March 21, 1961 A. J. ANDERSON ET AL 2,975,856

COLLAPSIBLE STEP STOOL

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Fig. 1

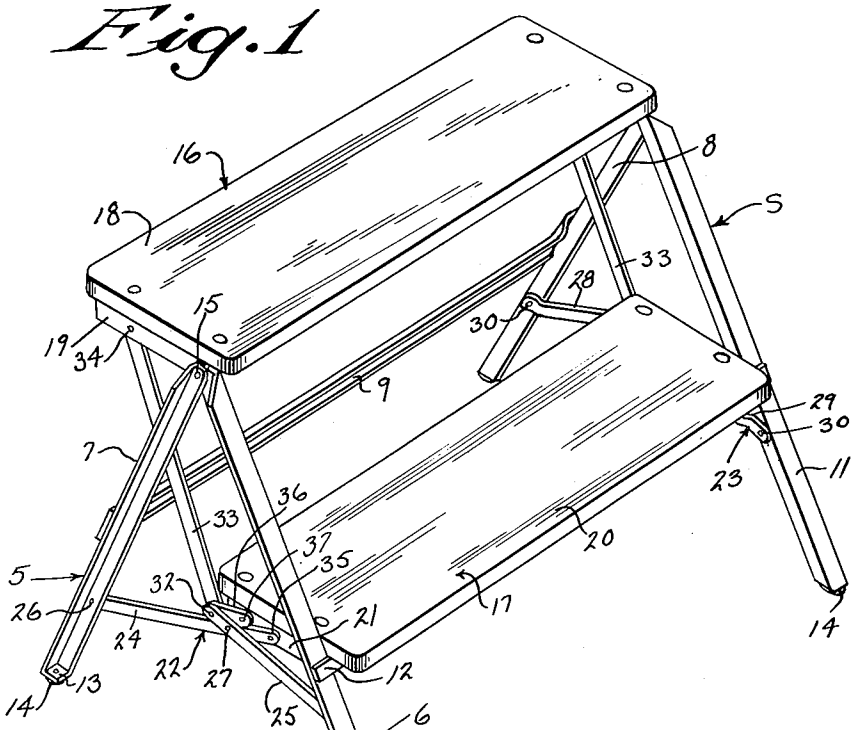
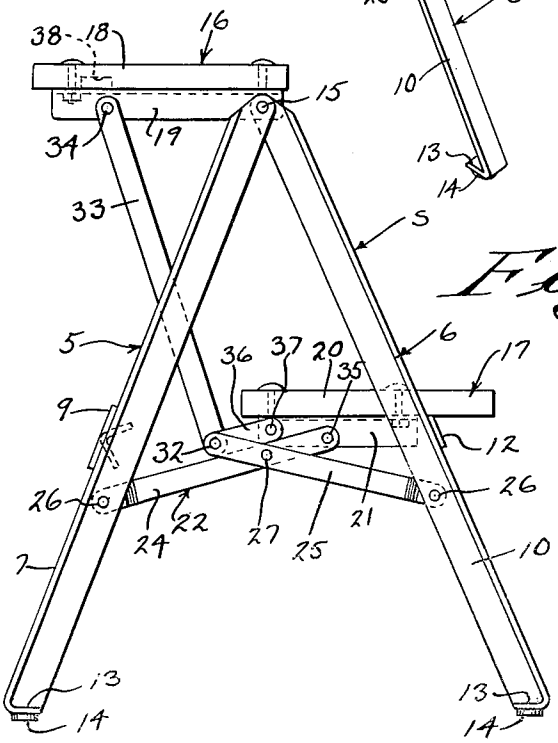


Fig. 2



INVENTORS
ENFRED W. ANDERSON
ARVID J. ANDERSON

BY Wright & Wright

ATTORNEYS

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Fig. 3

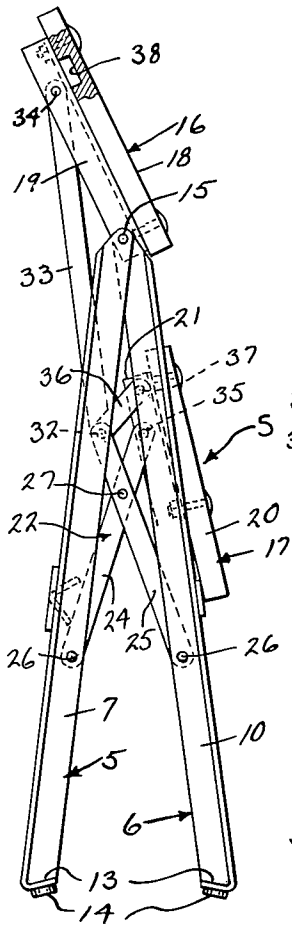
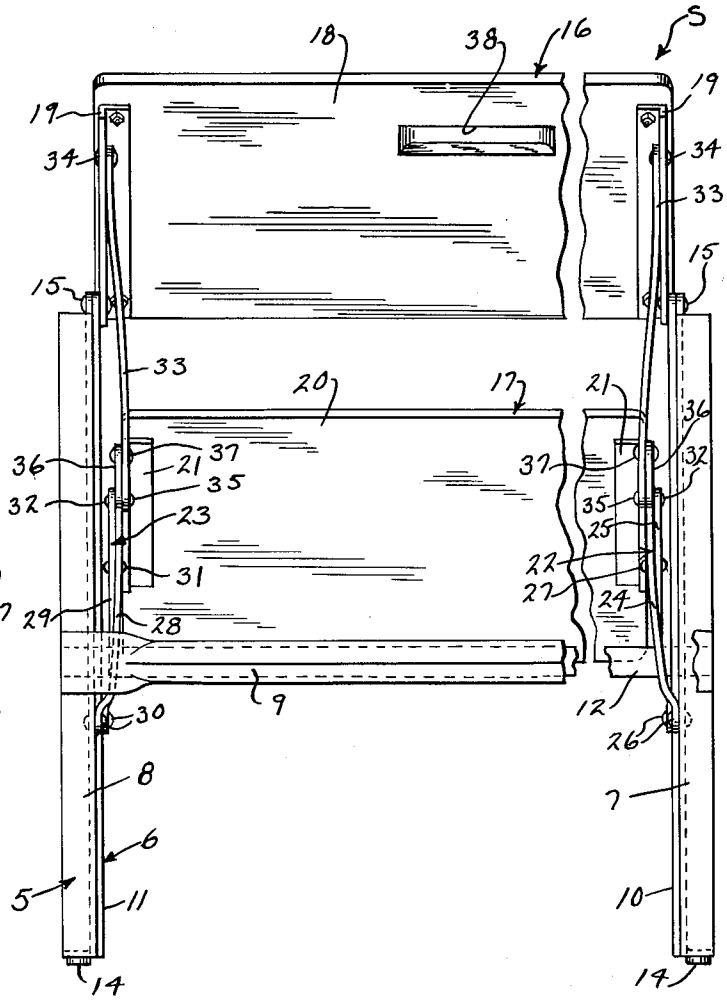


Fig. 4



INVENTORS
ENFRED W. ANDERSON
ARVID J. ANDERSON

BY Wright and Wright

ATTORNEYS

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COLLAPSIBLE STEP STOOL

Arvid J. Anderson and Enfred W. Anderson, Norway, Mich.

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1 Claim. (Cl. 182—161)

This invention appertains to an appliance for facilitating the reaching and the convenient working upon, of objects and devices out of the normal reach of persons, and more particularly to a readily portable step stool having wide, sturdy working platforms or steps.

In machine shops, garages and homes, a light, portable, very stable working platform, or a low ladder, is highly desirable, and this is particularly true in working around automobiles. In such appliances, the same should not only be freely portable, but should be collapsible and capable of folding into a compact form, so as to occupy a minimum amount of space when not in use. The device should not only be foolproof in use, but should be one which will be self-supporting when in its folded, collapsed position, so that the necessity of leaning the same against a wall and the consequent danger of its slipping or falling will be eliminated.

It is, therefore, one of the primary objects of our invention to provide a step stool having a series of wide and lengthy steps forming ample working platforms, which can be collapsed into a compact form with the steps or platforms moved from a horizontal working position to a tilted, raised folded position, the legs of the step stool being spread at their lower extremities a sufficient distance when the stool is collapsed to permit the stool to stand upright by itself.

Another salient object of the invention is to provide means for automatically locking or holding the legs in their spread apart position against accidental movement in any direction upon the opening of the stool to its operative working position, whereby a sturdy foolproof set of steps will be had.

A further object of the invention is the provision of means for opening and closing the step stool to its operative and inoperative positions through a set of levers, by the mere raising and lowering of the uppermost step or platform.

A still further object of the invention is to provide novel means for supporting the steps from a part of the frame of the stool when the stool is in its open operative position, so that strong, durable working platforms will be had.

A still further important object of our invention is the provision of a step stool embodying a pair of like side frames pivotally connected together at their extreme upper ends with a step or platform pivotally connected to the frames at their points of pivotal connection with means for operatively connecting the step to the levers employed for connecting the frames together so as to bring about the automatic opening and closing of the frames upon swinging movement of the upper step or platform by an operator.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described and claimed, and illustrated in the accompanying drawings, in which drawings,

Figure 1 is a perspective view of our improved step stool showing the same in its open operative position;

Figure 2 is an end elevational view of our improved step stool showing the same in its open operative position:

Figure 3 is an end elevational view showing the step stool in its collapsed inoperative position, parts of this view being shown broken away and in section to illustrate structural detail, and

Figure 4 is a side elevational view showing the stool in its collapsed position.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter S generally indicates our improved step stool and the same includes a pair of like side frames 5 and 6. The side frame 5 includes end legs 7 and 8 rigidly connected together by a longitudinally extending brace bar 9.

The side frame 6 likewise includes end legs 10 and 11 and these legs are rigidly connected together by a longitudinally extending brace bar 12. The legs of the side frames can be formed from any desired material, but as illustrated, the same are formed from angle iron and the lower ends thereof are bent to provide feet 13, and the feet can carry suitable pads 14, if such should be desired.

The extreme upper ends of the side frames 5 and 6 are pivotally connected together so that the frames can be swung toward and away from one another to a collapsed or to an open operative position. The upper ends of the legs of the side frames overlap and the legs are pivotally connected together by pivot pins 15. Thus, the legs 7 and 10 are pivotally connected together and the legs 8 and 11 are pivotally connected together.

The step stool includes, at least, two steps or working platforms 16 and 17. The steps or platforms 16 and 17 can be constructed in various manners and from different kinds of material. The uppermost step 16 preferably includes a flat wooden body portion 18 having bolted, or otherwise secured thereto, depending transversely extending angle bars 19. These brace bars extend substantially the full width of the uppermost step 16. The lowermost step 17 also preferably includes a flat wooden body 20 having bolted or otherwise secured to its lower face end angle bars 21. These angle bars 21 extend transversely of the step body 20, but terminate short of the forward edge of the step body for a purpose, which will later appear. The angle bars 19 and 21 form an ideal means for connecting the upper and lower steps or platforms 16 and 17 to the various other parts of the step stool. Thus, the extreme forward ends of the brace angle bars 19 form the means for connecting the uppermost step or platform with the side frames 5 and 6. By referring to the drawings (Figs. 2 and 3), it can be seen that the pivot pins 15 extend through the depending flanges of the angle braces 19. It is to be noted particularly that the uppermost step or platform 16 is pivoted to the upper ends of the frames 5 and 6 adjacent to its extreme inner or forward edge and hence this step or platform projects laterally in one direction from the upper ends of the platforms 5 and 6. The mounting of the lower step or platform 17 will be later set forth.

The side frames 5 and 6 are operatively connected together in a novel manner at a point intermediate their upper and lower ends. This means includes end toggles 22 and 23. The toggle 22 operatively connects legs 7 and 10 together and the toggle 23 operatively connects legs 8 and 11 together. The toggle 22 includes levers 24 and 25. The outer ends of the levers 24 and 25 are pivoted respectively, by pivot pins 26, to the legs 7 and 10. The levers 24 and 25 are pivotally connected together at a point intermediate their ends by a pivot pin

27. It can be seen that the inner ends of the levers 24 and 25 extend beyond the pivot 27 and that the levers cross one another. The toggle 23 is of identical construction with the toggle 22 and hence the toggle 23 includes levers 28 and 29. The outer ends of the levers 28 and 29 are pivotally connected, by means of pivot pins 30, to the legs 8 and 11. The levers 28 and 29 cross one another and are pivotally connected intermediate their ends by means of a pivot pin 31.

The upper platform or step 16 is operatively connected to the toggles 22 and 23 and the inner ends of the levers 25 and 29 of the toggles have pivotally connected thereto, by means of pivot pins 32, upwardly extending operating links 33. The upper ends of the links 33 are pivotally connected, as at 34, to the angle bar braces 19. The links are connected to the braces 19 adjacent to the outer ends thereof, and in spaced relation to the pivot pins 15.

Now referring to the mounting of the lower step 17, it can be seen that the inner ends of the levers 24 and 28 of the toggles 22 and 23 are pivotally connected by means of pins 35 with the angle bars 21 at a point intermediate the ends of the said angle bars. Thus, this lower step 17 is pivotally carried intermediate its ends by the toggles 22 and 23. Pivotally connected by the pivot pins 32 to the levers 25 and 29 are short operating links 36 and these links in turn have their inner ends connected by pivot pins 37 to the angle bar braces 21 of the lower step 17. The links 36 are connected to the step 17 adjacent to its inner longitudinal edge.

In use of our improved step stool and considering the same is in its open operative position, it can be seen that the lower ends of the legs are in an extreme spread position to give a wide stable support and that the platforms or steps 16 and 17 are in a horizontal position. The lower step or platform 17 adjacent to its outer edge rests upon the brace 12. With the step stool in its open operative position, it can be seen, by referring to Figure 2, that the short links 36 rest directly upon the upper edges of the levers 24 and 28 of the toggles 22 and 23 and that further spreading of the side frames is prevented and that the lower step is firmly and rigidly supported by the brace 12 and by the linkage. Likewise, the upper step 16 is rigidly and firmly supported in that further downward movement of the links 33 is prevented in view of the fact that the side frames are held firmly against additional spreading movement.

To collapse the stool, it is merely necessary to grasp the outer edge of the upper step 16 and pull upwardly on the same to swing the step on its pivots 15. The raising of the step will pull up on the links 33 and the inner ends of the levers 25 and 29, causing the movement of the side frames 5 and 6 toward one another. The upward raising or collapsing of the toggles 22 and 23 carries the lower step or platform therewith on the pivots 37 and 35 and the links 36 will push upwardly and outwardly on the inner ends of the step or platform causing the swinging thereof to a raised tilted position.

The striking of the step 17 against the brace bar 12 limits the drawing of the side frames 5 and 6 toward one another and as best shown in Figure 3, the stool, when in its collapsed position still has the side frames at their lower ends spread a sufficient distance apart to permit the stool to be stood upright on its own four legs.

To open the stool to its operative position, it is merely necessary to press down on the rear edge of the upper step 16 and this will force the links 33 downward as well as the levers 25 and 29 until the short links 36 strike and engage the levers 24 and 28.

In order to facilitate operation of the stool and the carrying thereof from one place to the other, the inner face of the step platform 16, adjacent to its outer edge can be provided with a hand hold 38.

Changes in details may be made without departing from the spirit or the scope of this invention, but what is claimed as new is:

A folding step stool comprising a pair of like side frames, each of said side frames including end legs and a brace connecting said legs together intermediate the ends thereof, means pivotally connecting the upper ends of said side frames together, whereby said frames can be swung toward one another to a collapsed position and away from one another to a spread open operative position, toggles connecting adjacent legs of the side frames together intermediate the upper and lower ends of said side frames, each toggle including levers pivotally connected together intermediate their ends, the lower ends of the levers being pivotally connected to the side frames, a step platform pivotally secured to the upper ends of the frames and movable to a lowered horizontal position and to a raised inoperative position, and links pivotally secured to the step platform depending therefrom and pivotally secured to the upper ends of said levers of the toggles, downward movement of the step platform functioning to push down on the toggles to open the toggles and spread the side frames and upward movement of the step platform functioning to close the levers of the toggles and move the side frames toward one another, and a lower step platform pivotally carried solely by the upper ends of the other levers of the toggles, and operating links pivotally connected to the upper ends of the first levers of the toggles at the points of pivotal connection of the first mentioned links therewith, the lower step platform being movable with the levers to a raised inoperative position and to a lowered horizontal operative position with the lower step platform resting on the brace of one side frame.

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