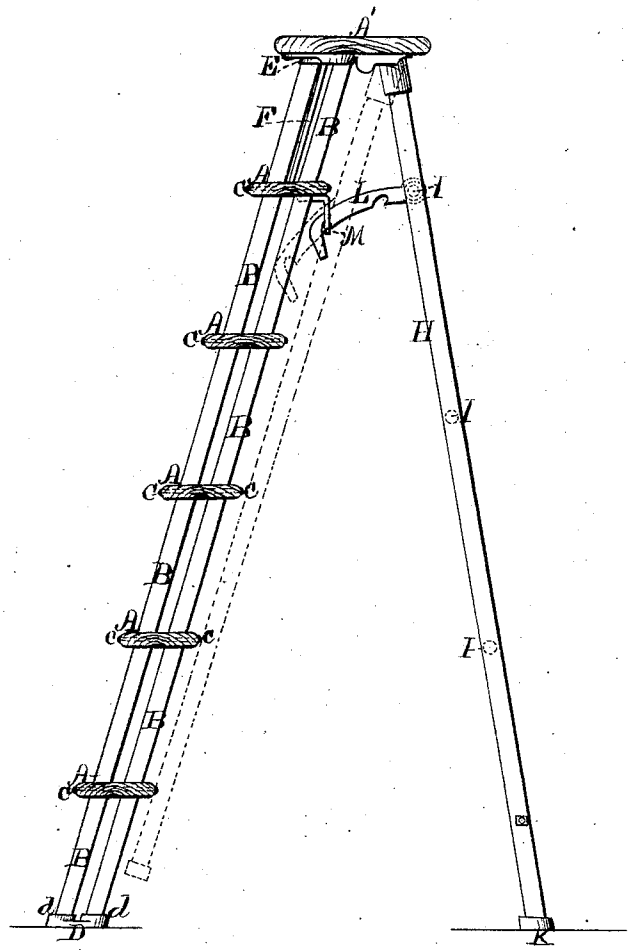
2 Sheets--Sheet 1.

T. F. KIFF.
Step-Ladders.

No. 157,183. Patented Nov. 24, 1874.

Fig. 1.



WITNESSES:

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2 Sheets--Sheet 2.

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Fig. 2.

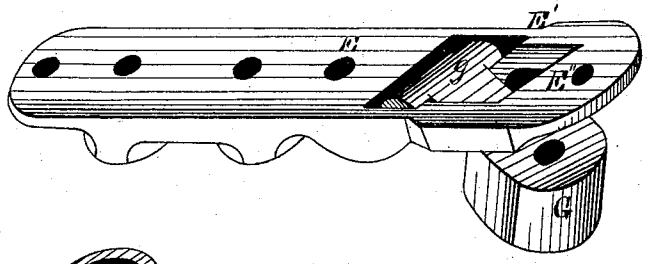


Fig. 3.

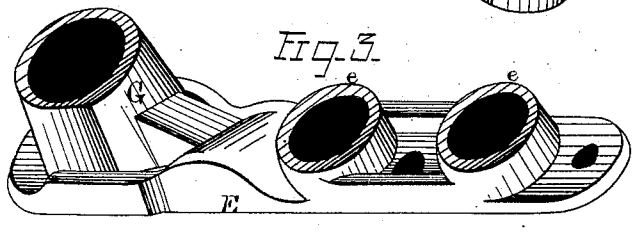


Fig. 4.

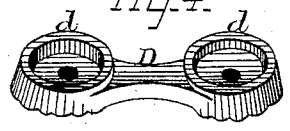
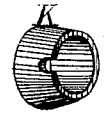


Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS F. KIFF, OF CINCINNATI, OHIO.

IMPROVEMENT IN STEP-LADDERS.

Specification forming part of Letters Patent No. **157,183**, dated November 24, 1874; application filed April 11, 1874.

To all whom it may concern:

Be it known that I, THOMAS F. KIFF, of Cincinnati, in the county of Hamilton and in the State of Ohio, have invented certain new and useful Improvements in Step-Ladders; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a side elevation of my improved device as arranged for use, the dotted lines showing the position of parts when closed together. Figs. 2 and 3 are, respectively, enlarged perspective views of the upper and lower sides of the top plate. Fig. 4 is a perspective view of the bottom plate, and Fig. 5 is a like view of the ferrule employed upon the lower ends of the back brace.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to increase the strength and durability of step-ladders, and decrease their weight and cost; to which end it consists, principally, in the construction and combination of the steps and side bars, substantially as and for the purpose hereinafter specified. It consists, further, in the means employed for connecting together the upper ends of the side bars and back brace, substantially as and for the purpose hereinafter shown. It consists, further, in the means employed for connecting the top plates to or with the ladder, substantially as and for the purpose hereinafter set forth.

In the annexed drawings, A and A represent a series of steps constructed of or from plain pieces of board, and having regularly-decreasing lengths from the lower steps upward. Passing in and through each end of each step are two round openings, within which are placed correspondingly-shaped bars B and B, to which, at equidistant points, said steps are secured by means of bolts C and C, that pass from front to rear through said parts, as shown in Fig. 1. The bar-openings through the steps A and A have an angle of about ten degrees from a vertical line, so that, when the side bars B and B are correspondingly inclined rearward, the faces of the former shall be horizontal, the upper and lower ends being cut upon parallel lines. The lower ends of each pair of side bars B and B are inclosed and connected together by means of a metal plate, D, which, upon its upper side, is provided with sockets *d* and *d*, that correspond to and receive said ends, while upon its lower side said plate is serrated, for the purpose of giving to it a firm bearing upon a floor. A wood-screw, passed upward through said plate into the end of each bar, connects the same firmly together. The upper ends of the side bars B and B are connected together by a metal plate, E, which, as seen in Figs. 2 and 3, is provided upon its lower face with suitable sockets *e* and *e*, for the reception of said ends. A wood-screw is passed through said plate into the end of each side bar, and secures the same together, while a metal rod, F, that passes through and extends between said plate and the step A next below, still further strengthens the connection between said parts. In front and rear of the sockets *e* and *e* the plate E is extended, as shown, and furnishes a bearing and support for a broad upper step, A′, which is connected therewith by means of wood-screws, and, if desired, by causing the rods F and F to extend through said step. Within the rear portion and upper side of the plate E is formed a transverse half-round socket, E′, and in rear of and opening into the same a vertical longitudinal slot, E″, which slot and socket receive and contain a T-shaped bar, *g*, which is attached to and extends laterally outward from one side of a round metal thimble or socket, G, the cross-bar shown being round, and forming a pivotal bearing for and upon which said socket swings. The socket G contains one end of a round wooden bar, H, which from thence extends downward to a point upon a line horizontally with the lower ends of the bars B and B, and is connected to or with a corresponding opposite bar by means of two or more cross-bars or rounds, I and I, that extend between said parts. Said bars are still further strengthened, when desired, by means of diagonal metal braces, which extend between their lower ends and said cross-bars, while their extreme lower ends are contained within corresponding metal thimbles K and K. In order that the relative positions of the step-section and brace-section may be insured, a curved

metal bar, L, (shown in Figs. 1 and 4,) is pivoted at one end upon the upper cross-bar, I, and extends forward and downward through a slotted angle-plate, M, that is attached to the lower side and rear edge of the second upper step, A. The forward end of the bar L is turned downward, so as to prevent its withdrawal from the slotted plate M, and immediately within such hooked end *l* a notch, *l'*, is formed within the lower side of said bar, which notch engages with said slotted plate and locks said parts together.

As thus arranged, it will be seen that the pivoted notched bar L effectually prevents the step and brace sections from moving toward or from each other, and constitutes of said parts a strong and firm step-ladder.

When not in use, the step-ladder may be closed together after the forward end of the pivoted bar L has been raised until its notch *l'* is released from engagement with the plate M, and, after having been so closed, may be locked in position by providing a second notch, *l''*, within the lower side and near the rear end of said pivoted bar, in such position as to engage with said plate M.

The step-ladder thus constructed possesses unusual strength and durability, has but little comparative weight, and can be so easily and quickly constructed as to render its cost as low as those commonly used.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. The steps A and A, provided with round openings near their ends, and combined together by means of the bars B and B and bolts C and C, substantially as and for the purpose specified.

2. In combination with the step-section A, A, B, and B, and the brace-section H, H, I, and I, the plate E, E', E'', *e*, and *e*, and the socket G and *g*, said parts being constructed to operate in the manner and for the purpose substantially as shown.

3. In combination with the side bars B and B, the plates E and E, provided with the sockets *e* and *e*, and connected to or with said bars by means of the rods F and F, substantially as and for the purpose set forth.

4. The plates D and D, provided with the sockets *d* and *d*, and combined with the side bars B and B, in the manner and for the purpose substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 7th day of April, 1874.

THOMAS F. KIFF.

Witnesses:
L. H. BOWERSOX,
WILL. S. BURROWS.