

April 12, 1949.

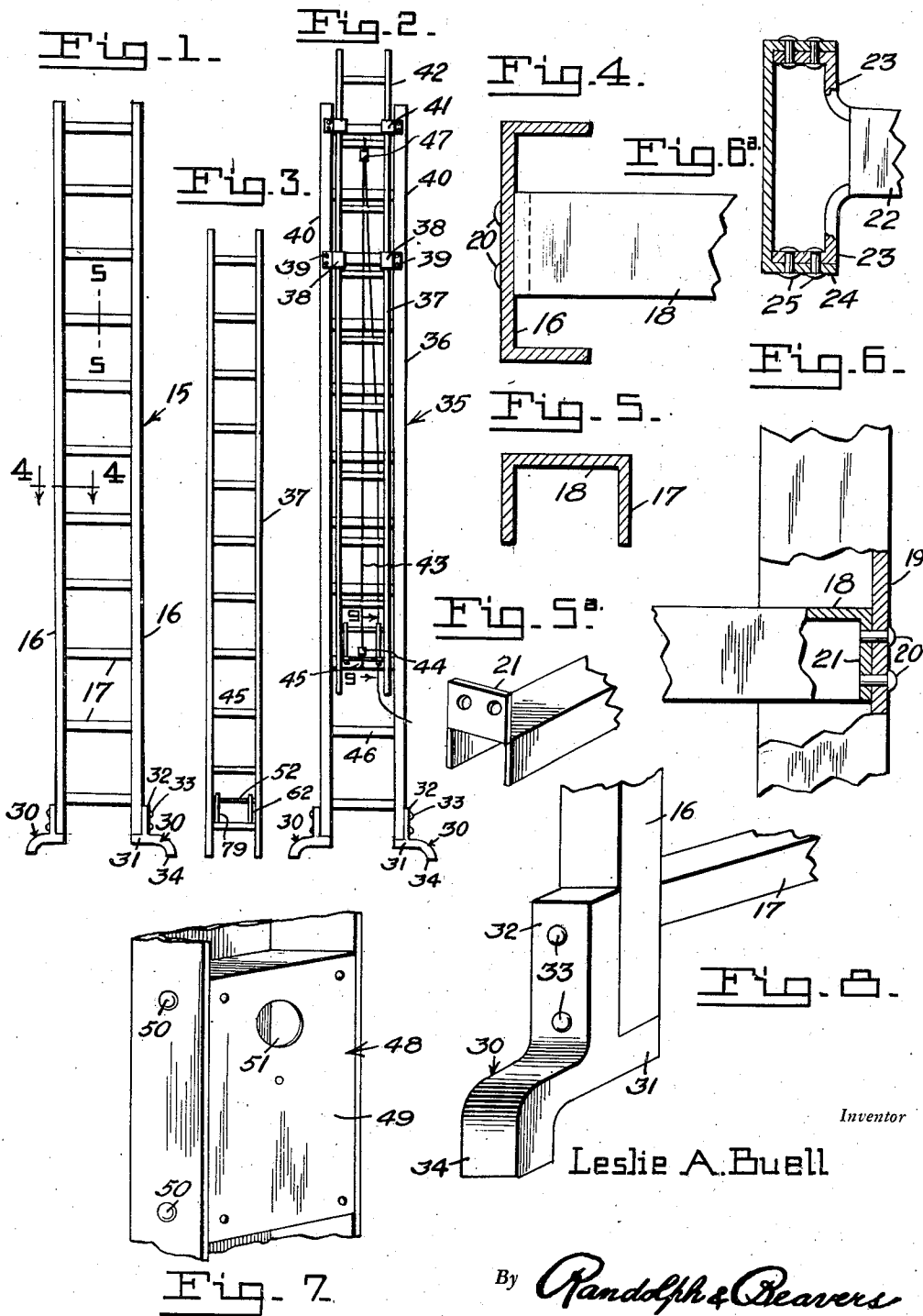
L. A. BUELL

2,466,838

LADDER ATTACHMENT

Filed Feb. 27, 1946

2 Sheets-Sheet 1



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Fig. 9.

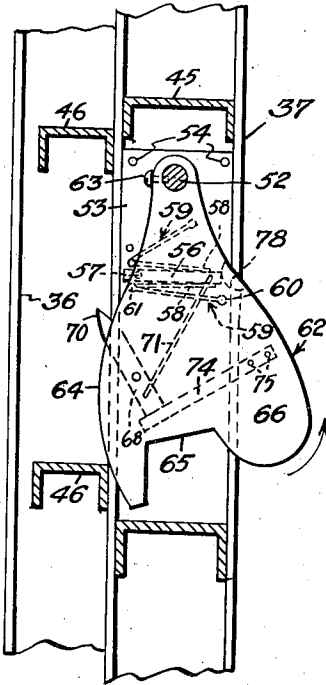


Fig. 10.

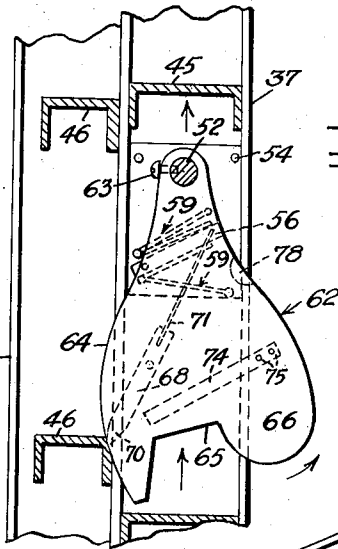


Fig. 14.

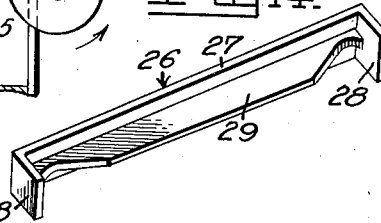


Fig. 11.

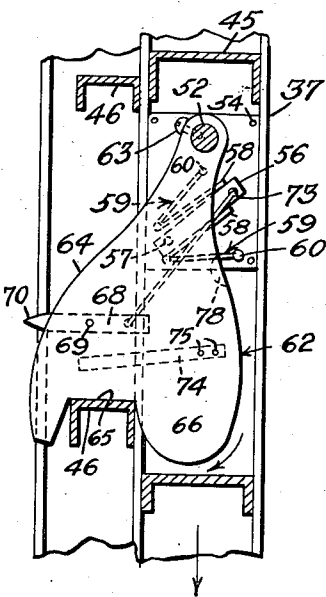


Fig. 12.

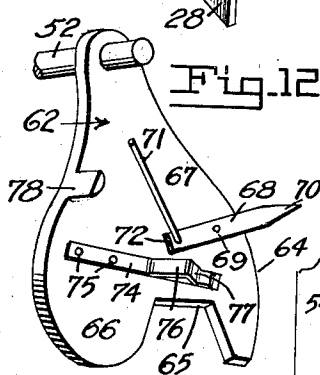
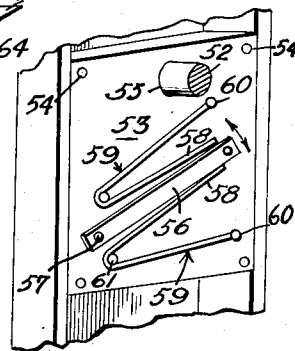


Fig. 13.



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UNITED STATES PATENT OFFICE

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LADDER ATTACHMENT

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4 Claims. (Cl. 228-65)

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This invention relates to an improved construction of ladder and particularly to a ladder which is adapted to be formed of metal.

The primary object of the present invention is to provide a novel construction of metal ladder which will be more durable and stronger than conventional wooden ladders and which will be much lighter and easier to handle.

Another object of the invention is to provide a ladder having extensions at the bottom thereof for increasing the width of the base of the ladder and thereby render a more stable use.

Still another object of the invention is to provide a novel construction of a retaining means for an extension ladder whereby the ladder sections may be retained in extended position for ready release in telescoping the sections.

Other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, which illustrate preferred embodiments thereof, and wherein:

Figure 1 is a front elevational view of a single section ladder constructed in accordance with the invention;

Figure 2 is a similar view showing the invention embodied in an extension ladder;

Figure 3 is a similar view of the upper section of the extension ladder;

Figure 4 is an enlarged sectional view taken on the line 4-4 of Figure 1;

Figure 5 is an enlarged sectional view taken on the line 5-5 of Figure 1;

Figure 5a is a perspective view in a slightly modified form of the ladder rung;

Figure 6 is a view partly in section and partly in elevation showing the preferred form of attachment of the rung to the ladder side rail;

Figure 6a is a sectional view similar to Figure 4 showing another means for attaching an end of the rung to a side rail;

Figure 7 is a perspective view of a portion of one of the side rails of the upper ladder section;

Figure 8 is a fragmentary perspective view of a part of the base of the ladder;

Figure 9 is an enlarged longitudinal sectional view taken along the line 9-9 of Figure 2 and showing the dog controlling mechanism in a position to permit lowering of the extension ladder;

Figure 10 is a view similar to Figure 9 illustrating the position to the part of the latching dog when the extension ladder is being raised;

Figure 11 is a similar view showing the ladder section latched by the dog;

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Figure 12 is a perspective view looking toward the outer space of the latching dog;

Figure 13 is a perspective view of the spring latch carried by the upper ladder section and controlled by the latching dog; and

Figure 14 is a perspective view of another form of ladder rungs.

Referring more particularly to the drawings, and particularly to Figures 1, 4 to 6, 8 and 14, in Figure 1, 15 designates generally a single section ladder formed of a light weight metal such as magnesium alloy and comprising spaced side rails 16 connected by a plurality of rungs 17. As best illustrated in Figures 4 and 5, the side rails 16 and the rungs 17 are channel shaped in cross section. The side rails 16 open inwardly and the rungs 17 preferably open downwardly. As seen in Figure 6, the web or intermediate portion 18 of the rungs 17 are elongated and bent downwardly and abut against the inner spaces of the intermediate portion or web 19 of the rails 16 and are connected thereto by fastenings 20. If desired, the extension 21 of the web 18 may be bent upwardly, as illustrated in Figure 5a, and attached to the inner side of the web 19 above the level of the rung 17. Another means of attaching the rung to the side rail 16 is shown in Figure 6a, wherein a rung 22 of channel shaped construction has its depending flanges 23 elongated to form extensions which are bent outwardly and which have terminal portions engaging against the inner sides of the flanges 24 of the rails 16 and secured thereto by fastenings 25. In Figure 14 another form of rungs, designated 26 is illustrated. The rung 26 comprises an elongated metal plate or bar 27 having downturned ends 28 which are adapted to be secured by fastenings, not shown, to the inner sides of the web 19 of the side rails 16. Between the downturned ends 28, the bar 27 is provided with a depending reinforcing rib 29 so that in cross section it is substantially T-shaped.

The ladder 15 is provided with a pair of feet 30, as best illustrated in Figures 1 and 8. The feet 30 each include a portion 31 upon which the lower end of a rail 16 rests and an upstanding flange 32 which engages against the outer side of the web 19 of such rail which is connected thereto by fastenings 33. The feet 30 extend laterally outwardly and are each provided with a downturned free end portion 34 which rests upon a suitable supporting surface. It will thus be seen that the feet 30 materially increase the stability of the ladder 15 by increasing the width of the base thereof.

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An extension ladder, designated generally 35, is shown in Figure 2. The ladder 35 comprises a lower section 36 and an upper section 37. The section 36 is constructed in the same manner as the ladder 15 and the upper section 37, also shown in Figure 3, is similarly constructed except that the feet 30 are omitted therefrom.

The ladder section 36 is provided adjacent its upper end with two pair of hook members 38 which are connected by fastenings 39 to the front sides of the side rails 40 thereof and which are provided with hook portions 41 which engage over the side rail 42 of the ladder section 37 for slidably connecting said section in the usual manner. A flexible member such as a rope 43 is connected at one end thereof at 44 to the bottom rung 45 of the ladder section 37. The rope 43 extends upwardly between the rungs 46 of the section 36 and the rungs 45 of the section 37 and is trained over the pulley 47 which is supported by the upper rung 46. The rope 43 then passes back between the rungs 45 and 46, as illustrated in Figure 2 and as is conventional in extension ladders.

Referring to Figure 7, a housing 48 which is channel shaped in cross section is disposed in each of the side rails 42 between the two bottom rungs 45 thereof and with its base or web portion 49 outermost. Inwardly extending flanges of the housing 48 engaging against the inner sides of the flanges of the rails 42 and are connected thereto by fastenings 50. The web portions 49 are provided with openings 51 in which a rod 52 is journaled, as seen in Figures 9 to 11.

As best illustrated in Figure 13, a plate 53 is secured to the outer side of the web 49 of one of the housings 48 by fastenings 54. The plate 53 is provided with an opening 55 which is aligned with the openings 51 and through which the rod 52 extends and is journaled. A latching bar 56 is pivotally mounted adjacent one end thereof at 57 on the plate 53 and is disposed between the free legs 58 of a pair of substantially V-shaped springs 59. The terminals of the other legs of the springs 59 are secured by fastenings 60 to the plate 53 and fastenings 61 secure said springs at their apexes to plate 53.

A latching or retaining dog 62 is mounted on the rod 52 and keyed thereto by a pin 63. The dog 62 extends downwardly from the rod 52 and is disposed adjacent to the plate 53. The lower portion of the edge of the dog 62, which is adjacent to the ladder section 36 is bowed outwardly as seen at 64. The bottom edge of the dog 62 is provided with a notch 65 which is located adjacent the edge 64 and which is shaped to fit over the ladder rungs 46. The preponderance of the weight of the dog 62 is in the portion 66 thereof which is adjacent the edge opposite to the edge 64 so as to cause the dog 62 to normally assume the position as shown in Figure 11 with the notch 65 directly over the rungs 46.

Referring particularly to Figure 12, the sides 67 of the dog 62 which is located adjacent to the plate 53 has an actuating lever 68 pivotally mounted thereon intermediate of its ends at 69. Lever 68 is provided with a tapered end 70 which normally projects outwardly beyond the edge 64. One end of a connecting rod 71 is pivotally connected to the opposite, inwardly extending end 72 of the lever 68; said rod 71 having its opposite end pivotally connected to the free end of the latch 56 at 73. A spring latch bar 74 is secured to the side 67 by fastenings 75, adjacent

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one end thereof. The opposite, free end of the bar 74 is provided with inclined surfaces 76 and 77 to be engaged by the lever end 72 as will hereinafter be described. A lug or detent 78 is stuck out from the face 67 and is located to be engaged by the free end of the latch 56 when the dog 62 is retracted and the latch 56 is drawn downwardly as shown in Figure 9 and as will hereinafter be described.

Another idler dog 79 is fixed to the rod 52 adjacent the opposite end thereof. The dog 79 is of the same shape as the dog 62 but is not provided with any of the parts including the lever 68, latch bar 74 and lug 78.

In order to raise the ladder section 37 from its position of Figure 2 a pull is applied to the flexible member 43 at its free end which will cause the ladder section 37 to be hoisted. As the ladder section 37 begins its upward movement the dogs 62 and 79 will each be disposed in engagement with the rung 46 as shown in Figure 11 and the lever 68 and the latch 56 will be disposed as shown in this figure. As the ladder section 37 is moved upwardly the edge 64 of the dog 62 will engage the next rung 46 thereabove and be swung counterclockwise thereby. This rung 46 will swing the lever 68 in a counterclockwise direction, as seen in Figure 10, by engagement with the tapered end 70 thus forcing the latch 56 to swing counterclockwise against the action of the upper spring 59. When the lever end 70 has passed over this rung 46 the upper spring 59 will return the lever 56 to the position of Figure 11, thus returning the lever 68 to the normal position of Figures 11 and 12. It will thus be apparent that the ladder section 37 can be raised as high as desired and upon being released with the dogs 62 and 79 between two of the rungs 46 will be latched by the dogs engaging the rung 46 which is disposed therebeneath.

To telescope the ladder sections the ladder section 37 is initially pulled upwardly by the rope 43 to a point slightly above that shown in Figure 10 at which time the lever end 70 is disengaged from rung 46 so as to return to its normal position of Figure 12. The rope 43 is then slacked off to allow the ladder section 37 to slide downwardly past the rung 46 so that the lower end of the edge 64 is engaged. As the dog 62 moves downwardly past this rung 46, the lever 68 will be in its position of Figure 12 so that its end 70 will be engaged by this rung 46 and swung upwardly. This movement of the lever 68 will cause its end 72 to engage and depress the inclined surface 76 to allow the end 72 to be latched against the surface 77. This movement of the lever 68 will draw the latch member 56 downwardly to its dotted line position of Figure 9 and with its free end will engage the lug or detent 78 to thereby latch the dogs 62 and 79 in retracted position which will permit a full telescoping of the ladder sections.

If it is desired to only partially telescope the ladder sections, when the section 37 has reached a point at which it is desired to latch it, by applying a pull on the free end of the rope 43, ladder section 37 can be moved upwardly sufficiently so that the rung 46 thereabove will engage the lever end 70 to swing in counterclockwise from its position of Figure 9 into its position of Figure 11. In this movement of the lever 68 its end 72 will cam the free end of the latch bar 74 inwardly by engagement with the inclined surface 77 to disengage the lever end 72

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therefrom. When the lever 68 is thus released the latch member 56 will return to its position of Figure 11, out of engagement with lugs 78 to allow the dog 62 to swing back to its position of Figure 11 to engage the rung 46 therebeneath.

Various modifications and changes are contemplated and may obviously be resorted to without departing from the spirit and scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. In an extension ladder, two telescoping ladder sections, manually operated means for extending and telescoping said sections, a rod disposed transversely of and journaled in the upper, movable section, a pair of latching dogs keyed to said rod and having downwardly opening notches normally disposed for engagement with the rungs of the stationary ladder section for holding the movable section in an elevated, extended position, a pivotally mounted latch member carried by the movable section, a detent on one of said latching dogs engageable by the free end of said latch member for holding the dogs in a retracted, inoperative position, an actuating lever pivotally mounted on said last mentioned dog and disposed to be operated by engagement with the rungs of the stationary ladder section, and a connecting rod connecting the latching member and actuating lever for moving the actuating lever into and out of engagement with the lug or detent.

2. In an extension ladder, two telescoping ladder sections, manually operated means for extending and telescoping said sections, a rod disposed transversely of and journaled in the upper, movable section, a pair of latching dogs keyed to said rod and having downwardly opening notches normally disposed for engagement with the rungs of the stationary ladder section for holding the movable section in an elevated, extended position, a pivotally mounted latch member carried by the movable section, a detent on one of said latching dogs engageable by the free end of said latch member for holding the dogs in a retracted, inoperative position, an actuating lever pivotally mounted on said last mentioned dog and disposed to be operated by engagement with the rungs of the stationary ladder section, a connecting rod connecting the latching member and actuating lever for moving the actuating lever into and out of engagement with the lug or detent, and spring means between which the latching lever is disposed for normally holding the latching member in a position away from the path of movement of said detent.

3. In an extension ladder, two telescoping ladder sections, manually operated means for extending and telescoping said sections, a rod disposed transversely of and journaled in the upper, movable section, a pair of latching dogs keyed to said rod and having downwardly opening notches normally disposed for engagement with

the rungs of the stationary ladder section for holding the movable section in an elevated, extended position, a pivotally mounted latch member carried by the movable section, a detent on one of said latching dogs engageable by the free end of said latch member for holding the dogs in a retracted, inoperative position, an actuating lever pivotally mounted on said last mentioned dog and disposed to be operated by engagement with the rungs of the stationary ladder section, a connecting rod connecting the latching member and actuating lever for moving the actuating lever into and out of engagement with the lug or detent, and a resilient latch bar carried by said last mentioned dog and disposed to engage and hold the actuating lever when said latching member is in engagement with the detent.

4. An extension ladder comprising two telescoping ladder sections each formed of spaced side rails connected by a plurality of longitudinally spaced rungs, said side rails being of channel shaped cross section and being disposed to open inwardly of one another, said rungs being of channel shaped cross section and disposed to open downwardly and having their ends extending into and secured to the side rails; manually operated means for extending and telescoping the ladder sections, a rod extending transversely of and journaled in the upper, movable ladder section, a pair of latching dogs keyed to said rod and having downwardly opening notches normally disposed for engagement with the rungs of the stationary ladder section for supporting the movable ladder section in an elevated, extended position, a plate fixedly mounted in one of the channels of one of the side rails of the movable ladder section and having a latch member pivotally mounted thereon, a detent on one of said latching dogs engageable by the free end of said latch member for holding the dogs in a retracted, inoperative position, an actuating lever pivotally mounted on said last mentioned dog and disposed to be operated by engagement with the rungs of the other, stationary ladder section, and a connecting rod connecting the latching member and actuating lever for moving the latter into and out of engagement with the detent when the dogs are in retracted, inoperative positions.

LESLIE A. BUELL.

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