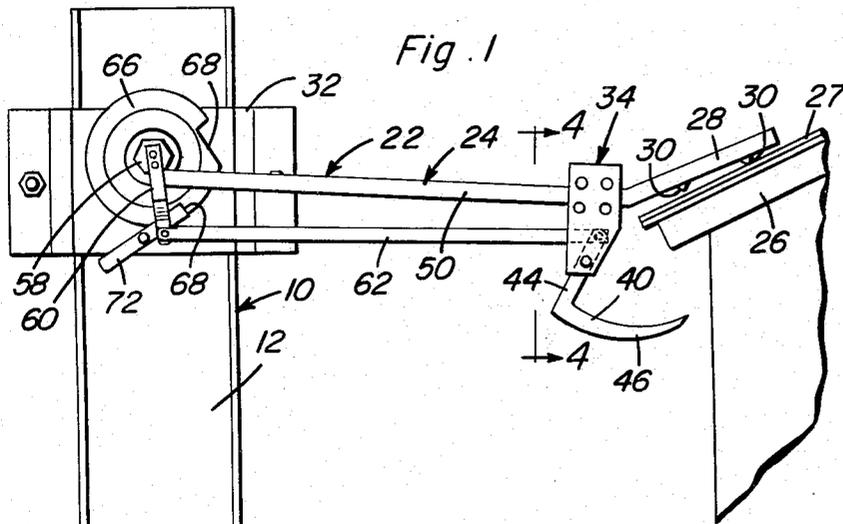
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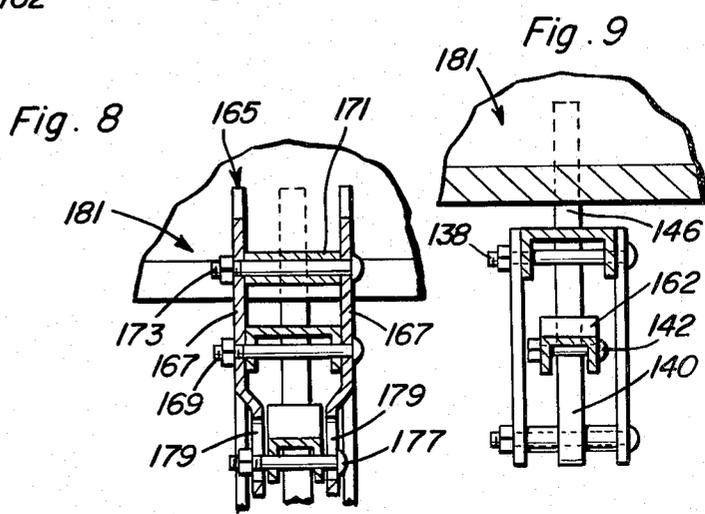
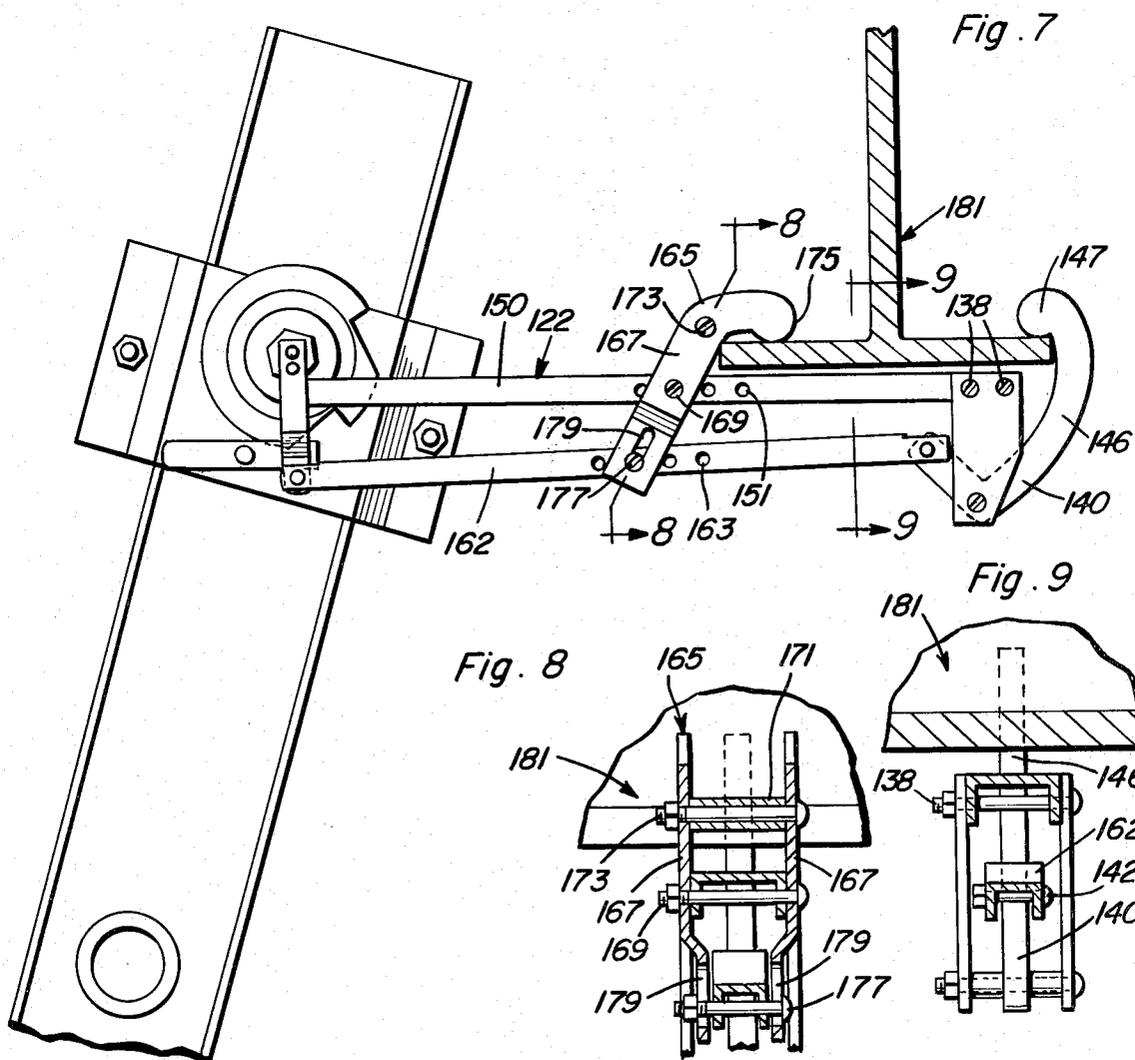
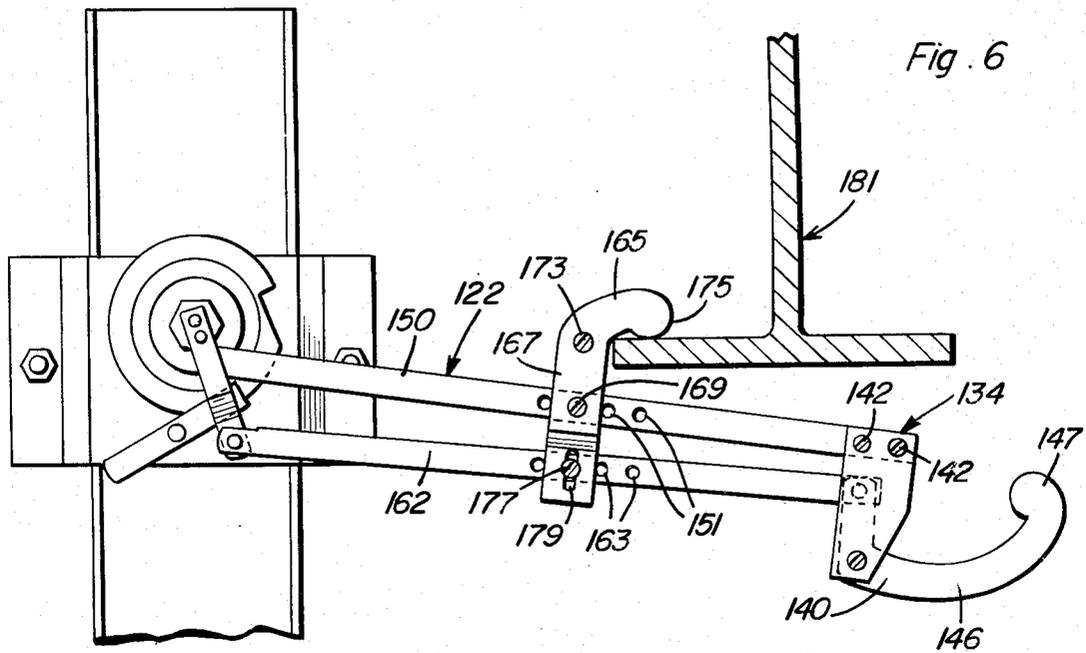
is provided and includes mounting structure for mounting one end of the support arm structure on the upper end of a ladder for swinging of the arm structure about a transverse axis extending transversely of the associated ladder, the support arm structure being swingable to a plane in which the ladder is disposed. A torsion spring is connected between the mounting structure and the support arm structure and yieldingly biases the support arm structure to swing the free end thereof in a downward direction toward the lower end of the associated ladder. Also, stop structure is carried by the mounting structure to limit downward swinging of the free end of the support arm structure and the outer end portion of the support arm structure includes a first stationary clamp jaw projecting upwardly from the support arm structure. A second jaw is pivotally supported from the support arm structure at a point spaced therealong from the stationary jaw for swinging toward and away from the stationary jaw and an operating link is operatively associated with the second pivoted jaw and mounting structure for swinging the pivoted jaw toward and away from the stationary jaw in response to downward and upward swinging movement, respectively, of the free end of the support arm structure relative to the ladder supported mounting structure.

[57] **ABSTRACT**  
 A support arm structure for the upper end of a ladder

10 Claims, 9 Drawing Figures







## LADDER WITH CLAMP EQUIPPED WALL ENGAGING BRACKET

### BACKGROUND OF THE INVENTION

This invention comprises an improvement over the ladder and support bracket therefor disclosed in my prior U.S. Pat. No. 3,603,431.

Various types of ladder support brackets have been heretofore designed for engaging a supportive structure against which the upper end of the ladder is to be leaned and maintaining the upper end of the ladder in spaced relation relative to the supportive structure. In addition, some of these ladder support brackets have included clamp means at the free ends thereof for clampingly engaging the associated supportive structure. However, these clamp equipped ladder support brackets have either not been constructed so as to adapt readily to various configurations of supportive structures to be clamped thereby or they have required manual actuation and release from the upper end of the associated bracket and therefore preclude the possibility of an associated ladder being clampingly engaged with a supportive structure prior to a person climbing the ladder.

Examples of previously patented ladder support brackets may be found in U.S. Pat. Nos. 1,658,191, 2,088,895, 2,419,065, 3,486,580 and 3,603,431.

### BRIEF DESCRIPTION OF THE INVENTION

The ladder support bracket of the instant invention includes a support arm structure pivotally supported from the associated ladder and equipped with a stationary jaw as well as a pivoted jaw on the free end of the support arm structure. The pivoted jaw is connected between the support bracket and the support arm structure for automatic swinging of the pivoted jaw toward and away from the stationary jaw in response to upward and downward movement of the free end of the support arm structure toward its limit positions of oscillation. The support arm structure being spring biased to swing the free end thereof in a downward direction.

The main object of this invention is to provide a ladder support bracket for use on single section ladders as well extension ladders and which will be capable of clampingly engaging a supportive structure for the ladder and supporting the upper end of the associated ladder in spaced relation relative to the supportive structure.

Another object of this invention, in accordance with the immediately preceding object, is to provide a ladder support bracket which may be automatically clampingly engaged with a supportive structure as the associated ladder is erected and prior to a person climbing the associated ladder.

Still another object of this invention is to provide a support bracket for a ladder constructed in a manner whereby it may be readily removably attached to substantially all types of ladders.

A final object of this invention to be specifically enumerated herein is to provide a support bracket for a ladder in accordance with the preceding objects and 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 objects and advantages which will become subsequently apparent reside in the

details of construction and operation as more fully hereinafter described and claimed, references being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary side elevational view of the upper portion of a ladder having the support bracket of the instant invention operatively associated therewith and with the bracket engaged with a supportive structure for the ladder immediately prior to the pivoted jaw of the clamp portion of the support bracket clampingly engaging the supportive structure between the pivoted jaw and the stationary jaw of the support bracket;

FIG. 2 is a fragmentary side elevational view, similar to FIG. 1, but with the pivoted jaw in clamping position;

FIG. 3 is a fragmentary top plan view of the assemblage illustrated in FIG. 1;

FIG. 4 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 4—4 of FIG. 1;

FIG. 5 is a vertical sectional view taken substantially upon the plane indicated by the section line 5—5 of FIG. 4;

FIG. 6 is a fragmentary perspective view of the upper end of a ladder equipped with a modified form of support bracket;

FIG. 7 is a fragmentary side elevational view of the structure illustrated in FIG. 6 with the movable clamp portion of the support bracket in the clamping position;

FIG. 8 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 8—8 of FIG. 7; and

FIG. 9 is a fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 9—9 of FIG. 7.

### DETAILED DESCRIPTION OF THE INVENTION

Referring now more specifically to the drawings and to FIGS. 1 through 5 in particular, the numeral 10 generally designates a conventional form of extension ladder including an upper ladder section 12. 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 FIGS. 1-3 as including a pair of support arm assemblies generally referred to 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 are illustrated as being utilized to support the upper end of the ladder 10 in horizontally spaced relation relative to a horizontal support structure 26. Each of the support arm assemblies 24 includes a mounting bracket referred to in general by the reference numeral 32. Further, each mounting bracket 32 has the base end of an inverted channel-shaped support arm 50 pivotally supported therefrom. The mounting bracket 32 and support arm 50 are substantially identical to the corresponding components identified by identical reference numerals disclosed in my above-mentioned prior U.S. Pat. No. 3,603,431. Further, the support arms 50 are spring biased in a clockwise direction as viewed in FIG. 1 in the same manner as that disclosed in my prior U.S.

patent and each mounting bracket includes a pivotally supported latching lever 72 cooperable with notches 68 formed in the cover discs 66 for limiting clockwise swinging of the support arms 50 in the same manner as the identically numbered components in my prior patent.

Each of the support arms 50 includes an outer end upwardly angulated stationary jaw 28 including longitudinally spaced downwardly projecting surface penetrating elements 30 and a mounting bracket 34 is mounted on the end portion of each support 50 immediately inwardly of the stationary jaw 28 thereof. Each mounting bracket 34 comprises a pair of spaced opposition side plates 36 clampingly engaging the corresponding support arm 50 therebetween by means of a fastener 38 secured through the plates 36. The plates 36 include lower end portions which project downwardly below each support arm 50 and pivotally support an L-shaped jaw 40 therebetween by means of a pivot fastener 42. Each jaw 40 includes a pair of angulated legs 44 and 46 and the pivot fastener 42 for each jaw 40 is secured through the leg 44 thereof centrally intermediate its opposite ends.

Each of the support arms 50 is pivotally supported from the corresponding mounting bracket 32 by means of a pivot fastener 58 also finding its equivalent in my prior patent designated by the same reference numeral and each of the pivot fasteners of the instant invention includes an anchor arm 60 supported therefrom and extending generally radially outwardly from the pivot fastener.

Each support arm assembly 24 further includes an elongated channel-shaped connecting member 62 pivotally secured at one end to the free end of the corresponding leg 44 and at the other end to the free end of the corresponding anchor arm 60.

In operation, with the support arms 50 locked against further downward swinging movement of the free ends thereof past the positions illustrated in FIG. 1 by means of the pivoted levers 62, the ladder 10 is positioned in an upstanding position leaning slightly toward the support structure or member 26. Then, with the stationary jaw 28 engaged with the upper surface 27 of the support member 26, the upper section of the extension ladder is lowered slightly relative to the support 26. With each support arm 50 thus positioned as illustrated in FIG. 2, the counter-clockwise displacement of the support arms 50 from the positions thereof illustrated in FIG. 1 to the positions thereof illustrated in FIG. 2 causes the connecting members 62 to swing the jaws 40 from the open positions thereof illustrated in FIG. 1 to the closed positions thereof illustrated in FIG. 2 with the support member 26 clamped between the stationary jaws 28 and the free ends of the legs 26 of the pivoted jaws 40. At this point, the ladder 10 is securely clamped to the support structure 26 and may be climbed without fear of the ladder slipping relative to the support structure 26.

With reference now more specifically to FIGS. 6 through 9 of the drawings, there may be seen a modified form of support arm structure referred to in general by the reference numeral 122 and which is substantially identical, for the most part, to the support arm structure 22.

The support arm structure 122 differs from the support arm structure 22 in that the mounting brackets 134 corresponding to mounting brackets 34 are se-

cured to the outer terminal ends of the support arms 150 by means of fasteners 138 secured through the support arms 150. The free end of the long leg 146 of a lever 140 corresponding to lever 40 is provided with a hook 147 and the support arm structure 122 does not include a jaw corresponding to the jaw 28. Rather, the support arm 150 is provided with a plurality of longitudinally spaced transverse bores or apertures 151 and a connecting member 162 corresponding to the connecting member 160 includes similar longitudinally spaced transverse bores or apertures 163. The other jaw of each support arm structure 122 is referred to in general by the reference numeral 165 and includes a pair of opposite side jaw plates 167 pivotally secured to the corresponding support arm 150 by means of a pivot fastener 169 secured through a selected bore 151. The plates 167 project above the support arms 150 and each pair of plates 167 is interconnected by means of a spacing sleeve 171 and a through fastener 173 above the support arm 150. Further, the upper ends of the plates 167 are provided with hooked terminal ends 175.

The lower ends of each pair of plates 167 extend downwardly along opposite sides of the corresponding connecting member 162 and are loosely pivotally and slidably secured to the latter by means of a fastener 177 secured through vertical slots 179 in the plates 167 and a selected bore 163.

From a comparison of FIGS. 1 and 2 and FIGS. 6 and 7, it may be seen that the operation of the support structure 122 is substantially identical to the operation of the support arm structure 22, except that the jaws 140 and 165 are better adapted to clampingly engage the lower horizontal flange of a horizontal I-beam referred to in general by the reference numeral 181. Further, it may be readily appreciated that the jaws 165 may be adjustably positioned longitudinally of the support arms 150 and connecting members 162 in order to vary the maximum and minimum spacing between each pair of jaws 140 and 165.

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.

What is claimed as new is as follows:

1. A ladder support bracket assembly, said assembly including elongated support arm means, mounting means for attachment to the upper end of a ladder to be leaned toward and supported from a support structure, said mounting means including pivot means pivotally supporting one end of said support arm means from said mounting means for swinging about a horizontal axis, said mounting means including mounting structure for support from an associated ladder including opposite side rails with said horizontal axis extending transversely of said rails and generally paralleling a plane containing said rails, the free end portion of said arm means including first jaw means and second movable jaw means shiftably supported from said arm means and with said second jaw means including at least portions thereof shiftable toward and away from said first jaw means to clamp said support structure therebetween, shift means operatively connected be-

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tween said second jaw means toward and away from said first jaw means in response to swinging oscillation of said support arm means relative to said mounting means.

2. The combination of claim 1 wherein said first jaw means project upwardly from the outer end portion of said support arm means and said second jaw means comprises jaw means dependingly pivotally supported from said support arm means outwardly of said first jaw means.

3. The combination of claim 1 wherein said first jaw means projects endwise outwardly of the outer end of said support arm means and said second jaw means comprises elongated jaw means pivotally supported at one end below the outer end portion of said support arm means inwardly of said first jaw means with the free end of said second jaw means swingable outwardly and upwardly into opposing relation with said first jaw means.

4. The combination of claim 1 including means operative to releasably latch said arm means in adjusted position relative to said mounting means against the biasing action of said first means.

5. In combination, an upstanding inclined ladder including opposite side longitudinal rails, elongated support arm structure pivotally supported at one end portion thereof from the upper end of said ladder with the free end of said support arm structure projecting outwardly from the side of said ladder facing in the direction in which the ladder is inclined and for oscillation of said support arm means about a horizontal axis extending transversely of said ladder, means connected between said ladder and support arm structure limiting downward swinging movement of the free end portion of said support arm structure, first jaw means carried

by the free end portion of said support arm structure and second jaw means supported on said support arm structure for shifting toward and away from said first jaw means, shifting means connected between said second jaw means and said ladder for shifting said second jaw means toward and away from said first jaw means in response to upward and downward swinging, respectively, of the free end portion of said support arm structure relative to said ladder.

6. The combination of claim 5 including force developing means between said support arm structure and said ladder yieldingly biasing said support arm structure toward a position with the free end portion thereof in its lower limit position.

7. The combination of claim 6 wherein said shifting means includes parallel linkage means connected between said second jaw means and said ladder, said parallel linkage means including said support arm structure.

8. The combination of claim 6 wherein said first jaw means and support arm structure include coaxing means for adjustably positioning said first jaw means along said support arm structure relative to the pivot axis of said second jaw means.

9. The combination of claim 6 wherein said first jaw means is stationarily mounted on said support arm structure.

10. The combination of claim 1 wherein said first jaw means is pivotally mounted on said support arm structure and operatively associated with said shifting means to effect oscillation of said first jaw means relative to said support arm structure in response to oscillation of the latter relative to said ladder.

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