March 24, 1953 H. M. EISMAN 2,632,592

LADDER

Filed Oct. 14, 1949

Fig. 1

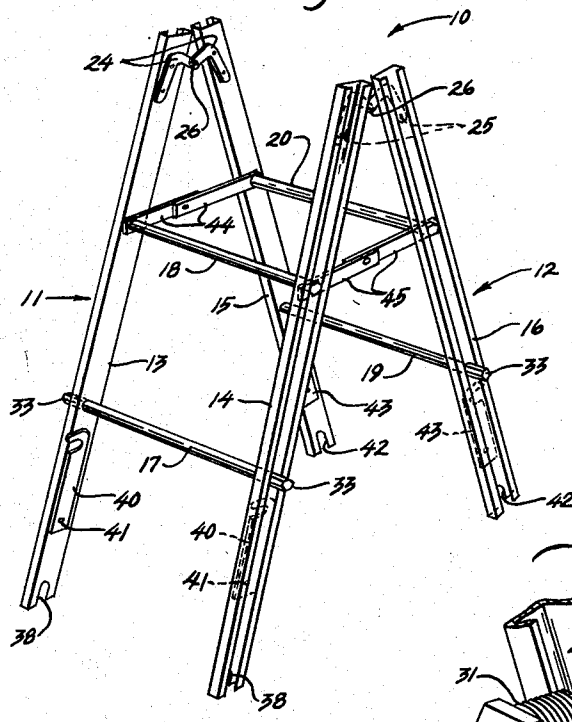
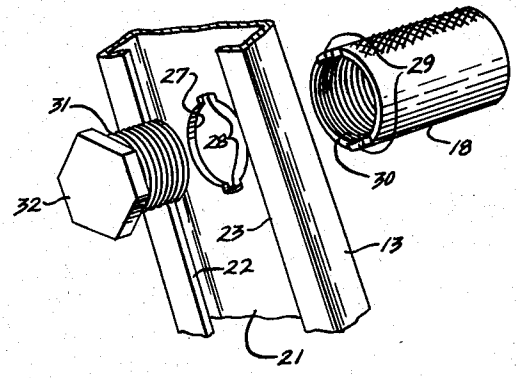


Fig. 2



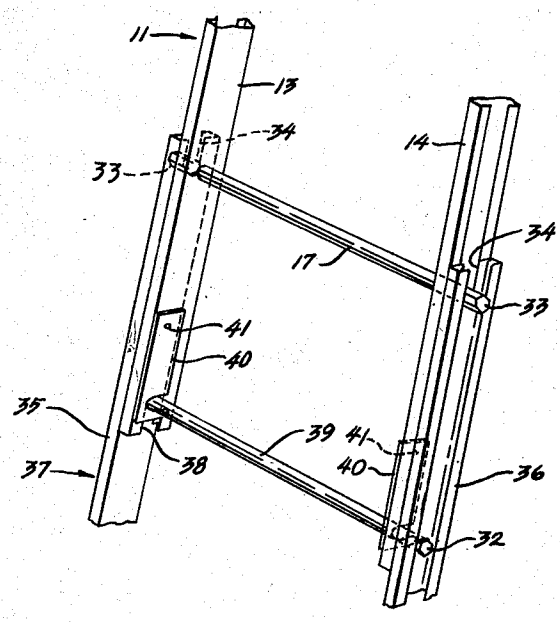


Fig. 3

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LADDER

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1 Claim. (Cl. 228—56)

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This invention relates to ladders, and more particularly to a ladder head of inverted V-shape, which is adapted to be assembled with a pair of straight ladders or ladder sections so as to form a self-supporting ladder or a trestle for use in scaffolding.

One object of this invention is to provide a device of the above nature having a pair of hinged head sections which have means for positively and securely connecting a pair of ladder sections thereto.

Another object is to provide an improved all-metal ladder construction wherein the rungs and the side rails are joined by connections which provide strength and rigidity in the ladder, and avoid the use of welding.

A further object is to provide a ladder head of the above nature which will be simple in construction, inexpensive to manufacture, easy to assemble and manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawing one form in which the invention may conveniently be embodied in practice.

In the drawing,

Fig. 1 is a perspective view of the improved ladder head.

Fig. 2 is an exploded fragmentary perspective view, on an enlarged scale, showing the construction of one of the joints between the rungs and the side rails.

Fig. 3 is a fragmentary perspective view illustrating the manner in which one of the head sections would be assembled with a ladder section.

Referring now to the drawing, in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates the improved ladder head which comprises a pair of head sections 11, 12, having pairs of upstanding side rails 13, 14, and 15, 16, respectively, joined by pairs of horizontal tubular rungs 17, 18, and 19, 20.

Each of the side rails 13, 14, 15, 16 is approximately C-shaped in cross section, as illustrated in Fig. 2 for example, and comprises a flat longitudinal web 21 and a pair of inturned flanges 22, 23 which are outwardly offset from said web and parallel thereto—said side rails preferably being constructed from aluminum and formed by an extrusion process.

The head sections 11, 12, are so assembled that the webs 21 of the respective pairs of side rails face each other, and are swingably connected

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adjacent their upper ends by means of pairs of angular hinge brackets 24, 25 secured to said webs and provided with pivots 26.

The construction whereby the ends of the rungs 17, 18, 19, and 20 are connected to the side rails 13, 14, 15, 16 is exemplified in Fig. 2 with reference to the rail 13 and the rung 18. The web 21 is provided with a circular central aperture 27 which has a diameter intermediate the inner and outer diameters of the tubular rung 18, and which has a pair of opposite outstanding notches 28, 28 formed on a diameter which is substantially equal to the outer diameter of said rung 18.

The end surface of the rung 18 is so cut as to provide a pair of arcuate projections 29, 29 which are adapted to be received in the notches 28, 28. Further, the end portion of the rung 18 is provided with inner screw threads 30, which are adapted to receive a screw plug 31 having a head 32. Thus, it will be seen that the end of the rung 18 may be applied in abutting relationship to the web 21 concentric to the aperture 27, and with the projections 29 disposed in the notches 28.

The depth of the projections 29 is made equal to or slightly less than the thickness of the web 21, so that the screw plug 31 may be entered through the aperture 27 and engaged with the threads 30 for clamping the web 21 tightly between the head 32 of the plug 31 and the end of the rung 18, thus providing a strong and rigid connection between the side rail 13 and said rung.

The lower pair of rungs 17, 19 are connected to the side rails 13, 14, 15, 16 by a construction which is identical to that described above, excepting only that the screw plugs 31 are slightly modified to provide elongated heads 33 which project outwardly of the inturned flanges 22, 23.

The elongated heads 33 are for the purpose of entering notches 34 in the upper ends of side rails 35, 36 of a ladder or ladder section 37. The lower ends of the side rails 13, 14 of the head section 11 are provided with a pair of notches 38 which are so disposed as to firmly engage a top rung 39 of the ladder section 37 when the elongated plug heads 33 are engaged in the notches 34.

In order to prevent accidental separation of the head section 11 from the ladder section 37, the lower portions of the side rails 13, 14 are provided with a pair of notched locking arms 40 which are swingably attached to the webs 21 by any suitable means, such as rivets 41. It will be seen that the locking arms 40 are so disposed as to be swingable in an outward and downward direction for engagement with the top rung 39 of the ladder sec-

tion 37 for holding the respective ladder sections securely in assembled relationship. The head section 12 also is provided with a pair of lower end notches 42, 42, and a pair of locking arms 43, 43 for attaching a ladder section thereto.

As a provision for holding the head sections 11, 12 in a predetermined angular relationship during use, pairs of pivoted links 44, 45 are swingably attached to respective end portions of the rungs 18, 20. The pairs of links 44, 45, may, of course, be folded so as to permit the head sections 11, 12 to be swung together and thus occupy a relatively small space for transportation or storage.

Operation

In operation, the ladder head 10 will be found to have a very strong and rigid construction which will not only be capable of carrying heavy loads, but will also be light in weight. The ladder head 10 may be used either alone, or when assembled with a pair of ladder sections 37, as a self-supporting ladder which will require no auxiliary bracing or other support.

The height of the ladder head 10 may be increased as desired, merely by connecting a pair of ladder sections 37 of suitable lengths to the lower ends of the ladder head sections 11, 12. In connecting a ladder section 37 to the head section 11, the upper ends of the rails 35, 36 will be applied in embracing relationship to the rails 13, 14, in such a manner that the upper end notches 34 embrace the elongated plug heads 33—at the same time inserting the top rung 39 of the section 37 into the lower end notches 38.

The locking arms 40 will then be swung downwardly so as to engage the rung 39, and thus hold the respective ladder sections firmly against separation.

A ladder section may, of course, be attached to the head section 12 in the same manner.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and

that the invention is not to be limited to the specific disclosure, but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claim.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

In a ladder, the combination comprising a pair of parallel channel-shaped side rails located with their webs on the inside, a plurality of tubular cylindrical rungs internally threaded at their opposite ends extending between and abutting the webs of said side rails, the opposite ends of said rungs each having a pair of diametrically opposed rectangular prongs interlockingly fitted into a corresponding pair of preformed diametrically opposed rectangular notches formed in aligned circular apertures in said webs, and a plurality of headed screw plugs entered through the outside of said apertures and having exterior threaded portions engaging the internally threaded ends of said rungs, said notches being covered by the heads of said screw plugs, whereby said rungs will be firmly held in said webs by said plugs and relative rotation between said rungs and said rails will positively be prevented.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
376,794	Barns	Jan. 24, 1888
1,036,932	Thompson	Aug. 27, 1912
1,935,349	Breslow	Nov. 14, 1933
2,113,403	Harmon	Apr. 5, 1938
2,594,561	Huck	Apr. 29, 1952

FOREIGN PATENTS

Number	Country	Date
10,457	Great Britain	May 14, 1908