W. P. NEWMAN & H. P. EATON.

STEP LADDER.

APPLICATION FILED APR. 14, 1913.

1,102,428. Patented July 7, 1914.

Fig. 1.

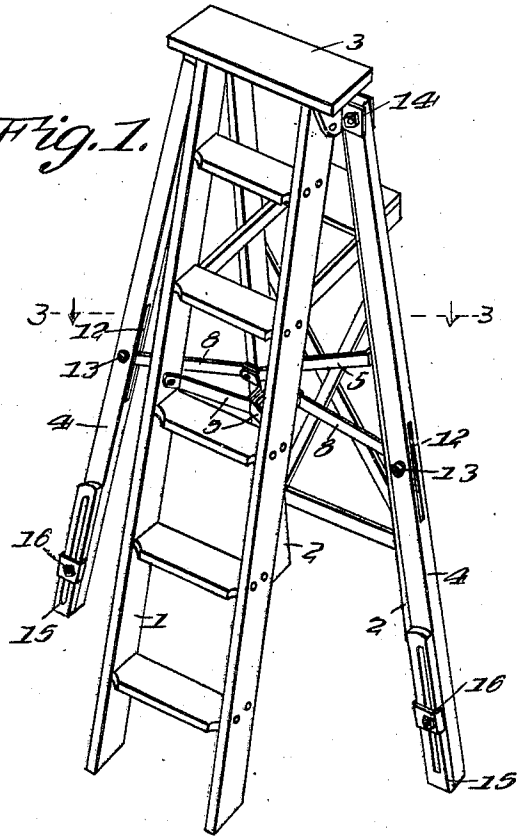


Fig. 2.

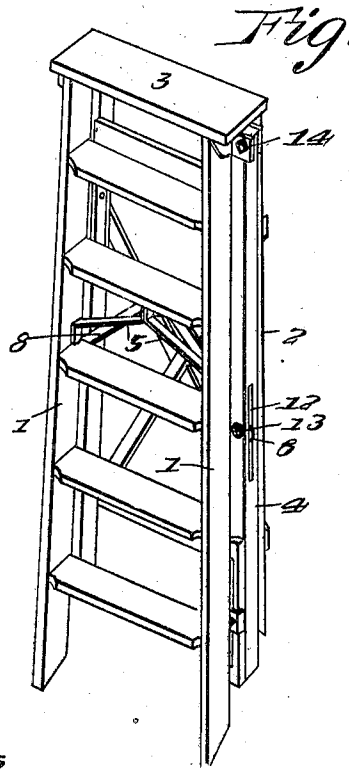


Fig. 3.

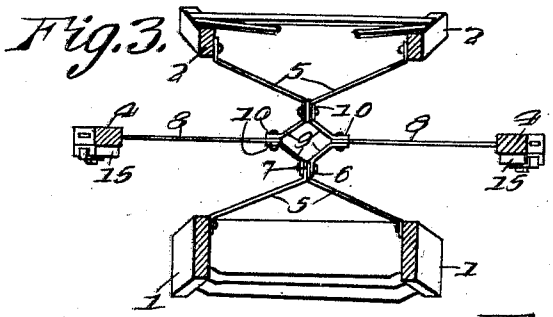


Fig. 4.

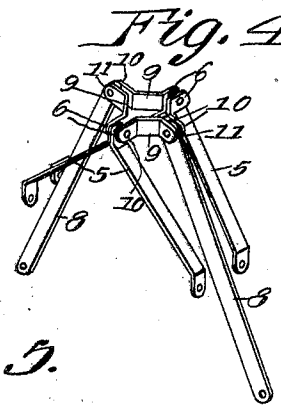
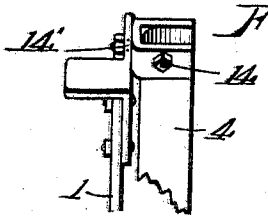


Fig. 5.



WITNESSES

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STEP-LADDER.

1,102,428. Specification of Letters Patent. Patented July 7, 1914.

Application filed April 14, 1913. Serial No. 760,883.

To all whom it may concern:

Be it known that we, WILLIAM P. NEWMAN and HORACE P. EATON, citizens of the United States of America, residing at Bucyrus, in the county of Crawford and State of Ohio, have invented certain new and useful Improvements in Step-Ladders, of which the following is a specification.

This invention relates to certain new and useful improvements in collapsible supporting structures, which may be of the step-ladder, derrick or rigging type, the latter commonly used in the drilling of wells, and relates more particularly to bracing means for such structures.

The primary object of the invention is to provide bracing means which are automatically actuated to operative and folded or inoperative positions by the opening and closing movements respectively of the ladder or the like.

Further the invention aims to provide a simple, compact and inexpensive means for bracing the ladder, or other structure.

A further object of the invention is to allow either of the side braces to be easily and quickly disengaged from the operating means in case one or the other side of the ladder is to be placed close to a wall, and the invention still further aims to provide means for allowing the side braces to be adjusted so as to effect engagement with uneven surfaces should the latter be encountered.

In the drawings: Figure 1, is a perspective view of a step-ladder equipped with the present invention, the parts being shown in operative position; Fig. 2 is a view similar to Fig. 1, the parts being shown in folded or collapsed position; Fig. 3 is a horizontal section on the line 3—3 of Fig. 1; and Fig. 4 is a detached perspective view of the invention. Fig. 5 is an enlarged detail view of the means for pivotally connecting the side rails to the top.

The invention is shown applied to, or in connection with, a step-ladder, but it will be understood that same may be used in connection with any form of rigging, or derrick or the like. The front and rear legs 1, and 2, respectively, are hingedly connected as usual to a top part 3. Hingedly connected to the top part 3 are side or lateral braces 4. A pair of links 5 are pivoted at their outer ends to each of the front and rear legs 1 and 2 and at their inner ends the links converge and are formed with perforated ears 6, which abut and are pivotally connected by means of rivets 7. The side braces 4 have a link 8 pivoted thereto, the inner ends of the links being pivotally connected to a series of U-shaped brackets 9. As depicted in the drawings there are four of these brackets employed, which latter are arranged in a substantially square formation, each bracket having an outwardly extending ear 10 at each end, the brackets having their ears 10 pivotally connected by rivets 11 to the side braces 8 and by the rivets 7 to the ears 6 of the links 5, the ears 10 of the brackets being arranged on opposite sides of the side links 8 and on opposite sides of the abutting ears 6 of the links 5. The side braces 4 are preferably formed with slots 12 in which the outer ends of the side links 8 extend and are pivoted by means of pins 13, the purpose of which is to allow one or the other of the pins 13 to be moved and the link 8 thereby disconnected from the braces to press the ladder close to a wall on one side of the former, should this use be necessary. When the side link is removed, it will be understood that the same drops down and the side braces 4 can then be moved about its pivotal connection 14 and in the plane of the side rails 1 and drop legs 2 about the pivot 14^1 with the top 3 to occupy a position parallel with the front and rear legs 1 and 2. The ends of the side braces are provided with foot extensions 15 that may be held in adjusted position by means of bolts 16, for the purpose of maintaining the ladder level at all times, that is to say that if the ladder is placed on uneven ground or other surface, the foot 15 can be moved to provide for such unevenness to thereby hold the ladder steady and level.

In operation, by simply spreading the front and rear legs from the position shown in Fig. 2, to that depicted in Fig. 1, the links 5, due to such spreading movement will move the connecting brackets 9 downwardly, with the result that the side links 8 at their inner ends will be given corresponding movement, whereby the lower ends of the links 8 will be moved downwardly thereby causing outward movement of the side braces 4. It will therefore be observed that the movement of the side braces 4 to operative position is entirely automatic. In closing the ladder it is merely necessary to

move the front and rear legs toward one another which will move the connecting brackets upwardly causing the upper ends of the links 8 to move therewith, with the result that the lower ends of the links will move inwardly carrying the side braces 4 therewith. The side braces 4 have a compound pivotal connection with the top 3, that is to say they are movable both laterally of the top and longitudinally thereof as well, whereby in opening of the ladder the links 8 cause the side braces 4 to first move laterally of the top 3 and then longitudinally away therefrom to assume the position shown in Fig. 1. In closing the ladder the braces are moved laterally of the top 3 and then inwardly toward same, bringing the parts in the position depicted in Fig. 2 of the drawings. The braces are placed upon the ladder, as you will note, so that the pivotal bracket connections will be positioned below the plane of the top of the braces to lock the braces and ladder proper in position for using.

What is claimed is:

1. In a collapsible support including front and rear legs, and means to connect said legs at their tops, side braces, means to connect the side braces to the top so that said braces are movable laterally and longitudinally of the top, a pair of links for each of the said respective legs pivoted at their outer ends thereto, a link for each side brace pivoted thereto, and means to connect all of the inner ends of the links together, whereby opening and closing of the legs effects corresponing movement of the braces.

2. In a collapsible support including front and rear legs, a top, means to connect the legs to the top, side braces, means to connect the side braces to the top so that said braces are movable laterally and longitudinally of the top, and means to connect the front and rear legs and each of the braces so that when the rear legs are moved away from the front legs the side braces will be moved away from the front legs and laterally with respect thereto.

3. In a collapsible support including front and rear legs, and means to connect said legs at their tops, side braces pivotally connected to said means for lateral and longitudinal movement, and a device located substantially central of the space between the front and rear legs and the side braces and having radiating connections with each of the front and rear legs and side braces whereby movement of the rear legs will effect movement of the side braces to operative and inoperative position.

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

WILLIAM P. NEWMAN.
HORACE P. EATON.

Witnesses:
JOHN H. COSS,
ELIZABETH KIPP.