

Jan. 17, 1939.

H. B. GAFFERS

2,144,440

EXTENSION LADDER TRESTD

Filed Sept. 16, 1938

2 Sheets-Sheet 1

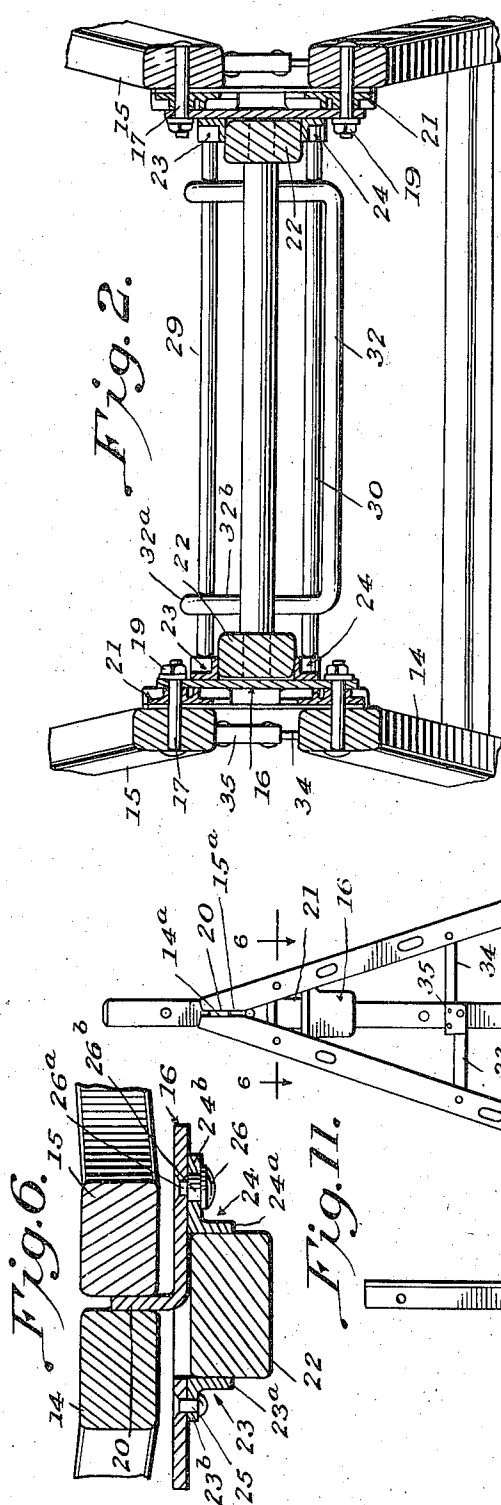


Fig. 7 Fig. 8 Fig. 9 Fig. 10

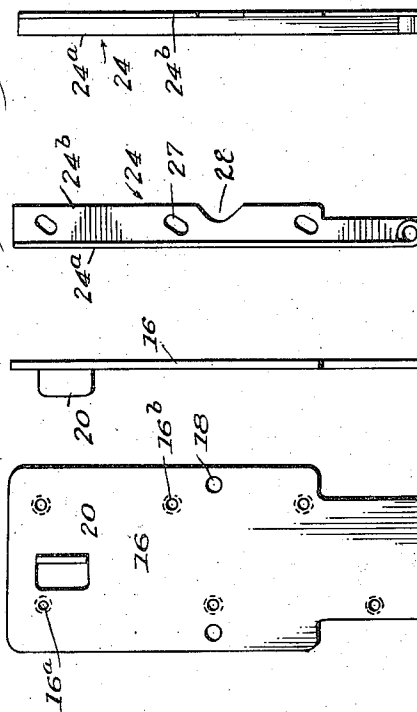


Fig. 1.

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2 Sheets-Sheet 2

Fig. 5.

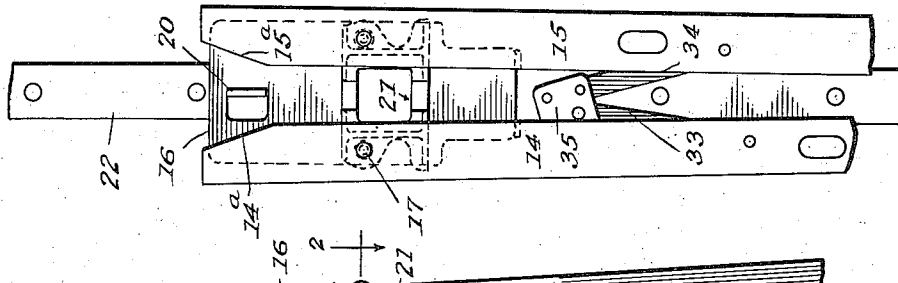


Fig. 4.

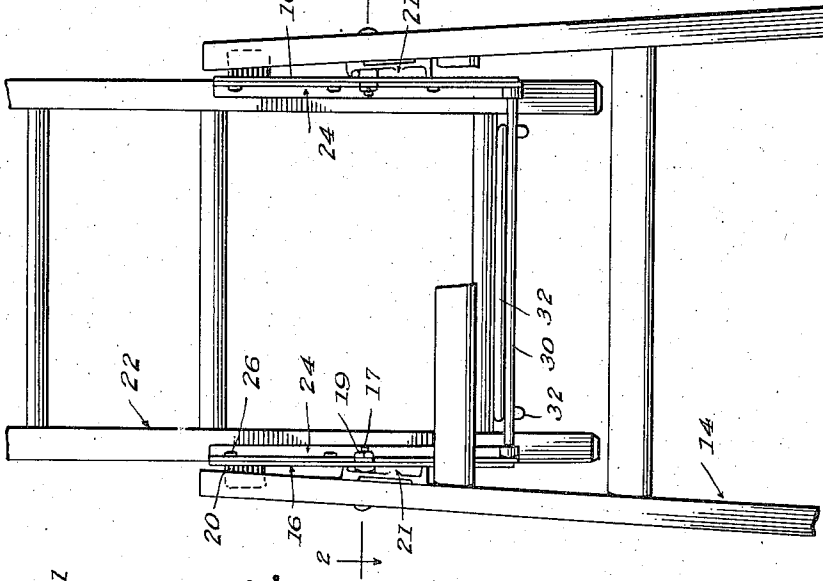


Fig. 13.

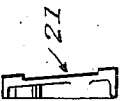


Fig. 3.

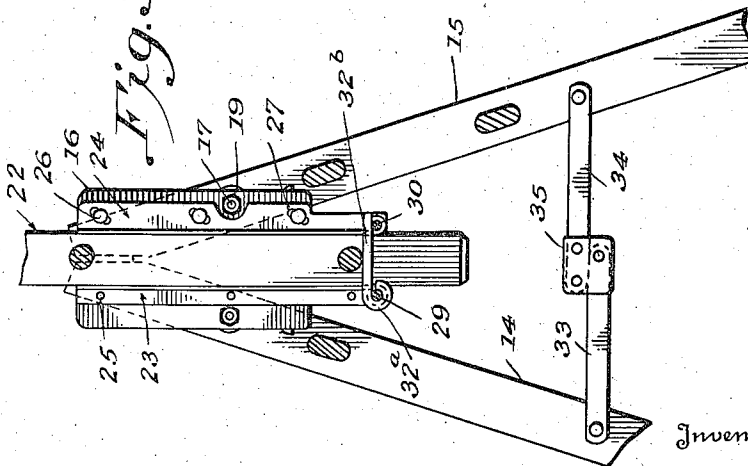
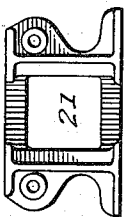


Fig. 12.



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EXTENSION LADDER TRESTLE

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Application September 16, 1938; Serial No. 230,328

11 Claims. (Cl. 228—22)

This invention relates to improvements in extension ladder trestles of the type disclosed in my Patent No. 1,965,311 of July 3, 1934, and which includes oppositely disposed sections hinged together at their upper end portions to fold together and to be opened out to provide a trestle structure, and an extension ladder section connected with the hinged sections for vertical sliding adjustment between the same.

An object of the present invention is to provide improved means of a simple, efficient nature for clamping the extension ladder section to prevent wobbling or lateral play of the same.

Another object of the invention is to provide improved clamping means for the extension ladder sections that can be easily brought into operation to firmly hold the extension section in fixed position against wobbling, and that can be readily released to permit easy vertical sliding adjustment of the extension section.

A further object of the invention is to provide improved clamping means for the extension ladder section that will embrace the same throughout a substantial portion of the length thereof, and that in addition to functioning as clamping means, will act to guide and support the extension section for vertical sliding adjustment so that the necessity for providing separate guiding means is avoided and the extension section can be raised to its fullest extent.

The invention, with other objects and advantages thereof, and the particular construction, combinations and arrangements of parts comprising the same, will be understood from the hereinafter contained detailed description when considered in connection with the accompanying drawings forming part hereof and illustrating one embodiment of the invention.

In the drawings:

Figure 1 is an end elevation of an extension ladder trestle constructed in accordance with the present invention, the sections of the trestle being shown in extended position.

Fig. 2 is a horizontal section on the line 2—2 of Figure 4 looking in the direction of the arrows.

Fig. 3 is a fragmentary vertical section on an enlarged scale.

Fig. 4 is a fragmentary front elevation on an enlarged scale.

Fig. 5 is a fragmentary end elevation of the device in folded position.

Fig. 6 is a transverse section, on an enlarged scale on the line 6—6 of Figure 1.

Figs. 7 and 8 are detailed views of one of the connecting plates.

Figs. 9 and 10 are detailed views of one of the movable clamp members for the extension ladder section.

Fig. 11 is a detailed view of one of the fixed guide and clamp members for the extension ladder section.

Figs. 12 and 13 are detailed views of one of the bearing plates for the inner side faces of the upper end portions of the hinged sections.

While a preferred embodiment of the invention is illustrated in the drawings, it will of course be understood that minor changes and modifications may be made in the particular construction shown and the invention may be embodied in other forms, as will appeal to those skilled in the art and falling within the scope of the appended claims, without departing from the spirit of the invention.

In the particular construction of extension ladder trestle shown in the drawings, 14 and 15 designate the oppositely disposed hinged ladder sections adapted to be adjusted to open position as illustrated in Figure 1 of the drawings to provide a trestle or to be folded as shown in Figure 5 to constitute a section of an extension ladder. The sections are pivotally connected at opposite sides at their upper end portions to connecting plates 16 by bolts 17, which extend through the side rails of the sections and through apertures 18 in the said connecting plates to the inner sides thereof, the bolts 17 having threaded inner end portions to receive nuts 19. Each of the connecting plates 16 is provided at its outer side with a projecting portion 20 adapted to be engaged by the upper beveled end faces 14^a and 15^a of the rails of the hinged sections 14 and 15 when the sections are opened to form a trestle, said projecting portions serving as stops to limit the separating movement of the sections and as bearings for the upper ends of the rails of the sections. The connecting plates 16 conveniently take the form of metal stampings, the projecting portion 20 of each of the plates being formed by a portion struck up from the plate.

The rails of each of the hinge sections 14 and 15 are preferably arranged to extend from their upper ends at an outward inclination, as shown, and when so constructed, plates 21 are interposed between the upper end portions of the rails of said sections and the adjacent connecting plate, the plates 21 being supported in place upon the pivot bolts 17 passing through suitable apertures therein.

22 designates the extension ladder section connected with the hinged trestle sections 14 and

15 for vertical adjustment therebetween. The present invention provides means for clamping the extension ladder section in fixed position and which also serves to guide and support the same for vertical sliding adjustment. The combined clamping and guiding means for the extension section includes oppositely disposed pairs of plate members 23 and 24 on the connecting plates 16. The plate members 23 and 24 of each pair each comprises vertically and laterally extending oppositely disposed plate portions 23^a and 24^a spaced to receive between the same one of the side rails 22^a of the extension ladder section. The plate members 23 of each pair are fixed, the same being shown as separate parts having connecting portions 23^b extending at an angle to their portions 23^a and fitting against and secured to the connecting plates by rivets 25. The companion plate member 24 of each pair of said plate members is supported for limited movement vertically and laterally toward and away from the fixed plate member 23. The movable plate members 24 each have a connecting portion 24^b disposed at an angle to its rail engaging portion 24^a parallel with and slidably engaging one of the connecting plates 16.

The movable plate members are supported on headed studs or rivets 26 on the connecting plates, the connecting portions 24^b of said movable plate members each being provided with a plurality of downwardly and inwardly inclined slots 27 that are engaged by the studs or rivets 26. A nice sliding fit is provided between the studs or rivets and the side walls of the slots 27 so that said plate members can slide freely on the studs. As will be understood, when the movable plate members 24 are forced downwardly, they will be caused to move inwardly by the inclined walls of the slots 27, the portions 24^a of said members will press against the rails of the extension ladder section, and the same will be clamped tightly between the pairs of plate members. When the movable members are relieved of downward pressure, the extension ladder section can be freely adjusted between the pairs of plate members, the same under the latter condition acting as guiding means for the extension section. The studs or rivets 26 each have a reduced inner end portion 26^a with a shoulder 26^b, the shoulder fitting against the side of the connecting plate, and the reduced end portion of the stud or rivet extending through an opening in the connecting plate and being upset to secure the stud thereto. The openings 16^a and 16^b in the connecting plates 16 for the rivets 25 and 26 are preferably formed so that the upset ends of the rivets are countersunk. The connecting portions 24^a of the movable plate members 24 are, as shown, each provided with an opening 28 extending inwardly from its side marginal edge to accommodate the nuts 19. The plate members 23 and 24, may be conveniently formed of angle iron.

29 and 30 designate transversely extending rod members connected respectively to the fixed plate members 23 and the movable plate members 24 at the lower end portions thereof, the ends of said rods fitting in sockets or eyes 31 on the plate members. Pivotally mounted on the rod member 29 is a latch 32 that is adapted to extend across the path of the rungs of the extension section and rest upon the rod member 30 to form a support for the extension ladder section and to also, through its engagement with the rod 30, to transmit the weight of the extension ladder section and the load thereon to the movable plate mem-

bers 24 so that the extension ladder section, when held locked in adjusted position by the latch, will be firmly clamped between the pairs of plate members. The latch 32 is adapted to readily permit the passage of the rungs of the extension section in the upward adjustment of the same and to engage behind or beneath a rung of the extension section to hold the same against downward movement. The latch preferably takes the form of a U-shaped bail, as shown, the same having eyes 32^a pivotally engaging the rod member 29. As will be understood, the weight of the latch 32 normally tends to maintain the same in horizontal position with its side portions 32^b resting upon the other rod member 30, the latch being adapted to be forced upwardly out of the path of the rungs of the extension section when the same is moved upwardly, and to automatically return to horizontal position after the rung has moved upwardly out of engagement therewith.

Folded braces of any suitable construction are connected with the hinged sections 14 and 15, the braces being shown as comprising link members 33 and 34, and a connecting member 35, the pairs of link members having their outer ends connected with the side rails of the hinged sections.

In the use of the extension ladder trestle, the extension section can be easily raised and adjusted by the workman either while standing on the trestle sections or from the ground, by simply grasping the lower portion of the extension section and pushing upwardly. As soon as the movable plate members 24 are relieved of downward pressure, the extension section can slide freely between the pairs of plate members. When the extension section has been adjusted as desired and is engaged with the latch to lock the same in adjusted position, the movable plate members will simultaneously be actuated to press against the side rails of the extension section and the same will be tightly gripped between the pairs of plate members.

It will be noted that by the particular construction and arrangements of parts hereinbefore set forth, means of an efficient nature is provided for clamping the extension section to prevent wobbling or lateral play of the same. The particular construction has several important advantages. It is of simple construction, can be readily released and brought into play in conjunction with a conventional form of latch, and it provides for gripping the rails of the extension section over a substantial portion of the length thereof. In addition to acting as clamping means, it functions to guide and support the extension section for vertical sliding adjustment.

The necessity for providing separate guiding means is entirely avoided, it provides for raising the extension section to its fullest extent, it is advantageously located to hold the extension section rigid and firm in all positions of adjustment of the same and to be entirely out of the way of other parts, the folding braces being free from obstruction so that the same may be operated by one hand.

What I claim is:

1. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely disposed sections, and means for clamping the extension section in fixed position including vertically extending oppositely disposed plate portions

on one of the connecting plates, said plate portions being spaced to receive between the same one of the side rails of the extension section and adapted to engage opposite side faces thereof, one of said plate portions being fixed, and the other being supported for movement vertically and laterally toward and away from the fixed plate portion.

2. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely disposed sections, and means for clamping the extension section in fixed position including vertically extending oppositely disposed plate portions on each of the connecting plates, said plate portions being spaced to receive between the same one of the side rails of the extension section and adapted to engage opposite side faces thereof, one of said plate portions being fixed, and the other being supported for movement vertically and laterally toward and away from the fixed plate portion.

3. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely disposed sections, and means for clamping the extension section in fixed position including vertically extending oppositely disposed plate members on one of said connecting plates, said plate members being spaced to receive between the same one of the side rails of the extension section and adapted to engage opposite side faces thereof, one of said plate members being fixed and the other plate member having a connecting portion disposed at an angle to its rail engaging portion and provided with a plurality of downwardly and inwardly inclined slots, and studs on the connecting plate engaging the slots of the connecting portion to support said plate member for movement vertically and laterally.

4. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely disposed sections, and means for clamping the extension section in fixed position including vertically extending oppositely disposed plate members on one of said connecting plates, said plate members being spaced to receive between the same one of the side rails of the extension section and adapted to engage opposite side faces thereof, one of said plate members being fixed and the other plate member having a connecting portion disposed at an angle to its rail engaging portion and provided with a plurality of downwardly and inwardly inclined slots, and studs on the connecting plate engaging the slots of the connecting portion to support said plate member for movement vertically and laterally, each of said studs having a shoulder intermediate its ends with a reduced inner end portion, the reduced end portion of the stud extending through the connecting plate, and the shoulder fitting against the side of the connecting plate.

5. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically ad-

justable between the oppositely disposed sections, means for clamping said extension section in fixed position including vertically extending oppositely disposed plate portions on one of the connecting plates, said plate portions being spaced to receive between the same one of the side rails of the extension section and adapted to engage opposite side faces thereof, one of said plate portions being fixed and the other plate portion being supported for movement vertically and laterally toward and away from the fixed plate portion, and means adapted to be engaged by a rung of the extension section to support the extension section in different positions of adjustment and adapted to force said movable plate portion downwardly and inwardly in clamping position.

6. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely disposed sections, means for clamping said extension section in fixed position including vertically extending oppositely disposed plate portions on one of the connecting plates, said plate portions being spaced to receive between the same one of the side rails of the extension section and adapted to engage opposite side faces thereof, one of said plate portions being fixed and the other plate portion being supported for movement vertically and laterally toward and away from the fixed plate portion, a part on the movable plate portion projecting inwardly therefrom, and a latch pivotally connected with said connecting plate and adapted to engage said inwardly projecting part on the movable plate portion, said latch being adapted to be engaged by a rung of the extension section and to form a support therefor, and said latch being also adapted to force said movable plate portion downwardly and inwardly in clamping position.

7. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely disposed sections, means for clamping the extension section in fixed position including a pair of vertically extending oppositely disposed plate portions on each of the connecting plates, each pair of plate portions being spaced to receive one of the side rails of the extension section between the same and adapted to engage opposite side faces thereof, one plate portion of each pair being fixed and the other being supported for movement vertically and laterally toward and away from its companion fixed plate portion, a transverse rod member connected with the movable plate portions, and a latch pivotally connected with one of the connecting plates and adapted to engage said rod member, said latch being adapted to be engaged by a rung of the extension section and to form a support therefor, and said latch being also adapted to force said movable plate portions downwardly and inwardly in clamping position.

8. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely disposed sections, means for clamping the extension

section in fixed position including a pair of vertically extending oppositely disposed plate portions on each of the connecting plates, each pair of plate portions being spaced to receive one of the side rails of the extension section between the same and adapted to engage opposite side faces thereof, one plate portion of each pair being fixed and the other being supported for movement vertically and laterally toward and away from its companion fixed plate portion, a transverse rod member connected with the fixed plate portions, a transverse rod member connected with the movable plate portions, and a latch member pivotally mounted on one of said rod members and adapted to rest upon the other rod member, said latch being adapted to be engaged by a rung of the extension section and to form a support therefor, and said latch being also adapted to force the movable plate portions into clamping position.

9. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely disposed sections, means for clamping the extension section in fixed position including a pair of vertically extending oppositely disposed plate portions on each of the connecting plates, each pair of plate portions being spaced to receive one of the side rails of the extension section between the same and adapted to engage opposite side faces thereof, one plate portion of each pair being fixed and the other being supported for movement vertically and laterally toward and away from its companion fixed plate portion, a transverse rod member connected with the fixed plate portions, a transverse rod member connected with the movable plate portions, and a latch member comprising a substantially U-shaped bail, the side portions of the bail being provided with bearing eyes at their free ends loosely engaging one of said rod members, and the side portions of the bail being adapted to rest upon the other rod member.

10. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely dis-

posed sections, means for clamping the extension section in fixed position including a pair of vertically extending oppositely disposed plate members on each of said connecting plates, each pair of plate members being spaced to receive between the same one of the side rails of the extension section and adapted to engage opposite side faces thereof, one plate member of each pair being fixed and the other having a connecting portion disposed at an angle to its rail engaging portion and provided with a plurality of downwardly and inwardly inclined slots, and studs on the connecting plates engaging the slots of the connecting portions to support said movable plate members for movement vertically and laterally, and means adapted to be engaged by a rung of the extension section to support the extension section in different positions of adjustment and adapted to force said movable plate members to clamping position.

11. In a device of the class described, the combination of oppositely disposed sections, connecting plates at opposite sides of the sections to which the sections are pivotally connected at their upper end portions, an extension section vertically adjustable between the oppositely disposed sections, means for clamping the extension section in fixed position including a pair of vertically extending oppositely disposed plate members on each of said connecting plates, each pair of plate members being spaced to receive between the same one of the side rails of the extension section and adapted to engage opposite side faces thereof, one plate member of each pair being fixed and the other having a connecting portion disposed at an angle to its rail engaging portion and provided with a plurality of downwardly and inwardly inclined slots, and studs on the connecting plates engaging the slots of the connecting portions to support said movable plate members for movement vertically and laterally, and a transverse rod member connected with the movable plate members at the lower end portions thereof, and a latch pivotally connected with the fixed plate members at the lower end portions thereof and adapted to rest upon said rod member, said latch being adapted to be engaged by a rung of the extension section and to form a support therefor, and said latch also being adapted to force the movable plate members into clamping position.

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