March 15, 1955 G. R. NILSSON 2,704,178

EXTENSIBLE LADDER

Filed March 3, 1949

Fig. 1.

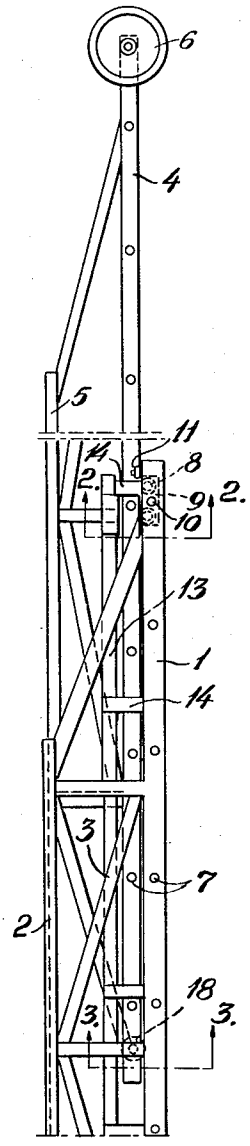


Fig. 2.

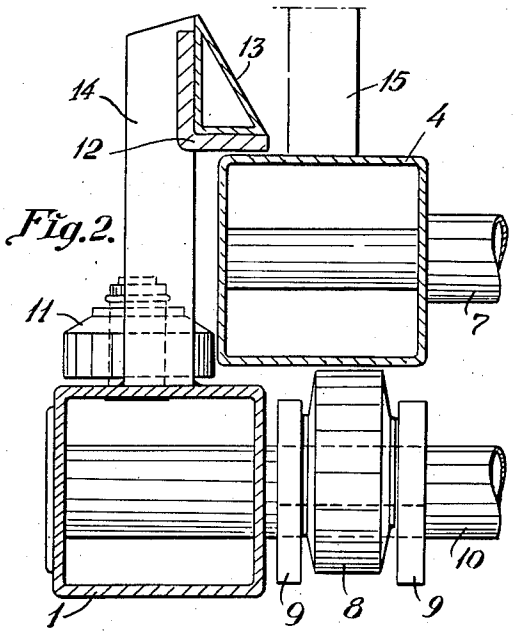
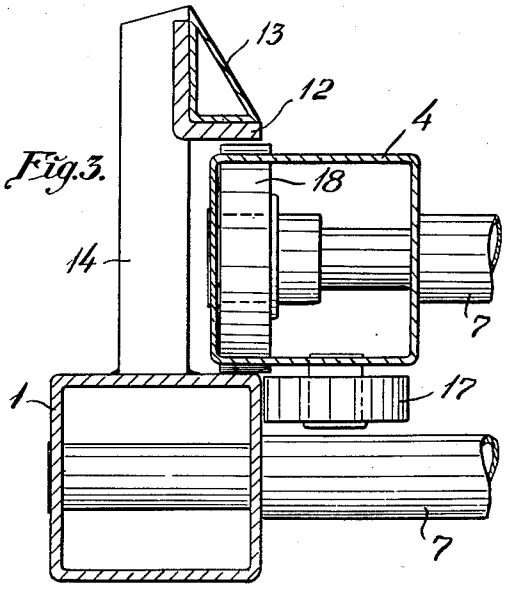


Fig. 3.



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EXTENSIBLE LADDER

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1 Claim. (Cl. 228—18)

The present invention relates generally to ladders, and more particularly the invention relates to extension ladders.

One object of the invention is to provide a construction for ladders having considerable stability. Another object of the invention is to provide an extensible ladder such as escape-ladder, fire-ladder etc. Other objects and advantages of the invention will appear from the following detailed specification of the invention as illustrated by the accompanying drawings, in which:

Fig. 1 is a side elevation of an extension ladder;

Fig. 2 is a cross section on an enlarged scale taken along the line 2—2 of Fig. 1;

Fig. 3 is a cross section on an enlarged scale taken along the line 3—3 of Fig. 1.

A bottom ladder with side rails 1 and an arch reinforcement 2 with cross stays 3 carries a runner, the side rails of which are indicated as 4 and an arch reinforcement 5. The runner is guided in the bottom ladder during its movement in relation to the same. The upper end of the runner is provided with wheels 6. The ladder rungs are denoted as 7. The upper end of the bottom ladder is provided, at each side rail 1, with two supporting rollers 8 carried in a cradle, the frames 9 of which are pivotably arranged on an axle 10 connecting the two side rails of the bottom ladder. The rollers 8 are in engagement with the under side of the side rails 4 of the runner, as is shown in Fig. 2.

Guiding rollers 11 mounted on the upper side of the side rails 1 are provided to roll on the outer side of the side rails 4 of the runner, and guiding rails 12 rest against the upper side of the runner and are detachably mounted on a bar or stringer 13, which runs parallel to the side rails 1 and is held by posts 14. These posts, which together with the stringers 13 form a part of the arch reinforcement of the ladder, are fastened to the side rails 1 of the bottom ladder. As is the case with the bottom ladder the runner is also provided with an arch reinforcement. In Fig. 2 is shown a post 15 belonging to this arch reinforcement preferably arranged as a hand-rail.

The side rails 4 of the runner is provided with guiding rollers 17 on the under side, which are adapted to roll on the inside of the side rail 1. At the lower end of the side rails of the runner supporting rollers 18 are arranged, fitted in the section and running on the upper side of the side rails and alternatively on the guiding rails 12.

In the drawing the side rails of the both ladder sections have been shown as tubes with square cross section. The tube walls are plane and the side walls are perpendicular to the plane of the ladder. The tube walls are used as tracks for the rollers in order to guide the runner both sideways and in a plane perpendicular thereto. For said purpose it is sufficient that the side rails have a rectangular cross section.

According to the example shown the side rails 4 of the runner overlap the side rails of the underlying ladder seen against the plane of the ladder. Alternatively, however, the side rails of the runner can overlap the side rails of the underlying ladder when seen in side view. In the latter case the ladder will have a slightly greater width than in the earlier alternative.

What I claim is:

An extension ladder comprising telescoping sections, each section having side rails of closed hollow rectangular cross section, the side rails of an upper ladder section laterally overlapping the side rails of an underlying ladder section, the contiguous portions of the upper and inner sides of the side rails of said underlying section and the outer and under sides of said upper section being free of projections to form tracks engageable by related rollers, first supporting rollers mounted on the lower end of the side rails of said upper ladder section adapted to roll on the upper side of the side rails belonging to the underlying ladder section, second supporting rollers on the upper end of the side rails of said underlying ladder section adapted to roll on the under side of the side rails belonging to said upper ladder section, first guiding rollers mounted on the side rails of the upper ladder section and adapted to roll on the inner side of the side rails of the underlying ladder section, second guiding rollers mounted on the upper end of the side rails of the underlying ladder section and adapted to roll on the outer side of the upper ladder section and guiding means mounted on the side rails of the underlying ladder section, and spaced from the upper sides of the latter to be adjacent the upper sides of the side rails belonging to the upper ladder section, said first supporting rollers being of a diameter greater than the distance between the upper and under walls of the side rails of said upper ladder section thereby to project beyond the surfaces of said upper and under walls and engage alternately the upper side of the side rails belonging to the underlying ladder section or said guiding means dependent upon the load on the ladder.

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