Jan. 14, 1941. H. P. LUNDSKOW 2,228,525

AERIAL LADDER

Filed Oct. 14, 1938 2 Sheets-Sheet 1

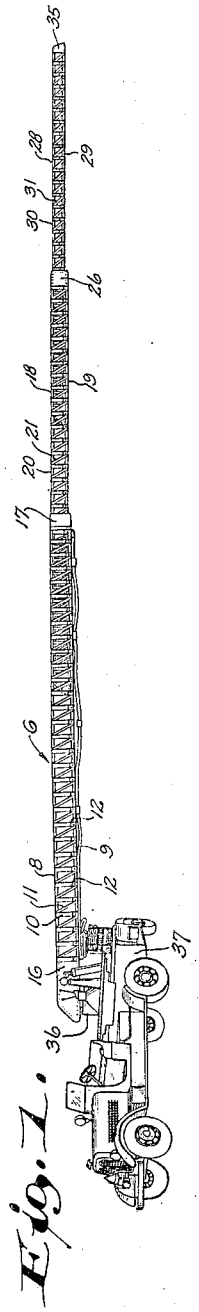

Fig. 1.

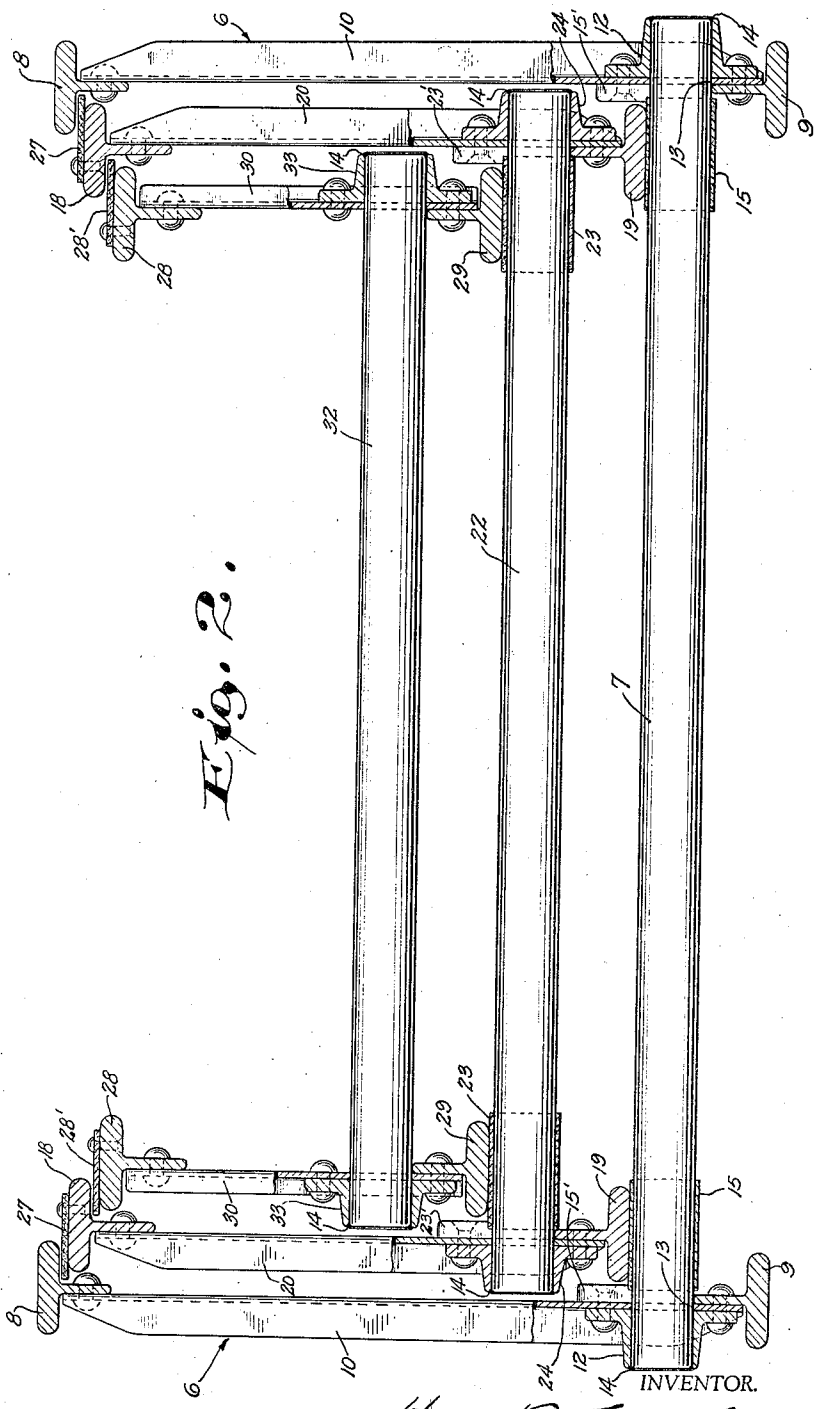

Fig. 2.

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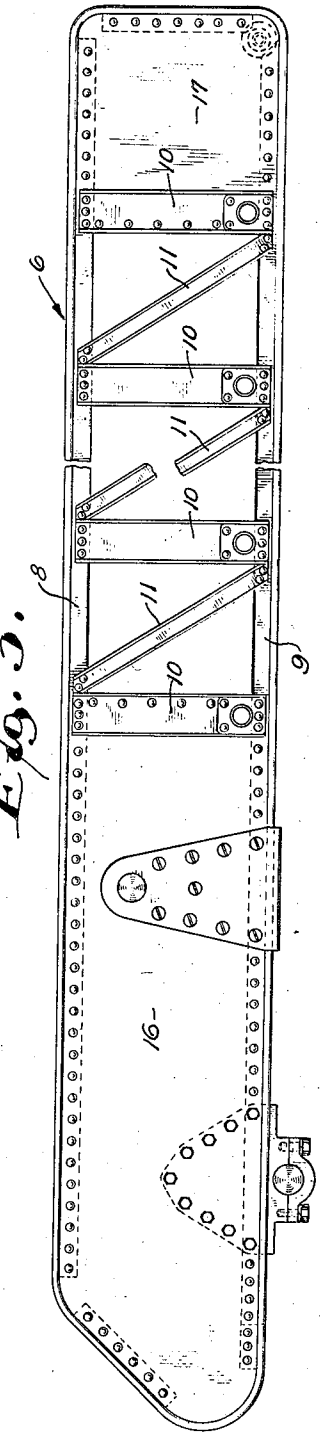

Fig. 3.

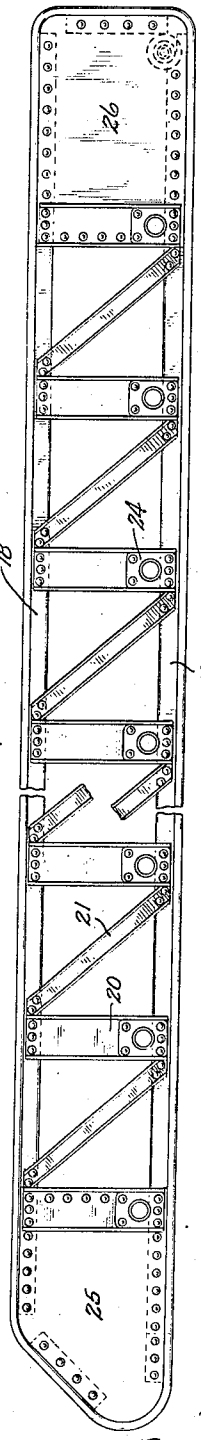

Fig. 4.

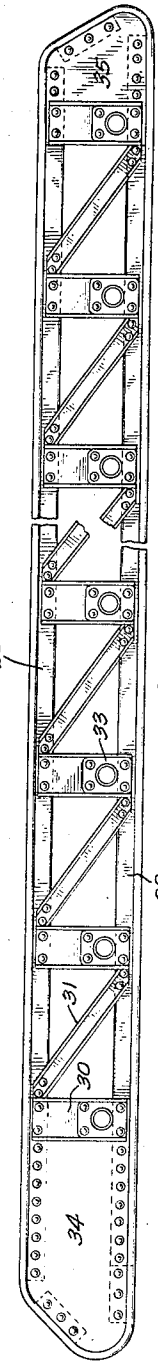

Fig. 5.

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Patented Jan. 14, 1941 2,228,525

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2,228,525

AERIAL LADDER

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Application October 14, 1938, Serial No. 234,936

5 Claims. (Cl. 228—18)

This invention relates to improvements in aerial ladders.

It is a general object of the present invention to provide an improved aerial ladder comprising a plurality of telescoping sections, each section including a ladder part having side railings of lattice construction whereby the fireman is protectively confined on three sides while using the ladder, and whereby the strength of the ladder is greatly increased to withstand tortional strains and to enable the ladder to be extended to substantial heights.

A more specific object of the invention is to provide a construction as above described wherein the side railings each comprise upper and lower rails, T-shaped in cross section, reenforced by transverse and angularly extending channel shaped pieces forming a lattice arrangement.

A further specific object of the invention is to provide a construction as above described wherein rung sockets are secured within the lower ends of the transverse channels, the ends of the rungs being tightly fitted and secured in said sockets.

A further object of the invention is to provide an aerial ladder wherein the upper T-shaped rails of the several ladder sections overlap one another in an interlocking manner to furnish a guide for the telescoping action and to positively maintain one section in proper position with respect to the section therebelow during operation of the ladder.

A further object of the invention is to provide an aerial ladder as above described constructed of aluminum, which material forms a poor bearing for sliding action, there being fiber contact members on which the sliding action of one ladder section with respect to another takes place so that aluminum parts do not contact one another.

A further specific object of the invention is to provide an aerial ladder which is light in weight, which is relatively simple to fabricate, which is capable of withstanding high reaction loads, and which is otherwise well adapted for the purpose described.

With the above and other objects in view, the invention consists of the improved aerial ladder and all its parts and combinations as set forth in the claims and all equivalents thereof.

In the accompanying drawings illustrating one complete embodiment of the preferred form of the invention in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is a view showing the aerial ladder mounted on fire apparatus and in partially extended position;

Fig. 2 is a cross sectional view, on an enlarged scale, through the aerial ladder showing the three ladder sections in telescoped relationship;

Fig. 3 is a side elevational view of the main or lower ladder section, part being broken away;

Fig. 4 is a similar view of the intermediate section; and

Fig. 5 is a similar view of the top section.

Referring more particularly to the drawings, the lower or main ladder section comprises spaced-apart side railings, designated generally by the numeral 6, connected at the bottom by transversely extending rungs 7. Each of the side railings is the same in construction and comprises an upper rail 8 and a lower rail 9, both of which are T-shaped in cross-section as shown in Fig. 2. The rails 8 and 9 are connected, throughout the major portion of their length, by spaced-apart transversely extending channels 10 which extend at right angles to the rails 8 and 9, and by other bracing channels 11 which extend angularly from the upper end of one of the transverse channels to the lower end of an adjacent transverse channel 10 as shown in Fig. 3. The ends of the channels are all riveted to the rails 8 and 9 as illustrated. The channels all open outwardly, and within the lower end of each of the transverse channels 10 a socket member 12 is riveted or otherwise secured, and said socket members are preferably castings or forgings. The lower end of each channel member 10 has an opening at 13 which alines with the socket opening, and the ends of the rung 7 extend through the openings 13 and into the sockets 12, and said ends are preferably welded in place as at 14. These rungs are preferably of tubular construction and formed of aluminum. Surrounding each rung adjacent the inner side of each of the railings 6 is a cylindrical contact member 15 formed of fibrous material to provide a good bearing surface for sliding action. On the inner side of each transverse channel is a fiber contact member 15' or spacer block held in place by the rivets for the rung sockets, and said fiber members take care of side thrust at the lower part of the ladder as shown in Fig. 2.

To provide increased strength at the lower end of the ladder section, there is a solid metal plate 16 which is riveted to the upper and lower rails 8 and 9 of each side railing as shown in Fig. 3. A shorter solid metal plate 17 is employed at the upper end of each side railing.

The intermediate ladder section shown in Fig. 4 is formed in a similar manner except that it is of less width to fit within the main ladder section, and the side railings are of less height so that the upper rails thereof are overlapped by the rails 8

of the main ladder as clearly shown in Fig. 2. The intermediate section comprises an upper rail 18, a lower rail 19, transverse connecting channels 20, angular bracing channels 21, rungs 22 having fiber contact members 23 thereon, side fiber contact members 23' or spacer blocks, rung sockets 24, solid lower plate sections 25, and solid upper plate sections 26.

The upper rails 18 of the intermediate ladder section are provided with fiber bearings 27 to prevent the underside of the rails 8 of the main ladder section from rubbing directly against the upper surface of the rails 18 and to thereby provide a good bearing surface for sliding action.

The top ladder section illustrated in Fig. 5 is formed similarly to the other two sections, but this section is of less width than the intermediate ladder section to slide within the latter, and the side railings are of less height so that the upper rails thereof are overlapped by the upper rails 18 of the intermediate ladder section as shown clearly in Fig. 2.

This top ladder section comprises a pair of side railings, each formed of an upper rail 28, a lower rail 29, transverse connecting channels 30, and angular bracing channels 31. The side railings are connected by rungs 32 having ends secured in sockets 33. The lower end of each side railing has a solid metal plate 34, and the upper end has a solid metal plate 35.

The upper surface of each of the upper rails 28 is protected by fiber contact members 28' which serve the same function as the fiber contact members 27 on the intermediate ladder section.

These fiber contact members 15, 15', 23, 23', 27 and 28' form excellent bearing surfaces for the sliding action and permit all portions of the ladder to be formed of aluminum. Aluminum ordinarily forms a poor bearing surface. These fiber contact members, however, prevent the aluminum parts from touching one another during sliding action of the ladder sections. Thus the entire ladder may be formed of aluminum to greatly reduce the weight thereof.

The construction of the side railing is such as to provide for maximum strength and resistance to tortional strains with a minimum of weight. The fitting of the rung sockets within the lower ends of the transverse channels forms a firm support for said rung sockets and thus the side railings are securely tied together by the rungs after the latter are inserted in the sockets. The rungs fit tightly in the socket castings, and the welding at the ends of the rungs makes a rigid structure.

It is to be noted that the lower rails of each ladder section are inverted T's in cross section to provide a flat surface for sliding action on the contact members 15 and 23. The shape of the upper rails 8, 18, and 28, and the manner in which the sections interfit as clearly shown in Fig. 2, with the upper rails in overlapping relationship, forms a perfect guide during elevation of the ladder sections and positively holds one ladder section within another.

The aerial ladder may be mounted on a turn table 36 of a fire truck trailer 37, and the operation of the turn table and the raising and lowering of the ladder sections may be performed by any suitable mechanism such as that shown in prior Patent No. 1,979,041.

Although only one form of the invention has been shown and described, it is obvious that various changes and modifications may be made without departing from the spirit of the invention, and all of such changes are contemplated as may come within the scope of the claims.

I claim:

1. An aerial ladder comprising side railings having transversely extending channel pieces which are open at the outer sides of the railings, sockets at the lower ends of said channel pieces secured to the bases thereof between the side walls of said channels, said sockets having outwardly projecting tubular parts, and rungs having ends extending through the bases of the channels into said outwardly projecting tubular parts of said sockets, said sockets having flanged bases with opposed parallel side edges fitting against the side walls of the channel pieces and braced thereby, whereby the sockets are maintained rigidly in position and prevented from being broken off during use.

2. An aerial ladder comprising a plurality of telescopic sections, each section having side railings, the upper rail of each side railing of one ladder section being T-shaped in cross section and overlapping the upper rail of a section therewithin to maintain said section in position and serve as a guide during sliding movement.

3. An aerial ladder comprising inner and outer telescopic sections, each section having side railings with rung ends projecting through the outer sides of said side railings, the lower rail of each ide railing of the inner ladder section having an outwardly directed flange, the outer edge of each flange forming a bearing edge cooperable during sliding movement with a portion of the outer ladder section to keep projecting rung ends of the inner ladder section out of contact with the railings of said outer ladder sections, and the bottom of each of said flanges being slidable on the rungs of said outer ladder section.

4. An aerial ladder comprising three telescopic sections, each section having side railings, with upper rails of each side railing of the intermediate ladder section being T-shaped in cross section with the inner flange of each of said upper rails overlapping the upper rail of a section therewithin and with the outer flange of each of said rails of the intermediate ladder section overlapped by an upper rail portion of outermost ladder section to maintain said sections in position and serve as guides during sliding movement.

5. An aerial ladder comprising inner and outer telescopic sections, each section comprising side railings having transversely extending channel pieces which are open at the outer sides of the railings, sockets in the lower ends of said channel pieces secured to the bases thereof between the side walls of said channels, said sockets having outwardly projecting tubular parts, rungs having ends extending through the bases of the channels into said outwardly projecting tubular parts of the sockets, the lower rail of each side railing of the inner ladder section having an outwardly directed flange, the outer edge of each flange forming a bearing edge cooperable during sliding movement with a portion of the outer ladder section to keep the projecting sockets of the inner ladder section out of contact with the railings of said outer ladder section, and the bottom of each of said flanges of the inner ladder section being slidable on the rungs of said outer ladder section.

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