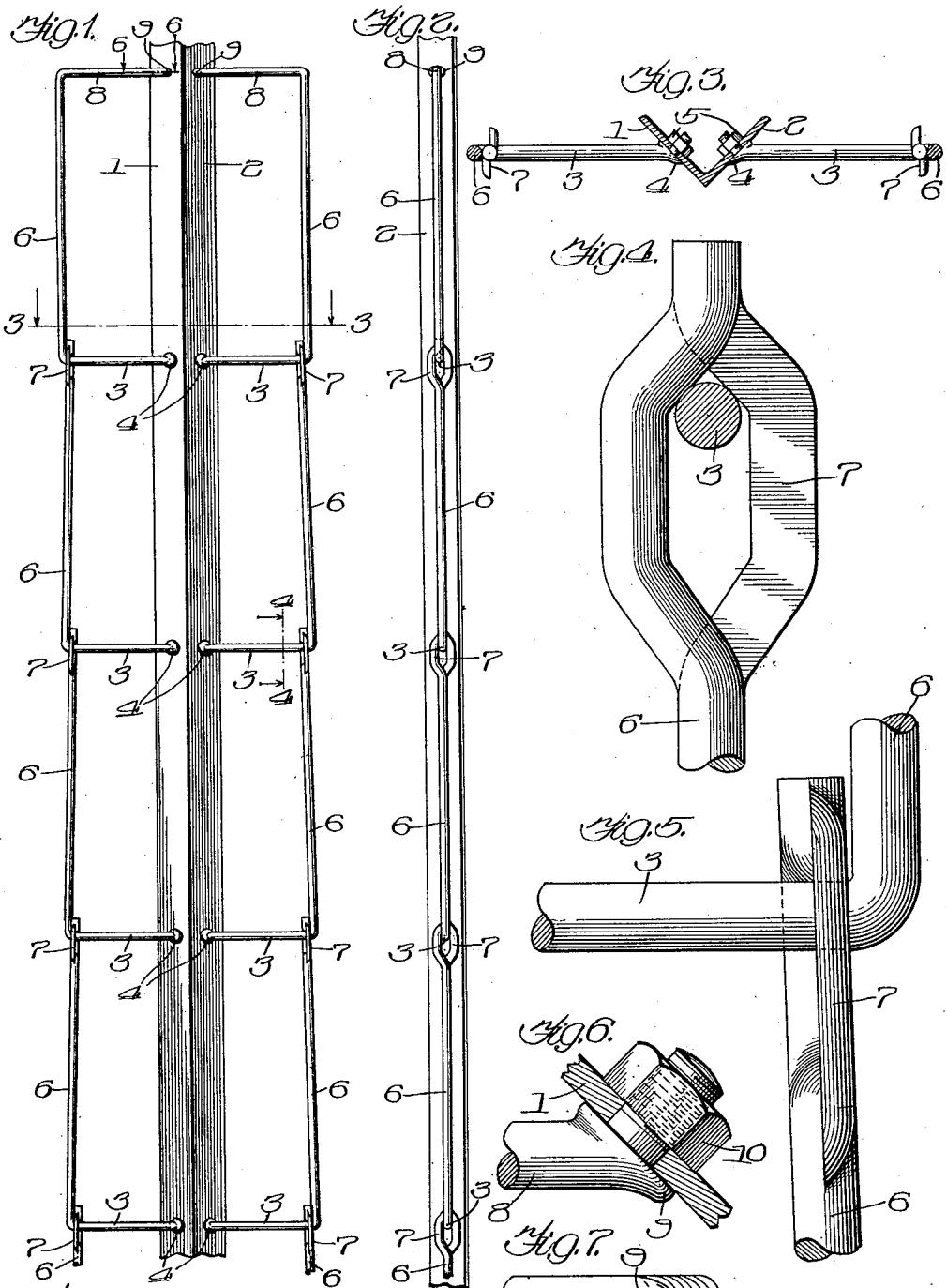


LA VERNE W. NOYES.
LADDER.
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Witnesses:

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UNITED STATES PATENT OFFICE.

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LADDER.

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To all whom it may concern:

Be it known that I, LA VERNE W. NOYES, citizen of the United States, residing at Chicago, in the county of Cook and State 5 of Illinois, have invented a certain new and useful Improvement in Ladders, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part 10 of this specification.

My invention relates to ladders and has for one of its objects the construction of a ladder wherein a side-rail may be sectionally formed, and in which the side-rail sections are individual to the ladder rounds. 15 Each composite unit comprising a side-rail section and a ladder round is formed of a single piece of iron rod having two portions bent substantially at right angles to each 20 other, one portion constituting the round and the other portion constituting the side-rail section. The end of each side-rail section remote from the round integrally connected with such section is preferably 25 formed with an eye in which is received the outer end portion of the ladder round adjacent this end, the ladder thus including a series of interconnected angular links. The side-rail of the ladder companion to the 30 sectionally formed side-rail is integrally formed or unitary, the inner ends of the aforesaid ladder rounds being fixedly secured to the integrally formed side-rail, the ladder rounds being preferably threaded at 35 their ends adjacent the integrally formed side-rail and passing through said latter side-rail so as to be clamped in engagement therewith by means of nuts applied to the threaded ends of the rounds. The invention 40 is not to be limited to these preferred characteristics.

I have specifically embodied my invention in a construction in which two ladders formed as above described are located side 45 by side with the adjacent integrally formed side-rails in fixed relation to produce a ladder more readily to accommodate both feet of the climber although the invention is not to be limited to this double ladder formation.

I will explain my invention more fully by reference to the accompanying drawing showing the preferred embodiment thereof and in which—

55 Figure 1 is a side elevation of a portion

of a ladder constructed in accordance with the invention; Fig. 2 is a side view of the structure shown in Fig. 1; Fig. 3 is a plan view on line 3 3 of Fig. 1 on a larger scale; Fig. 4 is a detail view on a larger scale on 60 line 4 4 of Fig. 1; Fig. 5 is a view of a part of the structure as it appears in Fig. 1, on a larger scale; Fig. 6 is a sectional view on line 6 6 of Fig. 1; and Fig. 7 is a side view of the structure shown in 65 Fig. 6 without the integrally formed side-rail and clamping nut.

Like parts are indicated by similar characters of reference throughout the different figures.

The ladder illustrated is a double ladder produced by the formation of two ladders side by side, these two ladders, respectively, including integrally formed unitary rigid side-rails 1, 2 which are brought into fixed 75 relation by being constituted of the two sides of an angle iron, as illustrated most clearly in Fig. 3. The use of an angle iron to furnish the connected integrally formed side-rails of a double ladder enables me to 80 employ this same element as one of the inclined angle iron legs of a tower which is so commonly supplied for supporting wind mills, tanks, etc. Each ladder of the double 85 or composite ladder includes a series of rounds 3, each provided with a shoulder or flange 4 near its inner end (Fig. 3) to engage the outer surface of its associate integrally formed side-rail, the inner end of each round being threaded and deflected at 90 right angles to its associate integrally formed side-rail so as properly to pass therethrough. This construction enables the application of a clamping nut 5 to the inner threaded end of each round 3 to effect 95 clamped engagement between the shoulder 4 of such round and the associate integrally formed side-rail. The outer end of each round 3 is merged with a unit 6 of the sectionally formed side-rail, each of these 100 units, except the top unit, being provided with an eye 7 at its upper end, each eye 7 being sufficiently elongated to permit the passage therethrough of the eye pertaining to the unit 6 next above.

The topmost unit of each ladder is preferably of the formation illustrated most clearly in Figs. 6 and 7, the upper end of this topmost unit 6 being horizontally continued at 8, the horizontal continuation 8 110

having a shoulder or flange formation 9 near its inner end (Figs. 6 and 7) to engage the outer surface of its associate integrally formed side-rail, the inner end of each round 5 being threaded and deflected at right angles to its associate integrally formed side-rail so as properly to pass therethrough. This construction enables the application of a clamping nut 10 to the inner threaded end 10 of the extension 8 to effect clamping engagement between the shoulder 9 of such extension and the associate integrally formed side-rail. The topmost unit of the sectional side-rail is thus fastened directly to the associate integrally formed side-rail, the flange 9, unlike the flanges 4, being flattened sufficiently to permit it to be passed through the eye of the unit 6 immediately beneath, in assembling the structure. Each round 15 3 and the sectional side-rail unit 6 merged therewith are desirably formed of an iron rod, each eye 7 being located between the adjacent unit 6 and the integrally formed side-rail and being in contact with such adjacent 20 unit, the whole structure being such that the sectionally formed side-rail is maintained in fixed relation with the companion integrally formed side-rail. It will be observed that the extension 8 at the top of 25 each ladder takes part in supporting the load imposed upon each of the underlying rounds and that each round takes part in supporting the load imposed upon the rounds beneath, the force of the load being 30 transmitted through the side rail sections 6 that intervene between the round 3 initially supporting the load and the rounds above. I believe it to be novel thus to distribute the load among the rounds, particularly when 35 such distribution is effected by linked composite units each including a side rail section and a ladder round in combination with the rigid integrally formed side-rail that ultimately supports the sections of the sectionally formed side-rail through the intermediation of the ladder rounds individual to said sections. 40

It is obvious that the double ladder illustrated in the drawing is in the form of two 45 single ladders whose adjacent integrally formed side-rails 1 and 2 are merged as indicated in Fig. 3 and the invention is not therefore to be limited to the double ladder

construction illustrated nor is it to be limited to the precise details of construction shown 55 as changes may readily be made without departing from the spirit of my invention. Where a double ladder formation is provided the rounds 3 entering into each may be made shorter than would be desirable in 60 a single ladder.

Having thus described my invention I claim as new and desire to secure by Letters Patent the following:—

1. A ladder structure including two connected unitary side-rails formed of the sides of an angle iron; ladder rounds connected with each side-rail; and a second side-rail 70 complementary to each of the aforesaid side rails and including adjoining connected sections in its formation each individual to and integrally formed with a ladder round, sections of the sectionally formed side-rails terminating in eyes in which are received adjacent ends of ladder rounds individual to 75 adjacent ladder rail sections.

2. A ladder structure including two connected unitary side-rails formed of the sides of an angle iron; ladder rounds connected with each side-rail; and a second side-rail 80 complementary to each of the aforesaid side-rails and including adjoining connected sections in its formation each individual to and integrally formed with a ladder round.

3. A ladder including a unitary side-rail; 85 ladder rounds connected with said side-rail; and a second side-rail including adjoining connected sections in its formation each individual to and integrally formed with a ladder round, sections of the second side-rail terminating in eyes in which are received the adjacent ends of ladder rounds individual to adjacent ladder rail sections.

4. A ladder including a unitary side-rail; 90 ladder rounds connected with said side-rail; and a second side-rail including adjoining connected sections in its formation each individual to and integrally formed with a ladder round.

In witness whereof, I hereunto subscribe 100 my name this eighth day of October A. D., 1913.

LA VERNE W. NOYES.

Witnesses:

L. C. WALKER,
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