July 4, 1961 E. F. HAMILTON 2,991,123

FOLDING CHAIR

Filed May 5, 1958 2 Sheets-Sheet 1

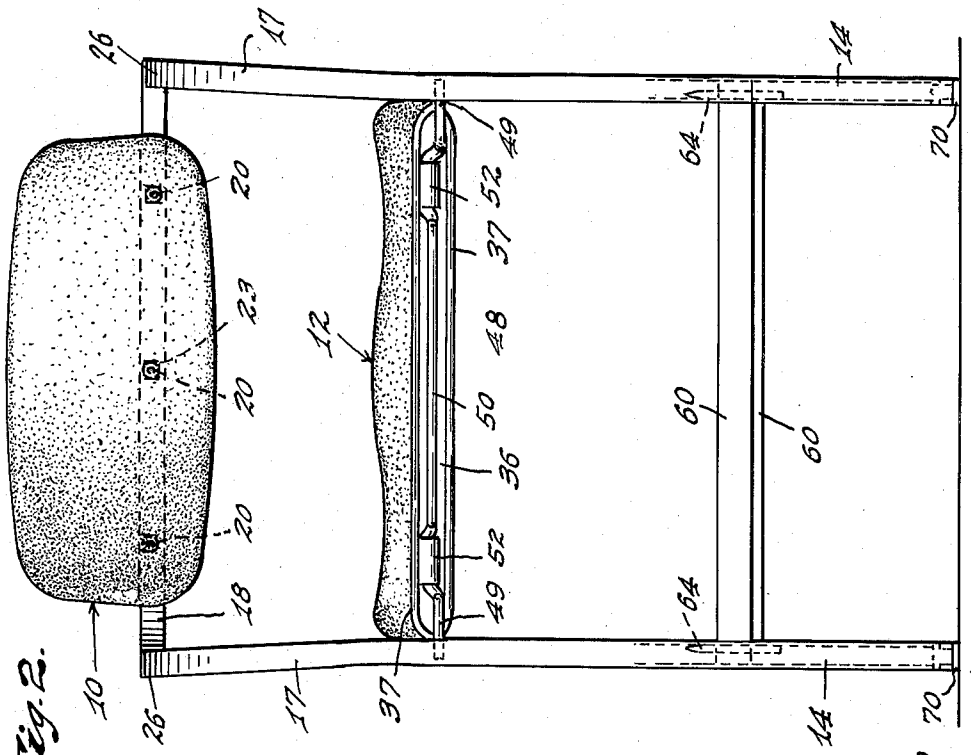


Fig. 2.

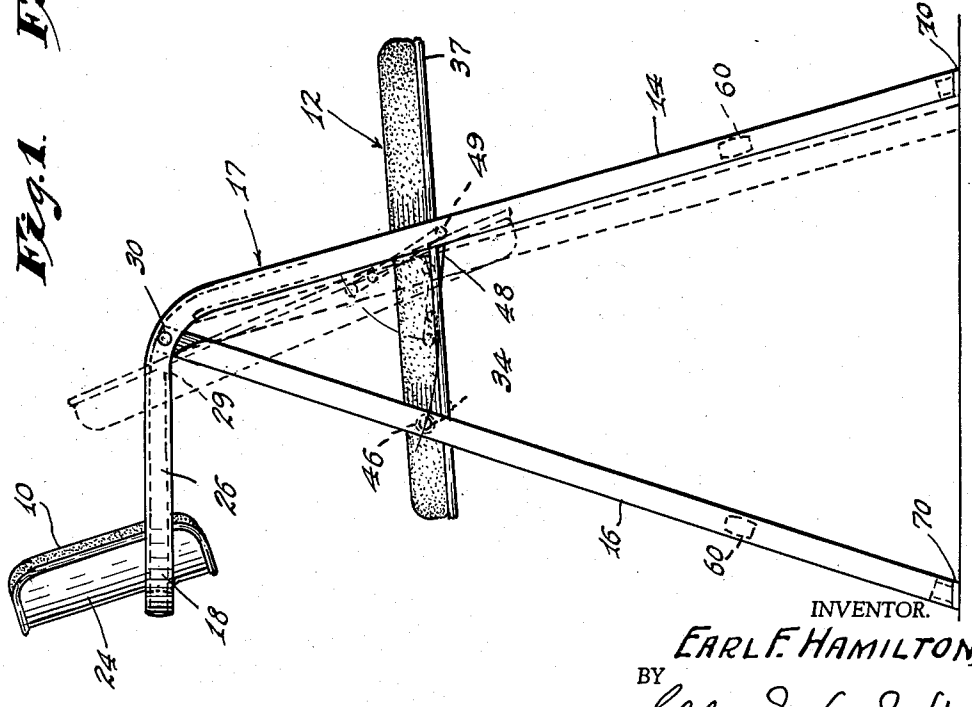


Fig. 1.

INVENTOR.
EARL F. HAMILTON,
BY
Schley, Lake & Jenkins
ATTORNEYS.

July 4, 1961 E. F. HAMILTON 2,991,123

FOLDING CHAIR

Filed May 5, 1958 2 Sheets-Sheet 2

Fig. 3.

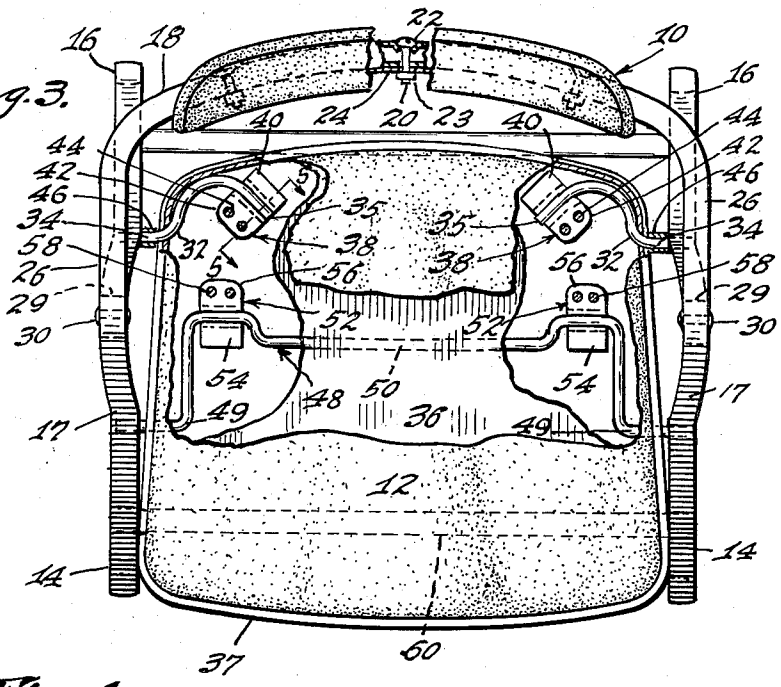


Fig. 4.

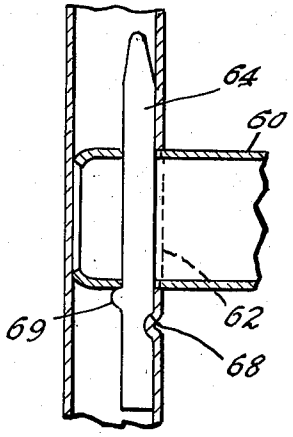
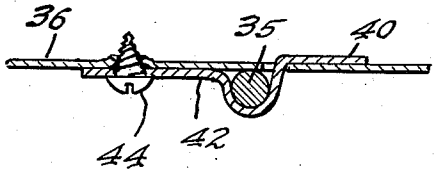


Fig. 5.



INVENTOR.
EARL F. HAMILTON,
BY
Schley, Dasle & Jenkins
ATTORNEYS.

United States Patent Office

2,991,123

Patented July 4, 1961

2,991,123

FOLDING CHAIR

Earl F. Hamilton, Columbus, Ind., assignor to Hamilton Cosco, Inc., a corporation of Indiana

Filed May 5, 1958, Ser. No. 733,170

4 Claims. (Cl. 297—55)

This invention relates to furniture, and more particularly to collapsible arm chairs in which the rear legs and the chair seat are foldable from an operative position into a collapsed position in which they are disposed adjacent the plane of the front chair legs.

The present invention has for an object to simplify and improve the assembly of such articles. Another object is to provide a chair which when its parts are disposed in operative position will offer but little indication of its collapsibility, and which when its parts are disposed in collapsed position can be compactly stacked or nested with other such chairs. A further object is to provide a collapsible chair whose retraction and extension may be readily and easily effected, and which will tend to remain in either of said collapsed or extended positions. A still further object is to provide a collapsible chair which lends itself to manufacture largely from sturdy and economical metal tubing and sheet metal.

In carrying out my invention in its preferred form, I provide a generally U-shaped, unitary frame having a horizontal intermediate stretch to which a back-pad is secured and side stretches which extend forwardly from the intermediate stretch to provide arms and are then bent to extend obliquely downward to form the front chair legs. A pair of rear legs are pivotally secured to the frame, desirably adjacent the front ends of the arm-forming portions thereof. The seat is pivoted to the rear legs near its rear edge and is connected to the front legs through a seat-supporting rod having its ends pivotally connected to the front legs and its intermediate portion offset rearwardly and pivotally connected to the seat on a transverse axis.

With this construction, chair collapse is readily effected by tilting the chair forwardly to lift the rear legs from the floor and simply raising the forward portion of the chair seat, whereupon the seat pivots with respect to the front legs about the seat-supporting rod and moves the rear portion of the seat downwardly. As the rear portion of the seat moves downwardly the rear legs pivot forwardly about the axis of their connection with the front-supporting frame until the front and rear legs are disposed on adjacent substantially parallel planes. In this position of complete retraction or collapse the seat is moved to a substantially vertical position in a plane adjacent the planes of the front and rear legs. To extend the chair, the front edge of the seat is forced forwardly, or the rear legs rearwardly, whereupon the seat and rear legs readily move to their operative positions.

The accompanying drawings illustrate my invention. In such drawings:

FIG. 1 is a side elevation of a chair embodying my invention and showing said chair in collapsed position in dotted lines;

FIG. 2 is a front elevation of the chair shown in FIG. 1;

FIG. 3 is a plan view of the chair of FIG. 1 with portions thereof broken away to show the pivotal seat construction;

FIG. 4 is an enlarged vertical section showing the leg bracing structure; and

FIG. 5 is an enlarged vertical section taken on the line 5—5 of FIG. 3.

The chair shown in the drawings comprises a back **10** and a seat **12** supported on front legs **14** and rear legs **16**. The front legs **14** conveniently are the generally parallel stretches of a frame **17** formed of square metal tubing bent at its intermediate or bight portion **18** and rigidly secured to the chair back **10** by bolts **20** extending through countersunk openings **22** in the bight **18** to receive nuts **23** rigidly mounted in openings cut in a chair back frame **24** constituting the rigid structural member of the back **10**. The frame **17** is bent in a manner so that the ends of the bight **18** extend forwardly from the chair back **10** to form a pair of arms **26** continuous with, and at an angle to, the upper ends of the legs **14**. The legs **14** extend obliquely downward from the forward ends of the arms **26** to provide in combination with the rear legs **16** a broad floor-engaging base. Conveniently, in order to enhance the comfort of the person using the chair, the arms **26** are displaced slightly beyond the lateral margins of the chair seat **12** and back **10**, as shown in FIG. 2. This lateral displacement of the arms also permits the chair to be completely collapsed when a seat having a wider width at its forward end than its rearward end is used.

Each of the rear legs **16** is formed from a length of square metal tubing and is pivotally joined to the forward end of one of the arms **26**. To this end, the upper ends of the legs **16** are pinched or partially collapsed for reception in openings **29** cut in the lower faces of the arms **26**. The arms **26** and the legs **16** are pivotally interconnected, as by rivets **30**, extending through openings formed in said arms and legs. Desirably, in order to lessen the indications of the chair's collapsibility the ends of the rivets **30** are recessed in countersunk openings formed in the side walls of the arms **26**.

The rear legs **16** are pivotally connected to the chair seat **12** by a pair of rods **32** whose out bent ends **34** are rotatably received in suitable coaxial openings in the inner faces of said legs. The opposite or inner ends **35** of the rods **32** are bent into a generally C-shape and are rigidly connected to the seat **12**. As shown, the seat **12** embodies a seat pan **36** having a depending peripheral lip **37** and forming the basic structural support for said seat. The rods **32** extend through openings in the lateral stretches of the pan lip **37** and are clamped to the pan **36** near its rear edge by clips **38** secured to the lower face of said pan. One end of each of the clips **38** comprises a tab **40** insertable in a slot cut in the seat pan, and the opposite end comprises a tab **42** secured to the lower face of the pan **36** by screws **44**; the ends **35** of the rods **32** being retained against the pan **36** between the tabs **40** and the bolts **44**. Conveniently, spacers **46** are disposed around the rods **32** between the lip **37** and the legs **16** to insure centering of the seat **12** between the legs **16** and to prevent the seat from binding against the legs **16** during collapse or extension of the chair.

The front legs **14** are interconnected by a seat-supporting rod **48** having its ends **49** pivotally received in aligned openings in the inner faces of said legs. When the chair is in extended position, the rod **48** extends transversely below the seat **12** with the pan lip **37** resting thereon forwardly of the transverse seat axis or center line. The mid-section **50** of the rod **48** is offset rearwardly from the ends **49** and is pivotally secured to the lower face of the seat pan **36** by clips **52** similar in construction and mounting to the clips **38**. That is, one end of each of the clips **52** comprises a tab **54** insertable in a slot cut in the seat pan **36**, and the opposite end comprises a tab **56** secured to the lower face of the pan by bolts **58**. By offsetting the rod mid-section **50** rearwardly of the ends **49** and the transverse seat center line a pivotal link is formed between each of the ends and the mid-section for effecting chair collapse, as will be more fully described hereinafter.

Desirably, in order to dispose both the front and rear legs **14** and **16** closer to the lateral margins of the seat **12** without constricting the space between the arms **26**, said front and rear legs are bent laterally inwardly at the

plane of said seat, thereby shortening the length of the rods **48** and **32** between the pan lip **37** and the front and rear legs respectively to add rigidity to the interconnection between said rods and the seat. This is of particular importance when the arms **26** are disposed a relatively great distance beyond the lateral margins of the back and seat which causes a corresponding separation between the lateral seat margins and the front and rear legs.

Preferably, both the front and rear legs are braced adjacent their lower ends by stretchers. As shown in FIG. 4, I prefer to interconnect both the front and rear legs by transversely extending stretchers **60** whose ends are received in openings **62** cut in the inner faces of the legs. The stretchers **60** are held in position in the legs **14** and **16** by pins **64** extending through vertically disposed openings cut in the ends of the stretchers **60** with the lower face of each stretcher resting on a lug **69** formed on each pin. Each of the pins **64** is retained in a fixed position in one of the legs by a dimple **68** formed in its side wall which receives a corresponding dimple formed in the inner face of the chair leg.

Desirably, each of the legs **14** and **16** is provided with a cap or foot **70** of rubber, plastic, or other suitable material fit over its lower end to prevent slippage and to provide a smooth floor-engaging surface.

Collapse of the chair from extended position is most easily effected by tilting it forward to lift the rear legs **16** from the floor and by then applying an upward force to the front of the seat **12** whereupon the seat **12** pivots about its connection with the rod **48** to lower the rear of the seat. Lowering of the rear of the seat forces the lower portion of the legs **16** toward the legs **14**, the legs **16** pivoting with respect to the seat about the axis of the rods **32** and with respect to the legs **14** about the axis of the rivets **30**. During this pivotal seat and rear leg movement the ends **49** of the rod **48** pivot in the legs **14** so that the pivotal link formed by the pivotal connection between the rod **48** and the legs **14** and the seat **12** is pivoted upwardly, thereby permitting the chair seat **12** to swing slightly past an upright vertical position to dispose its rear edge forwardly of its front edge, as shown in the dotted line in FIG. 1. Forward movement of the rear seat edge in collapse of the chair is limited by the pan lip engaging the rod **48** adjacent the rear edge of the seat.

The axis of pivotal interconnection between the seat **12** and the rod **48** is so located as to prevent the force of gravity from causing extension of the chair when it is lifted by the back when in collapsed condition. In this connection, it may be noted that when the collapsed chair is lifted by the back, the weight of the front portion of the chair seat tends to swing the seat in the chair-extending direction, such tendency being opposed by the weight of the rear portion of the seat and the weight of the rear legs. If, as is desired, the axis of pivotal connection of the seat to the rod **48** is located close enough to the front edge of the seat, the weights of the rear legs and of the rear seat portion will predominate and will tend to maintain the chair collapsed. However, owing to the relative horizontal shifting of pivot points when the chair is extended, the chair will not tend to collapse if lifted by the back when in extended condition.

One of the advantages of my novel chair resides in the provision of a construction which permits a plurality of such chairs to be nested or stacked for compact storage. Nesting is accomplished by collapsing the chairs and then inserting the back of one of the chairs in the space between the arms of the chair in back of it with the front legs of the second, or rear, chair abutting the rear legs of the forward chair. Conveniently, the length of the chair arms is sufficiently long that the backs of three chairs can be disposed between the seat and back of the most rearward chair, thereby permitting the chairs to be nested in convenient groups of fours.

I claim as my invention:

1. A collapsible chair having a back and a seat, comprising a front-supporting frame having a rearwardly offset bight portion upon which said back is mounted and interconnecting a pair of floor-engageable front legs, said back being fixedly mounted on said bight portion substantially rearwardly of the plane of the front legs, a pair of rear legs pivotally connected to said bight portion rearwardly of the plane of the front legs and vertically swingable between a retracted position in which they are in a plane parallel to and rearwardly of the plane of the front legs and an operative position in which they are disposed well rearwardly of the front legs, means pivotally connecting said rear legs to the chair seat on fixed pivotal axes, and a seat-supporting rod pivotally connected to the front legs forwardly of the transverse seat center line and pivotally connected to the seat rearwardly of its transverse center line to support the seat in operative position and to form a pivotal interconnection between said seat and front legs whereby said seat may be swung through the plane of the front legs to dispose its forward edge rearwardly of the plane of the front legs when the chair is in its collapsed position.

2. A collapsible chair having a back and a seat, comprising a front-supporting frame having a rearwardly offset bight portion upon which said back is mounted and interconnecting a pair of floor-engageable front legs, said back being fixedly mounted on said bight portion substantially rearwardly of the plane of the front legs, a pair of rear legs pivotally connected to said bight portion rearwardly of the plane of the front legs and vertically swingable between a retracted position in which they are in a plane parallel to and rearwardly of the plane of the front legs and an operative position in which they are disposed well rearwardly of the front legs, means pivotally connecting said rear legs to the chair seat on fixed pivotal axes, and a seat-supporting rod pivotally interconnecting said front legs to the seat, said seat-supporting rod having its mid-section offset rearwardly and pivotally mounted on the seat rearwardly of the transverse seat center line with the ends of said rod projecting laterally outwardly from said seat and pivotally received in the front legs to support said seat in extended position on the front legs forwardly of the transverse seat center line, said seat being swingable about said seat-supporting rod through the plane of the front legs upon chair collapse to dispose its forward end rearwardly of the plane of the front legs with the ends of said rod engaging said seat rearwardly of the transverse seat center line to limit the collapsing movements of the seat.

3. A collapsible chair having a back and a seat having a metal seat-pan provided with a depending peripheral lip, comprising a front-supporting frame having a bight section upon which said back is mounted and interconnecting a pair of floor-engageable front legs, the ends of said bight portion extending forwardly of the chair back to form a pair of chair arms interposed between the chair back and the front legs, a seat-supporting rod pivotally interconnecting said front legs to the seat and adapted to support the seat in operative position, said seat-supporting rod having an offset intermediate stretch pivotally connected to the seat pan rearwardly of the transverse seat center line and outwardly projecting ends pivotally received in the front legs for engagement with the lower face of the lateral stretches of the pan lip forwardly of the transverse seat center line to support the seat in extended position, a pair of rear legs pivotally connected to said front-supporting frame and vertically swingable between retracted position in which they are in a plane parallel to the plane of the front legs and an operative position in which the rear legs are disposed well rearwardly of the front legs, and a pair of rods pivotally connecting said rear legs to the chair seat on fixed pivotal axes, the outer ends of said rods pro-

jecting outwardly through the lateral stretches of the pan lip and pivotally mounted in the rear legs and the inner ends of said pair of rods being curved to abut the inwardly presented faces of the lateral stretches of the pan lip and fixedly connected to the seat pan, said seat being centered between the rear legs by spacers carried on the outer ends of said pair of rods between the pan lip and the rear legs and by the abutments between the curved inner ends of the pair of rods and the pan lip.

4. A collapsible chair having a back and a seat provided with a metal seat pan having a depending peripheral lip, comprising a front-supporting frame having a bight section upon which said back is mounted and interconnecting a pair of front legs, a seat-supporting rod pivotally interconnecting said front legs and the seat and adapted to support the seat in operative position, said seat upon chair collapse swinging through the plane of the front legs, a pair of rear legs pivotally connected to said supporting frame and vertically swingable between retracted position in which they are in a plane parallel to the plane of the front legs and an operative position in which the rear legs are disposed well rearwardly of the front legs, and a pair of rods mounted on said seat-pan and having their outer ends extending outwardly through the lateral stretches of said peripheral

lip for pivotal reception in said rear legs to form pivotal axes therewith for the seat, the inner ends of said pair of rods being fixedly mounted on the lower face of the seat pan and curved to lie against the inwardly presented faces of the lateral stretches of said lip, said seat being centered with respect to the rear legs by spacers carried on the outer ends of said pair of rods between the peripheral lip and the rear legs and by said curved inner ends of the pair of rods.

References Cited in the file of this patent

UNITED STATES PATENTS

D. 175,994	Wagner	Nov. 1, 1955
1,614,763	Rastetter	Jan. 18, 1927
1,698,698	Hageman	Jan. 8, 1929
1,760,008	Schermerhorn	May 27, 1930
2,525,876	Denny	Oct. 17, 1950
2,719,574	Adler	Oct. 4, 1955
2,860,692	Hamilton	Nov. 18, 1958

FOREIGN PATENTS

206,148	Switzerland	Oct. 16, 1939
1,103,090	France	May 18, 1955