Oct. 1, 1929. J. W. PEASE 1,729,963

LADDER

Filed Sept. 6, 1927

Fig. 1

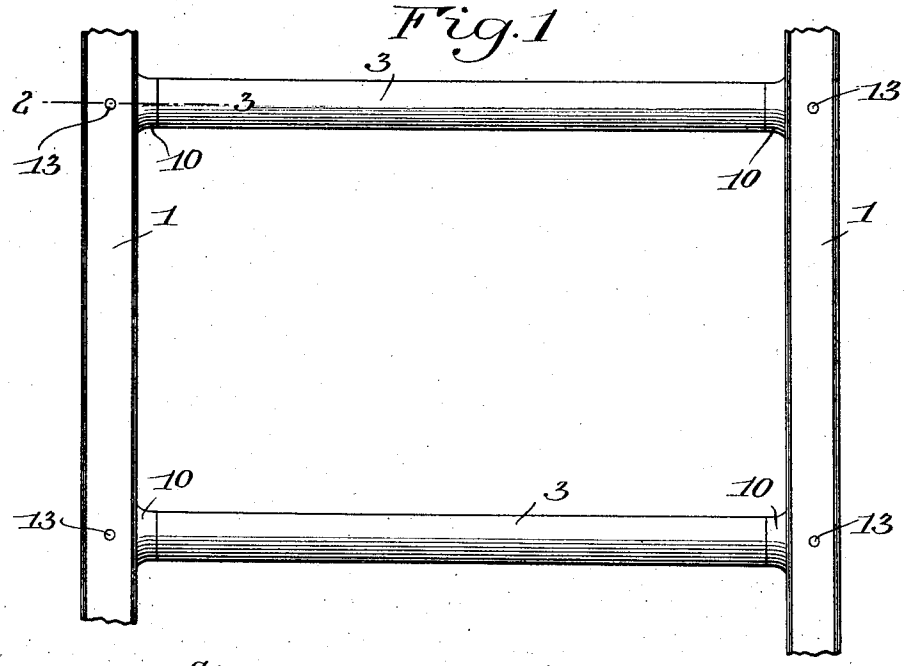


Fig. 2

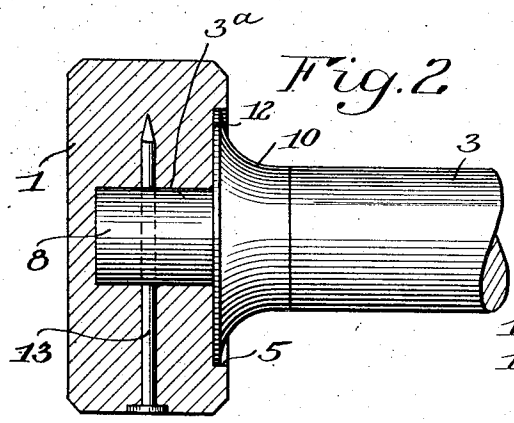


Fig. 3

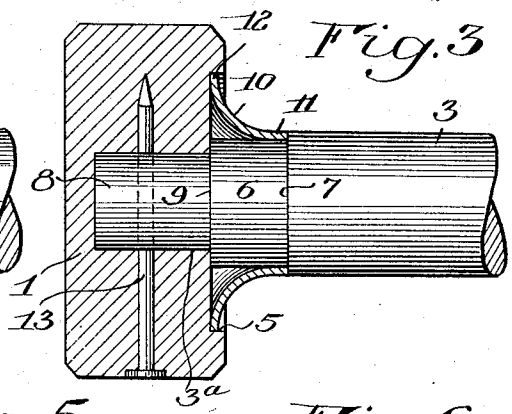


Fig. 4

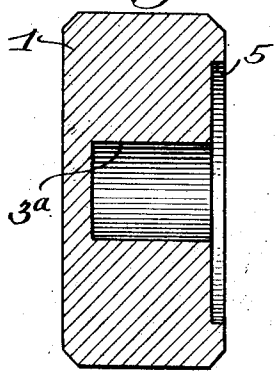


Fig. 5

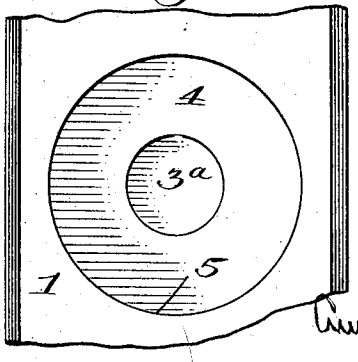
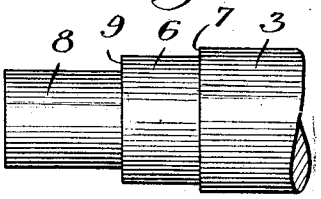


Fig. 6



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UNITED STATES PATENT OFFICE

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LADDER

Application filed September 6, 1927. Serial No. 217,610.

My present invention relates to ladders, and similar structures, and it has for its object to provide an improved connection between the rungs and the side rails of the ladder. Part of such improvement resides in the development of a construction in which it is made more difficult for rain or moisture to reach the joints between the rung and the side rail; part of such improvement is directed toward removing the weight of the climber from a single joint between the rung and rail and part of such improvement resides in accompanying the foregoing with a suitable simple means for fastening the rung and rails together. To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a front elevation of a fragment of a ladder constructed in accordance with and illustrating one embodiment of my invention;

Figure 2 is an enlarged fragmentary section on the line 2—3 of Figure 1 showing one of the circular elements in elevation;

Figure 3 is a similar view showing the same element in true section;

Figure 4 is a section on the line 2—3 of Figure 1 showing the ladder rail alone prepared for the reception of the rung;

Figure 5 is an inside face view of the portion of the rail shown in section in Figure 4, and

Figure 6 is a fragmentary front view of the end of one of the rungs as prepared for introduction into the side rail.

Similar reference numerals throughout the several views indicate the same parts.

In the ordinary construction of ladders in which the side rails indicated in the drawing at 1 are simply bored through on the same diameter to receive the cross rungs 3 and the latter are extended between them and to them from side to side, there is nothing but the bearing of the rung itself in the side rail, whether the end is reduced or not to support the weight imposed upon the rung. Nails are usually driven through to maintain the rung against side thrusts on the rails and end thrusts on the rungs. The joints between the rungs and side rails are furthermore open to the creeping entrance of moisture on both the inner and outer faces of the side rails.

In the practice of my present invention I bore a socket 3^a in the inner face of each side rail 1, which bore extends almost, but not entirely through the rail. In connection with this socket the rail is also counterbored at 4 to a shallow extent forming shoulders 5.

Each end of the rung element 3 has at each end a reduced portion 6 forming a shoulder 7 and a further reduced portion 8 forming a shoulder 9.

In assembling the ladder, I slip over the intermediate reduced portion 6 a bell shaped metal ferrule 10 having an annular reentrantly curved exterior portion and which may be stamped or spun from relatively heavy sheet metal. The smaller cylindrical inner end thereof indicated at 11 abuts the shoulder 7 of the rung to take the end thrust thereof so that the exterior surface of the ferrule forms a graceful curved continuation of the surface of the rung itself. The outer disc like portion 12 of the ferrule has its inner face in the plane of the second shoulder 9 of the rung.

I drive the rung into the rail as shown in Figures 2 and 3 so that the reduced tip 8 thereof occupies the socket 3^a of the rail which it closely fits, and in which it is secured, preferably, by a water proof cement or glue. The adjacent shoulder 9 abuts the bottom surface of the counter bore 4 as clearly shown in Figure 3. The disc portion 12 of the ferrule 10 also abuts this surface, and at its periphery it rests upon the shoulder 5 formed by the counter bore, as shown in Figures 2 and 3.

I also further additionally, do secure the rung in place in the rail by driving a nail or similar fastener 13 into the rail and through the reduced tip 8 of the rung. The advantages of this construction are as follows:

Wooden ladders deteriorate from exposure to rain and the elements due largely to the fact that moisture creeps in to the wooden joints and they become loose due to the soften-

ing of the wood from slow rot. In my construction the socket 3ª is protected from the entrance of moisture due to the fact that if the latter is to enter it it must pass around two sealed corners, namely, the shoulders 7 and 9, both of which are protected by the ferrule 10. Furthermore, this ferrule takes on a broad surface the side thrusts and strain of the ladder in general and the end thrusts of the rungs in particular. The ferrule in addition to forming a brace presents a broad supporting contact from the rung upon the large diameter of the shoulder 5 in the countersunk portion of the rail. In other words should the reduced portion 8 of the rung become loosened in the socket 3 with its small circumferential contact the weight of the climber upon the rung would be taken on the large circumference of the disc like portion 12 of the ferrule against the extended walls 5 of the countersink 4, in addition to which it should be noted that the portion 6 of the rung which is engaged by the ferrule is of greater diameter itself and stronger than the connecting portion 8.

The above improvements add little to the cost of ladder construction, it being as easy, in the one operation, to counterbore as to singly bore the side rail 1 and to form the two reductions on the ends of the rungs as the single reduction.

I claim as my invention:

1. In a ladder, the combination with a side rail having a socket therein and an adjoining countersunk portion adjacent thereto forming a shoulder, and a rung having an end portion occupying the socket, and an adjoining reduced portion forming a shoulder spaced from the inner face of the rail, of a metal ferrule surrounding the reduced portion of the rung and having an exteriorly arranged cylindrical portion at its inner end abutting the shoulder thereof, said ferrule having a disc-like portion at its outer end bearing flatwise against the bottom of the countersink in the rail and edgewise against the shoulder formed thereby.

2. In a ladder, the combination with a side rail having a socket therein and an adjoining countersunk portion forming a shoulder, and a rung having two reduced portions of different sizes and forming two shoulders, the smaller reduced portion being at the tip of the rung and occupying the socket in the side rail with its shoulder disposed against the bottom of the countersink therein, of a ferrule surrounding the larger reduced portion of the rung and having a cylindrical inner end abutting the shoulder of the latter and having a disc shaped outer end disposed flatwise against the bottom of the countersink in the rail and abutting edgewise the shoulder formed thereby.

JOHN W. PEASE.