Feb. 21, 1933. J. F. MURPHY 1,898,456

TUBULAR FRAME EXTENSION LADDER

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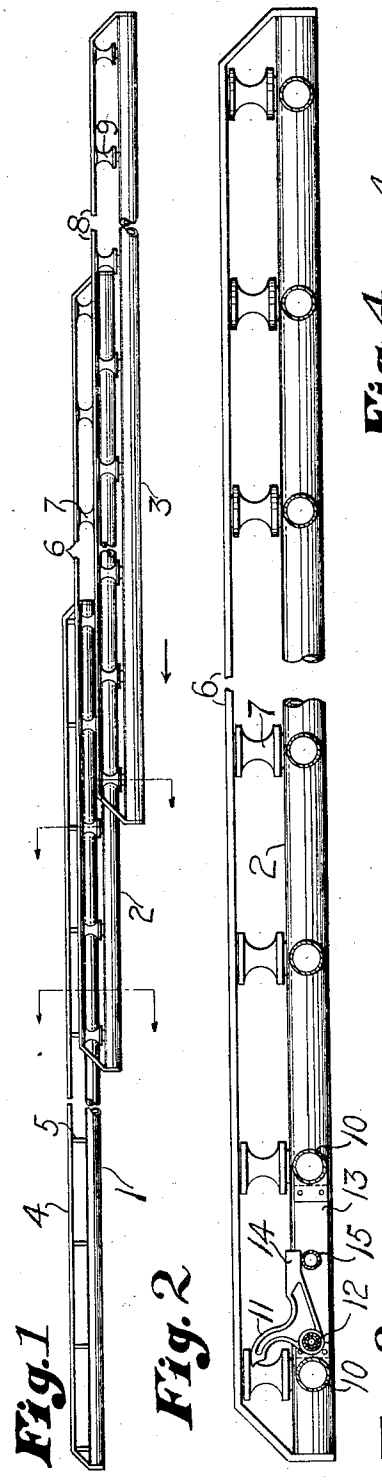


Fig. 1

Fig. 2

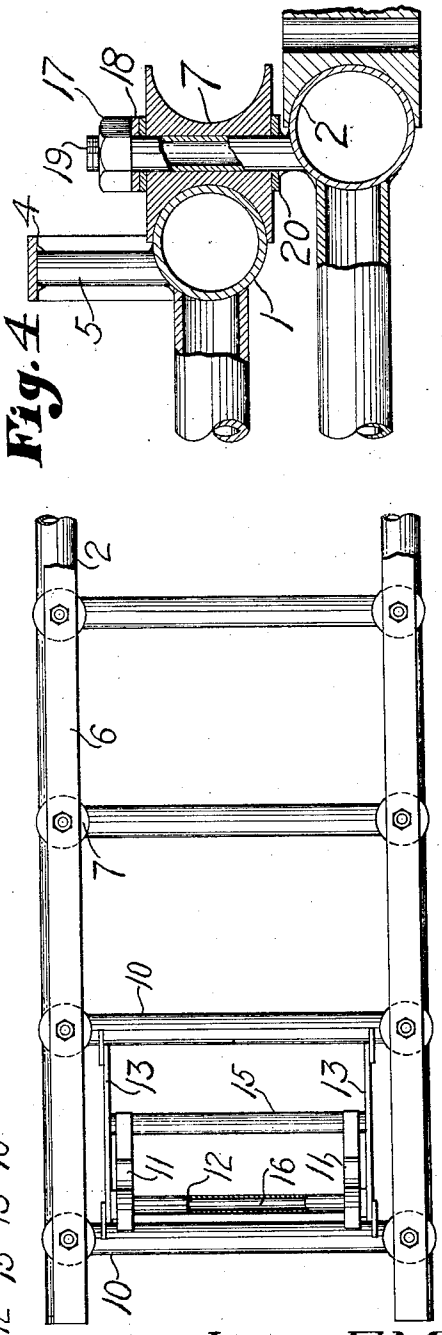


Fig. 3

Fig. 4

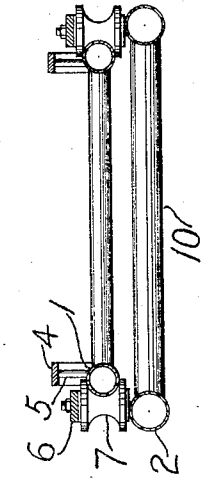


Fig. 5

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Fig. 6

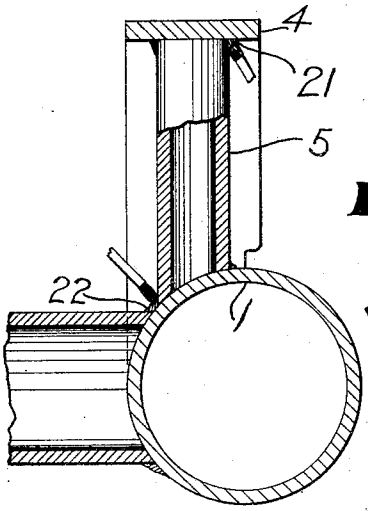


Fig. 8

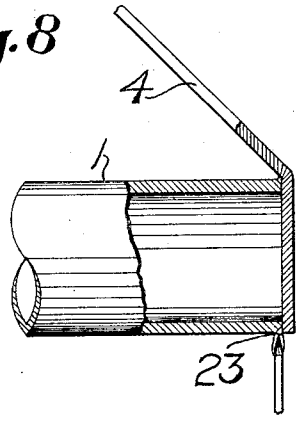


Fig. 7

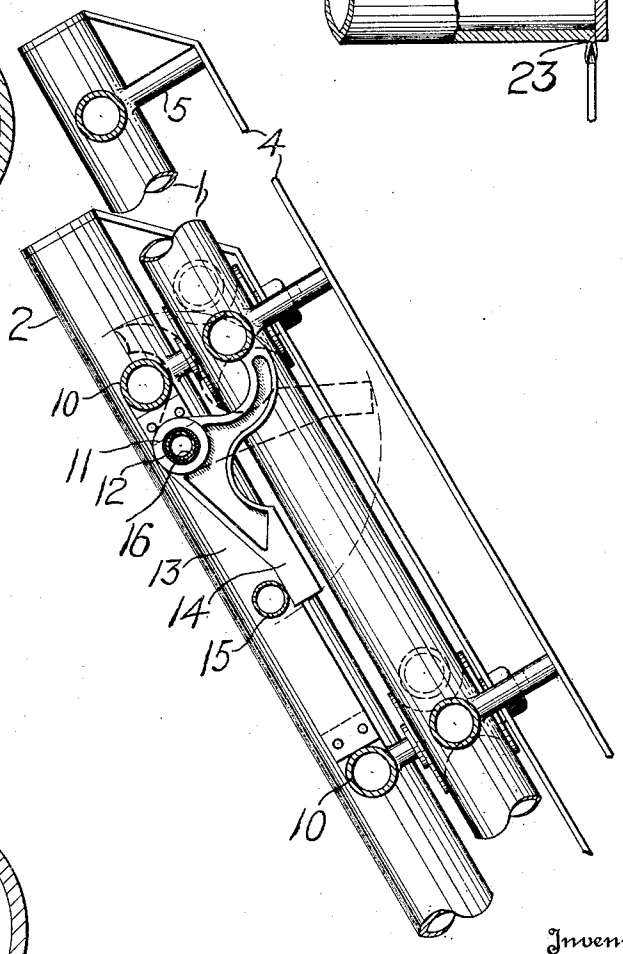
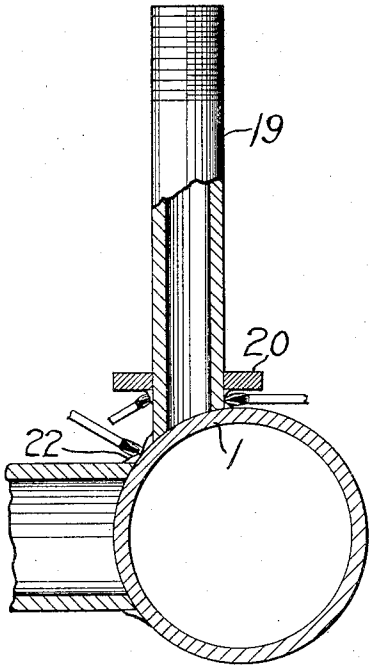


Fig. 9



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1,898,456

UNITED STATES PATENT OFFICE

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TUBULAR FRAME EXTENSION LADDER

Application filed August 22, 1931. Serial No. 558,739.

This invention relates to tubular frame extension ladders, and improvements thereof, having special reference to painters' ladders, or fire ladders, or ladders for general uses, constructed in such a way as to be extremely light in weight yet of very great strength.

A main object of this invention is to construct a ladder of tubular steel throughout, or other metal or combination of wood and metal may be employed.

Another object of this invention is the construction of a ladder of tubular steel wherein the rungs of the ladder and the lengthwise tubes or side rails are welded together either electrically or by means of the customary torch and cast welding as desired. It is a further object of this invention to provide the side rails with a hand rail which acts also as a strengthening rail or truss, and is spaced from the hand rail by means of tubular posts the ends of which are welded to the side rails.

In the accompanying drawings the special construction and arrangement of the parts of this invention are illustrated, and Fig. 1 represents a side view of three sections fashioned and combined as contemplated in this invention. Fig. 2 is a section lengthwise of one of the sections between the side rails and shows the pivoted and weighted stop or lock. Fig. 3 is a top view of a portion of one of the sections showing the disposition of the double locking stops arranged between the rungs. Fig. 4 is an enlarged sectional view of two associated side rails, showing the manner of connecting the rungs and also the posts of the hand rails to the side rails. In this view is likewise illustrated the manner of attaching the spindle or roller post to the side rail. Fig. 5 is a cross section of two of the sections of the ladder constructed in accordance with this invention. Fig. 6 is an enlarged cross section of the top side rail showing the manner of welding the rung and the hand rail post thereto. Fig. 7 is an enlarged side view of two sections of a ladder made in accordance with this invention and arranged in operative relation. Fig. 8 is a sectional view of the end portion of a side rail showing the manner of connecting the end of the hand rail thereto. Fig. 9 is a cross section of a side rail showing the manner of welding the rung thereto, and showing also the tubular post or spindle for a roller carrying the welded washer or collar for supporting the roller and illustrating also the manner of welding the said parts together to make the whole practically one piece.

Throughout the drawings and description the same number is used to refer to the same part.

Considering the drawings, the side rails 1, 2 and 3 have the hand rails 4 connected by welding the posts 5 at their ends to the side rail and hand rail. The posts attached to the hand rail 6 of side rail 2 carry rollers 7, and the like posts of rail 8 of ladder section 3 carry rollers 9, these rollers being grooved to engage or fit the side rails or tubes. It will be observed in Figs. 4, 5, 6 and 9 that the posts or spindles such as the posts 5 are erected upon the tubular sections on an extended line at one side of a diametrical line of the tube. As best illustrated in Fig. 4 the purpose of thus off-setting the posts is to hold the rollers on one section out of contact with the posts of an adjoining section engaged by such rollers.

Considering Figs. 3 and 7, it will be noted that between the rungs 10, which are all alike, are arranged two twin stops or locking members 11 pivotally carried by a transverse rod 16 welded at the ends to carrier plates 13 having their ends attached to the rungs 10 as illustrated. Each stop has a weighted arm 14 and when the ladder is in a raised position the weight 14 rests downwardly against the intermediate tube 15 having its ends welded to the side rails. The tube 12 carrying the stops or locking members 11 is revoluble on the rod 16 which has its ends welded to the side rails.

Considering Fig. 4, the nut 17 may hold only the washers 18 upon the tubular post 19, or the post may constitute the spindle of the rollers such as rollers 7, and the nut may secure the hand rail 6 upon the ends of the posts, as shown in Fig. 3. The roller 7 is usually supported rotatively upon a collar

or washer 20 as shown in Fig. 4 on post 19 below the roller.

Next considering Fig. 6 it will be noted that the post 5 of the hand rail and the end of the rung 10 may be welded together to the side rail 1, and in Fig. 9 it will be seen that the like post 19 and the rung 10 may be welded together to the side rail. The welded junction is marked 22. The welded junction of the top of the post 5 and the hand rail 4 is referred to by number 21.

In Fig. 8 the end of the hand rail 4 is shown bent down at an incline and then vertically placed against the end of the side rail tube 1. A welded junction 23 connects those parts in a solid manner. By thus connecting the hand rail with the ends of the side tube 1, the hand rail acts together with its posts 5 somewhat on the order of a truss and materially adds to the strength and stiffness of the side rail tube.

The operation of this invention is the same as that of any other extension ladder, and it is held to be within the rights of this applicant to use any rope and reel devices for raising the sections, not shown in the drawings, or to introduce a cage depending from the upper ladder section. It will be seen in Fig. 7 that when the section 1 is raised the lock or stop 11 is thrown into the position indicated by the broken lines, and the rungs may pass the stop. But, when the side rail 1 descends, it meets and is arrested by the tip of the curved arm of the stop, the weighted end 14 being turned down against the intermediate tube 15.

It will now be seen that there has been set forth hereinabove a ladder constructed of tubular members welded together solidly to form a single structure, of great strength but of minimum weight consistent with strength. It is not intended to confine this invention to any particular material, or to the size of the tubes or rungs, or to any special method of welding the parts together.

Having now described this invention and the manner of its construction, I claim :—

1. An extension ladder comprising sections movable lengthwise relatively, the rails and rungs of the said sections being composed of tubes, grooved rollers constructed to engage the tubes forming the rails, the said rails of one section having secured thereto at one side of a diametrical line of the tubular rail upwardly projecting spindle posts for carrying the rollers in revoluble relation whereby the peripheral edges of the rollers carried by one section are held out of contact with the posts of the section engaged by such rollers, and releasable pivotal locking members arranged to engage the rungs of said sections to hold same in extended positions.

2. An extension ladder comprising sections movable lengthwise relatively, the rails and rungs of the said sections being composed of tubes, grooved rollers constructed to engage the tubes forming the rails, the said rails of one section having secured thereto at one side of a diametrical line of the tubular rail upwardly projecting spindle posts for carrying the rollers in revoluble relation whereby the peripheral edges of the rollers carried by one section are held out of contact with the posts of the section engaged by such rollers, each of the said sections of the ladder having hand rails at the sides engaging and secured to the tops of said posts, and releasable pivotal locking members arranged to engage the rungs of said sections to hold same in extended positions.

In testimony whereof, I affix my signature.

JAMES F. MURPHY.