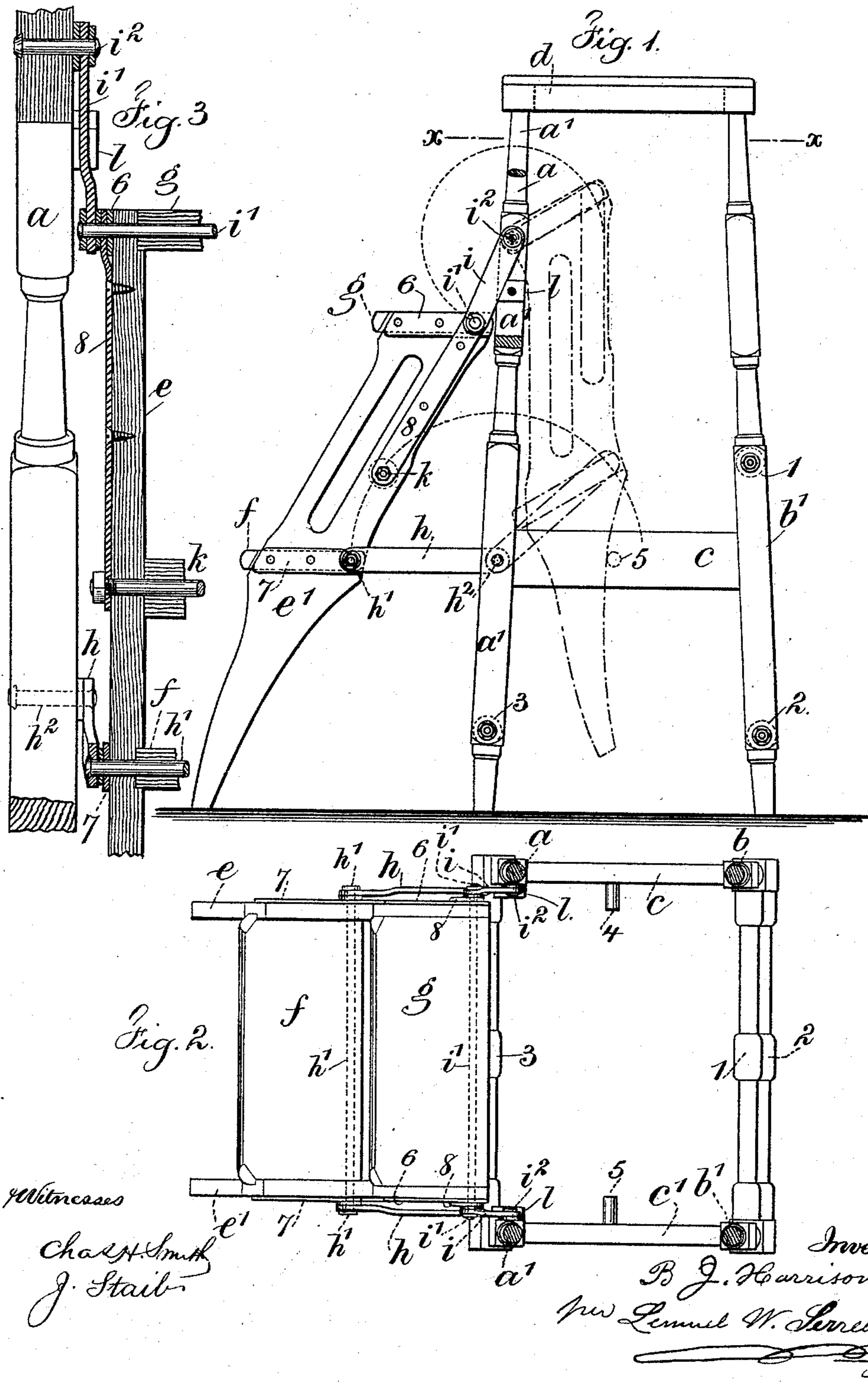


(No Model.)

B. J. HARRISON.
STEP LADDER.

No. 497,096.

Patented May 9, 1893.



UNITED STATES PATENT OFFICE.

BENJAMIN J. HARRISON, OF NEW YORK, N. Y.

STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 497,096, dated May 9, 1893.

Application filed February 18, 1893. Serial No. 462,845. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN J. HARRISON, a citizen of the United States, residing at the city, county, and State of New York, have invented an Improvement in Step-Ladders, of which the following is a specification.

My invention relates especially to step ladders for household use. These step ladders have usually consisted of a standard to which have been pivoted side frames and two steps so that the ladder has nominally consisted of three steps made up by the two steps and the platform of the standard. These two steps with their side frames have heretofore been pivoted to the standard about centrally of their length and have been adapted to turn over within the standard out of the way, so that when set aside no more space was occupied than that consumed by the standard itself. These ladders are very convenient for household use in removing and replacing articles, dusting, &c., but they have not heretofore been made very staple, and many accidents have occurred in their use from parties standing on the platform of the standard adjacent to a wall pressing against the wall and tipping back the standard, which action instantly turned the steps and their frame within the standard and allowed the standard to fall over, thereby causing a bad fall to the person using the steps, and the object of my invention is mainly to overcome this objection.

In carrying out my invention the two steps and their side frames are pivotally connected to two legs of the standard by pairs of links of unequal length, and the steps rise and swing over vertically within the frame of the standard to close the step ladder. When the two steps and their frame are in a distended position one pair of links occupies a nominally horizontal position, and the other or upper pair of links a slightly inclined position in which the lower pivot comes within or below a line drawn between the upper pivot and the outer pivot of the lower pair of links, and said upper pair of links come against permanent stops on the legs of the standard to which such links are pivoted. In this way a rigid bearing or stop is secured for the movable steps and their frames, and in use a backward pressure upon the standard only serves to

tighten and make more rigid the position occupied by the steps and their links, so that it is impossible to overturn the step ladder.

In the drawings, Figure 1 is a side elevation with part of one of the legs removed representing my improved step ladder. Fig. 2 is a sectional plan at the line $x x$ of Fig. 1, and Fig. 3 is a detached partial sectional view in larger size showing the link connections at one side of the step ladder.

The standard is composed of the four legs $a a'$ and $b b'$. These legs are connected at the top by the platform or top of the standard d , and upon two sides are the brace bars or rails $c c'$. The legs $a a'$ are connected at their lower ends by the rung 3, and the legs $b b'$ are connected by the rungs 1 and 2. A clear space is thus provided between the legs $a a'$ above the rung 3 for the movable frame and steps. This movable frame and steps are composed of the side portions $e e'$ and the steps $f g$, and these are connected together permanently and rigidly in any well known manner.

Upon each outer face of the sides $e e'$ and extending across the same are provided metal plates 6 and 7 and there are also metal plates 8 that run lengthwise with said sides adjacent to their back edges. Pairs of links $i i$ and $h h$ of unequal length connect the frame and steps to the standard, the pairs of links $i i$ being connected by pivots $i' i'$ to the upper end of the frame and steps and by the pivots i^2 to the legs $a a'$ of the standard. The frame and steps are also pivoted at or near the central portion by the pair of links $h h$ to the legs $a a'$ adjacent to the brace bars $c c'$, there being pivots at $h' h'$ connecting said links to the frame and steps, and pivots at $h^2 h^2$ connecting said links to said legs of the standard. The plates 6 and 8 overlap each other at the upper corners of the side pieces $e e'$, and the pivots $i' i'$ are preferably the ends of a rod that passes through the links $i i$ through the respective plates 6 and 8 through the side pieces $e e'$ and across said frame and steps. The plates 7 are also upon each outer face of the sides $e e'$ and the pivots $h' h'$ are also preferably the ends of a rod that passes across the frame and steps and through the plates 7 and links $h h$. These pivot rods i'

and h' form a rigid connection across the frame and steps and the plates 6 7 and 8 upon the respective faces of the sides $e e'$ form metallic bearing surfaces for said pivot rods i' h' that are independent of any bearing that said pivot rods may have in the wood of the sides $e e'$. The parts are thus made very strong and any liability of the wood breaking or the pivot rods pulling out of the wood is thus prevented.

I may prefer to employ a pivot rod k passing across the frame and steps and through a rung connecting said steps, this pivot rod passing through the lower ends of the plates 8. These plates 6 7 and 8 will preferably be connected upon the sides $e e'$ by wood screws.

Fig. 1 represents the extended position of the frame and steps with the pair of links $h h$ occupying nearly a horizontal position, and the pair of links $i i$ an inclined position resting against the stops or blocks $l l$ upon the inner faces of the legs $a a'$, and in this position it will be noticed that the pivot rod i' comes within or below a line drawn from the pivots i^2 to the pivot rod h' . It will be thus seen that a backward pressure by any one standing on the platform or top d cannot move the links $i i$ outwardly, but such pressure will tend to force said links more nearly into a vertical position and more strongly against the stops $l l$.

In Fig. 1 the curved dotted lines show the direction of movement of the frame and steps from their distended position to the dotted position shown which they occupy when within the standard. In this position the sides $e e'$ come against the stops 4 and 5 projecting inwardly from the brace bars $c c'$. These stops prevent the further downward movement of the frame and steps within the standard and act together with the pairs of links to support the same so that the standard and steps occupy no more space when set aside in a closet or other convenient location than the standard would of itself.

I claim as my invention—

1. The combination in a step ladder with a standard, of a movable frame and steps and two pairs of links by which the same is piv-
50 oted to the standard and adapted to swing

over within the standard, substantially as set forth.

2. The combination in a step ladder with a standard, of a movable frame and steps, two pairs of links of unequal length pivotally connecting the standard with the frame and steps, one pair of said links being pivoted at the upper end of said frame and steps and the other pair about centrally thereof, the pivots at the upper end when said frame and steps are distended falling within or below a line drawn from the upper pivots of the standard to the lower pivots of the frame and steps, substantially as and for the purposes set forth.

3. The combination with the standard and the frame and steps, of the pairs of links $i i$ and $h h$ pivoted at one end to two of the legs of the standard and at their other ends to the frame and steps, metal bearing plates fastened to the frame and steps and through which the pivots of the links pass, stops for arresting the downward movement of one pair of links and stops within the standard for the frame and steps, substantially as set forth.

4. The combination with the standard and the frame and steps, of the pairs of links $i i$ and $h h$ each pivoted at one end to the legs of the standard, metallic bearing plates upon the sides of the frame and steps, the pivot rods $i' h'$ passing through the other ends of said links, through the metal bearing plates and across the frame and steps, substantially as set forth.

5. The combination with the standard and the frame and steps, of the pairs of links $i i$ and $h h$ of unequal length pivoted at one end to two of the legs of the standard, the metal plates 6, 7 and 8 upon the outer faces of the frame and steps and forming bearings, the pivot rods i' and h' passing through the other ends of said links and through said plates and extending across the frame and steps, the stop blocks $l l$ and pins 4 and 5, substantially as set forth.

Signed by me this 15 day of February, A. D. 1893.

B. J. HARRISON.

Witnesses:

GEO. T. PINCKNEY,
HAROLD SERRELL.