United States Patent [19]

Loomis et al.

[11] **3,908,260**

[45] **Sept. 30, 1975**

[54] **METHOD OF MAKING A TRUCK LADDER**

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[21] Appl. No.: **518,468**

Related U.S. Application Data

[62] Division of Ser. No. 405,826, Oct. 12, 1973.

[52] **U.S. Cl.** ..... **29/434;** 29/464; 29/476; 113/116 I

[51] **Int. Cl.²** **B23P 11/00**

[58] **Field of Search** ..... 29/476, 464, 155, 469, 29/434; 113/116 I; 182/127, 228, 206, 93, 99, 194; 52/758

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Primary Examiner—Charlie T. Moon

[57] **ABSTRACT**

Two pairs of transversely-aligned longitudinally-spaced vee-bottomed notches are formed in the opposite edges of the mid-portion of an elongated flat sheet metal blank, the opposite edge portions of which are then bent perpendicular to the central portion thereof to form an elongated channel member. This channel member is then bent transversely along the center lines of each pair of notches to form a top step integral with two parallel side rails which are then interconnected at and above their lower ends by a pair of fixed channel steps secured thereto in vertically-spaced parallel relationship. A wider foldable step is pivotally mounted on the side rails below the top step and carries a pair of centrally-bored attachment pins which initially guide a drill in drilling pilot holes in the truck body side wall for subsequent enlargement to receive the attachment pins which then secure the ladder to the truck body.

9 Claims, 10 Drawing Figures

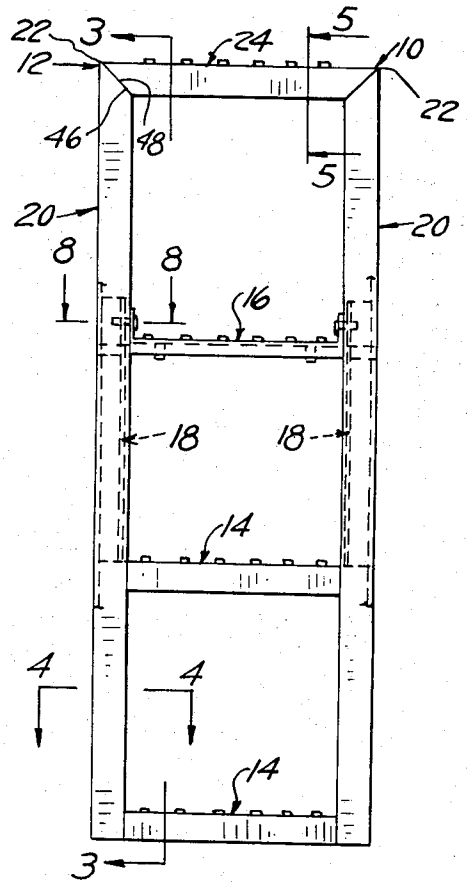


FIG. 1

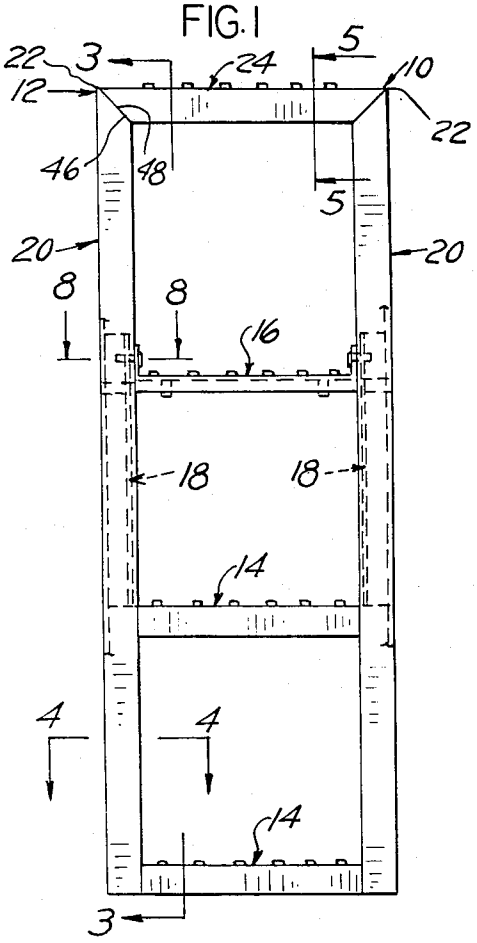


FIG. 2

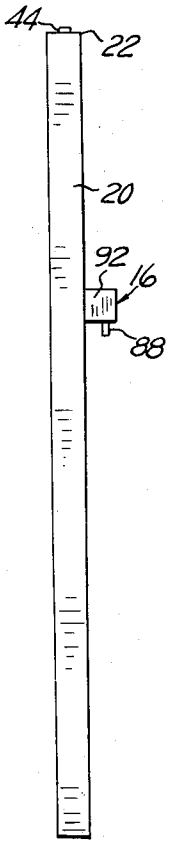


FIG. 3

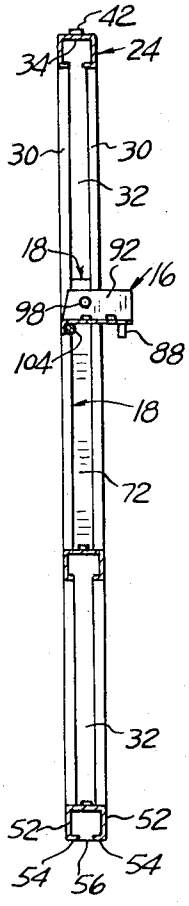


FIG. 10

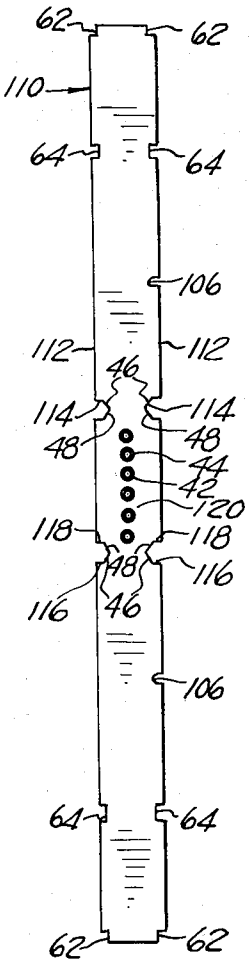


FIG. 4

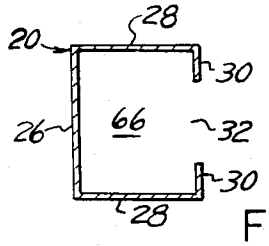


FIG. 5

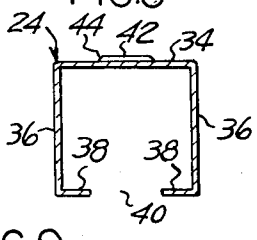
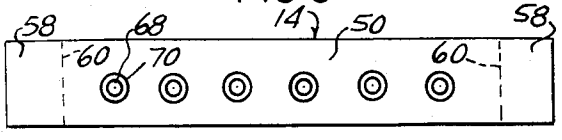


FIG. 9



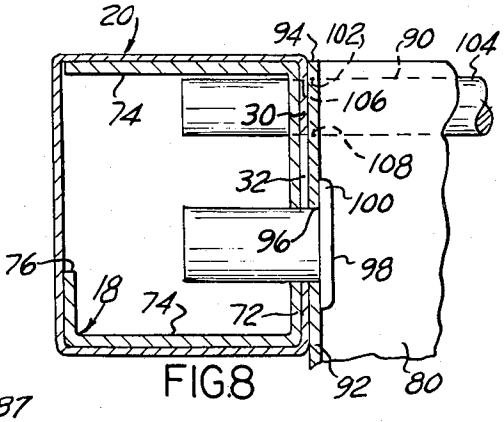


FIG. 8

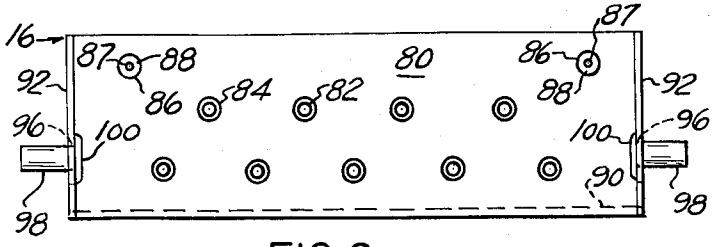


FIG. 6

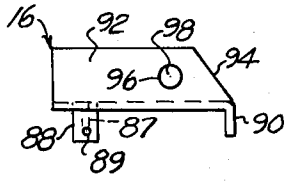


FIG. 7

METHOD OF MAKING A TRUCK LADDER

This is a division of our co-pending application, Ser. No. **405,826,** filed Oct. **12, 1973,** for Truck Ladder.

SUMMARY OF THE INVENTION

This invention particularly resides in the conversion of an elongated channel member with vee-notched flanges into a ladder top step integral with parallel side rails which are thereafter interconnected by channel lower fixed steps and an upper tiltable wider step possessing centrally-bored attachment pins the bores of which serve as drill guides for drilling truck body pilot holes which are subsequently enlarged to receive these attachment pins.

In the drawings,

FIG. **1** is a front elevation, upon a reduced scale, of a truck ladder, according to one form of the invention;

FIG. **2** is a right-hand side elevation of the ladder shown in FIG. **1,** with the upper and wider step in its extended position;

FIG. **3** is a vertical section taken along the line **3—3** in FIG. **1**;

FIG. **4** is an enlarged horizontal section through one of the side rails taken along the line **4—4** in FIG. **1**;

FIG. **5** is an enlarged vertical section, taken along the line **5—5** in FIG. **1**;

FIG. **6** is an enlarged top plan view of the folding upper step of the ladder shown in FIG. **1,** removed from the ladder;

FIG. **7** is a left-hand side elevation of the step shown in FIG. **6**;

FIG. **8** is an enlarged horizontal section taken along the line **8—8** in FIG. **1**;

FIG. **9** is an enlarged top plan view of one of the stationary steps; and

FIG. **10** is a top plan view upon a reduced scale of the elongated sheet metal blank from which the top and side rails of the ladder are produced by subsequent bending operations.

Referring to the drawings in detail, FIG. **1** shows a truck ladder, generally designated **10,** according to one form of the invention, as consisting generally of an integral top and side rail unit **12** of flanged channel cross-section to which are connected lower fixed steps **14** and an upper swinging step **16** pivoted to internal channel reinforcements **18.** The top and side rail unit **12,** as its name indicates, is composed of vertically-elongated parallel side rails or stiles **20** joined integrally at the upper corners **22** to the top member **24,** the whole being formed in a single piece as described more fully below. Thus, the top member **24** serves as a bridge or cross member connecting the side rails **20** at their upper ends.

Each side rail **20** and the top member **24** are of channel cross-section (FIGS. **4** and **5**), each side rail **20** having an end wall **26** which interconnects the side walls **28.** The side walls **28** at their free edges are provided with narrow flanges **30** directed toward one another and separated from each other by a gap **32.** Similarly, the top member **24** is provided with a top wall **34** which interconnects opposite side walls **36** and the latter at their free edges are provided with narrow flanges **38** also directed toward one another and separated from one another by a gap **40.** The top member **24** (FIG. **5**) is also provided, in its top wall **34,** with spaced holes **42** having upwardly-projecting frusto-conical rims **44** for

providing an anti-slip construction. The side rails **20** and top member **24** are joined to one another at their corners **22** and also along the oblique ends **46** and **48** respectively cut at angles of **45** degrees and welded or otherwise firmly secured to one another at the locations **46** and **48** (FIG. **1**).

The side rails **20** are also joined to one another at their lower ends and at a location spaced above the lower ends by the fixed steps **14.** The latter are also of channel cross-section with top walls **50** (FIG. **9**) which interconnect side walls **52** (FIG. **3**) from the lower edges of which narrow flanges **54** project toward one another leaving a space or gap **56** therebetween. Each of the fixed steps **14** at the opposite ends of its top wall **50** is provided with end extensions **58** which project outward from the dotted lines **60** through the gaps **32** and lower or upper notches **62** or **64** formed in the flanges **30** of the side rails **20** (FIG. **10**) into the interiors **66** thereof, where they are welded or otherwise secured in place.

The dimensions of the notches **62** and **64** are similar to those of the end extensions **58** of the fixed steps **14** in order to pass therethrough. Each of the fixed steps **14,** like the top member **24,** is provided with laterally-spaced holes **68** (FIG. **9**) having frusto-conical upwardly-projecting rims **70** for anti-slip purposes.

Each elongated internal channel reinforcement **18** (FIG. **8**) has an end wall or web **72** interconnecting opposite side walls **74** but, unlike the side rails **20,** top member **24** and fixed steps **14,** has only a single flange **76.** The channel reinforcements **18** (FIGS. **1** and **3**) extend from slightly above the upper fixed step **14** to a location above the swinging step **16.** The swinging step **16** (FIGS. **6** and **7**) has a horizontal plate portion **80** punched at staggered intervals with holes **82** having frusto-conical anti-slip rims **84** and drilled near its rearward edges with holes **86** in which are mounted ladder-attaching pins **88** with central drilling guide holes **87** therethrough for drilling pilot holes in the side rail or outer edge of the truck floor outside the sides or side boards of the truck bed. These pilot holes are then used to drill holes the size of the ladder-attaching pins **88** which are inserted therethrough and locked in place by cotter pins (not shown) through transverse holes **89** near the ends of the pins **88.** Depending from the forward edge of the plate portion **80** is a narrow flange **90** (FIG. **7**) while from its opposite ends rise end flanges **92.** Each end flange **92** is drilled (FIG. **8**) near its inclined forward edge **94** with a hole **96** in which is mounted a headed pivot pin **98,** the head **100** of which is welded or otherwise firmly secured to its respective end flange **92.** The end walls or webs **72** of the reinforcements **18** are provided with coaxial holes **102** adapted to receive the opposite ends of a support rod **104** extending thereacross immediately behind the front flange **90** when the swinging step **16** is in its horizontal or operative position. The forward flanges **30** of the side rails **20** are provided with notches **106** (FIG. **10**) aligned with the holes **102** to afford clearances for the adjacent ends of the rod **104.** The end walls or webs **72** of the reinforcements **18** are also provided with holes **108** adapted to be aligned with one another to receive the pivot pins **98** during assembly, as described more fully below.

In the method of making the ladder **10,** a sheet metal plank **110** (FIG. **10**) is formed from sheet metal into an elongated strip. The previously-mentioned rectangular

notches 64 and 106 are punched or otherwise formed extending inward from the opposite edges 112 of the blank 110. Partially V-shaped and partially rectangular or parallel notches 114 are also formed in the same manner in longitudinally-spaced relationship inward from the opposite edges 112 with their V-shaped portions 46 and 48 at forty-five-degree angles to the edges 112 and at ninety-degree angles to one another. The rectangular outer portions 116, 118 are formed simultaneously with the V-shaped portions 46, 48, so that the outline of each notch 114 thus resembles the end view of an ordinary barn. Either at this time or previously, the holes 42 with their frusto-conical rims 44 are formed in the central section 120, which ultimately becomes the top member 24 of the ladder 10.

The blank 110 is then subjected to bending operations along longitudinal bending lines running between the corners of the end notches 62 to form the flanges 30 at right angles thereto in a direction away from the plane of the paper in the drawing. This is conveniently done by rolling operations in a conventional rolling mill, as is well understood by those skilled in the metal-working arts. The shallow channel member thus formed is subjected to a second and similar rolling operation at the depth of the inner vertices of the notches 114 along bending lines parallel to the previously-mentioned bending lines, thereby forming the side walls 28 of the channel member having the end wall 26 and flanged configuration shown in FIG. 4.

The thus-formed flanged channel member is then subjected to transverse bending operations along bending lines extending between the vertices of the notches 114, whereupon the side edges 46 and 48 come together as shown in FIG. 1 to form the integral top and side rail unit 12 of flanged channel cross-section previously mentioned. The previously-prepared channel reinforcements 18 (FIG. 8), after the holes 102 and 108 have been drilled in their end walls 72, are then inserted in their respective locations within the side rails 20 as shown in FIGS. 1, 3 and 8) and then welded or otherwise secured in position.

Meanwhile, as these bending operations proceed, the opposite ends of the support rod 104 are aligned with the holes 102 in the reinforcements 18 and the pivot pins 98 are aligned with their respective holes 108, so that, as the bending nears its end, the ends of the rod 104 enter their holes 102 while the pivot pins 98 enter their holes 108. At the same time, the upper fixed step 14 is also aligned with its notches 64 (FIG. 10) in the flanges 30 of the side rails 20, so that as the bending thereof near its end, the opposite ends 58 of the upper fixed step 14 enter the interiors 66 of the side rails 20 so as to become seated therein. The lower fixed step 14 is then welded into place in the lower notches 62, and the ladder 10 becomes completely assembled as shown in FIG. 1.

Alternatively, the welding of one or both of the headed pivot pins 98 can be deferred until the ladder has otherwise been assembled as described above, after which the pivoted upper step 16 is moved into its proper position between the side rails, as one of the previously-welded pivot pins 98 is pushed into its respective hole 108 in the end wall 72 of its respective retainer 18, whereupon the loose remaining pivot pin 98 is pushed through the then-aligned opposite holes 96 and 108 and welded to the adjacent end flange 92.

We claim:

1. A method of making a multiple-step ladder adapted to be attached to a truck body, said method comprising

forming from sheet metal an elongated parallel-edged blank,

forming two pairs of transversely-aligned vee-bottomed notches in the opposite edge portions of said blank,

said pairs of notches being formed equidistant from the opposite ends of said blank at locations corresponding to the intended locations of the ends of the top step of the ladder,

bending the thus-notched opposite edge portions of said blank perpendicular to the remainder thereof along parallel longitudinal bending lines through the centers of said notches to form a channel member having a central wall and parallel side walls,

bending said channel member along transverse bending lines through each pair of said transversely-aligned notches into a central top step member and a pair of parallel ladder side members perpendicular to said top step member and integral therewith,

preparing a plurality of lower step members with lengths corresponding substantially to the distance between said central walls of said opposite side members,

and securing the opposite end portions of said lower step members to said opposite side members within the channels thereof and in spaced parallel relationship to said top member.

2. A method of making a multiple-step ladder, according to claim 1, wherein said vee-bottomed notches have parallel outer edge portions, and wherein said bending of said opposite edge portions is performed on bending lines passing through the junctions of said vee-bottomed notch portions and said parallel edge portions.

3. A method of making a multiple-step ladder, according to claim 2, including the additional step of bending the outer longitudinal edge portions of said side walls toward one another into co-planar flanges with a gap therebetween.

4. A method of making a multiple-step ladder, according to claim 1, including the additional step of fixedly securing said lower step members to said opposite side members.

5. A method of making a multiple-step ladder, according to claim 3, including the additional step of inserting the opposite ends of said lower step members through the gaps in their respective adjacent side members, and also through the parallel-edged outer portions of their respective adjacent notches.

6. A method of making a multiple-step ladder, according to claim 1, including the additional step of pivotally mounting an upper step member on said opposite side members for tilting motion between positions respectively co-planar with and perpendicular to said opposite side members.

7. A method of making a multiple-step ladder, according to claim 6, including the additional step of mounting truck body attachment elements upon said upper step member in projecting relationship therewith, said elements being adapted to be secured to the truck body.

8. A method of making a multiple-step ladder, according to claim 7, including the additional step of providing drill guide bores in said attachment elements

adapted to precisely align a rotary drill while drilling pilot holes in the truck body for subsequent enlargement into fastener holes for ladder supporting fasteners.

9. A method of making a multiple-step ladder, according to claim 1, including the additional step of forming said lower step members in channel configuration prior to securing said lower step members to said opposite side members.

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