

(No Model.)

2 Sheets—Sheet 1.

H. J. HECKEL.
EXTENSION STEP LADDER.

No. 580,690.

Patented Apr. 13, 1897.

Fig. 3.

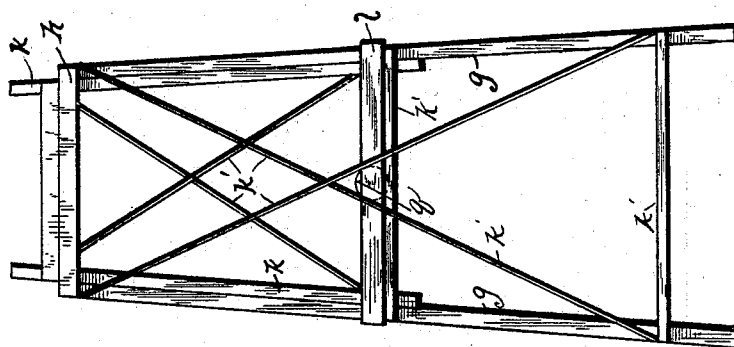


Fig. 2.

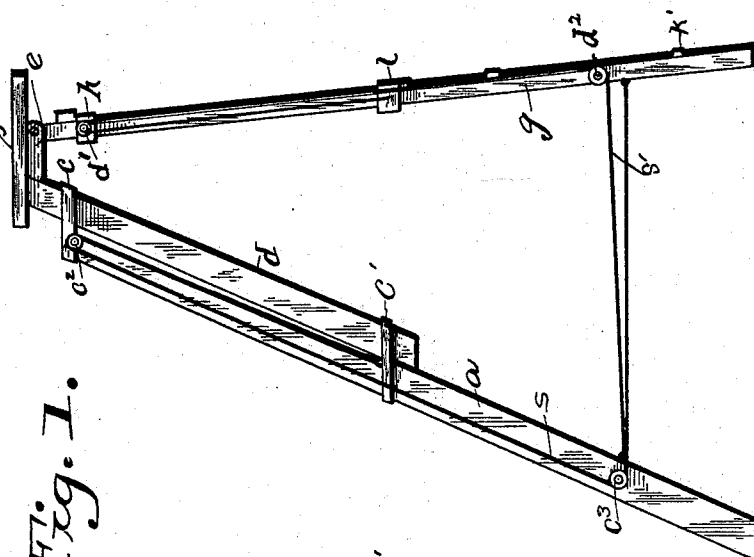
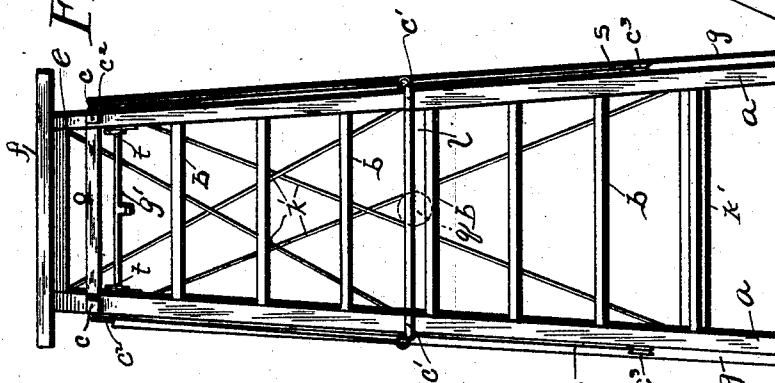


Fig. 1.



Witnesses:

J. R. Appleman

A. M. Mason

Inventor:

Harry J. Heckel.

By Henry C. Ernst Atty.

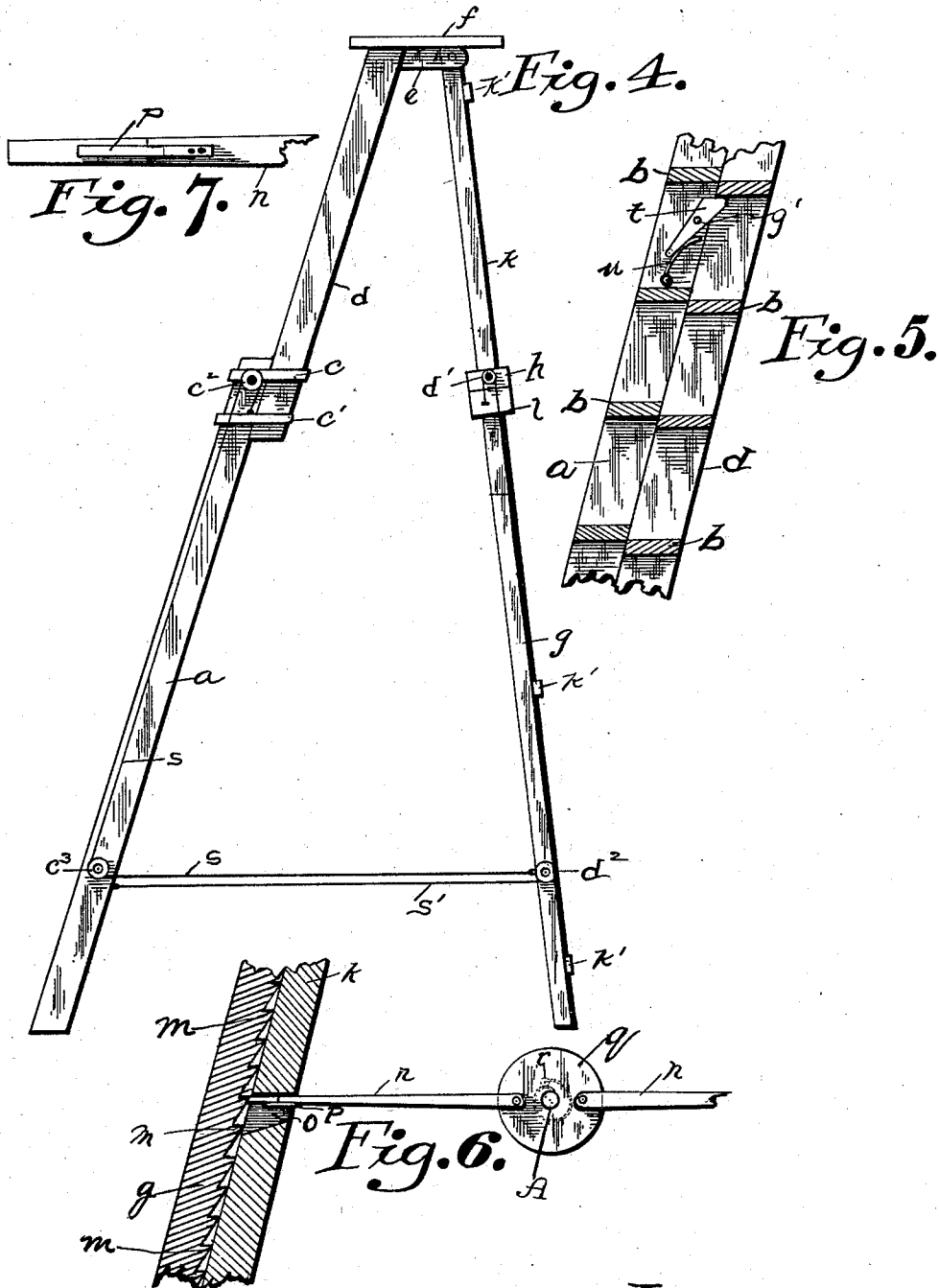
(No Model.)

2 Sheets—Sheet 2.

H. J. HECKEL.
EXTENSION STEP LADDER.

No. 580,690.

Patented Apr. 13, 1897.



Witnesses:

A. R. Appleman
A. M. Wilson

Inventor:

Harry J. Heckel.

By Henry C. Pratt, Atty

UNITED STATES PATENT OFFICE.

HARRY J. HECKEL, OF ALLEGHENY, PENNSYLVANIA.

EXTENSION STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 580,690, dated April 13, 1897.

Application filed November 30, 1896. Serial No. 613,898. (No model.)

To all whom it may concern:

Be it known that I, HARRY J. HECKEL, a citizen of the United States of America, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Extension Step-Ladders, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in extension step-ladders, and has for its object to construct a ladder that can be easily extended and may be folded in a neat and compact form when in the reduced size.

A further aim is to construct an extension-ladder that will be extremely simple in its construction, strong, durable, effectual in its operation, and comparatively inexpensive to manufacture; furthermore, that will be rigid in its construction both when in the reduced or extended form.

The invention finally consists in the novel construction, combination, and arrangement of parts to be hereinafter more specifically described, and particularly pointed out in the claims.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like letters of reference indicate similar parts throughout the several views, in which—

Figure 1 is a front elevation of my improved extension step-ladder. Fig. 2 is a side view of the same. Fig. 3 is a rear elevation with steps removed. Fig. 4 is a side elevation of the step-ladder fully extended. Fig. 5 is a vertical sectional view of a portion of the ladder, showing the catch. Fig. 6 is a vertical sectional view of a portion of the standards, showing the holding device by which the standards are locked in any desired relation to each other. Fig. 7 is a top plan view of a portion of the securing-arm.

Referring now to the drawings by reference-letters, *a a* indicate standards having secured therein the steps or rungs *b b*. Secured at the top of these standards *a a* is a keeper *c*, passing behind the extension-standards *d d*, which are provided near their base with a similar keeper *c'*, which slides on the front of the standards *a*. These extension-stand-

ards *d d* are secured at the top to the connecting-pieces *e e*, on which and on top of the extension is secured the top board *f*. These extension-standards are also provided with steps similar to those of the standards *a a*.

The rear supports of the step-ladder consist of the short upper standards *k* and the longer lower ones *g*, and these standards are connected by the two keepers *h l*. When the ladder is extended its full length, these two keepers are in contact with each other; but when the ladder is shortened the short standards *k* slip down through the upper keepers *h* until the cross-brace and stop *k'* come in contact with them, while the lower keepers slide down over the standards *g* until they come in contact with a second cross-brace and stop *k'*. In order that there may be no slipping of the standards after the ladder has been adjusted into any desired position, there are made a series of recesses *m* in the inner sides of the lower standards *g*, and in these recesses the outer ends of the catches *n* are made to catch after passing through the slots *o* in the short upper standards *k* by means of the spring *p*, which keeps the outer ends of the catches pressed outward. At their opposite ends these braces are pivoted to a disk or wheel *q*, journaled in the keeper *l*, said wheel having secured thereto one end of a spring *r*, having its other end attached to the shaft *A*, which carries the wheel.

The keeper *c'* has attached thereto a cord *s*, which passes over a pulley *c²*, secured near the top of the standards *a*, and over a pulley *c³*, secured near the base of said standards, said cord having its opposite end attached to the standards *g g*. A similar cord *s'* is attached at its upper end to the keeper *l*, passes over pulleys *d'*, secured near the top and base of the standards *g g*, and is attached at its other end to the standards *a*.

A shaft *g'* is secured in the standards *a a* near the top and carries retaining-dogs *t t*, which engage the steps of the extension-standards *d d* and hold the front portion of the ladder in the extended position, said dogs being retained in their position by a spring *u*, attached to the standards *a*. Stiffening-braces *k' k'* are secured to the standards and may be arranged in any suitable manner.

For the purpose of illustrating the opera-

tion of my improved extension step-ladder to enable those skilled in the art to construct and use the same I will assume that the parts have all been secured in their respective positions and it is desired to extend the ladder from the lower or positions shown in Figs. 1, 2, and 3 to the extended position or that shown in Fig. 4 of the drawings. The standards *a a* and *g g* are forced upward, causing the cords *s* to pull on the keepers *c*, and thus having to raise the front portion of the ladder simultaneously therewith the cord *s'* will pull on the keeper *l* and tend to raise the rear portion. As the front portion ascends the dogs *t t* will engage the steps of the extension part and hold the same. As the rear portion of the ladder extends the hinge in the braces *n n* will allow their outer free ends to pass the notches until the desired height is reached, when the standards *k k* will rest on the braces *n n*, the springs *p* serving to form a rigid brace when the weight is on the top. To lower the ladder, the dogs *t* are released from engagement with the step of the extension portion and the disk or wheel *q* turned on its shaft, which serves to move the inner end of one of the braces downward and the inner end of the opposite brace upward, thus serving to withdraw the braces from engagement with the standards and al-

lowing same to descend simultaneously with the standards *d d*.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an extension step-ladder, a shaft *A*, a disk on one end, combined with the two braces, pivoted to the disk and extending in opposite directions, the standard *g*, provided with notches *m*, and the standards *k* provided with openings through which the free ends of the braces pass, substantially as shown.

2. In an extension step-ladder, the standards *a*, provided with steps, the standards *d*, also provided with steps, and spring-actuated catches pivoted upon the standards *a*, and catching under the steps on the standards *d*, combined with the shaft *A*, a disk on one end, the braces *n*, pivoted thereto, the standards *g*, provided with notches on their inner edges, and the standards *k*, having holes through which the ends of the braces pass, substantially as described.

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

HARRY J. HECKEL.

Witnesses:

A. M. WILSON,
H. E. SEIBERT.