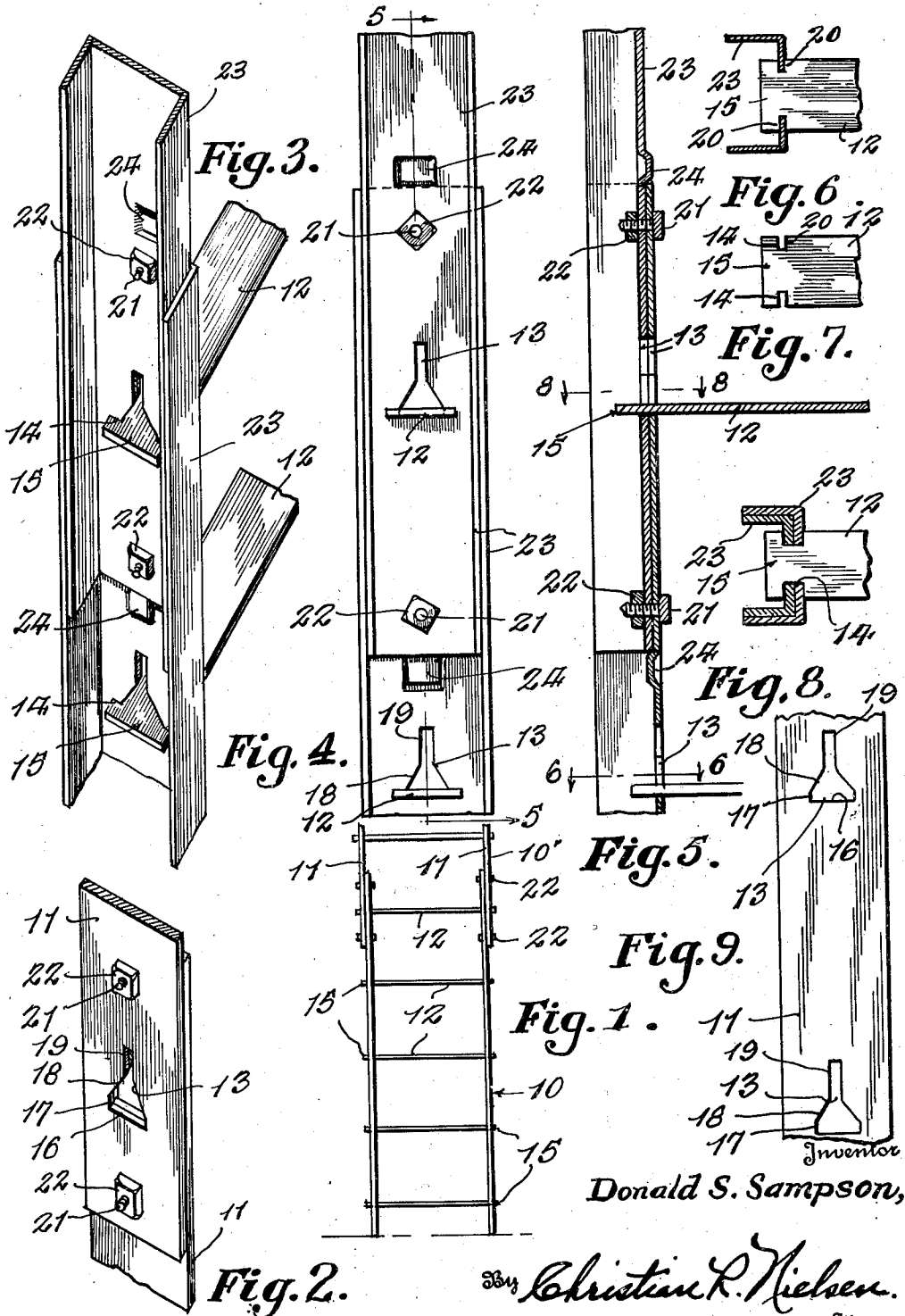


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LADDER CONSTRUCTION

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5 Claims. (Cl. 228—57)

This invention relates to ladders and more particularly to extension ladders and it consists in the constructions, arrangements and combinations herein described and claimed.

Extension ladders so far available are of a very heavy and cumbersome construction, requiring a great deal of skill as well as strength to position the ladder in an operative working position and also requiring an equal exertion to lower the ladder from such position. In addition, such ladders require considerable space for storage purposes, and due to the above difficulties the average householder is discouraged in the use of such ladders.

It is therefore the cardinal purpose of the invention to present an extension ladder which may be constructed from light weight metals, providing ready portability, and in which the parts constituting the ladder may be quickly dismantled for the purpose of storage in a limited space.

More specifically, it is an object of the invention to provide a ladder in which the upright or stile members are maintained in their spaced operative relation by means of detachable rung members, the rung members and the stile members being constructed to interlock in a manner to afford stability and rigidity to the ladder; as well as providing an end to end interconnection between two or more ladder sections, in a novel manner.

Additional objects, advantages and features of invention will be apparent from the following description considered in conjunction with the accompanying drawing, wherein

Figure 1 is a front elevation of a portion of ladder illustrating the invention,

Figure 2 is a fragmentary perspective view illustrating the juncture of a pair of overlapped stile members,

Figure 3 is a fragmentary perspective view of a modified form of connection for the stile members and also illustrating the detachable mounting of the rungs,

Figure 4 is an outside elevation thereof,

Figure 5 is a vertical section on the line 5—5 of Figure 4,

Figure 6 is a cross section on the line 6—6 of Figure 5,

Figure 7 is a fragmentary plan view of one of the rungs,

Figure 8 is a cross section on the line 8—8 of Figure 5,

Figure 9 is a front elevation of a portion of one of the stiles.

Attention is first invited to Figure 1 of the

drawing, wherein there is illustrated a portion of a ladder generally indicated by the reference character 10, consisting of a pair of stiles or uprights 11 connected in spaced relation by detachable rungs 12 as will be described. The stiles 11 may be of any suitable lengths and the rungs 12 will be spaced apart as in conventional extension ladders.

It is contemplated to form the stiles and rungs from aluminum, magnesium and alloys thereof, or similar metals, since these have been found to be extremely light in weight, of great strength, and affording rigidity to the ladder when so constructed.

Each of the stiles 11 are of identical construction, consisting of longitudinal flat strips of metal of a suitable thickness, and spaced longitudinally thereof key-hole slots 13 are formed, these slots being positioned in the medial longitudinal axis of the strips, and at the same distance apart, so that when the stiles are arranged in parallel relation, the slots of one stile will be aligned with slots of the other stile. With the slots thus aligned, the rungs 12 may be readily inserted in aligned pairs of slots and thus secure the stiles in rigid relation.

As may be seen in Figure 7, the rung is formed from flat stock metal of desired lengths and adjacent respective ends thereof, rectangular kerfs 14 are formed upon opposite sides of the rung, forming a head 15. These kerfs function to effect an interlocking engagement with the stile members, as will be apparent as the description proceeds.

As may be seen in Figure 9, the keyhole slots 13 are formed with a flat base 16, opposed parallel vertical walls 17, of a height the same as that of the thickness of the rung 12. The walls 17 are continued convergently inward, as at 18, and terminating in a vertical slot 19. The distance between the base 16 and the termination of the slot 19 is such as to readily admit a rung edgewise therethrough, the divergent walls 18 providing ample clearance so that the rung may be rotated slightly to present the flat side snugly upon the base 16, with the sides of the kerfs 14 snugly seated upon the opposite sides of the stock, forming the stile. It will be seen from Figure 6 that the kerfs 14 present shoulder portions 20 which firmly engage the stile, thus preventing loose movement between the rungs and stiles.

A ladder constructed as described may be employed as a single section where low heights are involved, but where a ladder of greater length is desired, additional sections may be quickly and

easily secured thereto, as will now be explained. Each of the stile members 11 is formed with a keyhole slot 13 for the topmost rung, as may be seen in Figure 2, and the stiles of the extension ladder section 10' will also include a keyhole slot 13 for support of the lowermost rung of the ladder. The stiles are each formed with openings aligned with the keyhole slots, for a purpose to be explained.

As shown in Figures 1 and 2, the stiles 11 of the extension section 10' are disposed upon the outer faces of the stiles 11 of the ladder 10 in parallel overlapped relation. With the openings and keyhole slots aligned bolts 21 are inserted through the openings and secured by a nut 22. The rung is next inserted and moved into interlocked engagement with the overlapped stiles. Inasmuch as the overlapped stiles present a double thickness of metal the kerf of the connecting rung must be wide enough to accommodate the increased thickness, as exemplified in Figure 8.

The modified form of ladder illustrated in Figures 3 to 8 embodies the identical construction of keyhole and rung, the only material difference being in the shape of the stile members. In these figures the stiles are formed as channel members indicated at 23, the stiles of the upper section being nested within the channel of the lower section. The same reference characters are employed to designate the corresponding parts of Figures 1, 2, and 9. In the form shown in Figures 1 and 2, the bolts 21 carry the load of the upper section, and in order to lessen the load thereon an outwardly pressed lug 24 is formed upon the upper channel member 23, positioned so as to rest upon the upper edge of the stile of the lower channel member 23. The lower channel member is also provided with a lug 24 but in this instance the lug is pressed inwardly so as to lie in the path and engage the lower end of the upper channel.

A ladder constructed and assembled as described, it will be seen can be readily dismantled, by grasping a rung intermediate of its length and giving it a partial rotation so as to present a longitudinal edge within the slot 19 of the keyhole, permitting ready removal of the rung. When all rungs have been removed, the stiles will be in a separated state and all parts may then be stacked in a bundle and tied, for safe storage. Of course, in case the extension section is employed, it will be necessary to remove the bolts and nuts to separate the stile sections.

While I have shown and described preferred forms of the invention, this is by way of illustration only, and I consider as my own all such modifications as fairly fall within the scope of the appended claims.

I claim:

1. An extension ladder comprising, a pair of parallel stile members having longitudinally spaced keyhole slots, each slot having a flat base, a pair of opposed vertical walls defining respective terminal ends of the base, and a longitudinally extended slot, the slots of one stile member being in horizontal alignment with the slots of the other stile member and a flat rung member insertable edgewise through said keyhole slots, each of said rungs having opposed kerfs at the ends of a width and depth to snugly contact said vertical walls of the keyhole slots when partially rotated and brought to rest upon the flat base of the keyhole slots.

2. An extension ladder comprising a pair of overlapped stile members detachably connected in end to end relation, longitudinally spaced keyhole slots formed in said stiles, the slots of the stiles at the overlapped portions being in alignment and a flat rung member insertable through aligned keyhole slots, each rung having opposed kerfs at the ends of a width and depth to snugly contact edges of the keyhole slots when said rungs are partially rotated and brought to rest upon the base of said keyhole slots.

3. In an extension ladder, a pair of stile members, each stile member consisting of overlapped sections detachably connected together, each stile member having longitudinally spaced keyhole slots, the slots of one stile member being in horizontal alignment with the slots of the other stile member, one series of slots being formed at said overlapped portions and a rung member detachably connected between each pair of aligned slots.

4. In an extension ladder, a pair of stile members, each stile member consisting of elongated sections arranged in end to end overlapped relation, each stile member having longitudinally spaced keyhole slots, each slot having a flat base, a pair of opposed vertical walls and a longitudinally extended slot, the slots of one stile member being in horizontal alignment with the slots of the other stile member, one series of slots being formed at said overlapped portion and a flat rung member insertable flatwise through said keyhole slots, the rungs having opposed kerfs at the ends of a width and depth to snugly contact said vertical walls of the keyhole when partially rotated and brought to rest upon the flat base of the keyhole slots.

5. The structure of claim 4, in which the elongated sections are channel members telescoped one within the other, each channel having a lug for mutual endwise support of the other.

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