Oct. 19, 1937. H. M. HAVENS 2,096,514

— LADDER

Filed July 2, 1936

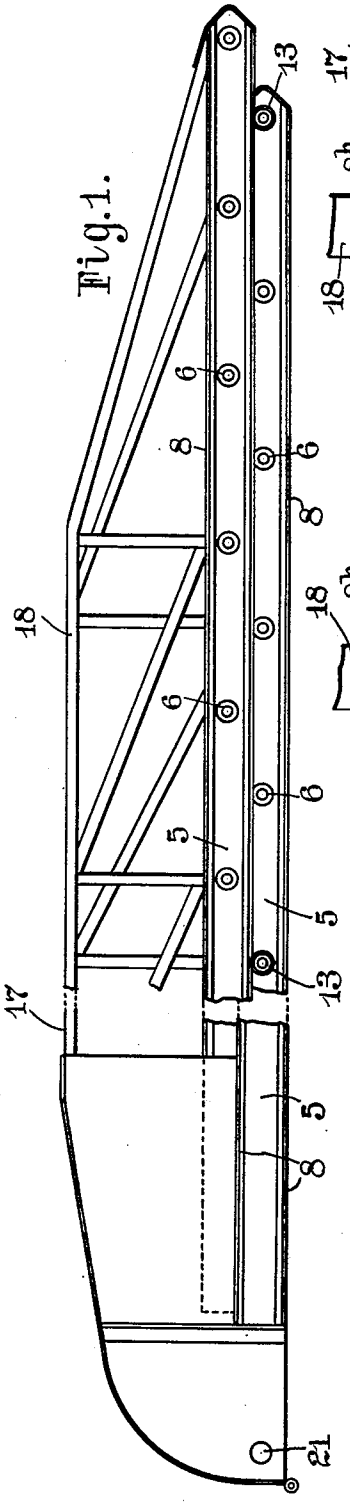


Fig. 1.

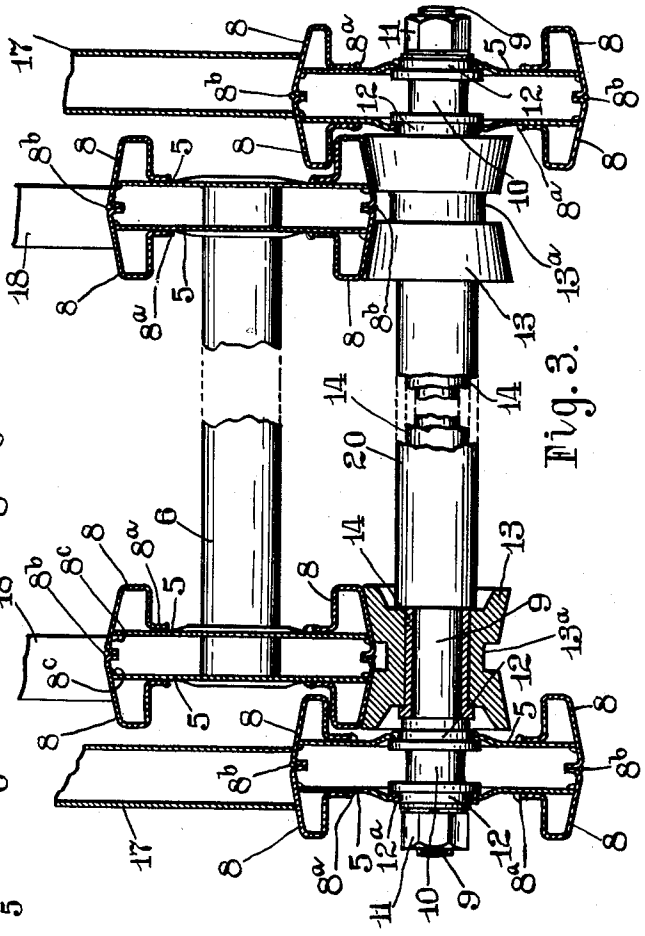


Fig. 3.

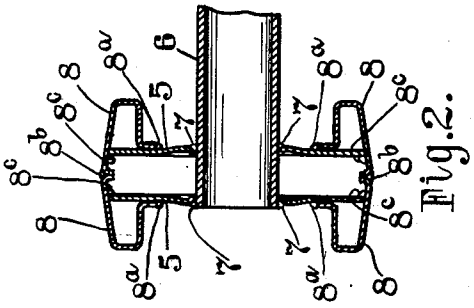


Fig. 2.

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Patented Oct. 19, 1937 2,096,514

UNITED STATES PATENT OFFICE

2,096,514

LADDER

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Application July 2, 1936, Serial No. 88,615

6 Claims. (Cl. 228—18)

This invention relates to the construction of ladders and is especially adapted for use in fire ladders.

Fire ladders, because they are long and have extensions for reaching to high points of buildings, should be of relatively light weight yet strong.

An object of this invention is to provide an improved construction of ladder having the characteristics desired. A further object of the invention is to so construct the ladder that one ladder telescopes in the other. Further objects will appear from the disclosure herein.

The invention is embodied in the example herein shown and described, the features of novelty being finally claimed.

In the accompanying drawing—

Figure 1 is a view in side elevation broken out illustrating a fire ladder according to the invention.

Fig. 2 is a sectional detail view, on a larger scale, through one of the side bars of the ladder and a fraction of a rung thereon.

Fig. 3 is a combined transverse sectional and elevational view broken out near the middle illustrating a main ladder and an extension of the ladder mounted thereon.

In the views 5, 5, designate two webs, strips of metal spaced apart and standing parallel to each other for the length of the ladder and forming a strut. These webs are perforated at regular intervals and cupped outward to strengthen them where they receive the end of the tubular metallic rung 6, said rung being welded to the webs, as indicated at 7.

The characters 8, 8, designate the beams, each of these in the present instance being shown as formed of two metal strips of preferably identical channel form adapted when placed together in symmetrical arrangement on the edges of the webs 5, to coincide at their edges, and each having a flange that fits on the outer face of the contiguous web. These channel portions 8 are welded together at their outer meeting edges as indicated at 8^b, and tack welded to the webs at 8^c and also where their flanges contact with the outer faces of the webs as at 8^a.

In a construction where an extension ladder is to be employed, as shown in Figs. 1 and 3, the side bars of the main or supporting ladder are each provided at suitable intervals with a spool shaped sleeve 10 welded to the strut webs 5, 5, said sleeve having angular heads. These sleeves 10 are each designed to receive the end of a rod or shaft 9 that extends transversely between the ladder side bars, said rod being of reduced diameter at each of its ends to form a shoulder to abut against the sleeve 10 and having a threaded portion to receive a holding nut 11 to bind the rod to the side bars of the main or supporting ladder. It will be observed that the rods 9 also serve as substantial augmenting spacers for the side bars.

Surrounding the rod 9 in a tube or bushing 14 having its ends flanged; and mounted on said tube 14 next the flange is a spool shaped roller bearing 13. The said roller bearing 13 has an annular channel 13^a at its middle in order to avoid contact of the welded joint of the outer face of the beam with the roller. If desired a tubular rung 20 can be secured non-rotatively by a pin or otherwise with reference to the rod 9. In this case the roller bearing would turn on the tube or bushing 14.

The function of the roller 13 is, of course, to support the weight of the extension ladder through the strut members 5, 5, and promote its easy longitudinal movement in either direction with reference to the main ladder.

The extension ladder is shown as of a construction similar to that of the main ladder, that is to say the side bar thereof includes the spaced webs 5, rungs secured therein, hollow beam flanges secured thereon and projecting laterally in opposite directions beyond the webs. By reason of this construction the extension ladder can be slid into the main ladder in telescoping fashion as shown in Fig. 3, that is with the upper side of the lower beam of the extension ladder projecting between the lower side of the upper beam of the main ladder and the roller 13.

It will be observed that the beams slope from their middle line toward the plane of the rungs, and that the rollers 13 correspondingly slope toward its middle line so as to form a full, as well as a guiding support, for the extension ladder.

The main and extension ladders are each shown as provided with suitable truss and strut members in connection with hand rails at 17 and 18 to further strengthen the ladder and make safe the ascent and descent of the same by firemen.

At the left hand end of Fig. 1 there is shown a pivot-point 21 for pivoting the ladder to a turn table (not shown).

Ordinary means, not shown, can be employed for operating the main ladder and its extension or extensions.

The parts, generally herein described, can be manufactured out of steel, and the forms and dimensions of the parts can be changed without

departing from the gist of the invention as claimed.

What I claim is:

1. A ladder having side bars including a pair of strut forming strips of sheet metal spaced apart parallelly and perforated at intervals for the reception of rungs, beam members for said struts, each formed of two metal strips of channel form symmetrically arranged on and secured to the edges of the strut forming strips and projecting therefrom in opposite directions, said channel members each provided with a lateral flange fitting on and secured to the outer face of the contiguous strut forming strip in a line removed from the rung receiving perforations, and rungs welded to said strut forming strips at the said openings therefor.

2. A ladder having side bars including a pair of strut forming strips of sheet metal, said pair of strut forming strips spaced apart parallelly and perforated at intervals, said perforations cupped opposingly outward for the reception of rungs, beam members for said struts, each formed of two metal strips of channel form symmetrically arranged on the strut forming members, said channel members each provided with a lateral flange that fits on the outer face of the contiguous strut forming strip in a line removed from the rung receiving perforations, said channel members welded to the strut forming members at their said lines of contact with the strut forming members and rungs welded to said strut forming strips at the said openings therefor.

3. In a ladder, a side bar including a pair of strut forming strips of sheet metal, said strips spaced apart parallelly and perforated at intervals for the reception of a rung, a beam member for said strut formed of sheet metal in channel form, said beam member engaging the edges of the strut and projecting laterally therefrom in opposite directions, and also engaging the outer faces of the strut in lines removed from the rung receiving perforations, and a rung secured to said strut forming strips at the openings therefor.

4. A main ladder and an extension ladder therefor, said extension ladder including a side bar consisting of a pair of strut forming strips of sheet metal, said strut forming strips spaced apart and perforated at intervals for the reception of rungs, beam members for said strut members, each consisting of two metal strips of sheet metal of channel form welded together at their outer edges and provided with lateral flanges that fit on the outer faces of the strut forming strips at a line removed from the rung receiving perforations, said lateral flanges welded to the strut forming members at their lines of contact with the strut forming members, a spacer rod connecting the side beams of the main ladder, a roller bearing mounted to turn with respect to said rod for supporting the side bar of the extension ladder, said roller provided with an annular channel lying in the plane of the welded edges of the components of the supported beam member of the extension ladder whereby the load of the extension ladder is exerted on the roller bearing at the beam projections and not at the welded joint thereof.

5. A main ladder and an extension ladder therefor, said extension ladder having a side bar including a pair of strut forming strips of sheet metal, said strips spaced apart parallelly and perforated at intervals for the reception of rungs, a beam member for said strut formed of sheet metal of channel form, said beam member engaged with the edges of the strut and projecting laterally therefrom in opposite directions, rungs secured in said strut forming strips at the openings thereof, a concaved roller bearing provided with an annular groove carried by the main ladder, said bearing supporting said extension ladder at the side bar thereof at opposite sides of said annular groove in planes coinciding with the planes of the strut forming strips of said side bars.

6. A main ladder and an extension ladder therefor, said extension ladder including a side bar consisting of a pair of strut forming strips of sheet metal parallel to each other and spaced apart and perforated at intervals for the reception of rungs, beam members for said strut members, each formed of two metal strips of channel form welded together at their outer edges and provided with lateral flanges that fit on the outer faces of said strut at a line removed from the rung receiving perforations, said lateral flanges welded to the struts at the said lines of contact, a spacer rod connecting the side beams of the main ladder, a bushing secured on said rod and a roller bearing mounted to turn on said bushing for supporting the beam member of the extension ladder, said roller bearing provided with an annular channel lying in the plane of the welded edge on the channeled components of the supported beam of the extension ladder and spacing the same from said welded edge whereby the load of the extension ladder is exerted on the roller bearing at points beyond said annular channel and in line with said strut strips.

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