No. 621,427. Patented Mar. 21, 1899.

P. PIRSCH.

EXTENSION LADDER.

(Application filed Mar. 19, 1898.)

(No Model.)

Fig. 1.

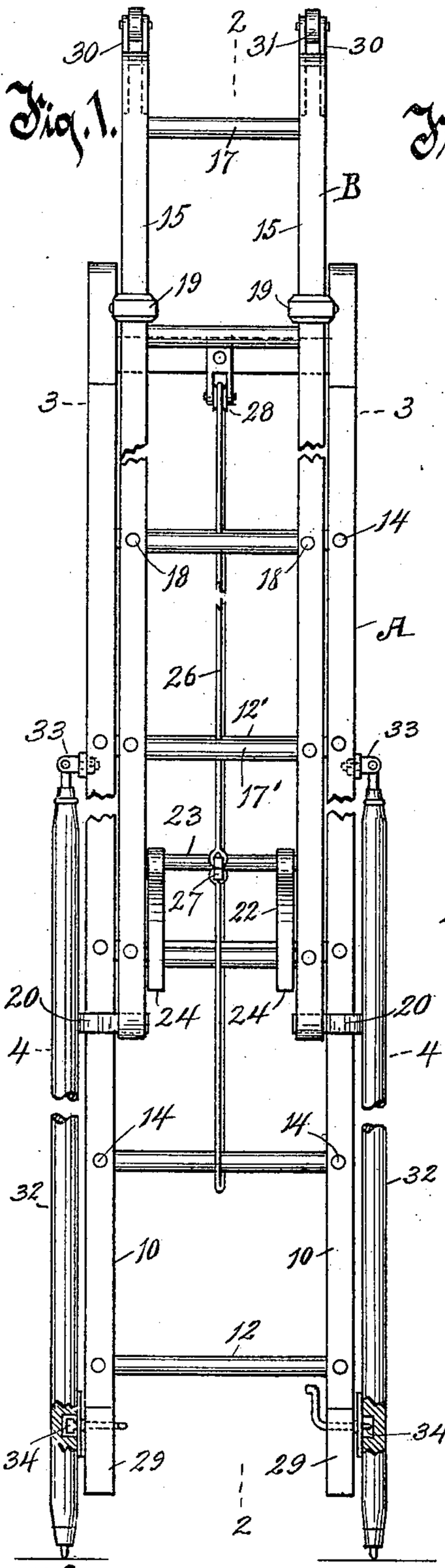


Fig. 2.

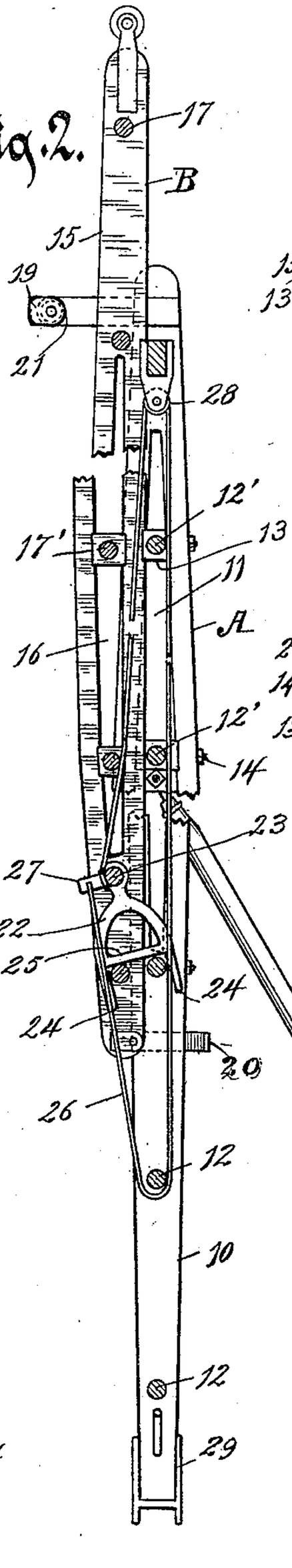


Fig. 3.

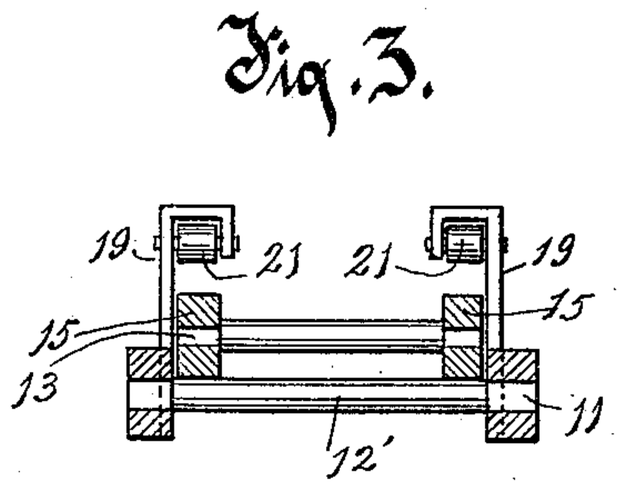


Fig. 4.

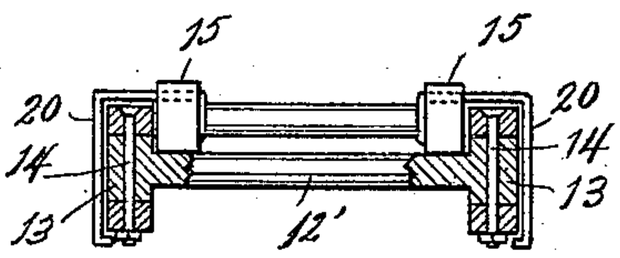
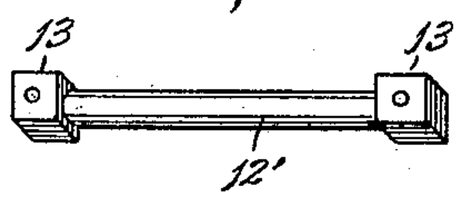
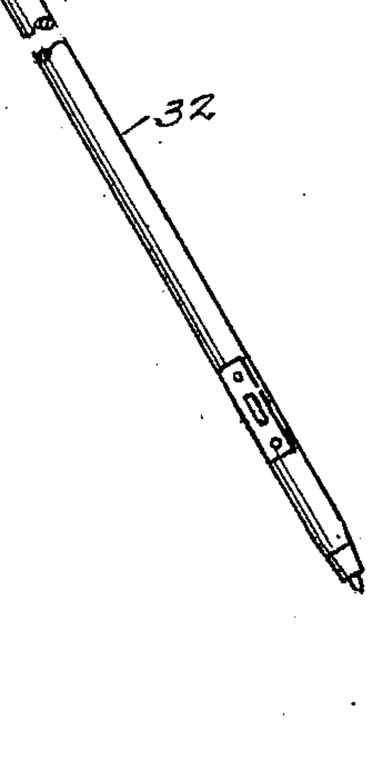


Fig. 5.





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UNITED STATES PATENT OFFICE.

PETER PIRSCH, OF KENOSHA, WISCONSIN, ASSIGNOR OF ONE-FOURTH TO NICHOLAS PIRSCH, OF SAME PLACE.

EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 621,427, dated March 21, 1899.

Application filed March 19, 1898. Serial No. 674,466. (No model.)

To all whom it may concern:

Be it known that I, PETER PIRSCH, of Kenosha, in the county of Kenosha and State of Wisconsin, have invented a new and useful Improvement in Extension-Ladders, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improvements in extension-ladders of the class that are especially adapted for use with fire apparatus, the special object of the invention being to provide a light but strong ladder capable of being contracted and folded compactly together and securely held in place and of being readily and surely extended and set up in secure position, and incidentally thereto of being so constructed that in case of breakage of parts the whole ladder will not collapse and that broken parts may be readily removed and replaced, and of other things incidental to these principal features.

The invention consists of the parts and combinations of parts, as hereinafter described and claimed, or their equivalents.

In the drawings, Figure 1 is a front elevation of my improved ladder, parts being broken away for convenience of illustration. Fig. 2 is a longitudinal section, on line 2 2 of Fig. 1, of my improved ladder, parts being broken away for convenience of illustration. Figs. 3 and 4 are cross-sections of the ladder, respectively on lines 3 3 and 4 4 of Fig. 1. Fig. 5 is a detail of a detachable round of the ladder.

In the drawings I have shown a ladder consisting of two sections A and B, which in general construction are in the form of trusses, the section B being so constructed as to be capable of sliding on and being extended beyond the upper extremity of the section A, to which it is slidably connected. Section A consists of the side rails 10 10, which are advisably constructed of tough strong wood and of the lightest possible weight compatible with the required strength. These side rails are of a truss form, being preferably made of a single piece of wood of somewhat greater width in the medial portion than at the ends, the wider medial portion being cut away centrally, forming an elongated space 11. This elongated space in each of the rails 10 10 extends nearly to the top extremity of the rails and downwardly a considerable distance toward but not to the lower extremity of the rails. A series of rounds 12 12′ are inserted in and secure the rails to each other at suitable distances apart. The rounds 12′, that are opposite the apertures 11, are provided at their ends with heads 13, that fit into the spaces in the two rails, one at each end of the round, and are secured to the rails at each end, respectively, by a bolt 14, the heads of the rounds being advisably slightly gained into the rails. By this construction one of these rounds, if accidentally broken or when greatly worn, may be readily removed by taking out the bolts 14 and replacing it with a new round. These detachable rounds are provided in the medial and upper portion of the rails 10, which rounds 12′ are subject to the greatest strain and wear in the use of the ladder, as they are required most frequently and usually to support thereon section B and its load.

Section B of the ladder is in a general way similar to section A, especially in that the rails and rounds are advisably constructed of strong tough but light wood and that the rails 15 15 are of an open or truss form, the apertures 16 16 of the truss construction being located nearer the lower than the upper end. The rounds 17 17′ are fixed in or secured to the rails and hold them at such distance from each other that the section B rests on the rounds of the section A, the rails of section B being just inside of the rails 10 of the section A. The rounds 17′ of section B are secured detachably to the rails in the apertures 16 by means of bolts 18 18, passing through the rails and through the rounds. It will also be noted that the under edges of the rails 15 are straight, so as to be adapted to bear evenly and slide freely and truly on the rounds of section A, while the upper or outer edges of the rails 15 are somewhat inclined or curved, the rails being widest in those portions opposite the apertures or spaces 16, giving them the truss-like form shown and indicated in the drawings.

Section B is connected movably to section A by means of two sets of hook-brackets 19 19 and 20 20, the brackets 19 being fixed in the rails 10 of section A near their upper ends and, projecting forwardly therefrom, turn over at their outer extremities in front of the rails 15 15 of section B and preferably carry therein antifriction-rollers 21 21, adapted to receive thereagainst the bearing of the upper and outer edges of the rails 15 when the ladder is supported in a leaning position, the top of the ladder resting against a building or permanent support. The brackets 20 are fixed in the rails 15 of section B at or near their lower extremities and project laterally therefrom beyond and pass around the outside of the rails 10 and turn slightly under the lower edges of those rails in the manner shown in Fig. 4. This construction permits of the free endwise movement of section B on section A, while it does not permit section B to escape from section A.

Section B is supported in place adjustably on section A by means of the brackets or toe-pieces 22 22, located on the inside of and respectively adjacent to the rails 15 15, near their lower extremities, the brackets or toe-pieces being hinged to the rails 15 15 by the short rock-shaft 23, pivoted in the rails 15, to which rock-shaft the brackets 22 are fixed. These brackets 22 are provided with downwardly-projecting toes 24 24 at such distance apart as adapts the bracket to pass over and simultaneously engage a round in section B and in section A, as shown in Fig. 2, the bracket being also provided with a transverse foot-piece 25, adapted to rest on the round in section A, whereby section B is supported thereon. It will be understood that section B can be raised so as to extend it nearly its entire length above section A and lowered or withdrawn to opposite section A, the toe-pieces being adapted to engage the several intermediate rounds of section A, whereby section B is correspondingly elevated or lowered. It will also be understood that as section B is on the upper or outside of the ladder as it is adapted to be put up or supported the brackets or toe-pieces 22 will, when released from a round by gravity, swing to such position as to surely engage the round immediately below them when the section descends thereto. This provides for a ready adjustment of the ladder automatically, so far as the engagement of the two sections is concerned, by means of these brackets, and also for the certain engagement of these brackets on a next lower round of section A if by any accident the round above on which section B was theretofore supported should be broken or torn out of place by any means whatsoever.

A cord 26, fastened at its ends to a radially-projecting finger 27 on the rock-shaft 23, that runs at its upper turn about a pulley 28, mounted on the upper round (or cross-bar that serves the purpose of a round) of section A, and also passes loosely about a round in the lower portion of section A, provides a means by which the brackets 22 can be readily thrown into or out of position for engagement with the round of section A when section B is raised sufficiently to carry the brackets above the round. This adjustment of the brackets 22 by means of the cord 26 can be accomplished by a person at a distance from the brackets, either above or below them, by means of this shifting cord 26.

The rails 10 10 are provided at their lower extremities with metal shoes 29, provided with toes adapted to enter the ground or other support sufficiently to prevent the slipping of the foot of the ladder. The rails 15 15 at their upper extremities are provided with finial straps 30 30, projecting beyond the ends of the wooden rails, and in these straps are mounted antifriction-rolls 31, which form the terminal extremity of the section B. These rolls 31 are adapted to bear against the side of a building or other support of the ladder.

The ladder is also provided with a plurality of swinging legs 32 32, one at each side, each leg being hinged at its upper extremity to a stud 33, which stud in turn is pivoted on a rail 10. These legs are adapted to be swung outwardly and rearwardly from the foot of the ladder when it is erected to brace and support the ladder in position. In fact, by the use of these legs 32 in connection with the ladder itself the ladder can be erected and made to do service without a direct support for the upper extremity thereof. When the ladder is not in use, these legs 32 can be folded alongside the rails 10 in the manner shown in Fig. 1, and latches 34, pivoted in the rails 10 and projecting laterally, are provided with transversely-elongated heads adapted to pass through elongated slots in plates therefor on the legs 32, and when the heads have passed through the slots into chambers therefor in the legs the latches are turned a quarter-revolution, and thereby the transversely-elongated or button heads of the latches engage the plates on the legs and hold the legs in position alongside the rails 10 10.

What I claim as my invention is—

1. An extension-ladder comprising a plurality of sections in truss form, the upper section being constructed and disposed to rest and slide on the upper or outer surface of the rounds of the lower section, hook-brackets one pair fixed to each section arranged to hold the sections slidably to each other, a rock-shaft journaled in the rails of the upper section said rock-shaft being provided with a radial finger, toe-pieces fixed on the rock-shaft and depending therefrom adapted to simultaneously engage a round of the upper section and releasably a round of the lower section, a pulley mounted in the upper section near its upper extremity, and a shifting cord secured to the finger of the rock-shaft and running about the pulley near the upper

extremity of the lower section and downwardly toward the lower extremity of the lower section.

2. In an extension-ladder the combination with a lower section comprising side rails and connecting transverse rounds, of an upper section in truss form slidable on the rounds of the lower section, the inner members of the rails of said upper section having straight outer edges in right lines substantially from end to end adapted to rest and slide on the rounds of the lower section, the outer members of the rails of the upper section being in bowed form their ends converging to the inner members and being secured rigidly thereto forming and completing an independent truss construction in and of said upper slidable section.

3. The combination with the rails of a ladder in truss form each having two parallel members opposite an intermediate elongated space, of detachable rounds provided with heads fitted between the members of the rails, and removable bolts passing through the rails and the rounds and securing them in place.

4. The combination with the side rails of a ladder, of movable legs secured at their upper ends to the rails of the ladder, and locking-latches consisting of cranked rods axled in the rails and projecting outwardly laterally therefrom the extremities of the rods being provided with transversely-elongated heads adapted to pass through slots therefor in said legs and on being rotated a part of a revolution to engage and lock said legs to said rails.

In testimony whereof I affix my signature in presence of two witnesses.

PETER PIRSCH.

Witnesses:
GEO. PIRSCH,
C. L. ALDRICH.