

Oct. 9, 1962

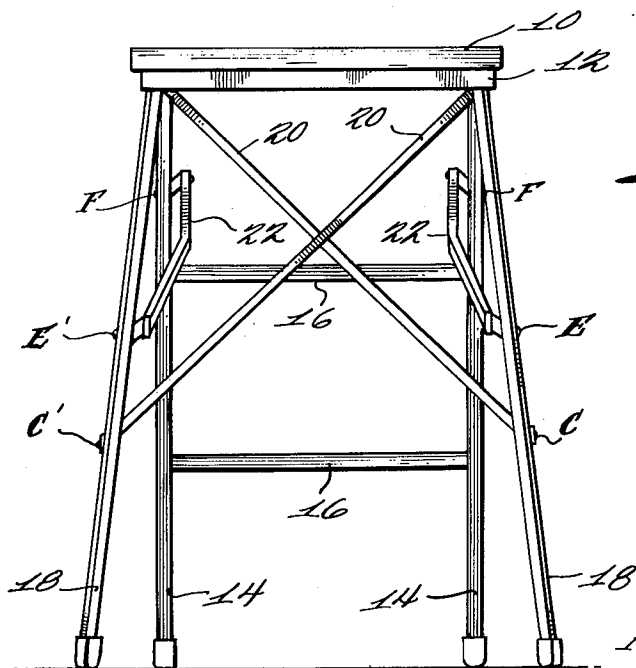
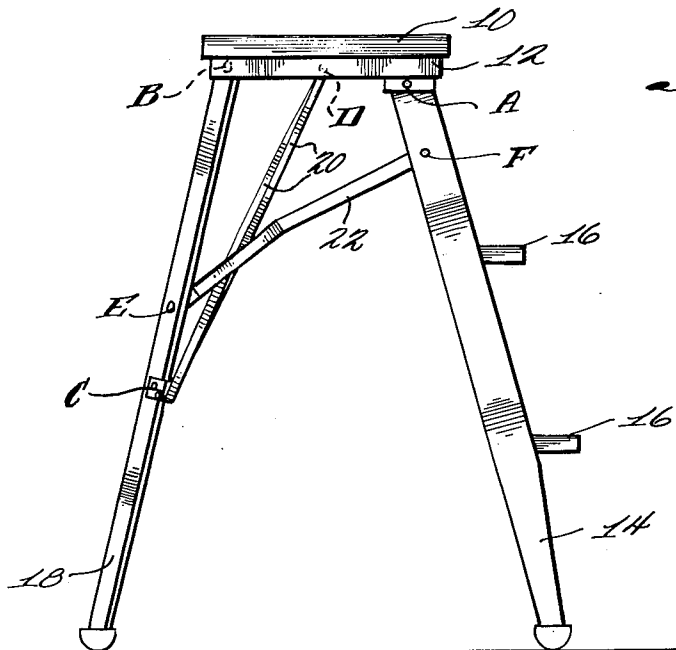
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3,057,432

FOLDING STEP STOOL

Filed Aug. 24, 1959

3 Sheets-Sheet 1



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Fig. 3.

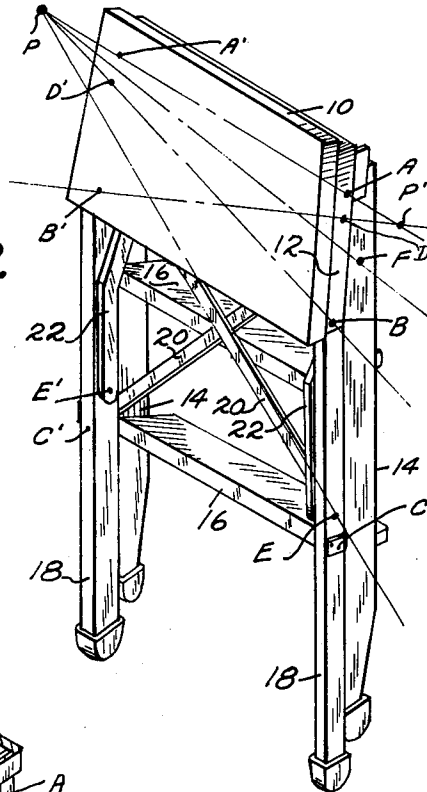
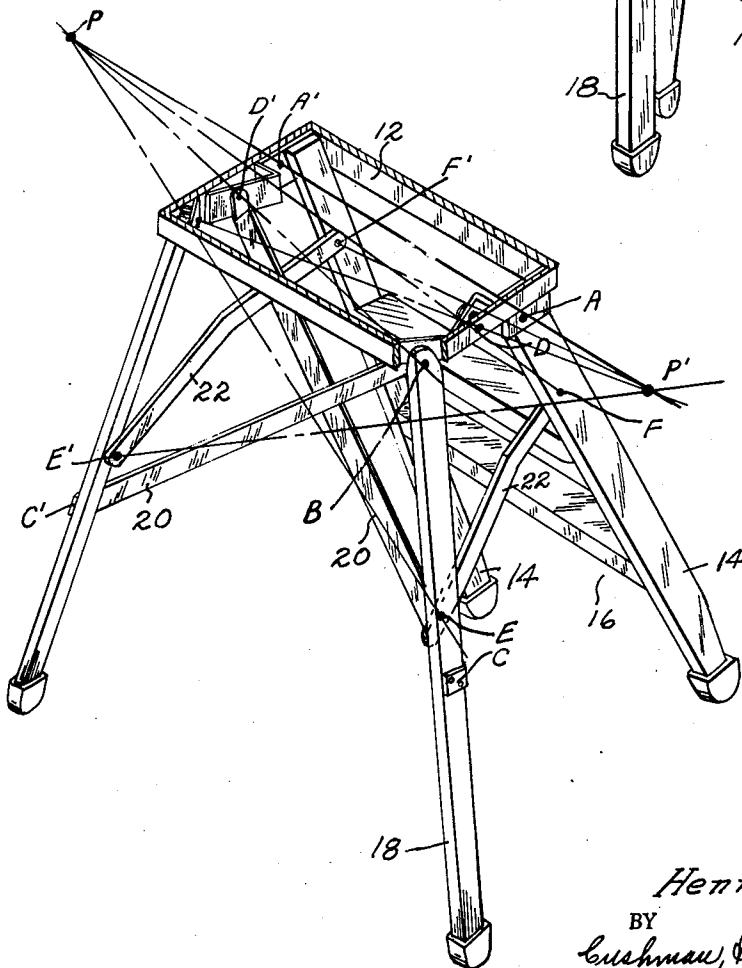


Fig. 4.



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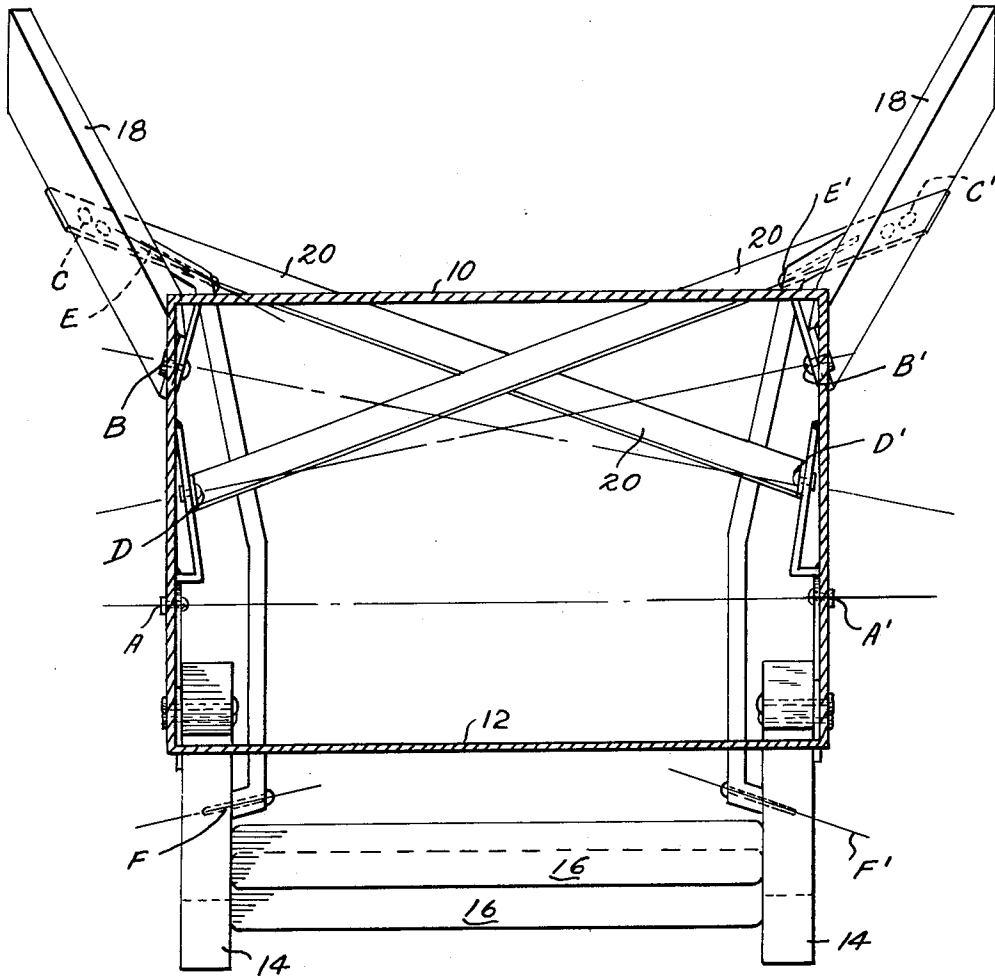


Fig. 5.

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FOLDING STEP STOOL
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This invention relates to a lightweight metallic folding step stool, and more particularly to a folding step stool adapted to fold up for ultra-compact storage.

This invention is primarily concerned with a folding step stool in which a top platform having rear legs pivotally mounted thereto folds about a pair of front legs so that the rear legs and top platform lie substantially parallel to the front legs when the stool is folded. Another feature disclosed in this invention is that the rear legs pivot about the top platform rearwardly and outwardly in order to provide a superior bracing means for the top platform and, therefore, provide a step stool which is not liable to tip over or be unstable as a load is moved about the top platform.

It is an object, therefore, of this invention to provide a new folding step stool in which the top platform and rear legs are adapted to pivot relative to the front legs so that the top platform and rear legs are substantially parallel to the front legs when the stool is folded.

Another object of this invention is to provide a folding step stool in which the rear legs pivot rearwardly and outwardly relative to the top platform.

These and further objects and advantages will become readily apparent to those skilled in the art upon reading the following detailed description taken in conjunction with the appended drawings, in which:

FIG. 1 is a side elevational view of the folding step stool in its open position;

FIG. 2 is a rear elevational view of the folding step stool in its open position;

FIG. 3 is a perspective view of the folding step stool in its closed position illustrating the pivotal axes of its several parts;

FIG. 4 is a perspective view of the folding step stool in its open position also illustrating the pivotal axes of its several parts; and

FIG. 5 is a view taken substantially along line 5—5 of FIGURE 4.

The preferred embodiment of the folding step stool of the present invention comprises a top platform 10 having a depending peripheral skirt portion 12 secured to its lower surface and a pair of spaced front legs pivotally secured to the sides of peripheral skirt 12, as at A, so that top platform 10 rests upon the upper ends of front legs 14 when the stool is in open position. A pair of rear legs 18 are pivotally mounted on the rearward portion of skirt 12, as at B. The pivotal axis of each leg 18 relative to top platform 10 is disposed parallel to the surface of platform 10, but at an angle with respect to the edges of platform 10 so that the legs 18 pivot rearwardly and outwardly relative to the top platform 10 and front legs 14 assuming the position shown in FIGS. 2 and 4. The lower ends of both pairs of legs may be provided with slip-preventing shoes or rubber caps 13. Rigidly secured to the front legs 14 and extending horizontally therebetween is a pair of steps 16. Preferably, the steps 16 are spaced so that the vertical distance between the two is equal to the vertical distance between the surface upon which the stool is resting and the lower of the steps 16 and also is equal to the vertical distance between the upper of the steps 16 and top platform 10.

A pair of first bracing links 20 is rigidly secured to the rear brace legs 18 and peripheral skirt 12. The lower end of each of the first bracing links 20 is rigidly secured, as at C, to one of the rear legs 18 respectively, substantially at its mid-point with the links extending diagonally

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of the stool and across each other to the opposite side so that their upper ends are pivotally secured, as at D, to the peripheral skirt 12 on the opposite side respectively from their associated rear legs 18. A pair of second bracing links 22 pivotally connect rear legs 18 and front legs 14 with each link 22 pivotally connected, as at E, to one of the rear legs 18 respectively at a point near point C and having the other end of each pivotally connected, as at F, to the front leg on the same side of the stool as their respectively associated rear leg 18. Each of the links 22 is bent upwardly at its mid-point to enable the rear legs 18 to lie parallel to the front legs 14 when the stool is in its closed position (FIG. 3).

When it is desired to open the stool from its closed position, it is only necessary to grasp the rearward edge of top platform 10 and pull upwardly so that the platform pivots about pivot points A relative to front legs 14; whereupon, through the action of the first and second bracing links 20 and 22, the rear legs 18 simultaneously pivot outwardly and rearwardly relative to the top platform 10 and front legs 14 to assume the position illustrated in FIGS. 2 and 4, thus providing an extremely stable stool which will not tip over or sway as a load is moved along the top platform 10. As previously mentioned, the pivotal axis of rear leg 18 relative to the top platform 10 is disposed at an angle relative to the edge of platform 10, thus effecting the simultaneous rearward and outward pivotal motion of the rear legs 18 as the top platform 10 pivots upwardly about the upper end of the front legs 14. In addition to this, referring now to FIGS. 3 and 4, the pivotal axes of the second bracing links 22 are also inclined to effect the rearward and outward pivotal motion of rear legs 18. For clarification, the pivotal points associated with leg 18 on the right-hand side of the stool (FIGS. 3 and 4) are indicated as A, B, D, E and F; while the pivotal points for the leg on the left-hand side of the stool are indicated as A', B', D', E' and F'. By inclining the pivotal axes of the rear legs 18 relative to top platform 10 and by inclining the pivotal axes of the second bracing links 22 with their associated front and rear legs, there is provided a step stool in which its associated elements move from a closed to an open position only by pivotal motion and in which the pivotal axes of the elements on one side of the stool converge at a common point on the opposite side of the stool, as will now be described.

The pivotal axis A—A' of both front legs 14, relative to top platform 10, lies in a horizontal plane and includes points P and P' spaced from the edges of top platform 10. As previously mentioned, each of the rear legs 18 has its pivotal axis inclined with the edge of platform 10, such that an extension of the pivotal axis of the right-hand rear leg 18 includes point P lying along the line A—A'. Additionally, an extension of pivotal axes E and F of the right-hand second bracing link 22 with its associated front leg 14 and rear leg 18 defines the lines E—P and F—P. Similarly, the pivotal axes of the aforementioned elements disposed on the left-hand side of the stool define the lines B'—P', E'—P' and F'—P' with the point P' lying along the line A—A' and horizontally spaced from the opposite, or right-hand edge, of top platform 10. It will thus be seen that the pivotal axes of the right-hand front leg 14 relative to top platform 10, and the right-hand rear leg 18 relative to the top platform 10 and the pivotal axes of their associated second bracing link 22 all converge at the point P located along the line A—A' spaced from the opposite side, or left-hand edge, of top platform 10. Similarly, the pivotal axis of the left-hand front leg 14 relative to top platform 10, and the left-hand rear leg 18 relative to top platform 10 and the pivotal axes of their associated second bracing link 22 all converge at the point P' lo-

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cated on line A—A' spaced from the right-hand edge of the top platform 10.

In FIGURE 5 there is shown the top platform 10 in section, to more clearly depict an exemplary arrangement of the joints. In this view, the front legs are connected to the peripheral skirt 12 of the top platform 10, shown here to be a simple pivoted joint construction, axis A, A', of course, providing a common pivot axis for the front legs 14. As previously described, the first cross-bracing links 20 are shown fixedly connected to the rear legs 18 at C, C' and pivotally connected to the platform skirt at D, D' in opposed angular relationship to provide outward movement of the legs 18 as the ladder is pivoted to the open position.

Likewise, the second bracing links 22 are connected to the rear legs 18 at E, E', and to the front legs 14 at F, F', respectively, for pivotable movement about the axes EP and E'P' (see FIGURE 4). Thus, these second bracing links 22 are joined to the front legs 14 as shown in FIGURE 4 so as to provide pivotable movement about the axes FP, F'P', as shown also in FIGURE 3. Conveniently, suitable angle joints may be welded to the interior skirt 12 of the top platform 10 to provide the desired angular relationship as previously set forth; and, numerous mechanical alternatives for joining the braces 20 and 22 to the front and rear legs will be apparent to those skilled in the art.

It is the disposition of the pivotal axes such that they converge at the aforementioned common points on the opposite side of the stool that effects the simultaneous upward and rearward pivotal motion of top platform 10 and the outward and rearward pivotal motion of the rear legs 18 to provide the extremely stable folding step stool of the present invention.

It will thus be seen that there has been provided by this invention a structure in which the various objects hereinbefore set forth, together with many practical advantages, are successfully achieved. As various possible embodiments may be made of the mechanical features of the above invention, all without departing from the scope thereof, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A folding step stool comprising: a top platform having means to mount supporting legs thereto; a pair of spaced front legs pivotally mounted adjacent the forward portion of said platform; transverse means rigidly connecting said front legs below said platform; a pair of rear legs each pivotally mounted to said mounting means adjacent the rearward edge of said platform; the pivotal axis of each of said legs being parallel to upper surface of said platform but at an angle to the edges thereof, said rear legs pivoting rearwardly and sidewardly with respect to said platform when said platform is pivoted upwardly about said front legs; first bracing means connecting each of said rear legs to said mounting means and second bracing means connecting said rear legs to said front legs said first and second bracing means being connected to said rear legs in spaced apart relationship to the pivot axes of said rear legs whereby intermediate support for said rear legs is provided.

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2. A folding step stool comprising: a top platform having means to mount supporting legs thereto; a pair of spaced front legs pivotally mounted adjacent the forward portion of said platform; transverse means rigidly connecting said front legs below said platform; a pair of rear legs each pivotally mounted to said mounting means adjacent the rearward edge of said platform; the pivotal axis of each of said legs being parallel to upper surface of said platform but at an angle to the edges thereof, said rear legs pivoting rearwardly and sidewardly with respect to said platform when said platform is pivoted upwardly about said front legs; first bracing means connecting each of said rear legs to said mounting means and second bracing means connecting said rear legs to said front legs, said first bracing means including a pair of first links each rigidly secured to one of said rear legs respectively and pivotally secured to said top platform; said first links extending diagonally upwardly from said rear legs to the opposite sides of the front portion of said top platform, said second bracing means comprising: a pair of second links each pivotally secured to one of said rear legs respectively and the front leg on the same side of the top platform as its associated rear leg.

3. The structure defined in claim 1 in which said first bracing means comprises: a pair of first links each rigidly secured to one of said rear legs respectively and pivotally secured to said top platform; said first links extending diagonally upwardly from said rear legs to the opposite sides of the front portion of said top platform.

4. The structure defined in claim 1 in which said second bracing means comprises: a pair of second links each pivotally secured to one of said rear legs respectively and to the front leg on the same side of the top platform as its associated rear leg.

5. The structure defined in claim 4 in which the pivotal axis of one of said front legs and said top platform, the pivotal axis of one of said rear legs on the same side as said one front leg, and said top platform, and the pivotal axes of said second bracing link connecting said one front and rear legs converge at a common point on the opposite side of said stool.

6. The structure defined in claim 2 in which the pivotal axis of one of said front legs and said top platform, the pivotal axis of one of said rear legs and said top platform on the same side as said one front leg, and the pivotal axes of said second bracing link connecting said one front and rear legs converge at a common point on the opposite side of said stool.

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