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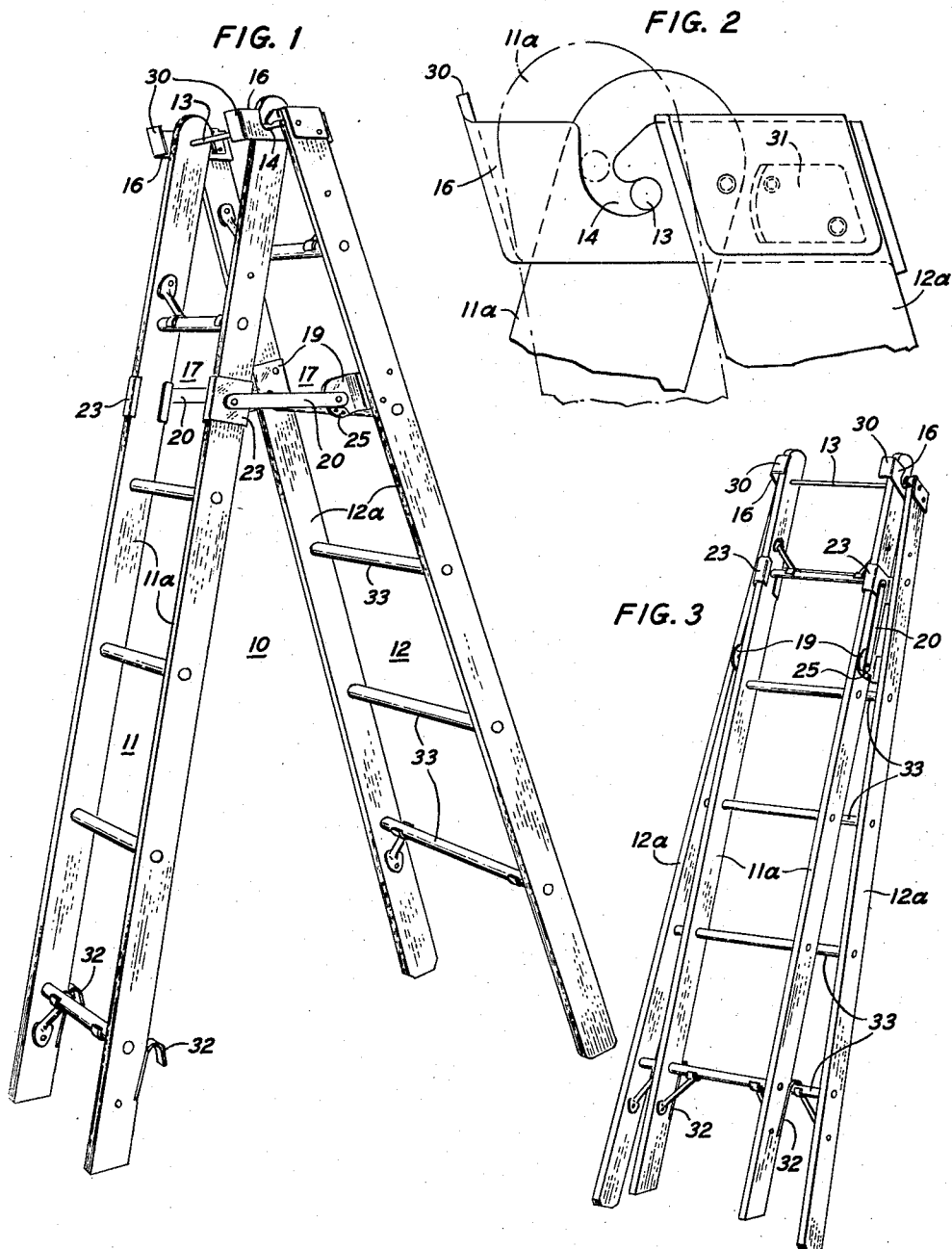
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2,919,762

COMBINATION STEP AND EXTENSION LADDER

Filed Nov. 19, 1957

3 Sheets-Sheet 1



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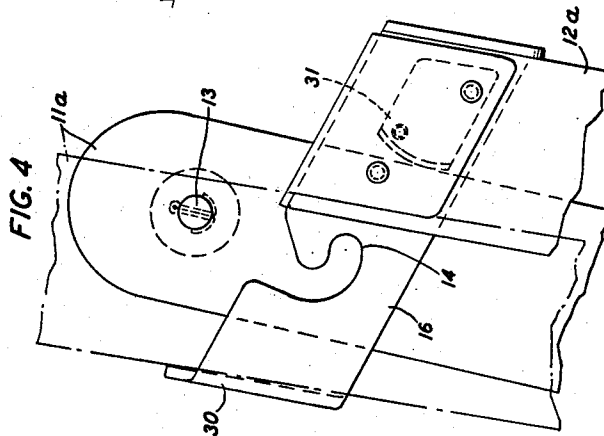
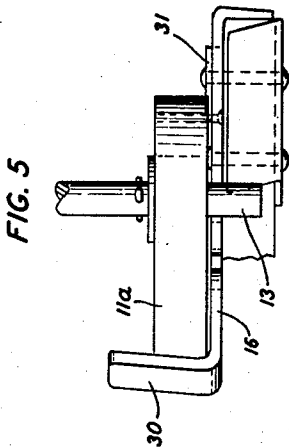
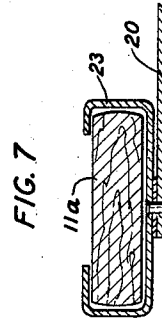
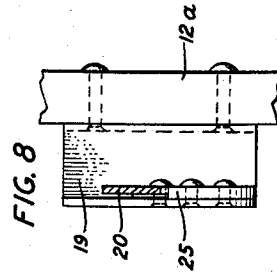
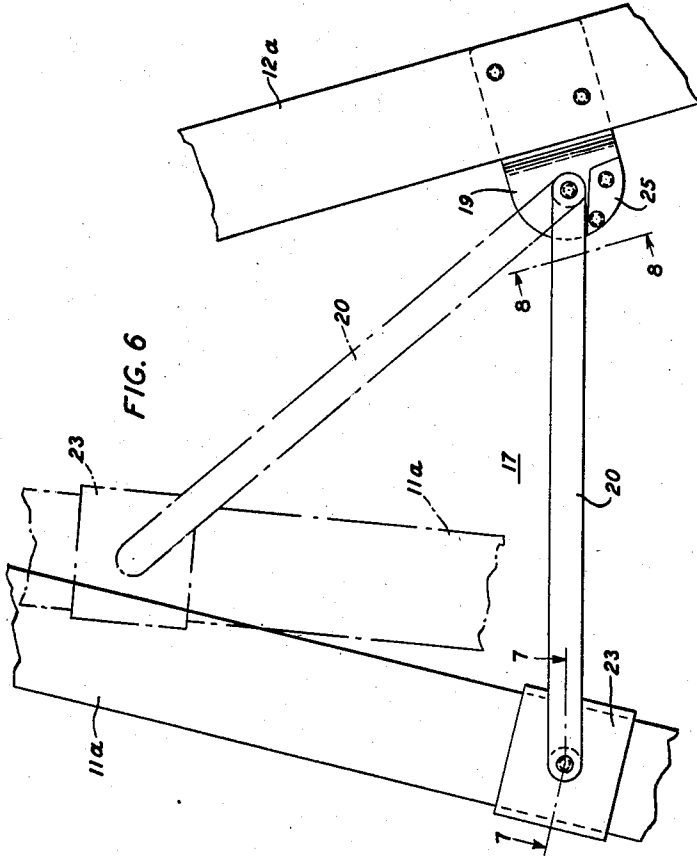
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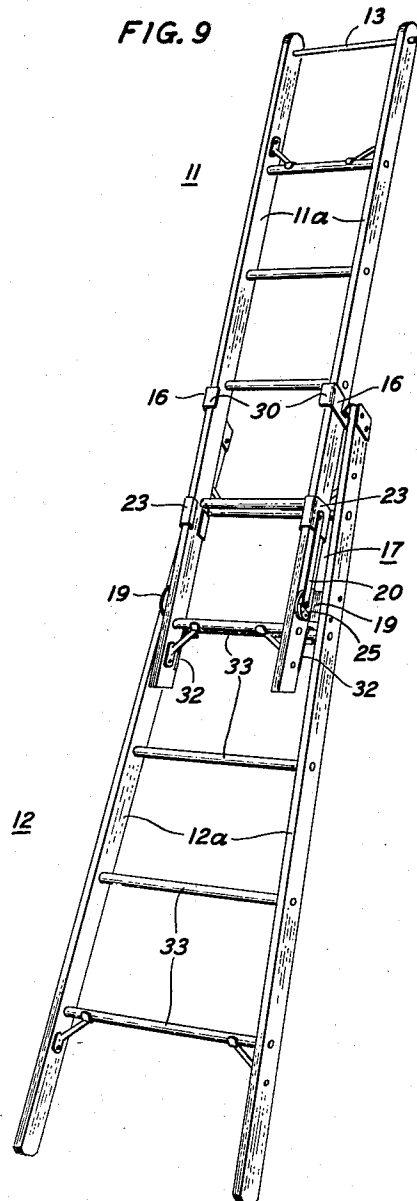
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## COMBINATION STEP AND EXTENSION LADDER

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3 Sheets-Sheet 3



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2,919,762

## COMBINATION STEP AND EXTENSION LADDER

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2 Claims. (Cl. 182—22)

This invention relates to a combination step and extension ladder comprising a front and rear section connected together and so constructed that they may be adjusted to constitute alternatively a step ladder or extension ladder.

One object of the present invention is the provision of a combination step and extension ladder which is capable of performing its purposes with greater safety, easier manipulation and more rigidity than those now in use. This object is attained in accordance with one feature of this invention through the utilization of a pair of spreaders or braces each of which includes a guide member slidably mounted on the side rails of the front ladder section. The guide members have pivotally mounted thereon extending arms the opposite ends of which are pivotally connected to brackets fixedly secured to the side rails of the rear section. The brackets are provided with stop members suitably located and secured thereon for limiting the downward movement of the arms and the sliding guide members of the spreaders, thus effectively resisting any further spread of the front and rear sections when the device is adjusted in an open position.

Another feature of this invention pertains to yoke members affixed to the top ends of the rear section, and so formed that, in addition to providing means for hinging together the front and rear sections of the ladder, they serve as guides which cooperate with the slidable members on the spreaders, thereby providing the front section with suitable top and bottom guidance when it is in its extended position.

These and other features of the invention will become more apparent from the following detailed description which, together with the accompanying drawing, discloses an illustrative embodiment.

In the drawings:

Fig. 1 is a right side elevational view, in perspective, illustrating the device opened to provide a step ladder;

Fig. 2 is an enlarged fragmentary view of the right side of the device illustrating the pivoted front section fully engaged within the curved slot of the yoke member of the rear section to form a hinge, and also illustrating the pivoted front section (in dot and dash outline) partially disengaged from its curved slot when said section is positioned against the rear section;

Fig. 3 is a front elevational view of the device, in perspective, showing it in a closed position;

Fig. 4 is an enlarged fragmentary view similar to Fig. 2, but showing the front section partially extended and positioned against a guide member secured to the inner wall of the yoke member (and shown in dotted outline); this figure also shows a fragment of the front section (in dot and dash outline) further extended and positioned against the hooked guide member of the yoke, when the device is used as an extension ladder;

Fig. 5 is a top view of Fig. 4 showing the pivoted front section of the device disengaged from its yoke member and positioned against the hooked portion of the yoke which serves as a guide;

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Fig. 6 is a fragmentary side elevational view of the right side of the device showing (by dot and dash outline) the adjusted positions of the spreader members with respect to the amount of spread between the front and rear sections, when the device is partially opened or closed; also shown is the position of the spreader members which limit the spread of the ladder sections when the sections of the device are spread to form a step ladder;

Fig. 7 is a view taken on line 7—7 of Fig. 6 showing in section the pivoted sliding member and arm of the spreader assembly as shown positioned in Fig. 6;

Fig. 8 is a view taken on line 8—8 of Fig. 6 showing the stop members for limiting the movement of the spreader arms; and

Fig. 9 is a front elevational view in perspective showing the front section fully extended conforming the device for use as an extension ladder.

The device as shown in Fig. 1 and referred to as 10 comprises a front section 11 and a rear section 12, connected together at their top ends by the pivot member 13 and the yoke members 16—16 respectively. The pivot member 13 is fixedly secured within the top ends of the rails 11a—11a, extending beyond the outer surface thereof, and is rotatably engaged within the closed ends 14—14 of the yoke members 16—16, which in turn are each fixedly secured to the top ends of the rails 12a—12a, thus forming a hinge means for the device when it is used in the form of a step ladder, best seen in Figs. 1 and 2.

The device 10 also comprises spreaders 17—17, as shown in the various figures, for automatically limiting the spread of the sections 11 and 12 when the device is used as a step ladder as shown in Fig. 1. The spreaders 17—17 include brackets 19—19 fixedly secured to the rails 12a—12a and pivotally supporting the ends of the braces 20—20, which in turn pivotally support the slidable guide members 23—23 on the rails 11a—11a as best seen in Fig. 6.

When the device 10 is opened as shown in Fig. 1, the spreading action of the sections 11 and 12, respectively, effect an angular downward movement to the braces 20—20, their movement being limited by the stop members 25—25, which are fixedly secured to the fixed brackets 19—19. Thus the slidable guide members 23—23 are automatically adjusted to the rails 11a—11a, thereby effectively preventing further spread of the front and rear sections 11 and 12, with respect to each other.

In Fig. 9 the device is shown as an extension ladder, so conformed by extending the front section 11 and fixedly positioning it with respect to the rear section 12. The front section 11 being suitably guided during its extended movement by the top guide members 30—30 and 31—31 which are formed and secured on the yokes 16—16, and in addition by the spreaders 17—17 whose slidable members 23—23 and fixed brackets 19—19 coact as bottom guides and means for limiting lateral movement of the extended section prior to engaging the hooks 32—32 thereof with the appropriate rung 33 of the rear section 12 for the height desired.

### Utilizing the device as a "Step Ladder"

When it is desired to use the device of this invention as a step ladder it is initially necessary that the front section 11 be displaced from its closed position shown in Fig. 3. This is accomplished by lifting the top end of the section 11 a distance sufficient for disengaging the pivot 13 thereat from the yokes 16—16 and also the hooks 32—32 from the bottom rung 33 of the rear section 12, thereby permitting the front section to be lowered sufficiently for engaging its pivot 13 within the

closed ends 14—14 of the yokes 16—16, thus hinging both of the said sections at their top ends.

Following the procedure described above, the sections 11 and 12 are then spread apart thereby producing a downward movement to the braces 20—20 and the slidable members 23—23 of the spreaders 17—17. The movement of the braces 20—20 is limited by the stop members 25—25 which are positioned on the fixed brackets 19—19; thus the sections 11 and 12 are adjusted automatically to a given angle for preventing further spread thereof when the device is used as described above.

When the use of the device as a step ladder has been completed, it may be easily adjusted to a closed position by sliding upwardly the guides 23—23 on the rails 11a—11a, thereby causing the pivoted front section 11 to hinge within the closed ends 14—14 of the yokes 16—16, and subsequently position itself against the rear section 12, whereupon the said front section may then be lifted sufficiently for disengaging the pivot 13 from the closed ends 14—14 of the yokes 16—16, and also for engaging the hooks 32—32 on said section to the bottom rung 33 of the rear section 12; thusly the device is adjusted closed.

#### *Utilizing the device as an "Extension Ladder"*

When it is desired to use the device of this invention as an extension ladder it is initially necessary that the front section 11 be disengaged from its closed position, as shown in Fig. 3. This is accomplished in the same manner described hereinbefore for the use of the device as a step ladder, wherein the front section 11 is displaced from the rear section 12.

Consequently, the front section 11 so disengaged may then be extended to the height desired with suitable guidance at its top and bottom ends during its said movement by the guides 30—30 and the slidable members 23—23 of the spreaders 17—17 respectively, thereby limiting the maximum extended length of said ladder. The members 23—23 in addition cooperatively serve with the fixed brackets 19—19 to limit the lateral movement between the front and rear sections 11 and 12 prior to the adjustment of the extended section 11.

The adjustment of the extended section 11 to the height desired is accomplished by engaging the hooks 32—32 fixed thereon to the appropriate rung 33 of the rear section 12, thereby adapting the device for use as an extension ladder.

When the use of the device as an extension ladder is completed, it may be readily adjusted to a closed position, as shown in Fig. 3, by lifting the extended section 11 at its lower end a distance sufficient to disengage the hooks 32—32 from the selected rung 33, thereby permitting the extended section to be lowered and subsequently positioned on the bottom rung 33 of the rear section 12 by the engagement of its fixed hooks 32—32, whereupon in turn the pivot 13 will engage the yokes 16—16 secured to the top of section 12, thus suitably adjusting the device closed.

It is to be understood that the above-described arrangements are illustrative of the application of the principles of the invention. Numerous other arrangements may be devised by those skilled in the art without departing from the spirit and scope of the invention.

What is claimed is:

1. A combined step and extension ladder comprising a rear section and a front section, each section having spaced apart side rails and rungs therebetween, a yoke member secured to the upper end of said rear section, a front section slidably positioned with respect thereto and having slidably and pivotally mounted thereon a pair of spreaders, said spreaders in embracing relation with the faces and edges of said side rails and having the rear portions thereof pivotally secured to said rear section by inwardly extending brackets, stop means on said brackets for limiting the downward travel of said spreaders and hooks on the lower portion of said front section for engaging the rungs of said rear section for fixedly positioning said section with respect to said rear section to prevent longitudinal movement therebetween.

2. In a combination step and extension ladder comprising front and rear sections, each section having spaced apart side rails and rungs therebetween, said sections having a pivot member and a pair of yoke members positioned at their upper ends respectively for hingedly and detachably securing said sections together, said yoke members provided with angular portions and ear members extending inwardly to serve as guides for the extension of said front section, a pair of spreaders in embracing relation with the faces and edges of the side rails of said front section and adapted to cooperate with the guide portions on said yoke to confine said first section, said spreaders serving to adjust the spread between said front and rear sections by means of slidable members, said slidable members pivotally connected to movable arms which in turn are pivotally connected to brackets fixedly secured to the rails of said rear section, said brackets extending inwardly and provided with stop members for limiting the angular downward movement of said arms and to positively position said slidable members on the rails of said front section for preventing further spread thereof with respect to said rear section, a pair of hook members secured to said front section adjacent the bottom portion thereof and adapted to engage the rungs on the rear section for fixedly positioning said front section with respect to said rear section.

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