July 11, 1961 H. HARRISON 2,991,828

KITCHEN STEP STOOL

Filed Nov. 10, 1959 2 Sheets-Sheet 1

Fig. 1.

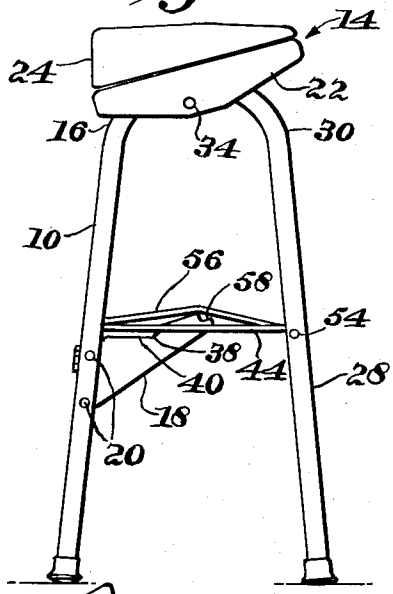
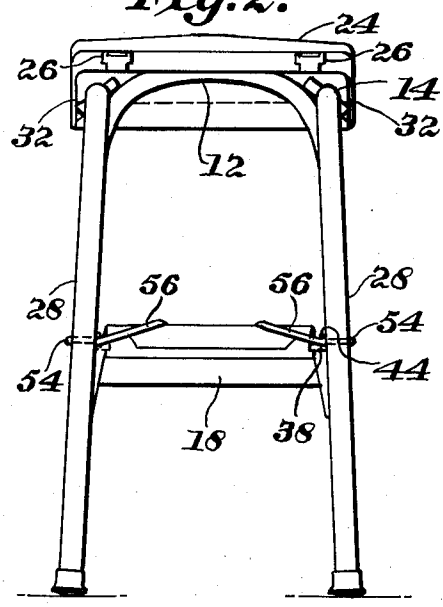


Fig. 2.



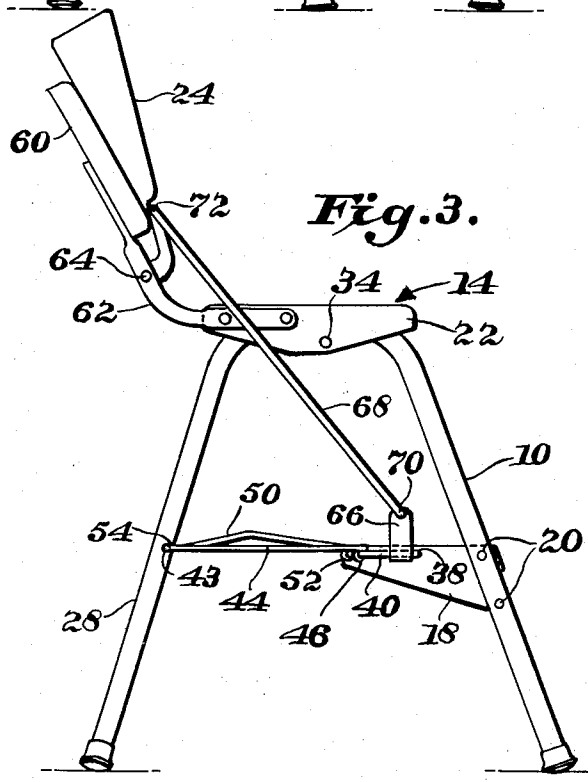


Fig. 3.

INVENTOR:

Henry Harrison,

BY Cushman, Darby & Cushman

ATTORNEYS.

July 11, 1961 H. HARRISON 2,991,828

KITCHEN STEP STOOL

Filed Nov. 10, 1959 2 Sheets-Sheet 2

Fig.4.

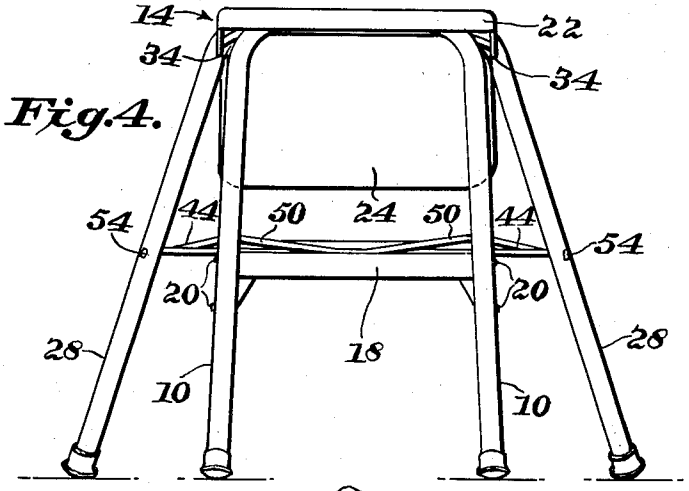
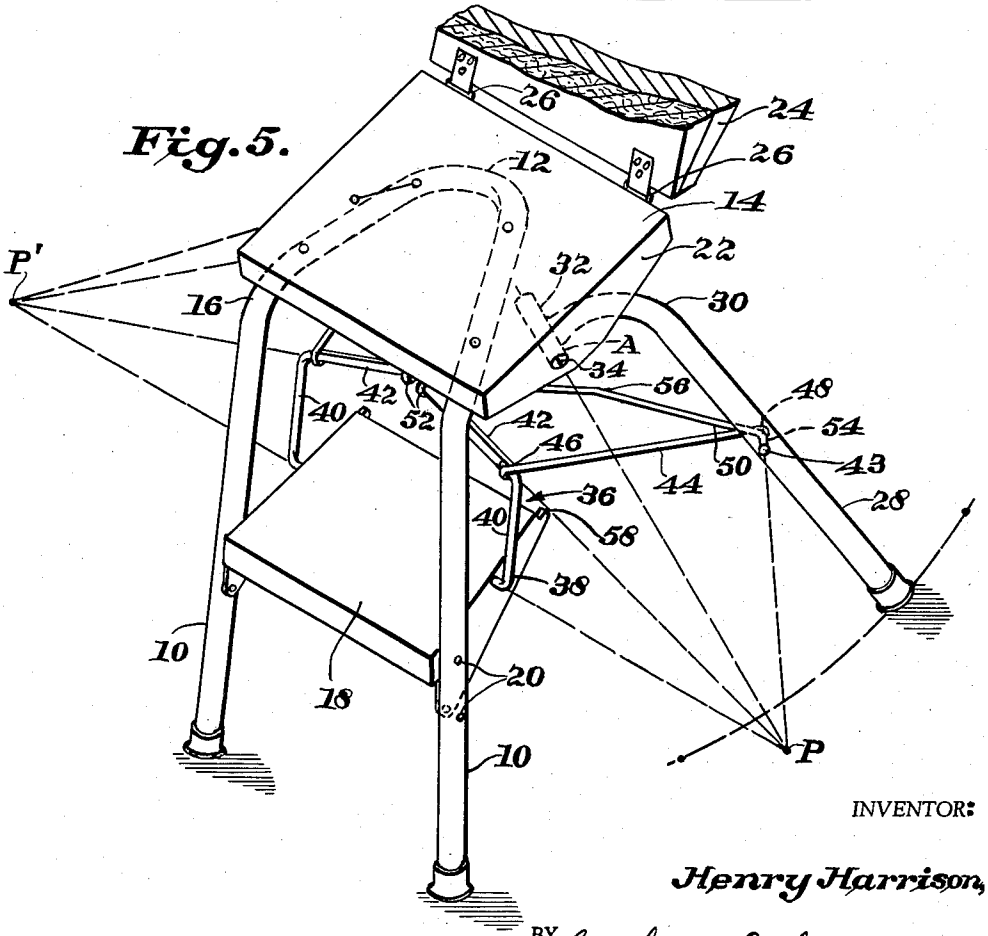


Fig.5.



INVENTOR:

Henry Harrison,

BY Cushman, Darby & Cushman
ATTORNEYS.

United States Patent Office 2,991,828 Patented July 11, 1961

2,991,828

KITCHEN STEP STOOL

Henry Harrison, 18 Frost Creek Drive, Locust Valley, N.Y.

Filed Nov. 10, 1959, Ser. No. 852,043
10 Claims. (Cl. 182—33)

This invention relates to a step stool and more particularly to a folding step stool which, when unfolded to an open position, converts into a step stool for climbing.

Stools capable of being opened to provide a climbing or step stool are old in the art; however, a major shortcoming of the known prior art devices of this nature is their lack of stability when used as a climbing or a step stool. This invention discloses a kitchen stool which may be opened to provide an extremely stable step or climbing stool by means of pivoting a pair of rear legs rearwardly and outwardly simultaneously relative to the front legs. By such a construction, an extremely stable platform is provided when the stool is open to provide a climbing step stool.

Briefly, the structure of the present invention consists of a rigid tubular yoke forming a pair of front legs to which a platform and a step are rigidly attached. A pair of brace legs or rear legs are pivotally connected to the platform on suitably chosen pivotal axes so that the rear or brace legs pivot outwardly and rearwardly relative to the front legs and the platform. An operating linkage consisting of a substantially U-shaped link and a second and third pair of links hinged to the first link operates to accomplish the outward and rearward pivotal motion of the rear legs. In one embodiment, an upholstered seat may be mounted upon the platform, while in another embodiment a back rest may also be secured to the platform, and means operatively connected to the first link to effect an unfolding motion of the legs into an open position when the seat is raised.

As will be described in detail below, when the stool is closed, or in a position for use as a sitting stool, the operating linkage is in its short dead-center position. When the stool is open, in a position for climbing, the operating linkage is in its open dead-center position. It is this use of both dead-center positions for locking the stool closed or open which is one particular feature of this invention.

It is an object, therefore, of this invention to provide a new stool structure which is readily adapted to be unfolded to further provide an extremely stable climbing stool.

It is another object of this invention to provide a combined sitting stool and climbing stool having a seat portion operatively connected to the means for unfolding the stool to a climbing stool position wherein the seat portion is moved to provide a stable top platform.

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

FIGURE 1 is a side elevational view of the stool of the present invention in its closed or sitting stool position;

FIGURE 2 is a rear elevational view of the stool in the position shown in FIGURE 1;

FIGURE 3 is a side elevational view of a modified form of the stool of the present invention showing the stool in its open or climbing stool position;

FIGURE 4 is a front elevational view of the stool illustrated in FIGS. 1 and 2 but in an open or climbing stool position; and

FIGURE 5 is a perspective view of the stool of the present invention in a partially open position and illustrating the pivotal axes of its associated elements.

Referring now to the drawings, the preferred embodiment of the stool of the present invention comprises a pair of tubular front legs 10 integrally joined at their upper ends, as at 12, forming a yoke and having a platform 14 rigidly secured adjacent their upper ends. The upper ends of front legs 10 are bent downwardly and rearwardly, as at 16, so that the front legs will be substantially vertical when the stool is in its closed position and so that the platform 14 will be horizontal when the stool is in its open position and adapted for climbing. A transverse step 18 extending between front legs 10 is rigidly secured thereto as by the rivets 20, and is inclined at an angle so that it extends parallel to top platform 14 and is horizontal when the stool is in its open position. Platform 14 is provided with a depending peripheral skirt 22 and has an upholstered seat portion 24 connected thereto on its rearward edge by hinges 26 to allow for pivotal motion of the upholstered seat portion 24 about the platform 14. A pair of brace legs 28 are each pivotally mounted on one side of the platform 14 respectively and are adapted to pivot rearwardly and outwardly relative thereto when the stool is unfolded to an open position, and pivot inwardly and forwardly when the stool is folded to its closed or sitting position. The upper ends of rear legs 28 are bent, as at 30, forwardly and inwardly relative to the platform 14 and have a hub 32 secured to their upper ends. Brace legs 28 are pivotally connected to platform 14 by means of a pivot pin 34 which passes through platform 14, hub 32, and the side of peripheral skirt 22 defining an inclined pivotal axis A relative to platform 14 to effect the rearward and outward pivotal motion.

The opening or closing motion of rear legs 28 is controlled by a pivotal linkage comprising a first link 36 which is substantially U-shaped and pivotally connected, as at 38, to opposite sides of step 18. First link 36 is preferably made of a stiff wire and comprises arm portions 40 which extend upwardly from pivotal connection 38 and upper portions 42 which extend upwardly and inwardly from the upper ends of arms 34. A pair of second links 44, also made of a stiff wire, are pivotally connected at one end thereof, as at 46, to the outer end of first link portions 42 respectively and extend rearwardly. A pair of third links 50 are pivotally connected, as at 52, to the center or apex of portions 42 of first link 36. The other end of each link 50 is pivoted, as at 54, to one of the brace legs 28, with the pivotal axis inclined at an angle to provide for the rearward and outward pivotal motion of its asociated rear leg. Each of the second links 44 is rigidly joined, at its rearward extremity 48, to one of the third links 50, near its pivotal connection 54 with the brace leg 28. In the preferred embodiment shown, each second link 44 is joined at its pivoted end 46 by a connection 43, substantially parallel to portion 42 of first link 36, to the pivoted end 52 of the corresponding third link 50. In this way, second link 44, connection 43, and third link 50 form a substantially triangular rigid link, of a single piece of wire, which pivotally joins first link 36 and brace leg 28. Each of the links 50 are bent upwardly at their middle, as at 56, to accommodate the rearward portion of step 18 when the stool is in its closed position, as shown in FIG. 1. Step 18 is provided with rearwardly extending hooks 58 adapted to engage and limit the pivotal motion of first link 36 when the stool is in its open position, as shown in FIGS. 3 and 4.

During the unfolding operation, first link 36 pivots rearwardly about step 18 on the pivotal connection 38 while simultaneously third links 50 pivot about portion 42 of first link 36, and second links 44 also pivot about the portion 42 of first link 36, causing the brace legs 28 to pivot outwardly and rearwardly about their pivotal axes A relative to platform 14.

As previously mentioned, the pivotal connection 54 of links 56 with their associated rear legs 28 and the pivotal connection A of rear legs 28 relative to the top platform 14, are inclined at an angle to accomplish the rearward and outward motion of the rear legs 28. The particular inclination of the aforementioned pivotal axes is such that all the pivotal axes on the right-hand side of the stool converge at a common point P (FIG. 5) spaced from that same side of the stool; while the pivotal axes located on the left-hand side of the stool all converge at a common point P' located and spaced from the left-hand side of the stool. The points P and P' lie along a line drawn through the pivotal axes 38 of first link 36 relative to the step 18, with the point P being spaced outwardly from the right-hand side of the stool and the point P' being spaced outwardly along the line P—38—P'. The upper portions 42 of first link 36 are inclined at an angle such that an extension thereof defines lines 42—P and 42—P' so that second link 44 on the right-hand side of the stool and third link 50 on the right-hand side of the stool are pivotally connected respectively at 46 and 52 to portion 42 of first link 36 such that their pivotal axes lie along the line 42—P. The rearward ends of third link 50 and second link 44 on the right-hand side of the stool are pivotally connected, as at 54, to rear leg 28 whereby the pivotal axes at 54 lie along the line 54—P. Thus, it will be seen that the pivotal axes of first link 36 relative to the right-hand side of step 18 and right-hand second link 44 and right-hand third link 50, and the pivotal axis of third link 50 relative to right-hand rear leg 28 all converge at the common point P lying on the line P—38, P'. Similarly, the aforementioned pivotal axes disposed on the left-hand side of the stool all converge at the common point P' disposed on line P—38, P'. It is this particular arrangement of the aforementioned pivotal axes that accounts for the rearward and outward pivotal motion of rear legs 28 when the stool is unfolded to its open position and also accounts for the fact that when the stool is in its closed or sitting position the links are in their short dead-center position, and when in an open or climbing position, the links are in their open dead-center position, thus providing an extremely stable climbing stool.

In the embodiment of the stool illustrated in FIG. 3, a back rest 60 in secured to top platform 14 by the extending arms 62 rigidly connected to the peripheral skirt 22 of platform 14. Additionally, the seat portion 24 is pivotally mounted to arms 62, as at 64. A bell crank 66 is rigidly secured to one of the arms 40 of first link 36 and has a link 68 pivotally secured to the bell crank 66, as at 70, with the other end of link 68 connected to the seat 24, as at 72. In such a construction, when the stool is folded to its closed position as first link 36 pivots upwardly and forwardly about the step 18, the bell crank moves downwardly and forwardly therewith causing the link 68 to pivot the seat 24 about the arms 62 so that the seat will lie upon the upper surface of platform 14, as shown in FIG. 1. When the stool is unfolded to its open position, first link 36 pivots upwardly and rearwardly carrying bell crank 66 upwardly and rearwardly so that the link 68 pivots seat 24 about the arms 62 to the position shown in FIG. 3. Alternatively, the seat 24 may be manually pivoted whereupon the link 68 serves as an actuator for link 36 and its associated second and third links 44 and 50.

In the embodiment disclosed in FIGS. 1 and 2 when the stool is in its open position, the seat 24 is manually pivoted about hinges 26 so that it will hang downwardly from the rear edge of platform 14, as shown in FIG. 4, so that the user of the stool for climbing purposes will stand upon the upper surface of platform 14 rather than the upholstered seat 24 and thereby be provided with a horizontal platform, as shown in FIGS. 3 and 4.

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 susccessfully 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 operable to provide a sitting position and a climbing position, comprising: a top platform; a pair of laterally spaced front legs secured at their upper ends to said top portion; a generally wedge-shaped seat hingedly secured on the rear of said top platform; a pair of rear legs each pivotally secured to said top platform and adapted to pivot rearwardly and outwardly relative thereto from a sitting position into an open climbing position; means to pivot said rear legs simultaneously rearwardly and outwardly relative to said top platform, whereby said top platform is generally horizontal when said legs are pivoted rearwardly and outwardly, and said top portion is inclined when said legs are moved forwardly and inwardly, said seat cooperating with the inclined top portion of said top platform to provide a generally horizontal sitting surface.

2. The structure defined in claim 1 in which said means to pivot said rear legs comprises a first link pivotally connected at each of its ends to opposite sides of said step respectively; a pair of third links both pivotally connected at one end thereof to said first link; the other end of each third link pivotally secured to one of said rear legs respectively.

3. The structure defined in claim 2 in which said means further comprise a pair of second links; one end of both links pivotally connected to said first link; the other end of each of said second links respectively connected rigidly to one of said third links adjacent to its pivotal connection with one of said rear legs.

4. The structure defined in claim 2 in which the pivotal axis of one of said rear legs with said top platform, the pivotal axis of said first link with said step, and the pivotal axes of one of said second links with said first link and said one rear leg converge at a common point on the same side of said stool as said one rear leg.

5. Structure defined in claim 1 further including a step connected to said front legs below said top platform, said step including means to limit the rearward and outward movement of said rear legs by said pivot means.

6. A folding step stool comprising: a top platform; a pair of laterally spaced front legs secured at their upper ends to said top platform; a pair of rear legs pivotally secured at their upper ends to the rearward portion of said top platform and adapted to pivot rearwardly outwardly relative to said top platform into an open position; means to pivot said rear legs simultaneously rearwardly and outwardly relative to said top platform; a back rest mounted on the rearward portion of said top platform; a generally wedge-shaped seat pivotally connected to said back rest and normally being on said top platform when the stool is in a closed position wherein said top platform is inclined and said wedge-shaped seat defines a generally horizontal sitting plane, and when said legs are moved rearwardly and outwardly, said top platform is disposed generally horizontal and said seat is pivotally movable in abutment with said back rest; means connected to said seat to operate said first named means when said seat is pivoted relative to said back rest and said top platform.

7. Structure defined in claim 6 further including at least one step joining said front legs below said top platform, means disposed on said step to limit the rearward and outward movement of said rear legs by said pivot means.

8. The structure defined in claim 6 in which said means to pivot said rear legs comprises a first link pivotally connected at each of its ends to opposite sides of said step respectively; a pair of third links both pivotally connected at one end thereof to said first link; the other end of each third link pivotally secured to one of said rear legs respectively.

9. The structure defined in claim 8 in which first link is connected to said seat whereby pivotal movement of said seat relative to said back rest and top platform pivots said first link and thereby said third links and said rear legs.

10. The structure defined in claim 9 in which the pivotal axis of one of said rear legs with said top platform, the pivotal axis of said first link with said step, and the pivotal axes of one of said third links with said first link and said one rear leg converge at a common point on the same side of said stool as said one rear leg.

References Cited in the file of this patent

UNITED STATES PATENTS

1,817,760	Peters et al.	Aug. 4, 1931
1,822,399	Hayne	Sept. 8, 1931
2,146,020	Lewis	Feb. 7, 1939
2,234,944	Rich et al.	Mar. 11, 1941
2,650,014	Harrison	Aug. 25, 1953