

N. BINGER & E. F. BURGSTALLER.

EXTENSION STEP LADDER.

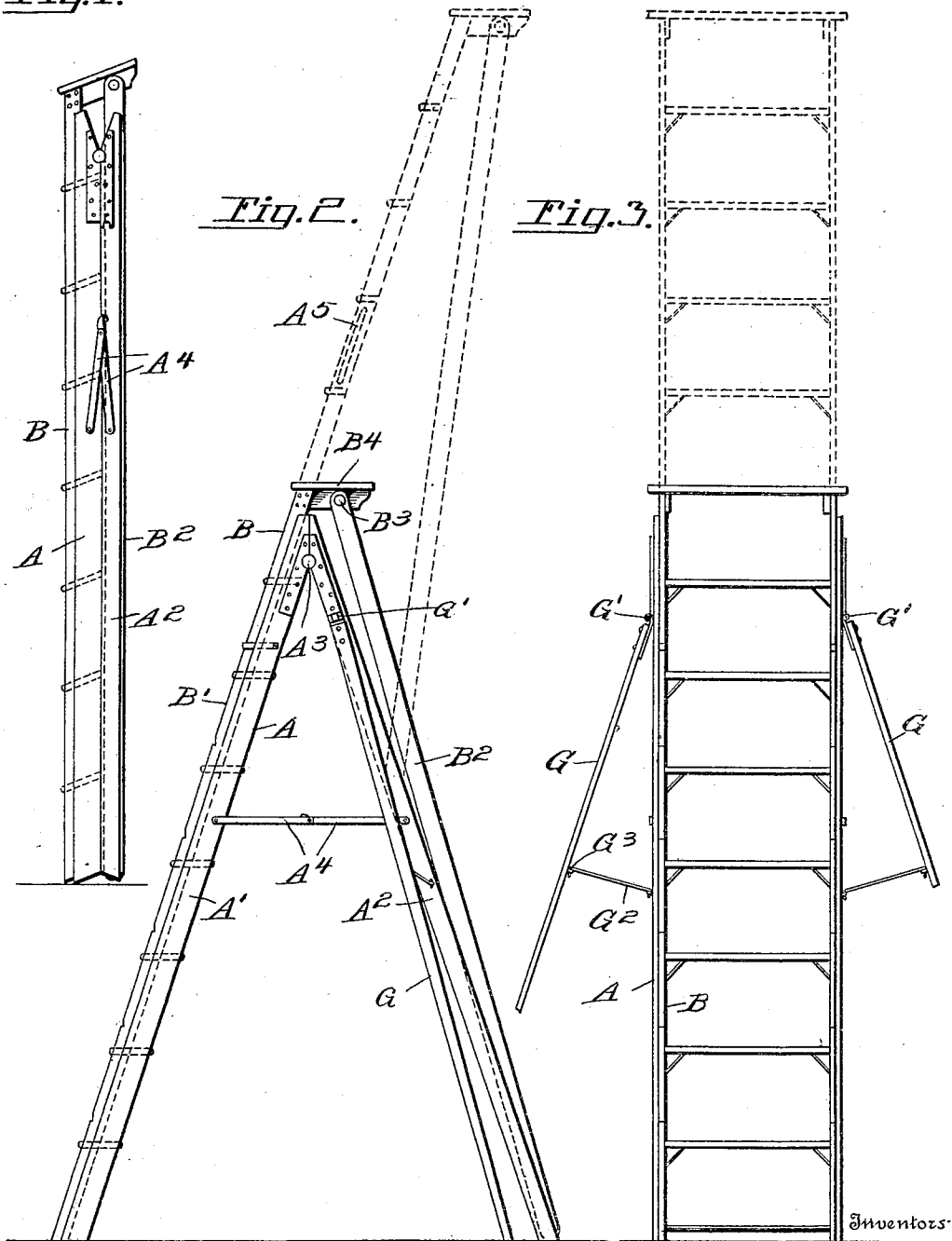
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2 SHEETS—SHEET 1.

Fig. 1.



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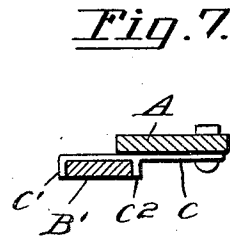
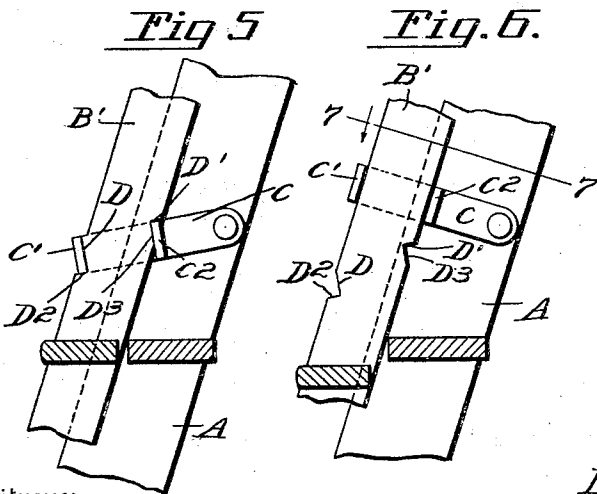
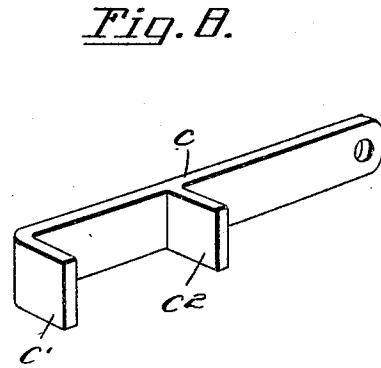
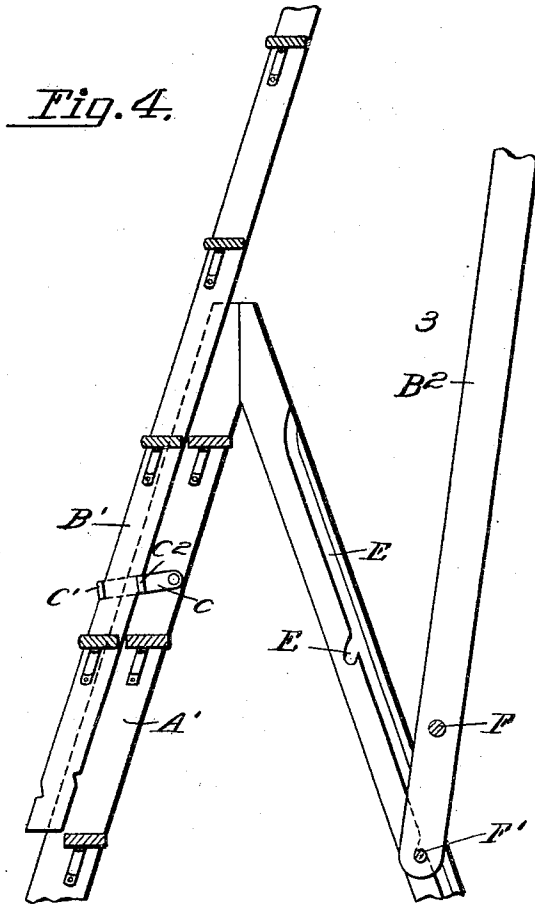
EXTENSION STEP LADDER.

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2 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

NICKOLAUS BINGER AND ERNST F. BURGSTALLER, OF SAN ANTONIO, TEXAS.

EXTENSION STEP-LADDER.

943,511.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, NICKOLAUS BINGER and ERNST F. BURGSTALLER, citizens of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented new and useful Improvements in Extension Step-Ladders, of which the following is a specification.

This invention relates to extension step ladders, the object of the invention being to provide a ladder of this type in which the extension ladder section may be easily and conveniently raised and lowered for adjustment and locked in adjusted position.

Another object of the invention is to provide an extension ladder in which the ladder sections are capable of being disconnected and used as independent ladders.

Still another object of the invention is to provide auxiliary props or braces of novel construction and arrangement to firmly and securely support the extended ladder.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation of the complete extension ladder in folded or collapsed condition. Fig. 2 is a similar view showing in full lines the ladder sections opened ready for extension and illustrating in dotted lines the extension ladder section raised or extended. Fig. 3 is a front view of the same. Fig. 4 is a front to rear section through the upper portion of the main or base ladder section and the lower portion of the elevated extension ladder section. Figs. 5 and 6 are detail sections showing the action of one of the locking devices. Fig. 7 is a horizontal section on line 7—7 of Fig. 6. Fig. 8 is a perspective view of one of the locking devices.

Referring to the drawings, the letter A designates the base or main section and B the adjustable upper or extension section of the ladder. Each of these ladder sections is of the general form of the ordinary step-ladder, the base section comprising a step portion A' and a prop portion A², pivotally connected at their upper ends, as at A³, while the extension section similarly comprises a step portion B' and prop portion B² pivotally connected at their upper ends, as at B³, the said ladder sections differing

mainly in the fact that the bars of the portions of the main ladder section are pivoted directly to each other, while the bars of the step portion of the extension ladder section carry a top step or platform B⁴ to which the bars of the prop portion of said section are pivoted. This platform serves as an upper support on which a person may stand or buckets or implements rest in the use of the ladder in paper-hanging, painting and other operations. The portions of the main ladder section are connected by pivoted folding braces A⁴ which limit their opening movement, while the portions of the extension ladder section are adapted to be connected by folding braces A⁵ pivoted to the bars of the step portion and adapted to detachably engage fastening elements on the prop portion, by which said braces may be folded to an out of the way position when said ladder section is employed for extension purposes and arranged for operation to connect the portions of said ladder section when the ladder is employed as an independent ladder.

The side bars of the step portion B' of the ladder section B are slidably connected with the corresponding bars of the ladder section A by a series of locking devices C, of the construction shown clearly in Figs. 4 to 8, inclusive. These locking devices consist of metallic bars or plates pivoted at one end upon the inner faces of the bars of the portion A' of the ladder section A and having their outer or free ends projecting beyond said bars and each provided with a pair of spaced inwardly extending locking lugs or flanges C' and C², between which lugs or flanges of the locking devices on each of said bars of the portion A' fit and slide the bars of the portion B' of the ladder section B. Any desired number of these locking devices may be arranged on each of the bars of the portion A' between the steps or rounds thereof, so as to firmly and securely guide and hold the portion B' of the ladder section B. The bars B' are arranged to slide in contact with the steps or rungs carried by the bars A' and between the front projecting edges of the ladder, and are formed in their front and rear edges with notches or recesses D and D' adapted to receive and engage the lugs or flanges C' and C² of the respective locking devices, the notches and locking devices being correspondingly spaced upon the respective ladder sections. The notches are

inclined at a proper angle to receive and interlock with the lugs of the locking devices when the latter are tilted downwardly at an oblique angle to the bars A' and extend reversely, the notches D presenting lower shoulders D² and the notches D' upper shoulders D³ for engagement with the lugs to lock the extension ladder section when the locking devices are so tilted firmly and securely in adjusted position. The arrangement of the lugs and notches is such, however, that by elevating the extension ladder section to bring the locking devices from the oblique locking position shown in Fig. 5 to a position at right angles to the bars A', as shown in Fig. 6, the lugs will be released from engagement with the notches and arranged parallel with the edges of the bars B', so that the extension ladder section may be freely raised or lowered and manipulated to bring the locking devices into action to lock said extension ladder section at any desired position in its range of adjustment.

The bars of the prop portion A² of the main ladder section are provided on their inner faces with longitudinal guide grooves E, which grooves open at their upper and lower ends through the rear edges of said bars and communicate at intervals throughout their length with inclined notches or recesses E' formed in the bars and spaced correspondingly to the locking notches in the bars B'. The bars of the prop portion B² of the extension ladder section are connected at their lower ends by cross bars or rods F and F', the ends of which latter project beyond said bars to form locking pins or projections which fit and slide in the guide grooves E and are adapted to engage the notches E' to slidably and adjustably connect the prop portion of the extension ladder section with the corresponding portion of the main ladder section. As the step portion of the extension ladder section is adjusted up or down through the locking devices on the step portion of the main ladder section, the said guide pins on the prop portion of the extension ladder section travel in the groove E, so that both portions of the extension ladder section will be automatically guided and maintained in proper relative position. When the step portion of the extension ladder section is locked in adjusted position by engagement of the notches therein with the locking devices on the main ladder section, the ends of the rod F' will be disposed in position for a simultaneous automatic engagement with opposed notches or recesses E' in the bars A², by which the corresponding portions of the two ladder sections will be synchronously thrown into locking engagement to connect them in a firm and stable manner.

It will be understood from the foregoing description that the two ladder sections may

be folded and collapsed, as shown in Fig. 1, to arrange the ladder sections in compact form for storage or transportation, in which arrangement it will be apparent that said sections will occupy but little if any more than the space of a single ladder section. It will also be understood that the extension ladder section may be adjusted on the main ladder section, when said ladder sections are opened, as shown in Fig. 2, to any desired elevation within its range of adjustment and firmly and securely locked in adjusted position, thus enabling the operator to work at comparatively high elevation in an easy, secure and convenient manner. By a simple preliminary elevation of the parts of the extension ladder section, the ladder may also be released from locking engagement with the main ladder section to raise or lower said extension ladder section or collapse the combination ladder, as occasion may require. The conveniences of our improved combination ladder will accordingly be apparent. When it is not desired to use the device as a combination ladder, the two ladder sections may be disconnected and used independently, thus further increasing its convenience and range of usefulness.

In order to enable the combination ladder to be firmly and securely braced and held from liability of tilting when the extension ladder section is raised to any material degree, brace or prop bars G are provided and pivoted at their upper ends, as shown at G' to the outer sides of the bars of the prop portion A² of the main ladder section A. These braces or prop bars are adapted to be folded against the bars A² when not in use and to be swung outwardly for use, as shown in Fig. 3, so that their lower ends will rest upon the ground or floor and hold the ladder from tilting sidewise in either direction. Hooked rods G² are provided upon the bars A² and are pivotally connected therewith so that their hooked free ends may be engaged with eyes G³ on the brace bars to hold the ladder in bracing position.

Having thus fully described the invention, what is claimed as new, is:—

1. An extension ladder comprising a main ladder section having pivoted step and prop portions, the latter being provided with guideways and spaced recesses communicating therewith, an extension ladder section having pivoted step and prop portions, the former provided with locking notches and the latter with projections to engage the said guideways and interlock with the said recesses of the prop portion of the main section, and pivoted locking elements on the step portion of the main section forming guides for the step portion of the extension portion, said locking elements being provided with spaced projections to engage the notches in the step portion of said extension section.

2. An extension stepladder comprising a main ladder section embodying pivoted step and prop portions, the bars of the prop portion being provided with longitudinal
5 guide grooves and spaced locking recesses communicating therewith, pivoted locking bars upon the bars of the step portion provided each with a pair of spaced guiding and locking lugs, and an extension ladder
10 section embodying pivoted step and prop portions, the bars of the step portion being slidably engaged with the lugs of said locking bars and provided in their front and rear edges with reversely inclined locking
15 notches for engagement therewith, and the prop portion of said extension section being provided with projections engaging said grooves in the bars of the prop portion of
20 the main section and adapted to interlock with the recesses thereof.

3. An extension ladder comprising a main stepladder section having its prop portion provided with guide grooves and locking recesses and its step portion provided with
swinging locking devices having engaging 25 members, and an extension step ladder section having its prop portion provided with projections to engage said guide grooves and locking recesses and its step portion provided with reversely inclined sets of locking 30 notches for sliding and interlocking engagement with the engaging members of said locking devices.

In testimony whereof we affix our signatures in presence of two witnesses.

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