Oct. 23, 1962 C. SHORE 3,059,723

EXTENSION LADDER WITH REMOVABLE ANTI-TILTING BRACE

Filed Oct. 31, 1961

Fig. 2.

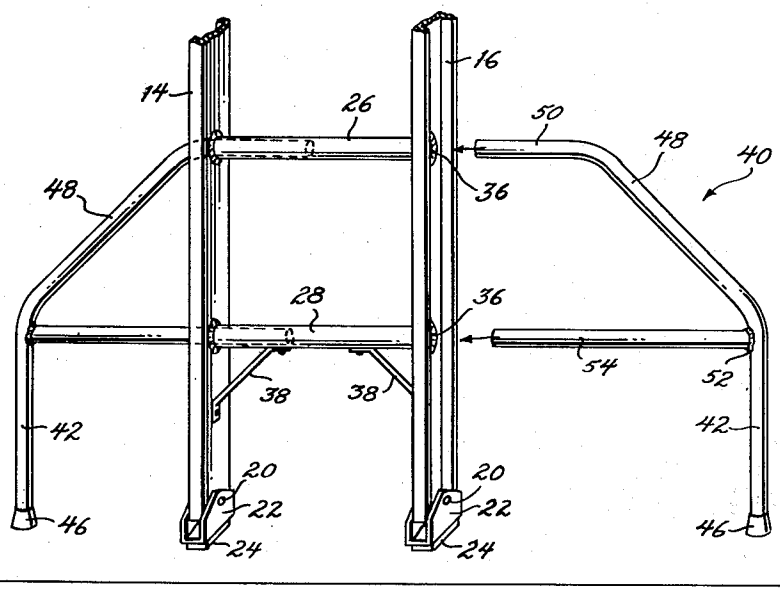


Fig. 3.

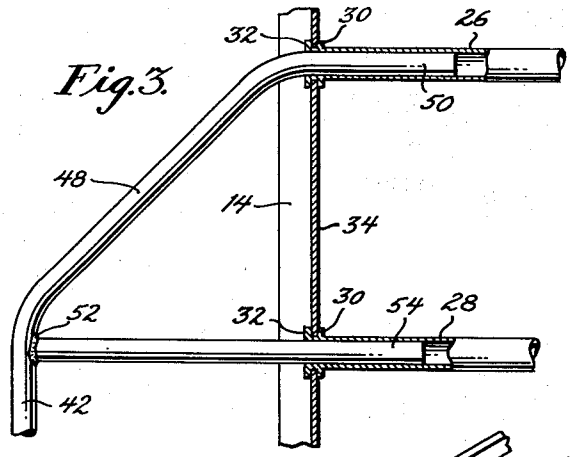


Fig. 1.

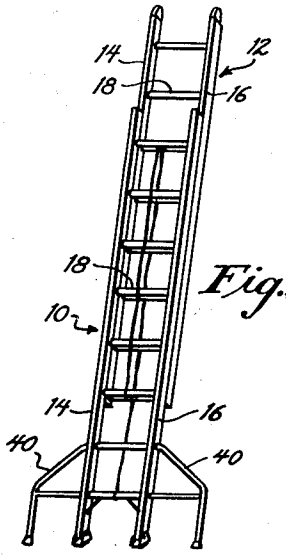
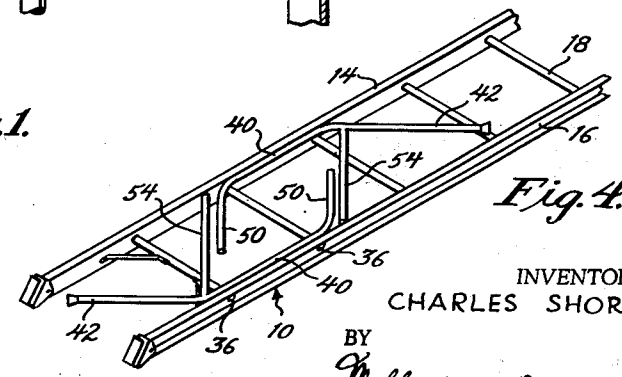


Fig. 4.



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United States Patent Office 3,059,723 Patented Oct. 23, 1962

3,059,723 EXTENSION LADDER WITH REMOVABLE ANTI-TILTING BRACE

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Filed Oct. 31, 1961, Ser. No. 148,988
7 Claims. (Cl. 182—107)

This invention relates to an extension ladder and has for its primary object to provide a ground-engaging bracing means which is readily and removably attached to the side rails of the ladder and extends laterally therefrom to restrain tilting of the ladder from side to side, a safety problem which is not infrequently encountered especially with light-weight ladders when the same is extended to a substantial length and one standing thereon must lean to one side or the other thereof to perform an operation.

Another object of the invention is to provide an extension ladder with ground-engaging, removable anti-tilting braces of such shape and dimensions as to permit them to be disposed on the ladder rungs between the side rails thereof so that the ladder and braces may be compactly packaged for shipping purposes.

Another object of the invention is to provide an extension ladder with hollow rungs opening through the side rails thereof and ground-engaging anti-tilting braces including spaced upper and lower portions adapted to be inserted and retained in the two lowermost rungs.

Yet another object of the invention is to provide an extension ladder and removable anti-tilting braces of the character above described in which the upper portion of the brace is longer than the lower portion so that after initial insertion of the upper portion in the upper rung, the lower portion of the brace is guided into the lower rung of the ladder.

These and other objects of the invention will become more apparent as the following description proceeds in conjunction with the accompanying drawing, wherein:

FIGURE 1 is a perspective view of the extension ladder;

FIGURE 2 is an enlarged fragmentary perspective view of the lower portion of the ladder and anti-tilting braces, one of which braces being shown separated from the ladder but in an about-to-attach position;

FIGURE 3 is a fragmentary view of one side of the ladder and one of the braces attached thereto, the ladder being shown in vertical section; and

FIGURE 4 is a perspective view of the lower part of the ladder with the braces nested therein for compact packaging.

Specific reference is now made to the drawings wherein similar reference characters are used for corresponding elements throughout.

While the invention is applicable to any ladder it is particularly well adapted to extension ladders of light-weight metallic construction since, when these are in a substantial extended position and one standing thereon must lean to one side or the other to perform an operation, the ladder may tilt relative to its longitudinal axis. The ladder comprises a lower or ground-engaging section **10** and an upper section **12** slidably mounted thereon and adapted at its upper end to rest against a wall or other supporting surface, the ladder also including means to releasably lock the two sections in any desired extended position (not shown in detail). The lower as well as the upper section includes side channel rails **14** and **16** between which are secured foot rungs **18** spaced apart a predetermined distance, generally one foot. Pivoted as at **20** to the lower ends of the channel rails of the lower section **10** are channel foot members **22** carrying non-slip ground-engaging foot pads **24**.

All of the rungs are the same in construction and attention is called to the lowermost rungs **26** and **28**, each of which is a hollow tube, as shown in FIGURE 3, having spaced terminal circular flanges **30** and **32** which are crimped or otherwise made to engage between them the web portion **34** of the channel side rail. Thus, the rungs are terminally secured between the side rails in such a manner that there are holes **36** in the web portions thereof contiguous with the bores of the rungs. If desired, the bottom rung **28** may be additionally secured to the side rails by diagonal braces **38**.

To restrain lateral tilting of the ladder, braces **40** are provided each of rod but preferably of tubular construction including a vertically extending portion **42** having a ground-engaging cap **46** at its lower end. Although the vertically extending portion may be normal to the ground for its entire length, it is preferred that its upper portion **48** be angulated in the direction of the side rails. The upper portion **48** terminates in a horizontally extending portion **50** of diameter somewhat less than but approximating the inner diameter of the upper rung **26** and adapted to be inserted therein through the hole **36**. The vertically extending portion **42** has secured thereto as by welding **52** or any other means (or even integral therewith) another horizontally extending portion **54** also of diameter somewhat less than but approximating the inner diameter of the lower rung **28** and adapted to be inserted therein, the horizontal portions **50** and **54** being substantially parallel to each other and spaced conformably with that of the rungs **26** and **28**, the distance between the lower horizontal portion **54** and the ground-engaging surface of the cap **46** also conforming substantially to the distance between the lower rung **28** and the ground-engaging surface of the foot pad **24**. It will also be noted, particularly from FIGURE 2, that the upper horizontal portion **50** is somewhat longer than the lower horizontal portion **54**.

In use each brace **40** is removably attached to the lower section **10** of the ladder by making the upper horizontal portion **50** thereon extend through hole **36** into the interior of the upper rung **26**. In so doing and because portion **50** is longer than portion **54**, the latter will be guided and begin to be inserted through hole **36** into the interior of the lower rung **28**. The insertion motion is continued until virtually the entire length of the upper horizontal portion **50** is inserted in its rung. When both braces are so assembled on the ladder, as seen in FIGURE 1, the lower section will be supported at four points by the foot pads **24** and brace caps **46** and therefore restrain tilting of the ladder around its longitudinal axis. To get satisfactory support it is preferred that the distance between a side rail **14** or **16** and brace cap **46**, when the braces **40** are fully assembled on the ladder, approximate at least the spacing between the side rails themselves, which are generally about 13" apart. When removed the braces may be laid over the rungs between the side rails, as shown in FIGURE 4, to make a compact package for ease of transportation.

While a preferred embodiment of the invention has been shown and described, a skilled artisan may make minor changes without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. In combination with a ladder having side rails and vertically spaced rungs secured therebetween, at least the lowermost two of which are hollow for at least a portion of their length and open terminally through the side rails; anti-tilting means removably attached thereto comprising a pair of braces each having a vertically extending member including a ground-engaging portion and a pair of horizontally extending members carried thereby and vertically spaced conformably with that of the lowermost

two rungs, the external dimensions of said horizontally extending members being less than but approximating the inner dimensions of said two rungs and extending removably thereinto.

2. The combination of claim 1 wherein the upper horizontal member is longer than the lower one whereby the lower horizontal member is guided into its corresponding rung after the upper horizontal member has been made to enter its corresponding rung.

3. The combination of claim 1 wherein said braces are so dimensioned that after assembly in the two rungs of the ladder, the ground engaging portions of the braces are each spaced from its corresponding side rail a distance equal at least to the space between the side rails themselves.

4. In combination with a light-weight extension ladder having a lower section comprised of side rails having ground-engaging ends and vertically spaced rungs secured therebetween, at least the lowermost two of said rungs being hollow and opening through the side rails; anti-tilting means removably attached thereto comprising a pair of braces each having a vertically extending member including a ground-engaging portion and a pair of horizontally extending members carried thereby and vertically spaced conformably with that of the lowermost two rungs, the external dimensions of said horizontally extending members being less than but approximating the inner dimensions of said two rungs and extending removably thereinto.

5. The combination of claim 1 wherein the distance between the ground-engaging portion of each brace and the lower horizontal member conforms to that between the lower rung and ground-engaging ends of the lower section of the ladder.

6. The combination of claim 5 wherein, after assembly in the rungs of the ladder, the ground-engaging portions of the braces are each spaced from its corresponding side rail a distance equal at least to the space between the side rails themselves.

7. The combination of claim 4 wherein the lengths of said horizontally extending members are unequal so that the longer horizontal member, after it has been made to enter its corresponding rung, guides the shorter horizontal member into its corresponding rung.

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