Nov. 6, 1951 G. L. GUTHMANN 2,574,387

FOLDING CHAIR

Filed June 24, 1947

Fig. 1

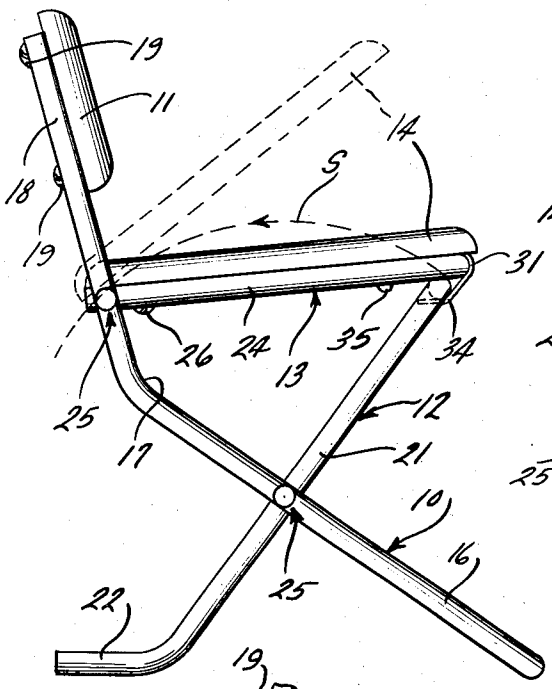


Fig. 2

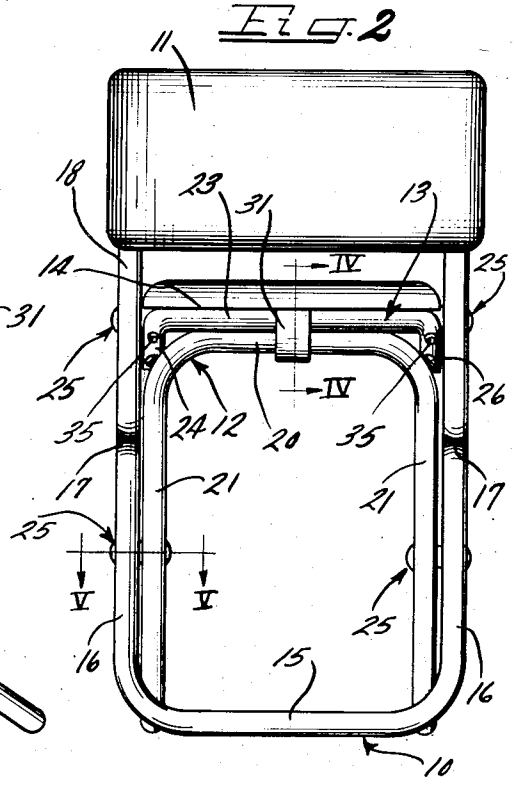


Fig. 3

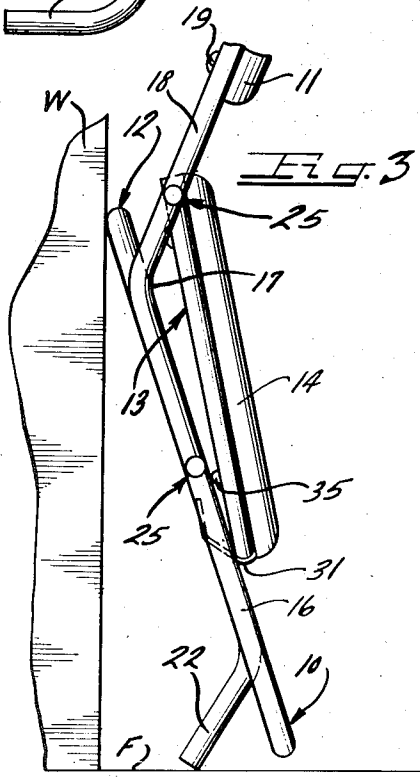


Fig. 4

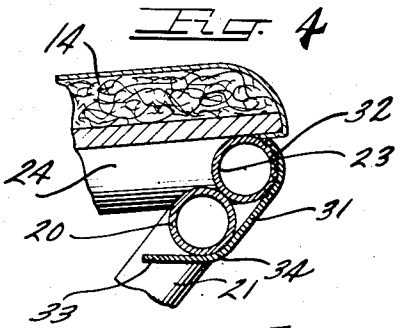
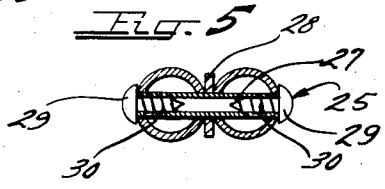


Fig. 5



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FOLDING CHAIR

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2 Claims. (Cl. 155—143)

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This invention relates to improvements in folding chairs and more particularly to chairs of the type which are adapted for indoor use.

An important object of the present invention is to provide a folding chair in which the seat is constructed and arranged to swing downwardly to the front of the chair when in collapsed condition.

Another object of the invention is to provide a folding chair which is especially suitable for manufacture from tubular steel such as the popular chrome finished tubular steel furniture.

A further object of the invention is to provide an improved readily engageable retaining structure for maintaining the chair in expanded or open condition.

A still further object of the invention is to provide an improved folding chair which will not accidentally open out from the folded or collapsed condition and which is especially well balanced to be leaned against an upright surface without slipping away when in storage or out of the way in folded condition.

Yet another object of the invention is to provide an improved pivotal connection for relatively pivotal portions of the chair assembly.

Other objects, features and advantages of the invention will be readily apparent from the following detailed description of a preferred embodiment thereof taken in conjunction with the accompanying drawings in which:

Figure 1 is a side elevational view of a folding chair embodying the features of the invention;

Figure 2 is a front elevational view of the chair;

Figure 3 is a side elevational view of the chair in collapsed or folded condition;

Figure 4 is an enlarged sectional detail view taken substantially on the line IV—IV of Figure 2; and

Figure 5 is an enlarged sectional detail view taken substantially on the line V—V of Figure 2.

An attribute of the chair of the present invention is its simplicity of structure and operation and yet sturdy, fool proof and positively acting mechanism. To this end, the chair comprises a front leg and back rest frame 10 supporting a back rest 11 on its upper portion, a rear leg and seat supporting frame 12 and a seat frame 13 supporting a seat 14. All of the frames 10, 12 and 13 are adapted to be made from tubular steel or other tubular metal of similar characteristics which may be chromium plated or otherwise finished suitable for the purpose.

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The front leg and back rest frame 10 may be of substantially U-shape in front elevation and substantially V-shape in side elevation, including a lower cross bar 15 and integral parallel side bars 16 each formed with an intermediate angle bend 17. Thereby the lower portions of the side bars 16 provide forwardly oblique leg portions while the upper portions of the side bars provide more nearly vertical though rearwardly slanting back rest portions 18 to which the back rest 11 is secured as by means of screws 19. Since the back rest 11 provides a connection between the upper ends of the bars 16, no other cross bar or connection is required, although if desired, of course, the upper ends of the side bars 16 could be connected together as by turning them toward one another and welding the joint. This would provide a closed loop if very great rigidity is desired.

The rear leg and seat supporting frame 12 is preferably in the form of an inverted U including a cross bar 20 and side bars 21, which at their lower ends are preferably formed with angular bearing portions 22.

The seat frame 13 is preferably of U-shape, formed with a front cross bar 23 and parallel side bars 24.

Although the rear leg and seat supporting frame 12 and the seat frame 13 are shown as U-shaped members, it is obvious that they could just as well be made as closed angular loops if desired.

The front leg and rear leg frames 10 and 12 are connected together pivotally intermediate their ends by means of a pivot assembly 25 at each side of the frame, the rear leg frame 12 being slightly narrower than the inside dimension of the front leg frame 16 so as to be received pivotally therein.

The seat frame 13 is pivotally connected to the back rest portions 18 of the front leg frame 10 above the bends 17, by means of respective pivot assemblies 25 connecting the rear ends of the seat frame bars 24 to the back rest bar portions 18. For this purpose, the seat frame 13 is preferably slightly narrower than the front leg and back rest frame 10, and may be of approximately the same width as the seat supporting and back leg frame 12. The seat 14 is secured to the frame 13 as by means of screws 26 and may be of any preferred construction.

The pivot assemblies may be of a standardized construction, as shown in Figure 5, comprising a pivot pin 27 in the form of a tube of suitable length, extending through appropriate

aligned holes in the tubes which are to be pivotally connected, with a spacer washer 28 between the tubes. Each end of the pivot tube 27 is provided with a retaining head 29 which comprises the head of larger diameter than the tube of a drive screw 30. The threads of the drive screw bitingly engage the inner wall of the tube 27 and quite effectively retain the assembled relationship. It will be observed that this pivotal assembly is quite simple and unusually effective since it is quickly assembled by merely pressing one of the drive screws 30 into one end of the pivot tube 27, inserting the pivot tube into the pivot joint to be effected and then pressing the remaining drive screw 30 into the opposite end of the tube, whereupon the pivotal connection is completed. By having the pivot tubes 27 of a predetermined length, adequate looseness for free pivoting is assured in the pivot joint, and there is virtually no possibility of the pivot assembly coming undone.

According to the present invention the pivotal relationship of the frames 10, 12 and 13, and the relationship thereof in the expanded or setup condition of the chair is such that the cross bar 20 of the seat supporting and rear leg frame 12 engages the cross bar 23 of the seat frame 13 in the open condition of the chair, and in the collapsed condition of the chair the seat supporting and rear leg frame 12 is collapsed within the front leg and back rest frame 10 behind the chair seat frame 13, while the latter hangs down in front of the collapsed frame 12. To this end, the length of those portions of the side bars 21 of the frame 12 from the pivots thereof to and including the cross bar 20 is such with relation to the distance between the pivots therefor and the bottom of the chair seat 14 and the pivots 25 for the chair seat frame 13, that the upper end of the frame 12 will freely swing rearwardly under and past the seat substantially as indicated by the directional line S in Figure 1 with the seat 14 swinging up or out to clear the cross bar 20, as shown in broken outline.

In practice, folding of the chairs is very readily accomplished by tilting the chair forwardly on the front cross bar 15 and pushing forwardly on the uptilted lower bearing ends 22 of the frame 12 to swing the same into the collapsed position. When collapsed, the chair assumes substantially the relationship shown in Figure 3, wherein the upper end of the frame 12 protrudes rearwardly and the lower bearing portions 22 of this frame due to its generally V-shape in side elevation, also extend rearwardly of the chair assembly and provide bearings for resting respectively against a vertical wall or the like W and a floor or the like F for supporting the collapsed chair generally upright. In this collapsed condition it will be seen that the pivoted end of the seat assembly is in such relationship to the bearing end portions 22 of the rear legs and with the seat hanging down within the V of the frame 10 that a fairly balanced center of mass is present and the collapsed chair will tend to maintain its upright position and not slide away from the wall W. If desired, of course, the chair can be turned around with the seat 14 nearest the wall W, and it has been found in this position that the chair will maintain its upright position against the wall with equal facility. Furthermore, it will be observed that since the seat 14 is swung down in front of the supporting and rear leg frame 12 and the lower end of the seat assembly comes lower than and rests against the frame 12 below the pivots 25 for the frame 12, the frame 12 is held quite substantially against tendency to swing outwardly or forwardly in either direction for inadvertent or accidental opening of the chair.

To open the chair is a simple and easy operation which calls merely for pressing down upon the back rest 11 in a rearward tilting direction, aided, if desired, by pushing forwardly with the foot on the lower cross bar 15, and the upper cross bar 20 will bear against the bottom of the seat assembly, and swing the seat assembly outwardly until the cross bar 20 engages against the cross bar 23 of the seat frame substantially as shown in Figure 4.

In order to retain the cross bars 20 and 23 positively in the assembled relationship, and avoid any possibility of the cross bar 20 overrunning the cross bar 23 during the chair opening operation, a retaining bracket 31 is provided which may be simply in the form of a metal bar secured as by welding 32 to the central portion of the cross bar 23 and extending downwardly and obliquely rearwardly therefrom to a generally horizontally rearwardly angled interlock portion 33, which may be formed with an integral juncture bend 34 within which the cross bar 20 is cradled. Thus, the retaining bracket 31 holds the cross bar 20 positively in supporting relation to the seat frame cross bar 23. The interlock flange portion 33 of the bracket positively holds the assembled relationship of the bars in opposition to upward pull on the seat at the front thereof which might tend to raise the seat from the supporting cross bar 20. Since, as best seen in Figure 1, movement of the cross bar 20 relative to the cross bar 23 is on an arc generally upwardly and rearwardly out of the cradle bend 34 of the bracket 31, it will be clear that there is no restraint upon relative freedom of movement of the bars in the chair folding or unfolding and opening operations. In the open condition of the chair, the load thrust of the front of the chair seat is imposed directly through the front cross bar 23 of the chair seat frame to the cross bar 20 of the seat supporting and back leg frame 12.

By preference the resilient bumpers 35 are provided on the under side of the forward end of the chair frame bars 24 to minimize clashing of the frame 13 against the frame 12 when collapsing the chair. The bumpers 35 may be held in place by the forward screws by which the seat 14 is attached to the frame 13.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. In combination in a folding chair, pivotally connected leg frames, a seat frame pivotally connected to one of said leg frames and being engageable in the open condition of the chair at its forward end with the upper end of the remaining leg frame, the forward end portion of the seat frame and the upper end portion of said remaining frame having cross bars of round periphery interengageable in the open condition of the chair, the cross bar of said remaining frame engaging the cross bar of the seat frame rearwardly and underneath in thrust relationship rearwardly of a vertical median plane through the seat frame cross bar and below a

horizontal median plane through the seat frame cross bar so that thrust of the seat frame cross bar is downwardly and rearwardly onto said remaining frame cross bar substantially in line with said remaining frame.

2. In combination in a folding chair of the character described, a front leg frame including an upper back rest portion, a rear leg frame, said frames being pivotally connected together substantially below said back rest portion and with the rear leg frame inside of the front leg frame, said rear leg frame having the lower extremity portion thereof angled rearwardly so as to lie as an elongated bearing against a floor when the chair is open, and a seat connected to said front leg frame above the pivotal connection of the leg frames, the upper portion of said rear leg frame cooperating with the under side of the front portion of the seat in thrust relation in the open condition of the chair, the chair being foldable by pivoting of the leg frames by swinging of the upper portion of the rear leg frame toward the upper portion of the front leg frame and under the seat so that the seat swings downwardly in front of the upper portion of the rear leg frame while at the same time the lower portion of the front leg frame swings toward the lower portion of the rear leg frame, the seat in the folded condition of the chair lying against the front of the collapsed rear leg frame as a retainer against unintentional forward swinging of the upper portion of the rear leg frame toward open position, said rear extremity of the elongated bearing portion of the rear leg frame extending below the lower end portion of the front leg frame in the folded

condition of the chair to support the folded chair upright on a floor when leaning against a wall, said extremity of the elongated bearing portion serving as a bearing on the floor for opening the chair by simply pushing forwardly and downwardly on the back rest portion to lever the upper portion of the back leg frame forwardly against the seat for swinging the latter up into open position and effecting opening of the frames to the open condition of the chair.

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