LOCKING DEVICE FOR FOLDING CHAIR

Fig. 1

Fig. 2

Fig. 3

Fig. 4

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LOCKING DEVICE FOR FOLDING CHAIR
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This invention relates to a folding chair and more particularly to a locking device for a folding chair.

Folding chairs are known to fold needlessly when they are picked up by their upper portion, that is, by the back of the chair or by the arms of the chair. This needless and unwanted folding movement of the chair may be prevented by increasing the stiffness of the pivoting movement of the chair but such increase in stiffness becomes very annoying when the chair needs to be folded.

The purpose of this invention consists of a locking device which will permit the locking of the chair in an erect position.

One object of the present locking device consists of an automatic locking means which operates when the chair is set in an erect position.

Another object of the present locking device permits the unlocking of the said device by a simple slight pressure on a lever.

A further object of the said locking device consists in the fact that the locking device is used simultaneously as a pivoting joint between two upright members of the chair.

It is an additional object of the present invention to be simple in construction, semi-automatic in operation and economical.

One form of embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which,

FIG. 1 shows a folding chair with the locking device according to the invention.

FIG. 2 shows an exploded view of the locking device.

FIG. 3 shows a sectional view of the lever along the section line III—III of FIG. 2.

FIG. 4 shows the initial unlocking movement of the device.

FIGS. 5 and 6 show two positions of the device during the folding movement of the chair.

FIG. 7 shows the position of the device prior to locking.

FIG. 8 shows the folding chair in an erect position and a locking device generally indicated by 2. The locking device is shown in a locked position. In order to fold the chair, a slight pressure is applied in the direction of the arrow B which unlocks the device and keeps it unlocked. The chair is then folded by using a forward pressure on the back of the chair in the direction of arrow A.

FIG. 2 shows a detailed view of the parts forming the locking device. A plate 3 is fixed at the intersection of two upright members 6 and 7 at pivotal axles 4 and 5 respectively. The upright members 6 and 7 are usually made of wood and the plate 3 is preferably made of metal. The plate 3 is fixed on the upright members by screws 8 and 9.

The plate 3 has preferably a notched portion 10 which engages a pin 11 when the chair is in erect position. The pin 11 is constituted preferably of a screw fastened partly to the upright member 6 in order to leave a space between the upright and the head of the screw.

A lever 12 is pivotedly fixed to the plate 3 at 13. The lever 12 is retained to the plate 3 by a rivet 14. The lever 12 is spring actuated by a wire spring 15 having a U-shape, one end being fixed to a bracket 16 solidly fixed to the lever 12 in a projection 16. The projection 16 may be simply a punched depression on the surface of the lever 12 permitting the engagement of the end 17 of the wire spring 15.

The tendency of the end 17 of the spring 15 will be to move upward and provide a clockwise rotation for the lever 12. The forward end of the lever 12 is provided with a hook portion 18 which is adapted to grip the pin 11 when in a locked position. A pawl or finger 19 is pivotally fixed on an axle 20 located around the hook portion 18 and is retained to the lever 12 by a rivet 21.

The lever 12 is built with an edge 22 and the edge provides a stop for the rotation of the pawl or finger 19. The lever 12 is located on plate 3 in a substantially horizontal position and the pawl 19 will normally fall by gravity on the horizontal part of the edge 22. The dimension of the pawl 19 will be such that its length will exceed slightly the lower edge of the hook 18. The part of the pawl 19 exceeding the lower edge of the hook 18 will permit the pin 11 to rotate the pawl 19 in a clockwise direction when the pin comes into the hook 18. This will be described in greater detail later.

FIG. 4 shows the locking device with the lever 12 in solid lines and dotted lines. The lever 12 shown in solid lines represents the position of the said lever when the chair is in an erect position and when the hook engages the pin 11. In this position, the pawl 19 is shown in the upper position and leaves open the hook portion of the lever 12. In order to unlock the locking device, the lever 12 is moved from the solid line position into the dotted line position in the direction from arrow B to arrow B'. When the left hand side of the lever 12 is lowered, the right hand side is raised in the direction B". This movement of the lever produces the fall of the pawl 19 by gravity in the position shown by the dotted line. The pawl 19 comes to rest onto the lower edge 22 of the hook 18. When this first position is obtained, the pressure on the left hand side of the lever 12 may be released and the device remains in an unlocked position on account of the pawl 19 resting against the pin 11. The pawl 19 prevents the lever 12 from rotating clockwise.

The initial pressure made on the lever 12 and indicated by B to B' is the only step required to unlock the chair. After this first step the chair may be folded in a normal manner.

FIGS. 5 and 6 show two steps during the folding of the chair. The upright member 6, the plate 3 and the lever 12 shown in dotted lines in FIG. 5 correspond to the upright 6 and the plate 3 shown in solid line in FIG. 4 and to the lever 12 shown in dotted lines in the same FIG. 4. In folding the chair, the axle 4 containing the screw 8 moves in a backward direction and the hook portion of the lever 12 disengages the pin 11. The part of FIG. 5 shown in a dotted line shows the position of the upright 6, the plate 3 and the lever 12 after the hook 18 has been disengaged from the pin 11. It can be seen that in this position, the pawl 19 obstructs the opening of the hook 18.

FIG. 6 shows the device in two different positions, the position represented by the dotted lines corresponding to the position shown in the solid lines in FIG. 5. The position shown in solid line in FIG. 6 consists of a further step in the folding of the chair, that is, when the upright 6 has been moved further in the direction indicated by arrows C and C'. It may be seen from this figure that the notch 19 disengages completely the pin 11 and that the upright member 6 is connected to the upright member 7 only by the plate 3 which is connected to the said uprights by screws 8 and 9.

FIG. 7 shows the locking device when the folding chair is about to be returned to its erect position. The upright 6 is moved in the direction of the arrow G. The pin 11 enters the notch 19 of the plate 3. The pin 11 comes in touch with the lower end of the hook 18 and raises the pawl 19 in the direction of the arrow F on account of the length of the pawl 19 exceeding the length of the lower edge of the hook 18. The lever 12 also moves in a direc-
tion such as shown by the arrow G which brings the hook 18 into a gripping engagement with the pin 11. When the hook 18 engages the pin 11, the lever 12 moves in a rotational direction shown by arrow E. At this time, the locking device returns to its position shown in solid lines in FIG. 4. This is the original locked position. The complete cycle of locking and/or unlocking of the locking device has therefore been completely described.

It may be seen from the above description that the locking operation is performed automatically and that the unlocking operation consists merely in a slight pressure of the thumb on the left hand of the lever 12 in the direction of the arrow B. The folding of the chair is made just like in any other folding chair of this type without any interference of the locking device according to the invention. The automatic operation of the locking device is due to the fact that the lever 12 is spring actuated and that the hook 18 is biased in the direction of the pin 11. The automatic operation is also due to the pawl 19 which is built and located so as to obstruct the hook portion 18 after the pressure B has been applied on the lever 12 and also due to the fact that the said pawl 19 is automatically raised by the pin 11 when the pin enters the hook 18. For this purpose, the axe 20 is located so as to permit the pawl 19 to fall by gravity when the pin 11 does not block its free movement in the direction of the lower edge of the hook.

I claim:

1. Lock means for folding chair to be located at the intersection of two upright members of the said chair, comprising a plate fixed to the said upright members, a pin in one of the said members, a notch on the edge of said plate adapted to engage said pin, a substantially horizontal lever for pivoting on an axle on said plate, spring means located in one end of said lever for biasing the other end of said lever in the direction of said pin, the said other end of said lever forming a forward, a downward and a rearward portion to form a hook, a finger pivoted at one end on an axle located in the said forward portion, a stop in the rearward portion for holding the finger when the hook is out of engagement with the pin.

2. Lock means as recited in claim 1, wherein the other end of said finger projects beyond the said rearward portion and is adapted to be pivoted by the pin when the chair is set in an erect position.

3. Lock means for a folding chair as recited in claim 1, wherein the stop consists of a portion of the lever forming an edge around the said lever.

4. In a folding chair, lock means for holding two upright members of the chair in an erect position, said lock means comprising a plate fixed to the said upright members, a pin in one of the said upright members, a notch on the edge of said plate adapted to engage the said pin, a lever for pivoting around an axle on said plate, one end of said lever having hook means intersecting the said notch for engaging the pin in said notch, the said hook means comprising a finger for pivoting on an axle located around the hook means, the said finger being adapted to project into and out of the hook means.

5. In a folding chair, lock means for holding two upright members in the chair in an erect position, said lock means comprising a plate fixed to the said upright members, a pin in one of the said upright members, a notch on the edge of said plate adapted to engage the said pin, a lever for pivoting around an axle on said plate, one end of said lever having hook means intersecting the said notch for engaging the pin in said notch, the said hook means consisting of a J-shaped hook having a tip portion beyond the semi-circle part of the J-shaped hook, a finger pivoted around an axle located on the tip portion, one end of said finger projecting slightly beyond the small arm of the J-shaped hook.

6. Lock means for folding chair located at the intersection of two upright members comprising a plate pivotally fixed to the two upright members, spring actuated lever means pivotally fixed to said plate, a pin on one of said members, said lever means having at one end hook means biased in the direction of the pin to engage said pin, the said hook means comprising disengaging means for maintaining unlocked the hook means when the lever means has been rotated opposite the biased direction of the hook means.

7. Lock means as recited in claim 6, wherein said disengaging means consists of a pivotally rotatable pawl adapted to fall by gravity inside the hook means to obstruct said hook means when the lever means is pivoted in a direction to disengage the hook means from the pin.

8. Lock means as recited in claim 7, wherein the pawl projects slightly outside the hook means intersecting the said hook means automatically pivots the said pawl outside the hook means when the pin engages the hook means.

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