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[54] **FOLDING STOOL**

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[52] **U.S. Cl.** **108/128,** 248/435

[51] **Int. Cl.** **A47b 3/00**

[58] **Field of Search** 108/128; 248/155.2, 155.3, 248/434, 435

[56] **References Cited**

UNITED STATES PATENTS

564,129	7/1896	Wade	248/435
550,256	11/1895	Deane	248/435 X
901,904	10/1908	Hutchinson	108/128
1,717,908	6/1929	Antonuk	108/159 X

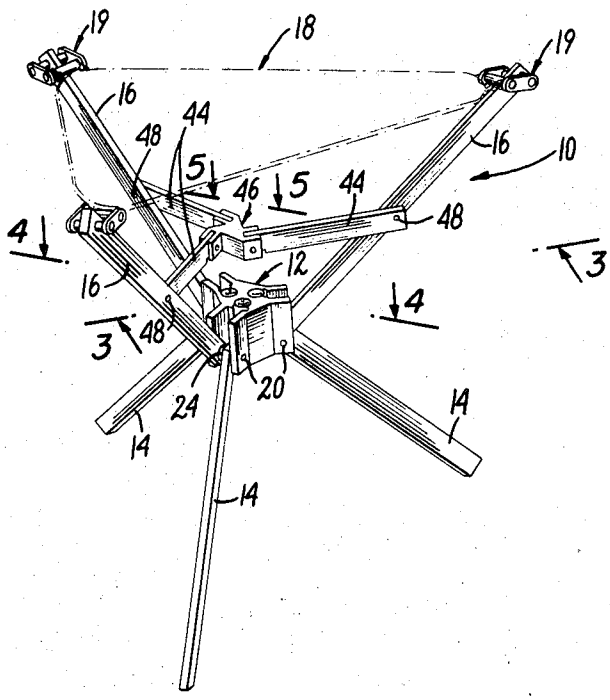
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[57] **ABSTRACT**

A folding stool with legs and separate seat braces that extend from and are pivotally attached to a hub. When the stool is unfolded, the legs are retained in their normal, load supporting positions by angularly disposed edges on their minor portions,and the seat braces are also retained in their normal, load supporting positions. The legs can be folded to overlap the seat braces so that the stool can be folded the length of the legs or seat braces, whichever are longer.

8 Claims, 10 Drawing Figures



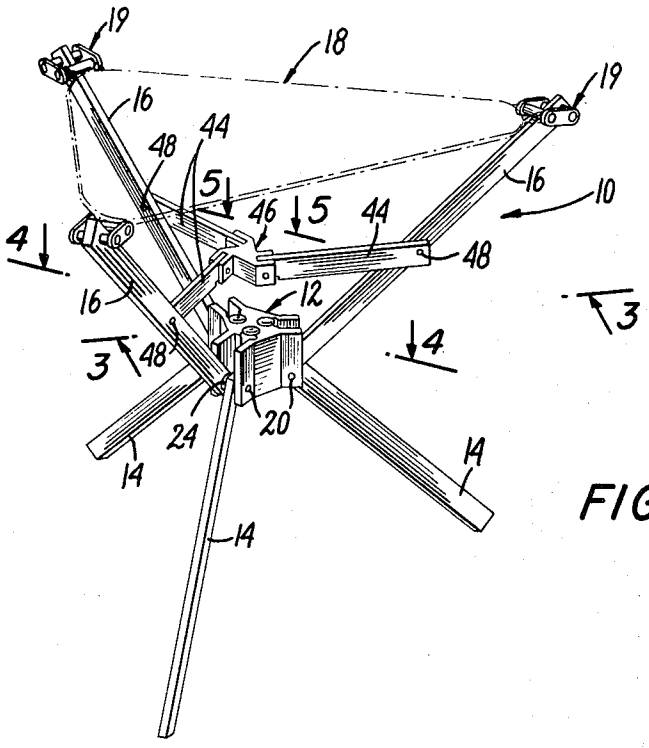


FIG. 1

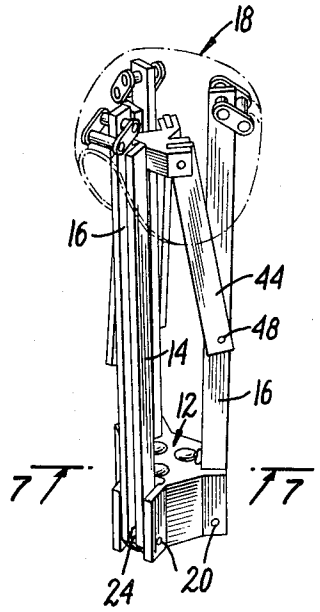


FIG. 2

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FIG. 3

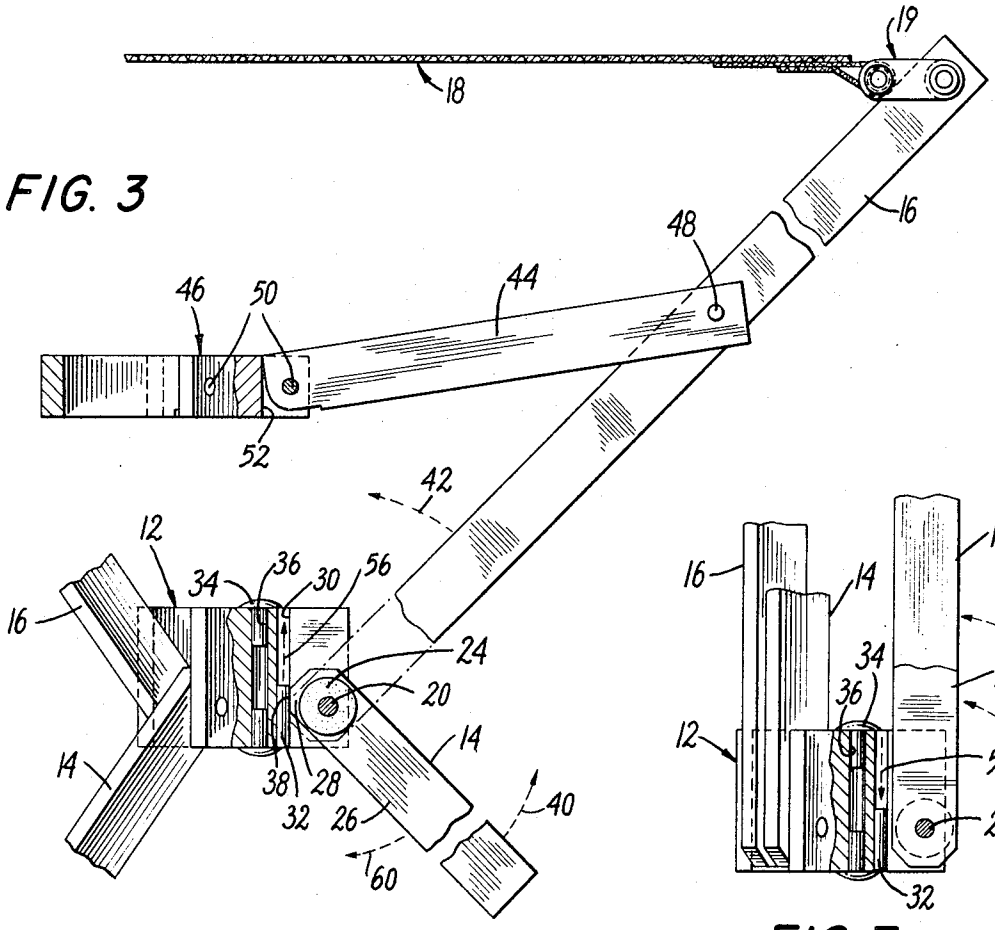


FIG. 7

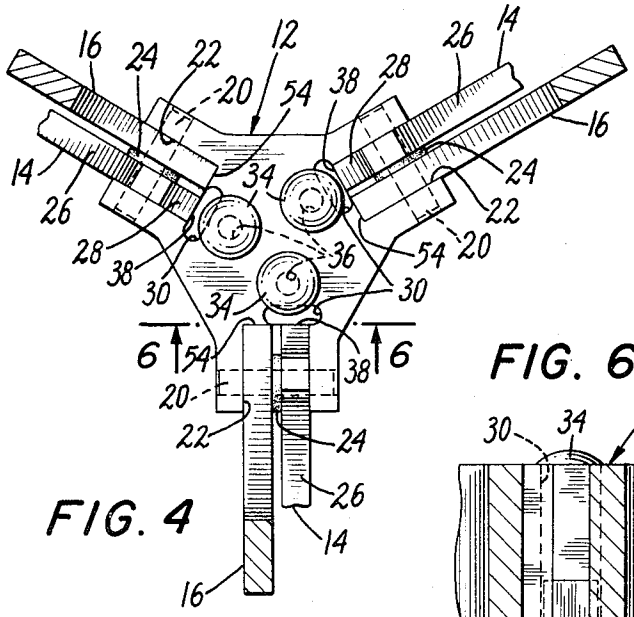


FIG. 4

FIG. 6

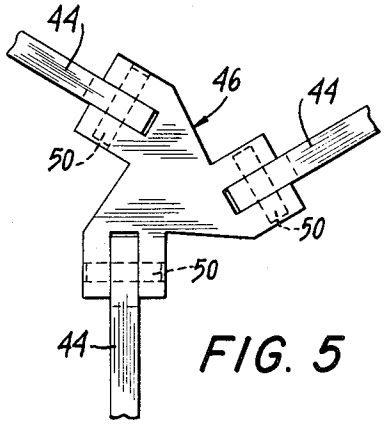


FIG. 5

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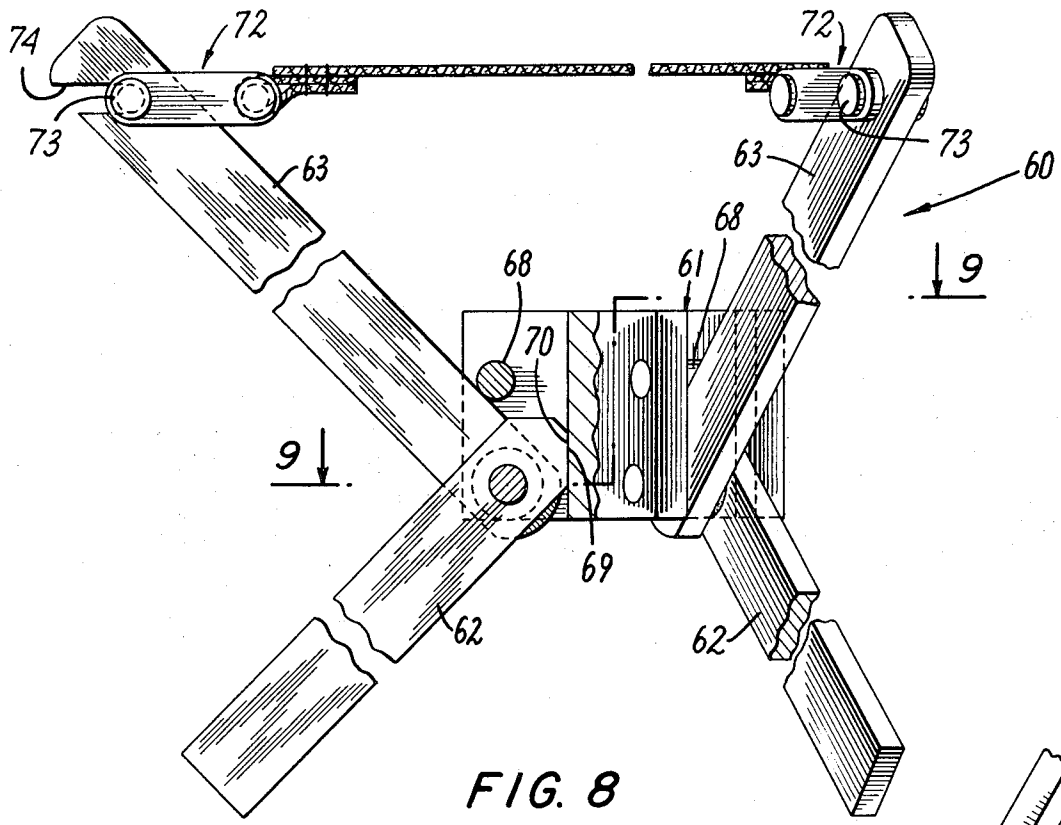


FIG. 8

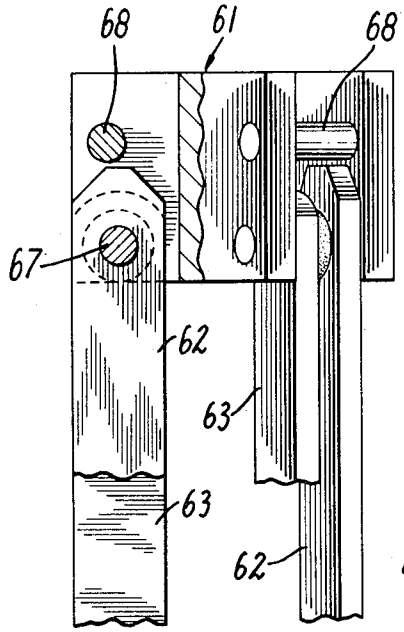


FIG. 10

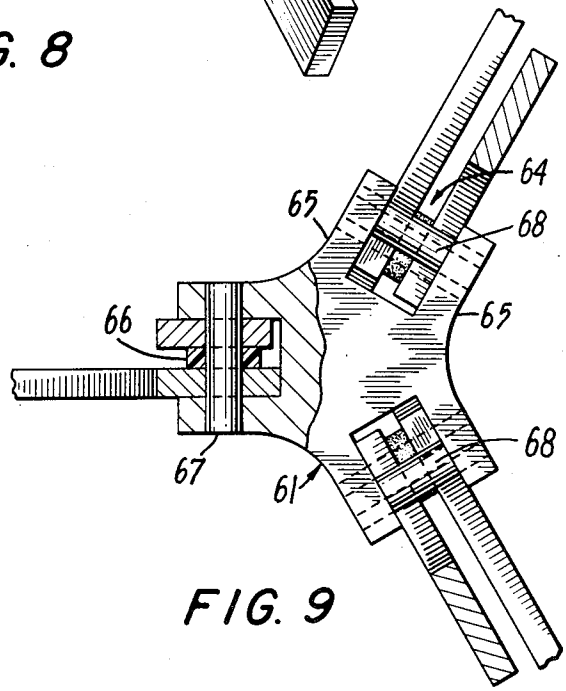


FIG. 9

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FOLDING STOOL

BACKGROUND OF THE INVENTION

This invention relates to folding stools, and, in particular, to those that are capable of being folded compactly.

Conventional three-legged, folding stools normally have legs that are pivotally connected to each other near the center of each leg. A seat formed of a suitable flexible material is attached at or near the top of each leg. When stools constructed in this manner are folded, each leg is pivoted toward the common vertical axis of the legs resulting in the folded length of the stool being no shorter than the combined length of the legs on both sides of their common pivot point. The net result is a bulky and unwieldy folded stool. Since the object of such a stool is its portability, the smaller the stool when folded, the closer the stool approaches serving its inherent purpose.

In addition, by providing a structure in which each leg extends from both sides of a common pivot point, the legs have a natural tendency to come together when a person sits on the seat. This tendency is normally resisted by the strength of each leg, which can result in a relatively large cross-sectional area for each leg or in the use of an expensive, high strength material. This reinforcement only adds to the bulkiness and weight of the structure and to its production cost.

Other folding stool structures have been designed, but these generally utilize a complicated arrangement of frame and bracing members without any accompanying reduction in size when the stool is folded.

SUMMARY OF THE INVENTION

There is provided, in accordance with the invention, a stool that can be folded compactly. The unique structure of the inventive stool enables it to be folded to the length of its legs, which extend outwardly from a centrally located hub. The legs, in their normal folded position, overlap seat braces formed by separate structural elements that also extend outwardly from the hub. In this way a stool is provided which can be folded to about one-half of conventional folded stools.

A stool that is capable of being folded in this manner has many advantages over conventional stools. First, it is less bulky when folded. In addition, by providing a stool with legs and seat braces as separate structural elements, stresses on those members are resisted by the centrally located hub. This feature results in legs and seat braces that are subjected to smaller stresses than the stresses that must be resisted by single elements acting as both legs and seat braces, as in conventional three-legged stools. Therefore, stools constructed in accordance with the invention can be provided with structural elements that have a smaller cross-sectional area than the prior art stools described above, when comparable materials are used.

The inventive stool includes a hub, with three legs and three separate seat braces pivotally attached to the hub and extending outwardly from it. In their unfolded, load supporting positions, the legs extend generally downwardly and outwardly from the hub and are retained in that position by restraining structure, and the seat braces extend generally upwardly and outwardly from the hub and are retained in position by additional restraining structure. A seat is attached at or near the outer extremities of the seat braces.

Restraining structure to control pivotal movement of the legs, in one embodiment of the invention, includes three slugs within the hub capable of movement into and out of the path of pivotal movement of the three legs. More specifically, each leg includes a major portion on one side of the pivot point and a minor portion on the other side, and the slugs may be moved into the paths of pivotal movement of the minor portions of the legs. When that happens, the major portions of the legs are prevented from moving outwardly and upwardly beyond predetermined positions, thereby providing leg supports for the stool in its unfolded, load supporting position. When the slugs are moved out of the paths of pivotal movement of the minor portions of the legs, the major portions are capable of moving upwardly beyond the horizontal plane and parallel to the seat braces, which also can be pivotally folded inwardly after their restraining structure is disabled. In this way, the stool can be folded to a length no longer than the length of the legs or the length of the seat braces, whichever are longer.

In another embodiment of the invention, the restraining structure for the legs includes an angular edge on each leg which is arranged to engage an associated surface on the hub. The seat brace restraining structure includes stops on the hub. With this arrangement, after using the stool, the legs may be folded inwardly and the seat braces pivoted downwardly and folded to be coextensive with the legs.

DESCRIPTION OF DRAWINGS

The above and other advantages of the invention will be more fully understood when the following description is considered in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of the inventive folding stool in its unfolded, load supporting position;

FIG. 2 is a perspective view of the folding stool when folded;

FIG. 3 is a partial front elevational view of the stool taken along line 3—3 as shown in FIG. 1, with partial cut-away portions for clearer illustration of the component parts;

FIG. 4 is a partial top elevational view taken along line 4—4 as shown in FIG. 1, illustrating essentially the hub portion of the stool;

FIG. 5 is a partial top elevational view taken along line 5—5 as shown in FIG. 1, illustrating essentially the lock hub portion of the stool;

FIG. 6 is a partial cross-sectional view of the hub, taken along line 6—6 as shown in FIG. 4, and illustrating essentially a groove and its corresponding slug for locking one of the legs;

FIG. 7 is a partial front elevational view taken along line 7—7 as shown in FIG. 2, illustrating the stool in its folded position with a portion of the hub being cut away for clear illustration of the groove and slug;

FIG. 8 is a partial front elevational view of another embodiment of the invention with partial cut-away portions for clarity;

FIG. 9 is a partial top elevational view taken along line 9—9 as shown in FIG. 8, illustrating the hub portion of the modified stool; and

FIG. 10 is a partial front elevational view similar to FIG. 8 showing the stool in its folded position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to an embodiment of the invention with reference to FIG. 1, the folding stool is designated generally by reference numeral 10 and is shown in its normal unfolded, load supporting position. The main structural components that form the frame of the stool 10 are the hub 12, the legs 14 and seat braces 16 which are pivotally attached to the hub 12. When the stool 10 is unfolded, as shown in FIGS. 1 and 3, the legs 14 extend downwardly and outwardly and the seat braces 16 extend upwardly and outwardly from the hub 12. These frame elements are preferably formed of a rigid, lightweight metal, but other rigid materials with relatively high strength characteristics may also be used. A seat 18, formed in this embodiment of a strong flexible material, designated by the broken lines in FIG. 1, is attached by any suitable means such as couplings 19 (best shown in FIG. 3), which are readily removable to facilitate cleaning of the seat, at or near the outer extremities of the seat braces 16.

The legs 14 and the seat braces 16 are attached to the hub 12 by pivot pins 20 which extend across channels 22 in the hub 12. A washer 24 separates each leg 14 and seat brace 16 to prevent them from rubbing against each other.

Each channel 22 is formed by a pair of integral parallel flanges that are spaced apart from each other and that extend outwardly from the side of the hub 12. Although the invention is described in conjunction with the hub 12 having this particular design, other hubs may be used to which the legs 14 and the seat braces 16 can be pivotally attached and which include restraining means for the legs 14, which operate in a similar fashion to the type that will be described in greater detail below.

In this embodiment of the invention, as best shown in FIG. 4, each leg 14 includes two portions, a major portion 26 that extends in one direction from the pivot pin 20 and a minor portion 28 that extends in the other direction from the pivot pin.

As best shown in FIGS. 3 and 4, a groove 30 runs longitudinally along one side of the back wall of each channel 22. Part of the groove 30 extends through the path of pivotal movement of the minor portion 28 of the leg 14. A slug 32, slidably disposed within each groove 30 (see FIGS. 3, 6 and 7), is capable of moving into and out of the part of groove 30 that extends through the path of pivotal movement of the minor portion 28 of the leg 14. The slug 32 is preferably in the shape of a relatively flat rectangular body which has rounded longitudinal edges to conform to the shape of the groove 30 (see FIG. 4). Slugs and grooves of other shapes may also be used.

To prevent the slug 32 from falling out of its groove 30, the longitudinal opening of the groove 30 that opens into channel 22 is constricted and, in addition, pins 34 are received in holes 36 (see FIGS. 3, 4 and 7) located in the hub 12 near both ends of the groove so that the head of each pin 34 at least partially covers the groove 30, thereby acting as a stop for the slug 32. Instead of the pins 34, a single plate can be attached to each end surface of the hub 12 to cover at least partially the ends of the grooves 30. Other suitable stops may also be provided.

Each leg 14 includes a contact surface 38 (see FIG. 3) which is formed on an edge of the minor portion 28 of the leg 20 and is angularly disposed to its longitudinal axis. The angle of the contact surface 38 determines the distance that the legs 14 can travel upwardly when the stool 10 is unfolded, as shown in FIGS. 1 and 3, which will be described in greater detail below.

When the stool 10 is in its unfolded load supporting position as shown in FIGS. 1 and 3, and a person is seated on the seat 18, each contact surface 38 engages and is flush against its corresponding slug 32, and the major portion 26 of that leg 14 cannot move outwardly in the direction illustrated by the broken arrow 40 as shown in FIG. 3.

In addition, as a person is sitting on the seat 18 each seat brace 16 tends to fold inwardly in the direction illustrated by the broken arrow 42, as shown in FIG. 3. This tendency is resisted by brace member 44 and lock hub 46, with each brace member 44 being attached at one end to one seat brace 16 by pivot pin 48 and at the other end to the lock hub 46 by pivot pin 50 (see FIGS. 3 and 5). When the seat braces 16 are at their point of maximum outward and downward movement (when the stool 10 is unfolded) the brace members 44 are slightly above the horizontal. Because of the gap 52 (see FIG. 3) between the end of each brace member 44 and the corresponding portion of the lock hub 46, the lock hub 46 can be moved "overcenter" by a slight downward push to the position shown in FIG. 3, thereby causing the end of each of the brace members 44 nearest the pivot pin 50 to be below the end nearest the pivot pin 48 in relation to the horizontal. In this way, the brace members 44 and the lock hub 46 are locked into their supporting position to resist the tendency of the seat braces 16 to move inwardly as is shown by the broken arrow 42.

In addition, each seat brace 16 includes an angularly disposed contact surface 54 which, along with the point of maximum extension of the brace members 44 and the lock hub 46, limits the outward and downward movement of the seat brace 16 when the stool 10 is unfolded. Each contact surface 54 abuts the back wall of its corresponding channel 22 when the seat braces 16 are in their unfolded position.

When the stool 10 is folded, as shown in FIGS. 2 and 7, the legs 14 and the seat braces 16 are folded upwardly, coextensive and parallel with each other. With the stool 10 in that position, each slug 32 will be located in the bottom of its groove 30 and in the path of pivotal movement of the minor portion 28 of the corresponding leg 14. To unfold the stool 10, it is turned upside down causing each slug 32 to gravitate into the part of its groove 30 which is not in the path of pivotal movement of the minor portion 28 of the leg 14, as illustrated by the broken arrow 56 shown in FIG. 3. Each leg 14 is then pivoted outwardly in relation to the vertical axis of the stool 10 to a point beyond the angle at which each of the legs 14 extend when the stool 10 is in its unfolded, load supporting position illustrated in FIG. 1.

The stool 10 is then turned back to the position shown in FIG. 2, but with the legs 14 extending downwardly from the hub 12. This action causes the slugs 32 to slide, this time moving by gravity into the path of movement of the minor portion 28 of each cor-

responding leg 14 as illustrated by the broken arrow 58 shown in FIG. 7. Each leg 14 is then pivotally moved upwardly and outwardly in the direction illustrated by the broken arrow 40, as shown in FIG. 3, until each contact surface 38 engages its corresponding slug 32. Each leg 14 is then in its normal load supporting position.

Seat braces 16 are then pivotally moved outwardly and downwardly until the contact surfaces 54 on the ends of each seat brace 16 abut the back wall of their corresponding channels 22. At this point of maximum outward and downward movement of each of the seat braces 16, the brace members 44 are slightly above the horizontal, as described above. The lock hub 46 is then pushed downwardly a short distance to its overcenter position and the folding stool 10 is then in its normal load supporting position.

To fold the stool 10 into the position shown in FIG. 2, the lock hub 46 is grasped and pulled upwardly which causes seat braces 16 to be moved upwardly and inwardly a short distance. The seat braces are then pushed inwardly in the direction illustrated by broken arrow 42 in FIG. 3, to the position shown in FIG. 2. Each leg 14 is then pivotally moved downwardly and inwardly a short distance, illustrated by broken arrow 60 shown in FIG. 3, to move the contact surface 38 of each leg 14 out of engagement with the slugs 32. The entire stool 10 is then turned upside down causing each slug 32 to slide into the part of its groove 30 that is not within the path of pivotal movement of the minor portion 28 of the corresponding leg 14, as illustrated by the broken arrow 56 in FIG. 3. The legs 14 are then pivotally moved outwardly and downwardly, as illustrated by the broken arrow 40 in FIG. 3 (in relation to the upside down position of the stool 10), until they are coextensive with the seat braces 16, as shown in FIG. 2. At this point, the stool 10 is in its normal folded position with both the legs 14 and seat braces 16 in parallel relation from one side of the hub 12, thereby providing a folded stool which is about one-half the folded length of conventional stools.

Referring to another embodiment of the invention with reference to FIGS. 8, 9 and 10, a folding stool designated generally by reference numeral 60 includes a hub 61, three legs 62 and three seat braces 63. Three channels 64 formed in the hub 61 by flanges 65 receive the ends of the legs 62 and the braces 63 which are separated by spacers 66. Pivot pins 67 extend through openings in the legs, braces and spacers to enable the legs and braces to be pivotally moved in a limited manner as discussed hereinafter. A stop pin 68 affixed to the flanges 65 extends across each channel 64 to restrain movement of the seat braces 63.

On the inner end of each leg 62 there is formed an edge 69 angularly disposed to the major longitudinal axis of the leg and engaging, when the stool is in use, a surface 70 parallel to the axis of the hub.

A triangular flexible seat 71 supported by the braces 63 is attached to three couplings 72. One of the couplings is secured to one of the seat braces 63 by a pin 73 inserted in an opening in the brace, and the other two couplings are adapted to be removably secured to the seat braces by slots 74 which receive the pins 73.

When the stool shown in FIGS. 8, 9 and 10 is folded, the legs and seat members extend coextensively from the hub, as shown in FIG. 10. To unfold the stool for use, the seat braces 63 are pivoted upwardly into engagement with the stop pins 68 to the position shown in FIG. 8 and the couplings 72 of the seat are readily slipped into the slots 74 due to the flexibility and resilience of the seat material. Note that the seat tends to hold the braces in position. The legs are then pivoted outwardly until their edges 69 engage the hub surfaces 70. The stool is then ready for use.

To fold the stool 60, the seat 71 must first be removed from the two braces and then the legs 62 and seat braces 63 pivoted downwardly into the coextensive positions shown in FIG. 10. The resulting folded stool is compact and readily transportable.

While the invention has been particularly described with regard to the preferred embodiment, it is understood that the stool can assume other shapes and configurations and still be within the spirit and scope of the invention as described in the appended claims. Therefore, the invention is not intended to be limited to the specific apparatus disclosed herein but is to be defined by the appended claims.

I claim:

1. A folding stool capable of assuming folded and unfolded positions comprising a hub, three legs pivoted to the hub for movement from folded positions to unfolded positions at which the legs normally extend downwardly and outwardly from the hub, three seat braces pivoted to the hub for movement from folded positions coextensive with the folded legs to unfolded positions at which the braces normally extend upwardly and outwardly from the hub, a seat adapted to be attached to the outer ends of the seat braces, first restraining means for preventing the seat braces from pivotally moving inwardly from their unfolded positions when the stool is in use, and second restraining means for preventing the legs from pivotally moving upwardly from their unfolded positions when the stool is in use, the three legs moving through paths to their unfolded positions and the second restraining means including elements movably disposed on the hub and associated with each leg for preventing the legs from pivotally moving upwardly from their unfolded positions when the movable elements are moved into the paths of pivotal movement of the legs and for allowing the legs to move pivotally upwardly and into positions coextensive with the folded seat braces when the restraining means is moved out of the paths of pivotal movement of the legs.

2. A folding stool capable of assuming folded and unfolded positions comprising a hub, three legs pivoted to the hub for movement from folded positions to unfolded positions at which the legs normally extend downwardly and outwardly from the hub, three seat braces pivoted to the hub for movement from folded positions coextensive with the folded legs to unfolded positions at which the braces normally extend upwardly and outwardly from the hub, a seat adapted to be attached to the outer ends of the seat braces, first restraining means for preventing the seat braces from pivotally moving inwardly from their unfolded positions when the stool is in use, and second restraining means for preventing the legs from pivotally moving

upwardly from their unfolded positions when the stool is in use, each leg including major and minor portions extending in opposite directions from its pivot point, the major portions extending downwardly and outwardly from the hub when the stool is in its unfolded position, the minor portion moving through a path when the leg is pivoted to its unfolded position, and the second restraining means including an edge of each leg minor portion, three grooves in the hub, part of each groove extending through the path of pivotal movement of one of the minor portion edges, a slug slidably disposed in each groove, each slug being capable of movement into and out of the part of its groove that extends through the path of pivotal movement of the minor portion edge so that when the stool is in its normal unfolded position the minor portion edges engage the slugs, thereby preventing the legs from pivotally moving upwardly beyond the predetermined positions.

3. A folding stool in accordance with claim 2, wherein each slug is movable due to gravity, and each groove includes stop means at each end thereof for preventing the slug from falling out of its groove.

4. A folding stool in accordance with claim 2, wherein the minor portion edge that engages the slug is an edge that is angularly disposed to the major longitudinal axis of the leg, the angle determining the maximum distance that the major portion of the leg can move upwardly when the edge engages the slug.

5. A folding stool in accordance with claim 2, wherein the hub includes three channels formed by pairs of spaced apart flange members extending outwardly from the hub, and three pivot pins extending across the channels and through the legs being anchored by the flanges for pivotally connecting the legs to the hub.

6. A folding stool in accordance with claim 5, wherein each pivot pin also extends through a seat brace, thereby pivotally connecting the legs and seat braces to the hub at the same pivot points.

7. A folding stool capable of assuming folded and unfolded positions comprising a hub, three legs pivoted to the hub for movement from folded positions to unfolded positions at which the legs normally extend downwardly and outwardly from the hub, three seat braces pivoted to the hub for movement from folded positions coextensive with the folded legs to unfolded positions at which the braces normally extend upwardly and outwardly from the hub, a seat adapted to be attached to the outer ends of the seat braces, first restraining means for preventing the seat braces from pivotally moving inwardly from their unfolded positions when the stool is in use, and second restraining means for preventing the legs from pivotally moving upwardly from their unfolded positions when the stool is in use, the first restraining means comprising a lock hub and three brace members pivotally connected at their one ends to the seat braces and at their other ends to the lock hub, the longitudinal axes of the brace members being slightly above the horizontal when the stool is in its normal unfolded position, and means providing overcenter action of the lock hub when it is moved downwardly a short distance through the horizontal position of the brace members for preventing the seat braces from moving inwardly from their unfolded positions when the stool is in use.

8. A folding stool capable of assuming folded and unfolded positions comprising a hub that includes three pairs of spaced apart flange members extending outwardly from the hub, each pair of flange members forming a channel between them, a pivot pin anchored by each pair of flange members and extending across the channel, a leg and a seat brace pivotally attached to the hub by each pivot pin, each leg including major and minor portions extending in opposite directions from its pivot pin, a seat attached to the ends of the seat braces, first restraining means for preventing the seat braces from pivotally moving inwardly from their unfolded positions when the stool is in use, the hub further including a groove extending along a portion of the back wall of each channel, a portion of each groove extending through the path of pivotal movement of the minor portion of the leg, and a slug slidably disposed in each groove, each slug being capable of sliding into and out of said portion of each groove, so that the major portions of the legs are prevented from pivotally moving upwardly from their unfolded positions when the slugs are in said portions of the grooves and the legs engage the slugs, and the legs are permitted to move pivotally upwardly to positions coextensive with the folded seat braces when the slugs are slidably moved out of said portions of the grooves.

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