

Sept. 13, 1960

E. SCHLAAK ET AL
FOLDING STEP STOOL

2,952,301

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2 Sheets-Sheet 1

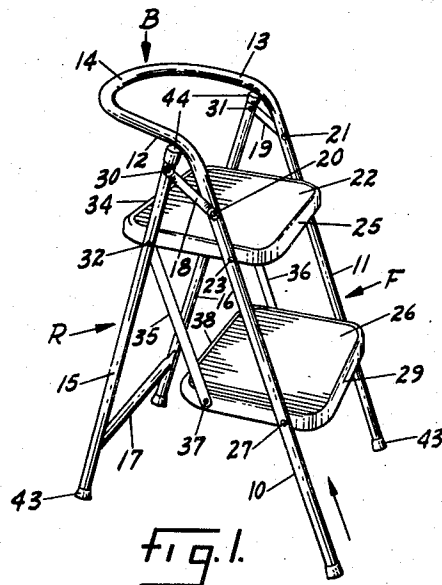


fig. 1.

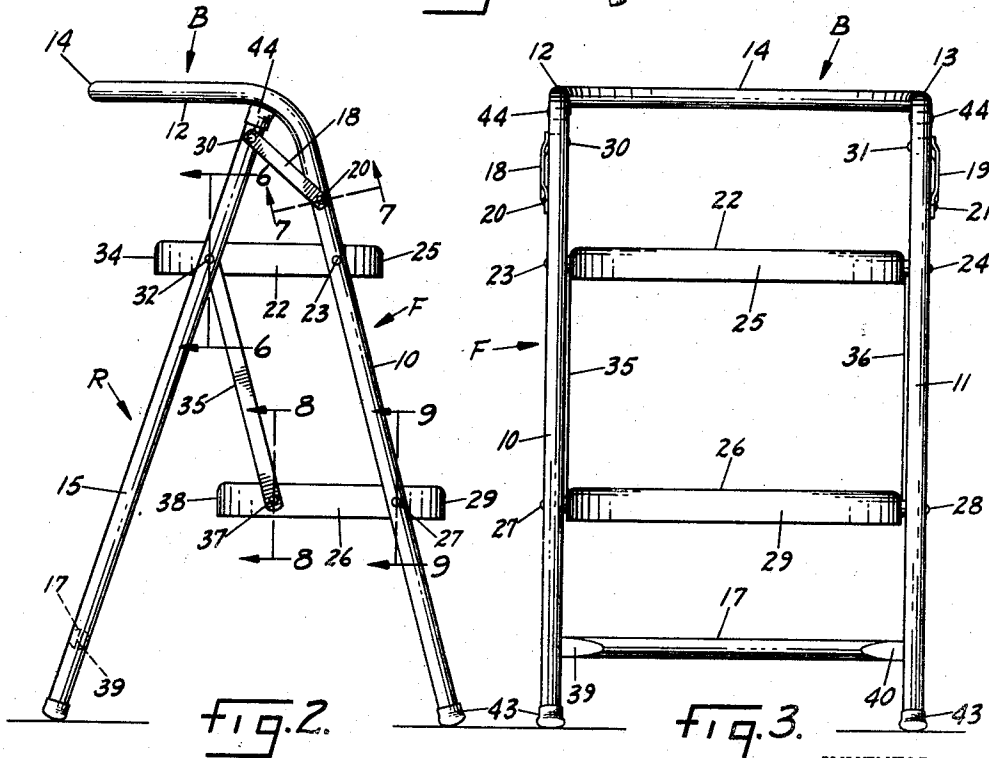


fig. 2.

fig. 3.

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2 Sheets-Sheet 2

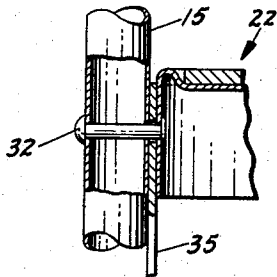
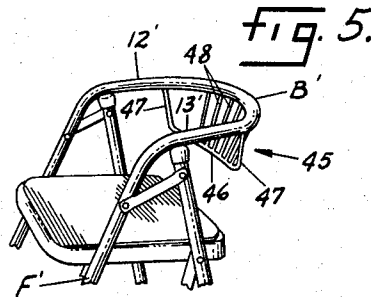
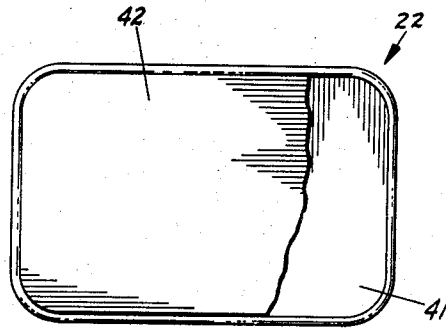
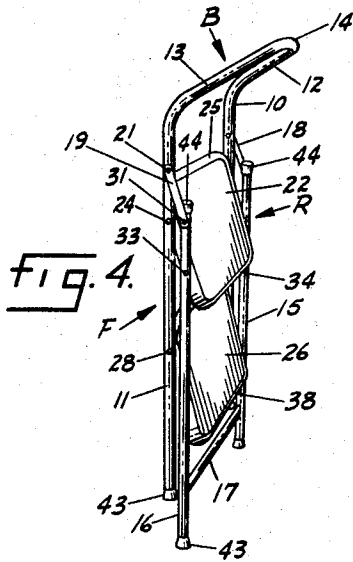


FIG. 6.

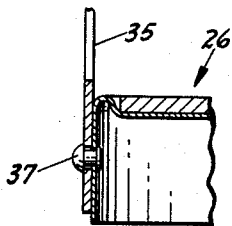


FIG. 8.

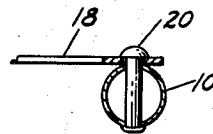


FIG. 7.

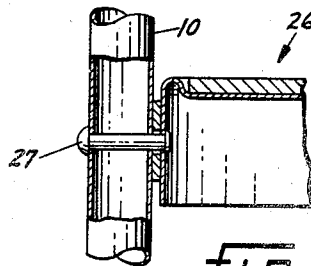


FIG. 9.

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FOLDING STEP STOOL

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5 Claims. (Cl. 155—42)

The present invention relates to a folding step stool, and the primary object thereof is to provide an improved device of the character described. More specifically, it is an object of the present invention to provide a folding step stool which, while capable of being folded into a substantially flat condition in which it will occupy very little storage space, when opened to use position, will provide an unusually sturdy, safe and convenient step ladder and an unusually comfortable stool.

A further object of the invention is to provide a novel folding mechanism for a step stool which, while affording unusually broad platform surfaces, nevertheless permits the structure to be folded into a condition of unusually shallow depth, and to be shifted from folded condition to use condition, and vice versa, with unusual facility.

Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, our invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a perspective view of a step stool embodying the present invention, in use condition;

Fig. 2 is a side elevation thereof;

Fig. 3 is a front elevation thereof;

Fig. 4 is a perspective view of the device in folded condition;

Fig. 5 is an enlarged plan of one step or platform constituting a part of the structure, parts being broken away for clarity of illustration;

Fig. 6 is an enlarged fragmentary section taken on the line 6—6 of Fig. 2;

Fig. 7 is a similar section taken on the line 7—7 of Fig. 2;

Fig. 8 is a similar section taken on the line 8—8 of Fig. 2;

Fig. 9 is a similar section taken on the line 9—9 of Fig. 2; and

Fig. 10 is a fragmentary perspective view of the upper portion of a modified embodiment of our step stool, including an improved back-rest feature.

Referring more particularly to the drawings, it will be seen that the illustrated step stool comprises a front leg unit F which, in its preferred form, constitutes an integral, inverted U-shaped element with the bight B of the U bent or turned out of the common plane of the legs of the U to project rearwardly from that plane; and a rear leg unit R. We presently prefer to form the unit F from a single length of metallic tube or bar stock, and to form the unit R from assembled lengths of similar stock.

Thus, the unit F is formed to provide a pair of parallel uprights 10 and 11 having rearward projections 12 and 13 at their upper ends, said projections being joined by

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the base 14 of the bight B to constitute brace means. While the integral structure illustrated is presently deemed preferable, it will be apparent that many of the advantages of the structure can be attained through an assembly of separate pieces arranged to provide the substantial equivalent of the unit F.

The rear leg unit R comprises a pair of parallel uprights 15 and 16 joined, near their lower ends, by a cross bar 17.

We provide a pair of links 18 and 19 pivoted, respectively, at 20 and 21, to the uprights 10 and 11, upon a common axis near, but below, the upper ends of said uprights to project rearwardly therefrom. A step, seat or the like, broadly referred to hereinafter as a platform 22, is positioned between the uprights 10 and 11 to span the same and is pivotally connected to the upright 10 by a rivet or the like 23 and to the upright 11 by a rivet 24, said rivets being disposed on a common axis somewhat below the pivotal connections 20 and 21, and engaging the platform 22 near the forward edge 25 thereof. A second platform 26, which may preferably be identical in all respects with the platform 22, is similarly positioned between the uprights 10 and 11 and is pivoted at 27 to the upright 10 and at 28 to the upright 11 upon a common axis near the forward edge 29 of the platform 26.

The end of the link 18 remote from its pivotal connection 20 is pivotally connected at 30 to the upper end of the upright 15; and the corresponding end of the link 19 is similarly pivotally connected to the upper end of the upright 16 at 31, the pivotal connections 30 and 31 being disposed upon a common axis. Rivets 32 and 33 provide pivotal connections, on a common axis, between the platform 22, near its rear edge 34, and the uprights 15 and 16, respectively.

A second pair of links 35 and 36 is provided, one end of the link 35 being pivotally supported upon the rivet 32 and the corresponding end of the link 36 being similarly supported upon the rivet 33. The lower ends of said links are respectively pivotally connected to the opposite ends of the platform 26, near the rear edge 38 thereof by rivets 37 (only one of which is shown). The parts are so proportioned and designed that the distance between the rivets 32 and 33 and the rivets 37, respectively, is equal to the distance between the rivets 23 and 24 and the rivets 27 and 28, whereby the links 35 and 36 form, with the platforms 22 and 26 and the uprights 10 and 11, a flexible parallelogram.

It will be perceived that the disclosed step stool may be adjusted, from the condition of Fig. 1 to the condition of Fig. 4, by grasping the base 14 of the bight B, placing a foot on the cross brace 17, and lifting on the bight, whereupon the unit F will be moved upwardly relative to the unit R, the several links 18, 19, 35 and 36 pivoting about their respective fulcra, and the platforms 22 and 26 swinging in a counter-clockwise direction, as viewed in Fig. 2, about their pivotal connections with the uprights and with the links 35 and 36, whereby their rearward edges 34 and 38 are turned downwardly and the uprights 10 and 11 are brought into substantial parallelism with the uprights 15 and 16. Similarly, the assembly may be shifted from the condition of Fig. 4 to the condition of Fig. 1 by resting the lower ends of the uprights 15 and 16 on the floor and pressing downwardly on the bight B. As the parts attain the relationship of Fig. 1, the upper ends of the uprights 15 and 16 will come into abutting engagement with the lower surfaces of the projections 12 and 13 to stop further relative movement of the parts and to sustain the assembly firmly in the condition of Figs. 1 and 2.

Preferably, but not necessarily, the cross brace 17 is assembled with the uprights 15 and 16 by flattening its

opposite ends, as at 39 and 40, inserting them into slits in the mutually facing surfaces of the uprights 15 and 16, and welding them in place.

It will be seen that, by reason of the above-described construction, we are able to provide platforms of unusually large area, and particularly of unusual depth from front to back. Specifically, in one commercial form of the invention, having an overall width of 18 inches and a spread between the lower ends of the front and rear uprights of 20 inches, we are able to use platforms whose width from side to side is $15\frac{3}{4}$ inches and whose depth from front to back is $10\frac{3}{4}$ inches. Preferably, each platform comprises a metal pan formed to provide a recess 41 in its upper surface in which may preferably be received a pad or slab 42 of suitable composition. If desired, the pad 42 for the upper platform 22 may be upholstered.

Furthermore, the bight B, whose base 14 preferably is disposed beyond the rear edge 34 of the platform 22, provides a convenient hand hold for steadying a user in ascending or descending the steps, and provides, further, a back rest when the step stool is used as a seat.

We prefer to provide conventional plastic or rubber caps 43 for the lower ends of the several uprights, and similar caps 44 for the upper ends of the uprights 15 and 16 to engage the projections 12 and 13.

It will be apparent that the parts are so proportioned and designed that, when the lower ends of the uprights 10 and 11 are separated from the lower ends of the uprights 15 and 16 to a maximum degree, and the lower ends of all of said uprights are positioned in a common horizontal plane, the platforms 22 and 26 will automatically be positioned in separate horizontal planes.

In the preferred commercial form of the invention, above-mentioned, when the stool is in use condition, the top surface of the platform 26 is disposed at a level $11\frac{1}{4}$ " above the floor or other supporting surface for the stool, while the top surface of the platform 22 is disposed at a level $22\frac{1}{2}$ " above that supporting surface. It will be seen that the platform 22 is thus ideally arranged not only as a seat for an adult at a kitchen counter, sink, stove, or the like, but also as a seat for a small child at a conventional dining table. It will further be seen that, when the stool is used as a juvenile chair, the platform 26 is ideally arranged as a foot rest for a child seated on the platform 22.

In Figure 10, we have illustrated a modified form of stool in which a back rest, indicated generally by the reference numeral 45, is integrated with the bight B' of a front leg unit F', the stool of Fig. 10 being otherwise identical with the stool of Figs. 1-9. The back rest, as shown, is preferably formed of heavy wire or light bar stock, and may preferably consist of a bottom frame member 46 bent to provide a pair of legs 47-47 having their upper ends seated and welded in place in suitable perforations in the projections 12' and 13', and a series of short wire sections 48 having their opposite ends similarly seated and welded in place in suitable perforations in the base of said frame member 46 and in the base of the bight B'. Preferably, the base of said frame member 46 will be curved to conform generally to the curvature of the base of the bight B', as shown. Not only does the back rest 45 contribute to the comfort of the stool as a "use" chair, but further it acts as a safety feature, when a small child is using the stool, to guard against the possibility that the child might slip backwardly between the platform 22 and the bight B.

We claim as our invention:

1. A folding step stool comprising a front leg unit including a pair of parallel uprights and having a rearward projection at its upper end, a rear leg unit including a pair of parallel uprights each disposed substantially in a vertical plane including one of said rearward projections, a first pair of links, each link of said first pair being

pivotaly connected to one upright of said front leg unit near, but below, the rearward projection thereof and to the corresponding upright of said rear leg unit near the upper end thereof, a first platform spanning, and pivotally connected to, the uprights of said front leg unit at points closely below the points of pivotal connection of said links to said front leg unit uprights, said first platform further spanning, and being pivotally connected to, the uprights of said rear leg unit at points below the points of pivotal connection of said links to said rear leg unit uprights, a second platform spanning, and pivotally connected to, the uprights of said front leg unit at points below the points of pivotal connection of said first platform to said front leg unit uprights, and a second pair of links, each link of said second pair being pivotally connected to one of the uprights of said rear leg unit at a point below the point of connection of the corresponding link of said pair to said upright and to the corresponding end of said second platform at a point spaced rearwardly from the point of pivotal connection of said second platform to the corresponding upright of said front leg unit, said rear leg unit being so proportioned and arranged that, when the lower ends of said front and rear leg units are separated to a maximum extent and disposed in a common horizontal plane, the upper ends of the uprights of said rear leg unit will supportingly engage the lower surfaces of the rearward projections of the uprights of the front leg unit, respectively, and said platforms will be disposed in separate horizontal planes.

2. A folding step stool comprising an integral front leg unit formed as an inverted U-shaped member with the bight of the U turned out of the plane common to the legs thereof in a rearward direction, a first pair of links, each pivoted at one end to one of the legs of said U at a point near, but below the level at which said bight is so turned, and extending rearwardly therefrom, a first platform disposed between the legs of said U and pivoted thereto, near its front edge, on a common axis below the common pivotal axis of said links, a second platform disposed between the legs of said U and pivoted thereto, near its front edge, on a common axis below the common pivotal axis of said first platform, a rear leg unit comprising a pair of parallel uprights, means connecting the uprights of said rear leg unit near their lower ends, the other ends of said links of said first pair being pivotally connected, on a common axis, to said rear leg unit uprights, respectively, near the upper ends thereof, means pivotally connecting said first platform, near its rear edge, to and between the uprights of said rear leg units below the points of pivotal connection of said first links to said uprights, and a second pair of links, each link of said second pair having its upper end pivotally connected to one of the uprights of said rear leg unit at the point of pivotal connection of said first platform to said upright and having its lower end pivotally connected to the corresponding end of said second platform near the rear edge thereof.

3. A folding step stool comprising an integral front leg unit formed as an inverted U-shaped member with the bight of the U turned out of the plane common to the legs thereof in a rearward direction, a first pair of links, each pivoted at one end to one of the legs of said U at a point near, but below the level at which said bight is so turned, and extending rearwardly therefrom, a first platform disposed between the legs of said U and pivoted thereto, near its front edge, on a common axis below the common pivotal axis of said links, a second platform disposed between the legs of said U and pivoted thereto, near its front edge, on a common axis below the common pivotal axis of said first platform, a rear leg unit comprising a pair of parallel uprights, means connecting the uprights of said rear leg unit near their lower ends, the other ends of said links of said first pair being pivotally connected, on a common axis, to said rear

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leg unit uprights, respectively, near the upper ends thereof, means pivotally connecting said first platform, near its rear edge, to and between the uprights of said rear leg unit below the points of pivotal connection of said first links to said uprights, and a second pair of links, each link of said second pair having its upper end pivotally connected to one of the uprights of said rear leg unit at the point of pivotal connection of said first platform to said upright and having its lower end pivotally connected to the corresponding end of said second platform near the rear edge thereof, and said rear leg unit being so proportioned and arranged that, when the lower ends of said front and rear leg units are separated to a maximum extent and disposed in a common horizontal plane, the upper ends of the uprights of said rear leg unit will abut the lower surface of said bight and said platforms will be disposed in separate, horizontal planes.

4. The folding step stool of claim 3 in which said bight projects rearwardly beyond the rear edge of said first platform while said upper ends of the uprights of said rear leg unit engage said bight in a vertical plane

substantially midway between the front and rear edges of said first platform.

5. The folding step stool of claim 2 including a back rest depending from, and fixedly secured to, the base of said U and comprising a frame member including a base portion and a pair of terminal legs joined by said base portion, and a series of upright members spanning the space between said base portion and the base of said bight and fixed thereto, said back rest guarding the space between said bight and said first platform.

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