June 3, 1924. 1,496,201

C. E. BAXTER

SELF SUPPORTING EXTENSION LADDER

Filed Jan. 11, 1922 3 Sheets-Sheet 1

Fig. 1.

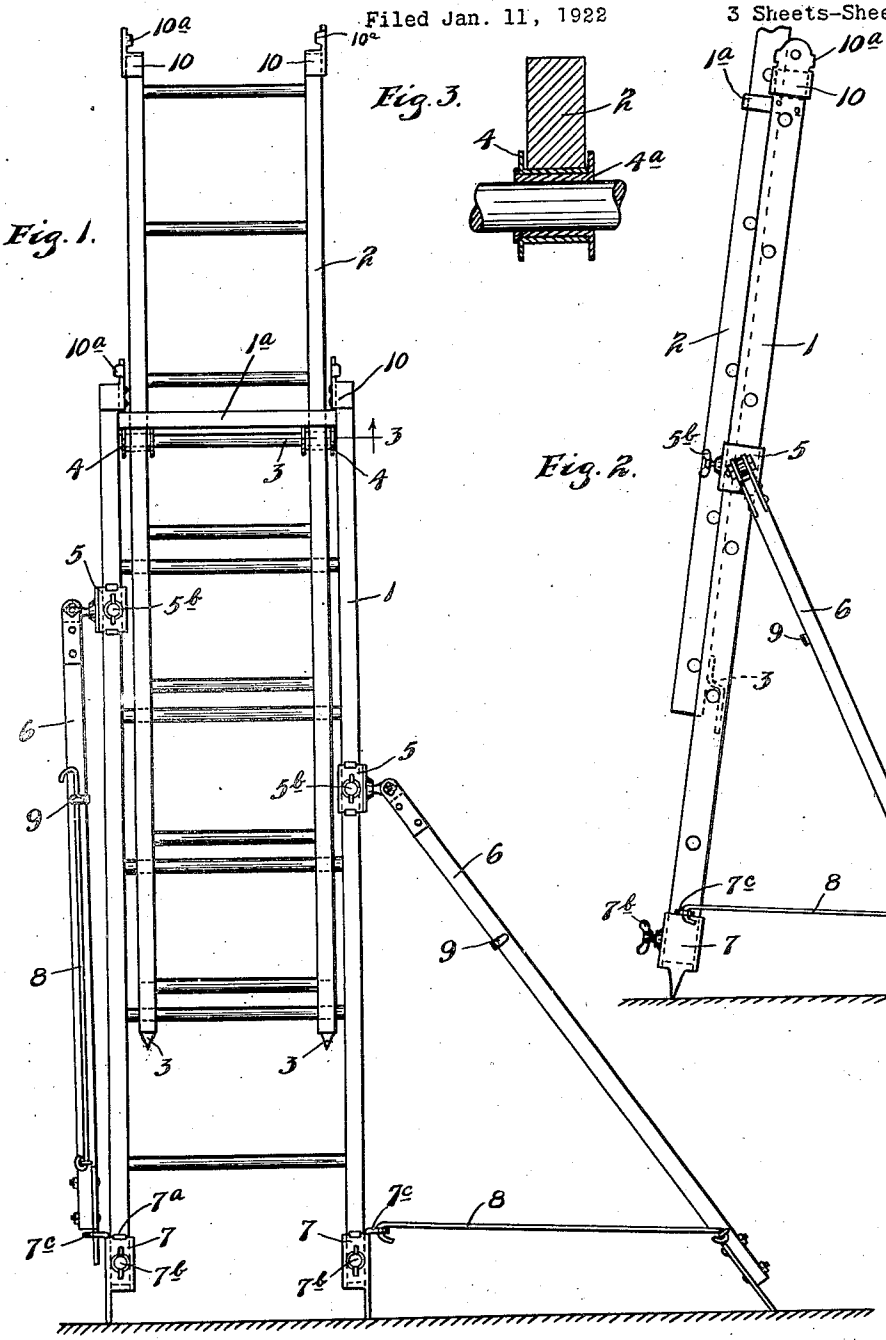


Fig. 3.

Fig. 2.

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Filed Jan. 11, 1922 3 Sheets-Sheet 2

Fig. 5.

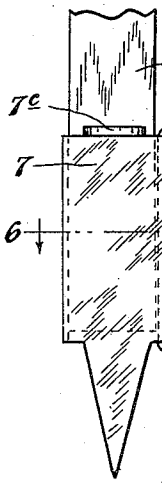


Fig. 4.

Fig. 6.

Fig. 7.

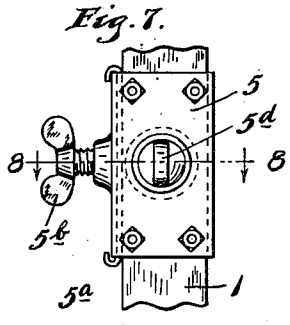


Fig. 8.

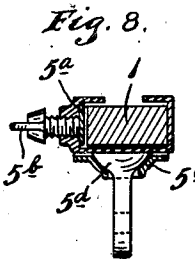


Fig. 9.

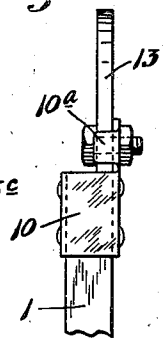
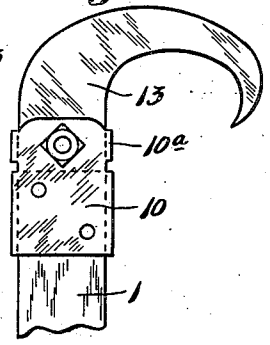


Fig. 10.



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Filed Jan. 11, 1922 3 Sheets-Sheet 3

Fig. 11.

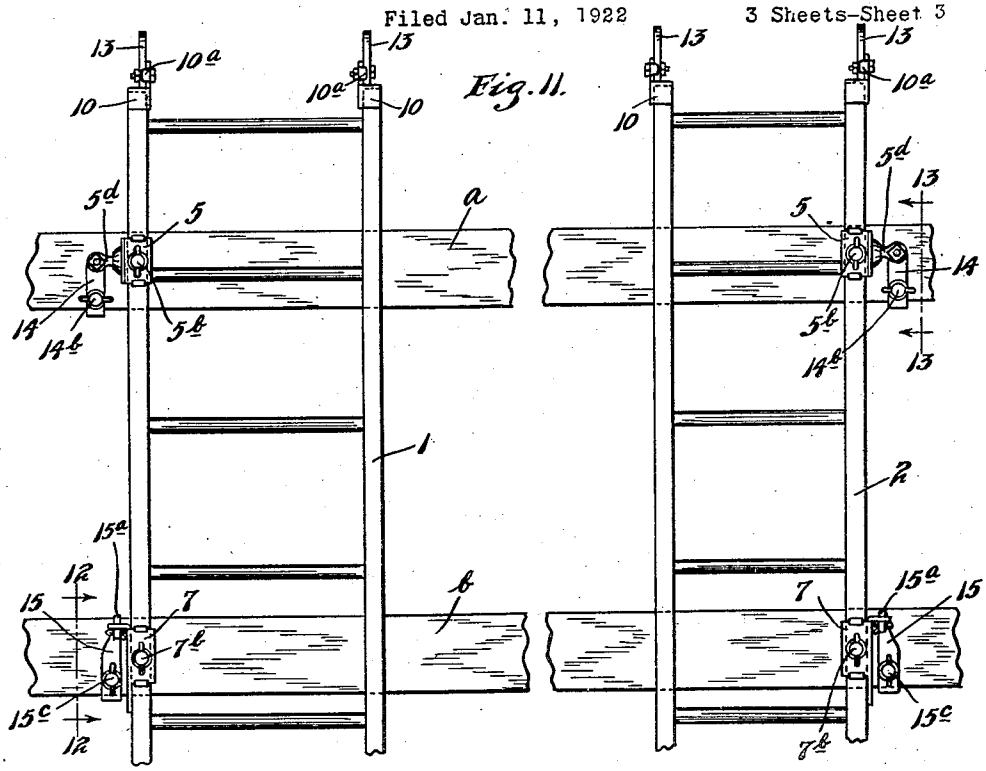


Fig. 12.

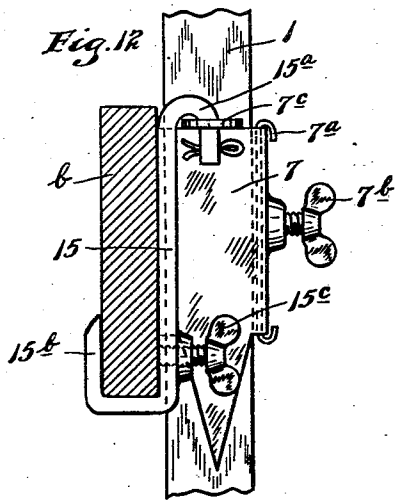
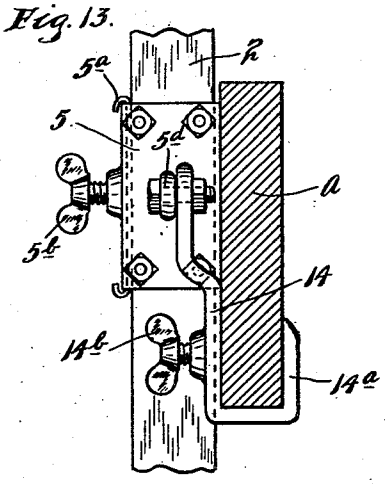


Fig. 13.



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UNITED STATES PATENT OFFICE.

CHARLES E. BAXTER, OF PARK RAPIDS, MINNESOTA, ASSIGNOR OF ONE-FOURTH TO RUSSELL O. WEBSTER, OF PARK RAPIDS, MINNESOTA.

SELF-SUPPORTING EXTENSION LADDER.

Application filed January 11, 1922. Serial No. 528,397.

To all whom it may concern:

Be it known that I, CHARLES E. BAXTER, a citizen of the United States, residing at Park Rapids, in the county of Hubbard and State of Minnesota, have invented certain new and useful Improvements in Self-Supporting Extension Ladders; and I do hereby declare the following to be a full, clear, and exact description of the invention such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an extension ladder of the type in which two ladder sections are employed, one of which is slidable in relation to the other.

It is an object of this invention to provide such a ladder with bracing members connected thereto by a joint comprising pivots disposed at right angles to each other whereby a universal movement of the brace is permitted, said braces being adjustably secured to one of the ladder sections.

It is another object of the invention to equip the top portions of the two ladder sections with connecting devices whereby the said ladder sections can be pivotally connected and conveniently arranged to form a scaffolding support.

It is a still further object of the invention to provide the ladders with attachments whereby the same will have great utility when used in the roofing operations on a building.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to the same parts throughout the different views, and in which—

Fig. 1 is a view in front elevation of the ladder, the brace at each side being shown in a different position;

Fig. 2 is a view in side elevation of the ladder in extended position;

Fig. 3 is a section on an enlarged scale taken on the line 3—3 of Fig. 1;

Fig. 4 is a view in side elevation showing the ladder arranged as a scaffolding support;

Fig. 5 is a view on an enlarged scale of the end members of the ladder;

Fig. 6 is a vertical section taken on the line 6—6 of Fig. 5;

Fig. 7 is a view in side elevation of the brace joint and connecting member;

Fig. 8 is a vertical section on the line 8—8 of Fig. 7;

Figs. 9 and 10 are side and front elevations, respectively, of a hook attachment for the ends of the ladder;

Fig. 11 is a view showing the use of the ladder sections in a roofing operation;

Fig. 12 is a vertical section taken on the line 12—12 of Fig. 11; and

Fig. 13 is a vertical section taken on the line 13—13 of Fig. 11.

Referring to the drawings, the device comprises a ladder section 1 which may be referred to as the outer ladder section, and another ladder section 2 of less width, the side portions of which are adapted to be received within the side portions of the ladder section 1. The ladder section 1 has secured thereto adjacent or at its upper ends a member 1^a comprising a metal strap extending over the top of the side portions of the ladder section 2. The ladder section 2 is equipped adjacent its bottom edges with members 3 comprising flat metal pieces secured to the sides thereof and having a shouldered portion offset from the said sides, the ends of said members being formed as points. The ladder section 1 has one or more of its rounds equipped with an antifriction roller 4 mounted upon a hub 4^a attached to said round. With this structure it will be seen that the sides of the ladder section 2 rest upon the rollers 4 and that said ladder section can be moved longitudinally with respect to the ladder section 1, the sides thereof moving under the strap 1^a and the ladder section being held in various extended positions by the members 3 engaging over the rounds of the ladder section 1, as shown in Fig. 2.

The ladder section 1 has slidable members 5 embracing the sides thereof, which members can also be applied to ladder section 2, the members being shown in detail in Figs. 7 and 8. As shown therein, the said mem-

bers comprise the casing 5 surrounding the sides of the ladder section 1, except at the inner sides where an opening is left so that the members can be moved past the rounds of the ladder section. The clamping plate 5^a is seated in one side of the casing and urged against the top of the ladder section side by a thumb screw 5^b. A plate 5^c is secured to the side of the casing by suitable headed and nutted bolts and is formed with a semi-spherical projection thereon in which is seated a semispherical member 5^d having an apertured projecting stem. Said stem is adapted to be embraced by spaced plates secured to a brace member 6, the said stem and plates being pivotally connected by a suitable headed and nutted bolt. In this structure it will be seen that the brace members 6 are connected to the sides of the ladder section by a joint comprising pivots extending at right angles to each other and that the connecting members 5 can be adjusted longitudinally of the ladder section by manipulating the thumb screws 5^b. The lower ends of the brace members 6 are provided with pointed plate members bolted thereto and the lower ends of the sides of the ladder section 1 are provided with metal sleeve members 7 also provided with pointed ends and having clamping plates 7^a held therein which are urged against the ladder section by the thumb screw 7^b to clamp the members 7 securely thereto. The members 7 are provided at their upper ends with laterally projecting apertured lugs 7^c. When the brace members 6 are extended for use, brace rods 8 which may if desired be constructed to be adjustable in length by a turn buckle, or otherwise, connect the same to the members 7, said brace rods being formed with hooked end portions adapted to hook into the lugs 7^c and into eyelets or staples shown as secured to the brace members 6. When the ladder is not in use, the same is assembled in compact form by swinging the lower ends of the brace members inwardly into parallel relation with the sides of the ladder section 1 and disposing the pointed ends of the plates at the ends thereof in the apertures of the lugs 7^c, the brace rods 8 then being disposed along the sides of the brace members 6, one end thereof being frictionally held in a spring clip 9 secured to said brace rod.

As clearly shown in Figs. 1 and 5, sleeves 7 are open at both ends and are thus reversible so that their pointed ends can be disposed upwardly if desired.

The upper ends of the side portions of the ladder sections 1 and 2 have secured thereto metal members 10 comprising plates surrounding said sides, bolted or riveted thereto, and having upstanding and apertured lug portions provided with spaced lugs 10^a, for a purpose to be later described. If desired, the member 1^a on the ladder section 1 may be made integral with the members 10 thereon or this member may be separate and bolted to the sides of the ladder section.

Referring to Fig. 4, it will be seen that the ladder sections 1 and 2 can be placed with the apertured lugs of the member 10 in alinement said members being connected by suitable pivot bolts so that the ladder sections 1 and 2 can be moved with their base portions extended more or less, as desired. The ladder sections are disposed in this manner to form a support for a scaffolding, the members of which may be placed across the rounds of the ladder. With this arrangement, the braces 6 are disposed as shown in Fig. 4 and adjustable tie members may be used, the said members comprising hook members 11, to one of which is connected a chain 12, and to the end of the other of which is detachably fastened a snap hook adapted to be snapped into different links of the chain, according to the length desired. The sides of the ladder section 1 and the brace 6 may be connected by a similar member, the hooks of which take into the lugs 7^c and the staples in said braces.

The ladder sections are also arranged to be equipped with hook members 13 formed as shown in Figs. 9 and 10 and having an attaching portion consisting of a flat bar adapted to be received between the lugs 10^a of the members 10 and to be bolted to said lugs, the ends of said hook members engaging the tops of the members 10. These hook members are of great utility when the ladder is used for roofing operations, but as will be apparent, are capable of many other uses.

To adapt the ladder sections for use in shingling and other roofing operations, the braces 6 are removed from the member 5^d and said members are equipped with hook shaped devices 14 having an apertured portion adapted to be bolted to the stem of member 5^d and having a rectangular hook portion provided with a clamping screw 14^b in which hook portion a plank or board *a* is adapted to rest. The members 7 of the ladder have connected thereto a somewhat similar device 15 comprising a hook portion 15^a adapted to be received in lug 7^c said hook portion having a split key or other means to prevent its withdrawal. The member 15 also has a rectangular hook portion 15^b at its lower portion equipped with a clamping screw 15^c, these latter hook portions also being adapted to receive and have clamped therein a plank or board member *b*. With this structure, as shown in Fig. 11, the boards *a* and *b* can be quickly and easily adjusted to different positions along

the ladder sections 1 and 2, which are hooked over the comb of the roof by the hooks 13. The rows of shingles or other roofing material can thus be accurately and conveniently put in place.

It is thought the the use and operation of the ladder will be understood from the above description. Attention may, however, be called to the fact that the braces 6 are universally movable so that they can be swung about the sides of the ladder section 1 to any desired position, the members 5 moving on the sides of the ladder section to accommodate such positions. The ladder section 2 can be easily moved to extended position resting on the rounds of the ladder section 1 and the rollers 4. When in this extended position the ladder section 2 is, as stated, supported by members 3 and the brace members will then be disposed, as shown in Fig. 2. As has been found in practice, the brace forms a very efficient support and the ladder will support a great weight at its upper end without any danger of tipping.

The ladder is designed to be constructed of two or more sections, each from twelve to twenty-two feet in length, so that when fully extended, a ladder of forty feet or more in length may be had. The members 5^c and 5^d constitute a type of ball and socket joint and one having a large bearing surface. Various parts of the ladder can be quickly and easily attached and detached and when not in use the ladder can be collapsed to compact position so as to require small space for storage or deportation, as illustrated in Fig. 1.

It will, of course, be understood that various changes may be made in the form, details and proportions of the parts without departing from the scope of applicant's invention, which, generally stated, consists in the matter shown and described and set forth in the appended claims.

What is claimed is:

1. An extension ladder having in combination, an outer ladder section, a sleeve adjustably clamped to the bottom of each side of said section having a point at one end thereof and a laterally projecting apertured lug at its other end, an inner ladder section longitudinally slidable on said outer section, brace members carrying means slidable along the sides of said outer section for the entire length thereof, said brace members having pointed members at their lower ends, stay rods pivoted adjacent the lower ends of said brace rods and engageable in said apertured lugs, clips on said brace members for holding the ends of said stay rods when disengaged from said lugs, said pointed members at the lower end of said brace members being engageable in said lugs when said ladder is collapsed and said brace members are disposed substantially parallel with the sides of said ladder sections.

2. An extension ladder structure having in combination, an outer ladder section, an inner ladder section, the sides of the latter being adapted to be disposed inside the sides of the outer section and to move in parallelism therewith, connecting means secured at the top of the sides of both of said sections whereby the same may be pivotally connected and have their lower ends separated to form a scaffold support, the said connecting means having lugs formed thereon constituting retaining members for hooks adapted to be attached thereto.

3. An extension ladder structure having in combination, an outer ladder section, an inner ladder section, connecting brackets secured to the tops of the sides of both ladder sections having apertures therein, and detachable hook members fitting and adapted to be secured to said connecting brackets through said apertures.

4. The structure set forth in claim 3, said connecting brackets being provided with spaced lugs forming channels, said hook members being disposed in said channels.

5. A ladder having a sleeve embracing the side thereof and slidable thereon, said sleeve having its outer side extended to form a point, a plate within said sleeve and secured at the ends thereof so as to be slidable therewith adapted to contact the side of said ladder and a screw threaded in said sleeve adapted to press said plate against said ladder to hold said sleeve in position.

6. An extension ladder structure having in combination, an outer ladder section, an inner ladder section slidable thereon, means for retaining said inner ladder section in extended position adjustable and detachable pointed supporting members comprising sleeves adapted to embrace and be clamped adjacent the lower ends of said outer ladder section, said sleeves having apertured laterally extending lugs, and brace members having their upper ends universally connected to the sides of said outer ladder section and having pointed lower ends adapted to be received in said apertured lugs when the ladder is in folded position.

7. An extension ladder structure having in combination an outer ladder section, an inner ladder section slidable longitudinally thereon, members embracing the sides of the outer ladder section and slidable thereon, means for holding said members in adjusted position, a plate secured to each of said members, and an apertured stem rotatably mounted between said plate and said member and projecting outwardly through said plate and adapted to have other ladder section parts connected thereto.

8. The structure set forth in claim 7,

brace members having spaced plates secured to the upper end thereof, and a pivot member extending through said plates and the aperture in said stem, said pivot extending at right angles to the axis of said stem.

9. The structure set forth in claim 5, said sleeve having a laterally projecting apertured lug at its end opposite said pointed projection, said lug being adapted to receive a brace rod when the ladder is in operative position, and to receive the pointed end of a brace member connected to said ladder when the ladder is in inoperative position.

In testimony whereof I affix my signature.

CHARLES E. BAXTER.

Witnesses:
C. L. BRADT,
P. A. CHRISTOSON.