E. A. LANGILLE.

COMBINED STEP AND EXTENSION LADDER.

APPLICATION FILED DEC. 30, 1915.

1,269,463.

Patented June 11, 1918.

2 SHEETS—SHEET 1.

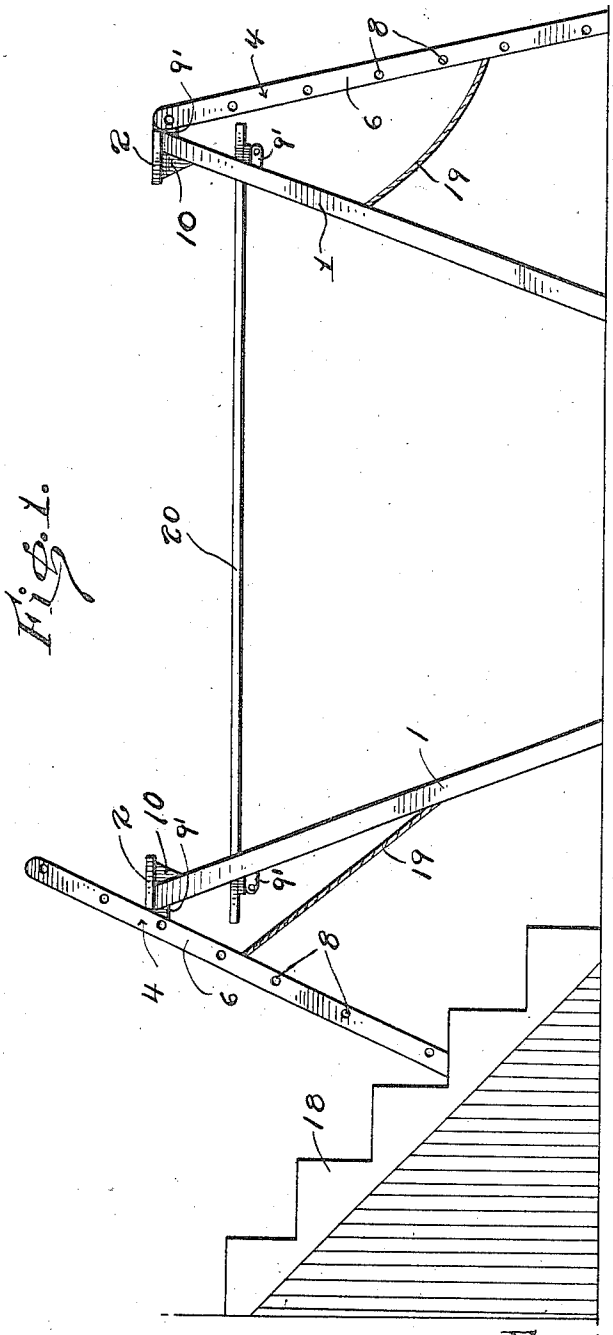


Fig. 1.

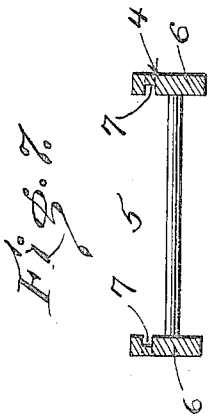


Fig. 7.

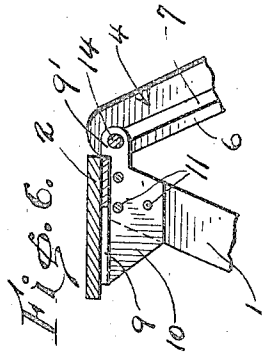


Fig. 6.

INVENTOR

ERNEST A. LANGILLE

WITNESSES

H. F. Costello

BY

ATTORNEY

E. A. LANGILLE.

COMBINED STEP AND EXTENSION LADDER.

APPLICATION FILED DEC. 30, 1915.

1,269,463.

Patented June 11, 1918.

2 SHEETS—SHEET 2.

Fig. 3.

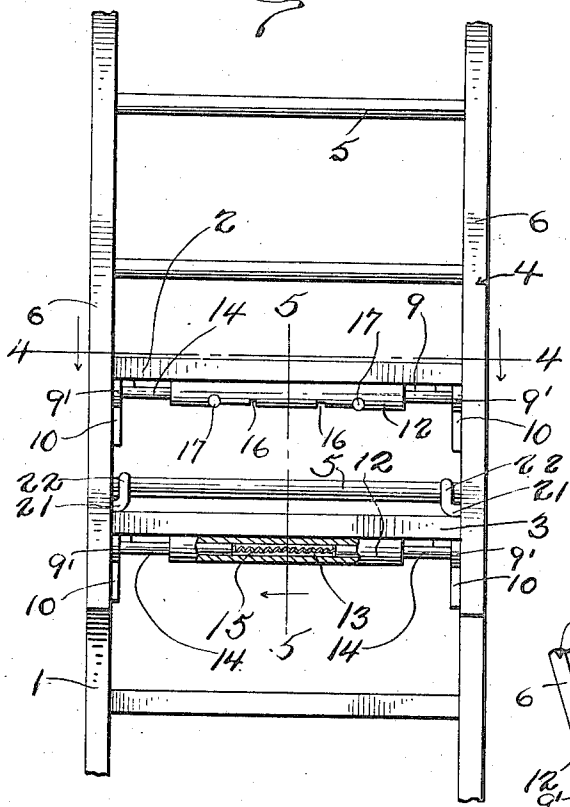
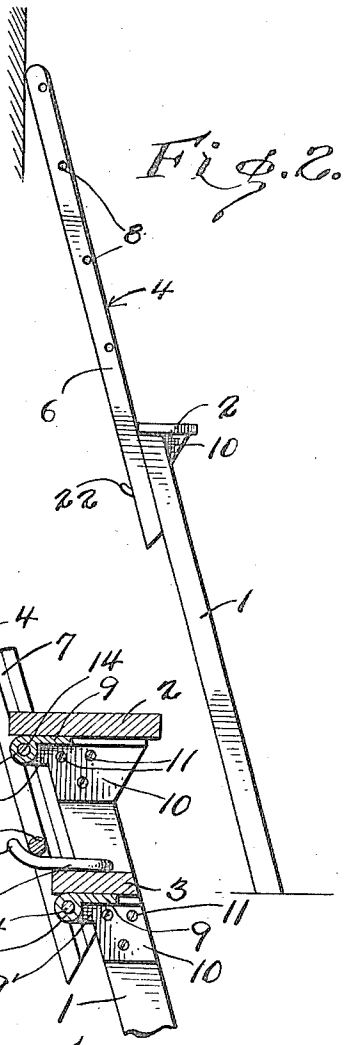


Fig. 2.



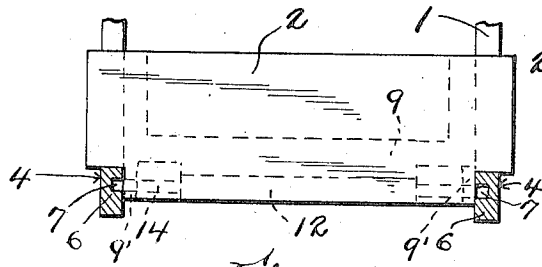


Fig. 4.

Fig. 5.

INVENTOR

ERNEST A. LANGILLE

WITNESSES

H. J. Costello

BY Richard B. Owen.

ATTORNEY

UNITED STATES PATENT OFFICE.

ERNEST A. LANGILLE, OF SAN FRANCISCO, CALIFORNIA.

COMBINED STEP AND EXTENSION LADDER.

1,269,463. Specification of Letters Patent. Patented June 11, 1918.

Application filed December 30, 1915. Serial No. 69,425.

To all whom it may concern:

Be it known that I, ERNEST A. LANGILLE, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Combined Step and Extension Ladders, of which the following is a specification.

My invention relates to ladders and has particular reference to new and useful improvements in step-ladders.

The primary object of my invention is to provide an improved form of step-ladder having means associated therewith to permit the use of the same as an ordinary step-ladder or as an extension ladder.

Another object of my invention is to provide means whereby the prop section of a step-ladder may be either pivotally or slidably connected to the main ladder section whereby to provide for the use of the device as a step-ladder or as an extension ladder.

A further object of my invention is to so construct a step-ladder of the class described whereby the device when used in its capacity as an extension ladder may be locked in an adjusted extended position.

With the above and other objects in view my invention resides preferably in the construction, combination and arrangement of parts as hereinafter set forth in the specification and illustrated in the accompanying drawings, in which,

Figure 1 is a side elevational view of a pair of step-ladders embodying the improvements of my invention showing one application of the device as a step ladder.

Fig. 2 is a side elevational view of my improved step-ladder showing the same in use as an extension ladder.

Fig. 3 is a fragmentary rear elevational view of my invention in use as an extension ladder.

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 3 looking in the direction of the arrow.

Fig. 5 is a vertical sectional view taken on the line 5—5 of Fig. 3 looking in the direction of the arrow, portions of the device being broken away.

Fig. 6 is a fragmentary enlarged view of a portion of the step-ladder adjacent the hinged joint, showing the same in position for use as an ordinary step-ladder.

Fig. 7 is an enlarged transverse sectional view of the prop section of the ladder.

Similar reference characters designate corresponding parts throughout the various views of the drawings.

In the drawings, wherein the preferred embodiment of my invention is illustrated, I provide the usual step-ladder section 1 having the top or cap step 2, and the intermediate steps 3. I provide a prop section 4, said prop section having a plurality of step rungs 5 for use when the device is employed as an extension ladder. The side rails 6 of the prop section 4 are provided on their inner faces with longitudinally extending grooves 7, said side rails 6 also being provided with a plurality of complementally located apertures 8 at intervals throughout the length of the rails and communicating with said grooves.

In order to pivotally connect the prop section with the ladder section 1 when using the device as a step-ladder I have provided a plurality of plates 9 having flanges 10 which are adapted to be bolted or otherwise secured as at 11 to the side rails of the main ladder section, as shown to advantage in Figs. 3 and 5. The plates 9 are preferably disposed beneath the top step 2 and the step 3 of the ladder and adjacent the rear marginal edges thereof, said plates being provided with cylindrical enlargements 12 having concentric bores 13 formed therein to receive and guide a plurality of slidable bolts 14, between which are disposed springs, preferably of the coil type, designated 15, for normally tending to force said slidable bolts outwardly. A plurality of elongated apertures 16 are provided in the cylindrical sections 12, and lateral extensions 17 carried by the bolts 14 project through said apertures to afford means for manipulating the bolts. The slots 16 are enlarged at each extremity to provide recesses for reception of the extensions 17 to maintain the same in a given position.

In order to hinge the main ladder section and the prop section when using the device as a step-ladder, the prop section is adjusted to a position whereby the bolts 14 of the uppermost plate 9 will engage one of the pairs of openings in the rails 6 of the said prop section. This provides a hinged prop section and, as shown to advantage in Fig. 1, the point at which the same is hinged may be changed at will whereby to adjust the length of the prop section for use when adjacent a flight of stairs or the like desig-

nated 18. A rope or other flexible connection 19 may be provided for limiting the movement of the sections 1 and 4. As shown to advantage in Fig. 1, a pair of step-ladders embodying the improvements of my invention may be combined with a stringer or board 20 to form a platform on which work may be done. The hinging of the sections 1 and 4 when in use as a step-ladder is shown to advantage in Fig. 6.

To convert the device into an extension ladder the uppermost plate 9 is connected with one of the pairs of openings 8 in the prop section 4 and the lowermost plate 9 is connected with one of the other pairs of openings 8. To adjust the extension section 4 relative the ladder section 1 the slidable bolts 14 are released from engagement with the openings in said slidable section and the prop section may be moved upwardly or downwardly to the desired position, whereupon the bolts will automatically engage in certain of the openings 8 and maintain the sections in adjusted extended position.

In order to remove strain from the bolts 14 when the device is used as a step-ladder a pair of ears 9′ are formed on the flanges 10 of the uppermost plates, the bolts 14 passing through said ears and being reinforced thereby.

In order to partly remove the strain from the slidable bolts 14 when the ladder is in use as an extension ladder, I provide a pair of pivoted arms 21 having upturned outer ends 22 for engagement under one of the rungs 5 of the prop section 4. It is to be understood that the rungs 5, openings 8, and the distance between the slidable bolts 14 of each of the plates 9 are so related as to permit the arms 21 to receive the weight of the prop section when in extended position. It is of course to be understood that the prop section must be moved upwardly beyond the upturned end 22 of the arm 21 whereupon the latter will fall beneath the rung next above the same. At this time the bolts 14 will automatically lock the prop section and prevent the complete detachment of the sections of the ladder.

From the above description taken in connection with the accompanying drawings it is thought that a clear and comprehensive understanding of the construction, operation and advantages of my invention may be readily gathered. It will be apparent that detachment of the sections for either replacement or repair may be easily accomplished, the parts of the invention being exceedingly simple and the range of uses to which the device may be put is practically unlimited. I desire to lay particular stress upon the slidable bolts 14, brace arms 21 and the grooved rails of the prop section.

While I have shown and described my invention as embodying the preferred structure I desire that it be understood that changes may be made therein which do not depart from the spirit and scope of the invention as claimed.

I claim:

An interchangeable prop or extension ladder having rearwardly extending brackets in proximity of the top thereof carrying slidable bolts, in combination with a further section, the stiles of said section being grooved on the inner faces thereof and adapted to engage said bolts and be slid thereon to extended position, and a series of spaced openings along said grooves interchangeably engageable by the bolts, certain of the openings being near the end of the stiles whereby the section may be pivotally engaged with said bolts in position to serve as a prop.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST A. LANGILLE.

Witnesses:
FRANK SUTTON,
WALTER WILKIE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."