LOCKING MECHANISM FOR FOLDING BACK RESTS

Fig. 1

Fig. 2

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DRAWING CHECKED BY

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LOCKING MECHANISM FOR FOLDING-BACK RESTS

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1. This invention relates to folding back rests and is particularly concerned with folding-back rests that may be associated with bed pans and the like.

An object of the invention is to provide a folding back rest that may be associated with a bed pan, which back rest is positive in its action to prevent collapse when in supporting position. In carrying out this object, it is a further object to provide a back rest that may be stored in an integral pocket beneath the bed pan and may be moved easily to a usable, or supporting, position where it is positively locked until released and again folded into the pocket.

Another object of the invention is to provide a folding back rest that includes a novel locking mechanism that permits opening of the back rest by outward and forward movement and simultaneous locking thereof in supporting position whereby the rest may be folded only by continued forward movement to overcome the locking mechanism. This action assures that the rest will not collapse, or fold up, during use which is an important factor in the safe use of the device.

In carrying out the above objects, it is a further object to provide means that frictionally hold the device in folded position against accidental opening movement thereof.

Another object of the invention is to provide a three piece folding back rest which may be used in connection with the locking mechanism so that the rest will be compact in folded position and utilitarian in opened position to the complete comfort of the user.

In carrying out the above objects, it is still a further object to provide a groove, vertically disposed in the back rest, which conforms to the shape of the spinal column of the user whereby the use of the rest is comfortable.

Further objects and advantages will be apparent, reference being made to the accompanying drawings wherein preferred forms of the invention are clearly shown.

In the drawings:

Fig. 1 is a view in perspective of a bed pan with the folding back rest incorporated therein in the folded and concealed position.

Fig. 2 is a view in perspective of the bed pan with the back rest in the extended or supporting position.

Fig. 3 is a plan view of the back rest in the folded position.

Fig. 4 is a rear view of the bed pan showing the pocket therein for receiving the back rest (back rest not shown).

Fig. 5 is a view in section of the back rest in folded position taken on line 1—1 of Fig. 3.

Fig. 6 is a view in section of the back rest in folded position taken on line 2—2 of Fig. 3.

Fig. 7 is a fragmentary view taken on line 1—1 of Fig. 3 showing the anti-rattle device.

Figs. 8 through 10 are fragmentary views of the locking mechanism used in connection with the back rest in different positions, from partially open to fully open.

Figs. 11 through 13 are fragmentary views of the locking mechanism in different positions during the folding up of the back rest.

Fig. 14 is a view in section taken on line 1—1 of Fig. 10.

Fig. 15 is a view in section of an assembly detail of the locking mechanism; and

Fig. 16 is a view of the spring used in the assembly shown in Fig. 15 in its free position and in its assembled position shown in dotted lines.

Fig. 17 through 19 show the back rest per se in its various positions from fully closed to fully open position with the locking mechanism removed for clarity.

Figs. 20 through 22 show in detail the action of hinges used in connection with the back portion of the back rest in partially closed to fully open and locked position.

Bed pans with folding back rests are disclosed in my Patent No. 1,984,894 granted April 10, 1934. In this patent the basic invention of associating a back rest with a bed pan is clearly shown, which back rest may be folded into a pocket in the bed pan when not in use. The present application is directed to improvements in the structure of the bed pan and particularly the back rest therefor wherein the back rest has incorporated therein a positive locking device that prevents accidental folding of the back rest during use which assures that back rest will remain in back supporting position until it is raised by manual manipulation to a closing position at which time the action of the locking device is overcome.

It is to be understood that while this back rest has great utility in connection with a bed pan that it may also be used in connection with a multitude of applications where a seat with a folding back rest is desired. For example, as a portable seat for a boat, or as a portable seat for a child, or as a portable seat for use in a stadium etc. In each case, a compact seat with a folding back rest will be useful which can be easily and quickly unfolded to provide a back rest that will not collapse.
In use of the back rest with a bedpan, I have made several other improvements over my original design which are useful and desirable. For example, I have provided an anti-rattle device so that when the bedpan is in folded position it may be carried about without noise. I have also provided a friction operated lock that holds the folded back rest in place within the bedpan to prevent accidental displacement thereof when the pan is being carried from its place of storage to the patient's bed, or vice versa.

Another improvement of particular utility is concerned with a vertical groove in the back rest which is shaped to conform to the contours of a human spine so that hospital patients that are in an emaciated condition may sit on the pan with complete comfort and without chafing their thoracic spinous processes against the metal back. This factor is of real importance from a comfort angle and persons who have used my improved bedpan can readily differentiate it from the prior type that does not include such a groove.

Basically, the improvements in the bedpan over my prior type of pan are directed to the folding back rest which is improved in many respects to provide a smoother operation with a positive action. This is of the utmost necessity that the back rest be positive in its action and be non-collapsible except where properly manipulated by the nurse or attendant. The present mechanism assures this action through the inclusion of a novel type of locking mechanism which can only be operated in one direction and which cannot be caused to move backwards. Thus as the back rest is raised into back supporting position, it passes through a series of locking movements that will prevent backwards motion. After the rest is in the fully opened position, it can only be closed by continued upward movement past the final locking device whereupon the rest will fold up into the base of the pan. A patient cannot jar or jolt the rest into this upwards movement, this can only be accomplished by a positive upwards pull of appreciable movement so that accidental folding up of the rest is an impossibility.

The locking mechanism is incorporated in a camming device which may be carried by the back rest that slides from closed to open position along substantially horizontally disposed guide ways that are supported on or are integral with a frame carried and fixed within the pocket beneath the bedpan or they may be carried only by the bottom of the bedpan per se. Thus the back rest may be easily manipulated from one position to another by sliding movement over the guides.

Referring particularly to the drawings, Fig. 1 shows a bedpan 20 which includes a container portion 22 having a receiving aperture 24 therethrough. A pocket 26 is provided which extends a substantial distance beneath the container 22 as shown in Fig. 8. Within the pocket 26 is a back rest assembly 28 shown in folded position in Fig. 1. The particular shape of the bedpan 20 is of interest. In this connection, it will be noted that the rear portion of the top wall therefor, as designated at 30, is inclined downwardly at approximately a 15° angle so that the user will experience greater comfort. This design permits the patient to be placed on the pan with greater ease as it facilitates sliding of the pan beneath the user.

Fig. 2 shows the pan 20 with the back rest assembly 28 in extended position. In this position it will be noted that the rest is preferably made in three sections designated as 32, 34 and 36. This design permits a higher back rest to be used which will fold up into the required space. It is apparent that one or two sections only may be used if desired in certain applications or even in any way departing from the scope or spirit of my invention; however in connection with a bedpan, I prefer three sections, as shown. The portions 32 and 36 each include a hand grip 38 and 40 respectively which grips superimpose when the back rest is in folded position as shown in Fig. 1. The portions 32 and 36 are preferably formed from a relatively strong metal, such as steel, stainless steel, etc., which is cross ribbed, as shown, for added rigidity. The intermediate portion of the rest 34 is made of a pair of foldable channeled side rails or extensions 42 and 44 which interlock with the remaining back rest portions in a positive manner as will be explained hereinafter. The top portion 36 includes a vertical channel or groove 46 therein which conforms to the contour of a human spine and thus adds comfort in the use of the device as explained herein.

Referring particularly to Fig. 19, the back rest assembly 28 is carried by, and is slidably in a, guide plate assembly or frame 50 which includes a bottom plate 52 that has two identical upward extending projections or sides 54 and 56 thereon. These projections are each disposed at right angles to the surface of the plate 52 and carry the guide ways 58 and 60 for the back rest thereon in together with a locking notch 62 for the back rest when in folded position. The bottom plate 52 and the projections 54 and 56 may be integrally formed out of a single piece of metal although it is apparent that three or more pieces of metal could be successfully used. The guide plate assembly is immovably positioned within the pocket 26 in the bedpan 20 as by welding, riveting etc. or the plate may be positioned removable by headed screws or rivets 51 which slide into notches in the projections 54 and 56, as shown in Fig. 3, and forms a substantially integral part of the bedpan when assembly is complete.

A locking device 70 is shown in various positions of operation in Figs. 8 through 13. Two of such devices 70 are provided on opposite sides of the back rest 28 and associated with identical extensions 72 carried by the portion 32 of the back rest 28. For the sake of clarity one locking device only will be described, it being understood that another identical device is provided for the other side of the back rest. The device 10 includes a pair of swingable levers 74 and 76 which are pivoted at 78 on the side projection 56 of the guide plate assembly 50 and which are yieldably held in position by springs 75 and 77 respectively. The levers cooperate with a cam 78 carried by the extension 72. The cam 78 rides in and is guided by a slot or groove 60 in the projection 54. In order to guide properly the back rest, a second cam 82 is provided and is carried by the extension 72 which cam 82 is guided in a second slot or groove 60 in extension 54. The slot 60 has no function in the locking device being provided only as a guiding means for the back rest. Slots 58 and 60 are clearly shown in their entirety in Figs. 17 through 19.
The particular contour of slot 58 is important; it will be noted that at the left end thereof, a notch 88. To this position the back rest is held in folded position through the inherent resiliency of the slot 54. When the rest is to be brought to supporting or open position, the operator grasps the superimposed hand grips 38 and 48 and pulls upwardly and outwardly to flex the slot 54 and thus cause the cam 78 to be disengaged from notch 98 and be free in the slot 58. In this position the slot 54 is no longer engaged with the hump 90 so that action is free.

At the right end of slot 58 is a substantially triangular shaped aperture 95 having a notch 98 at its extreme lower corner. The triangular shaped edges of the aperture 95 act as camming surfaces in connection with cam 78 as will be described hereinafter.

In operation, from a folded position, the cam 78 moves towards the right end of slot 58 until it engages the notched surface 100 on lever 76 as shown in Fig. 9. Continued movement causes lever 76 to yieldably move toward the right and permit the cam 78 to pass and drop into notch 98. During the movement of lever 76, lever 74 moves concurrently due to engagement of lever 76 therewith to open the notch 98 and permit cam 78 to drop therein, as shown in Fig. 10.

In this position the back rest 28 is in supporting position and cannot move backwardly or collapse since the lever 76 has moved to a locking position as noted in Fig. 10. During the aforementioned movements the back rest 28 is being unfolded to fully extended position as noted in Figs. 19 and 19a. The specific functions of the hinges 104 are shown more clearly in Figs. 20 through 22.

In order to fold up the back rest 28, further upward and outward movement thereof is required which causes cam 78 to operate against cam surface 102 on lever 74 and cause the lever 74 to yieldably move towards the right as shown in Fig. 11 where the lever 74 moves alone and permits the cam 78 to pass upwardly into notch 108 carried by lever 74. At this point, pressure exerted against the back rest 28 to push the folded assembly into the receiving pocket 25 causes the cam 78 to simultaneously press against the surfaces 108 on projection 54 and 110 on lever 76 whereupon levers 74 and 76 yieldably move towards the right to permit the cam 78 to again enter slot 58. As soon as the cam passes any of the camming surfaces on the levers 74 and 16, the levers assume their normal positions due to springs 75 and 77 and thus close the slots against reverse movement of the cam. In this manner, the cam 78 can only move in a clockwise direction through the friction action which prevents collapse of the back rest.

In the folding movement of the back rest 28 it is necessary to lift the rest an appreciable distance to overcome the locking mechanism, in fact the distance between the cam 82 and the toothed edge 86 as shown in Fig. 10 through a hump 90. With this movement required it is apparent that no accidental collapse is possible.

The cams 78 and 82 are preferably of a roller type to reduce friction and are held in place in the channeled member 72 by a spring lock 111 which is resiliently positioned in the channel of the member 72 and which has notches 115 and 114 in ears thereof that clip into grooves in the cam rollers 78 and 82.

In folded position the back rest 28 is engaged in notch 95 in the side projections 54 and 56 of the base plate assembly 50. In this position, rollers 120 which also act as pivots for hinge 104 cam into the locking notch 82 and are pressed downwardly therein by the action of the slot 94 riding upon hump 90 as explained hereinbefore. Thus the notches 62 and 68 act simultaneously to lock the folded back rest in position. It will be noted by referring to Fig. 6 that the hump 90 acts as a pivot and the entire back rest swings around the contact point between the hump 90 and the slot 54 to force the cam 78 upwardly into notch 98 and to force the roller pivots 120 downwardly into notch 62.

Instead of hump 90 acting as a pivot, a pair of curved camming surfaces 121, carried by the side of section 36 of the back rest, may be used, as shown in Figs. 5 and 6. In this embodiment the hump 90 raises the front end of the back and causes it to swing about surfaces 121 to pivot the rear end of the folded back rest downwardly. It is apparent, however, that the hump 90 and slot 54 may be so positioned to cause the action independent of the surfaces 121, if desired.

In order to prevent any noise or rattling in this position, anti-rattle devices 124 are incorporated in the assembly and one of these is attached to each of the projections 54 and 55. The anti-rattle devices 124 each consists of a swingable lever 125 pivoted at 126 and including a camming surface 130 that yieldably bears against the rollers 120. A spring 132 holds the lever tightly against the roller 120 so that the entire folded back rest 28 is held under pressure, thus preventing any rattling thereof.

From the foregoing it is apparent that I have provided a novel arrangement of parts which act to lock the folding back rest in positive positions whether open or closed. I have also devised an improved bedpan which is safe for hospital use and which is compact when folded and comfortable in use.

While the embodiments of the present invention as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow:

What is claimed is as follows:

1. A self-locking mechanism, comprising in combination, a base structure including a substantially triangular cam track therein, a part to be locked in substantially upright position, a cam carried by said part and movable in said track to one of three corner positions, two levers each pivoted in the same direction on the base structure yieldable means holding the levers in position to oppose free movement of said cam in one clockwise direction and each opposing movement of said cam in a direction counterclockwise to said one clockwise direction, whereby said cam when moved to any one of the three extreme corner positions of said track is only movable therefrom in said one clockwise direction.

2. A self-locking mechanism comprising in combination, a base structure, a part to be locked in a substantially upright position, a cam carried by said part, a track in said structure for said cam, a lever, for yieldably opposing said movement of said cam in said track in one clockwise direction and for positively opposing movement
of said cam in said track in a counterclockwise direction, a second lever movable with said first lever upon yieldable movement thereof in said track, said cam being independently yieldable movable to permit passage thereby of said cam after the cam has passed said first lever, said second lever including a stop thereon for positively preventing counterclockwise movement of said cam in said track after said independent movement of said second lever, said cam being movable to its initial position through yieldable movement of said first lever when said cam has passed said stop whereby the cam may be moved to any one of three positions consecutively and is prevented from backward movement after attaining any one of said three positions.

3. A self-locking mechanism, comprising in combination, a base structure including a cam track therein having three extreme corner positions, a part to be locked in substantially upright position, a cam actuated by said part and movable in said track, a pair of locking levers yieldably opposing free movement of said cam in said track in one clockwise direction and positively opposing movement of said cam in a counterclockwise direction to said one direction, said cam being movable successively to each of said three extreme corner positions in one direction and being locked against movement in any other direction.

4. A self-locking mechanism comprising in combination; a base structure including a cam track associated therewith having three extreme corner positions a part to be locked in a substantially upright position, a cam actuated by said part and moveable in said track, two latches yieldably opposing free movement of said cam in one clockwise direction only and positively opposing movement of said cam in a counterclockwise direction, said cam when moving from a first to a second position causing both of said latches to move, said cam when moving from said second to a third position causing only one of said latches to move, said cam when moving from the third to the first position causing both of said latches to move, said movement of said latches permitting successive movements of said cam to said extreme corner positions and simultaneously preventing said cam from backward movement.

5. A folding back rest comprising, a plurality of yieldable latching levers adapted to be operated by said cam for latching the cam and its associated back rest in successive positions of fully folded and fully open, said device locking the back rest against accidental folding and being operable to permit premeditated folding thereof only by further opening movement of said back rest prior to folding up of the back rest.

6. A folding back rest comprising, a base having opposed upturned sides thereon each of which includes two guide tracks associated therewith, a back rest collapsible onto said base in folded position and disposed substantially perpendicular thereto in open position, a pair of spaced cams carried by each side of the back rest, one of said cams being journaled in each of said guide tracks, and locking means associated with the base adjacent to the back thereof and cooperating with one pair of said spring actuated latches to prevent the back rest from accidental collapse after it is in open position, said back rest being opened by manipulation thereof in a direction upwards and outward of the base, said locking device locking the back rest against accidental collapse until the back is again raised upwardly to actuate the said latches to release the cams and permit collapse thereof.

7. A locking mechanism for use with a folding back rest comprising in combination; a base structure having substantially perpendicular opposed sides thereon, each of said sides having an elongated guide track associated therewith adapted to guide the back rest from one position to another position thereof, said tracks each having a first notch adjacent one end thereof and a second notch disposed in each of the perpendicular sides, said second notch being spaced apart from said track at the opposite sides from said first notch a back rest adapted to be folded into said base from an open position and including opposed side members thereon, a pair of cams, one of which is carried by each side member adapted to lock the backrest and adapted to ride in said track for guiding the back rest in its movements and further adapted to fit into said first notches, a second pair of cams one of which is carried by each of said side members, said second pair of cams being spaced remotely from said first mentioned pair of cams and being adapted to fit into said second notches, a camming hump associated with said base, and a cross member connecting said side members and being disposed between said first and second pair of cams and adapted to ride up onto said camming hump when the back rest is in folded position whereby the first mentioned pair of cams are forced into said first notches while said second pair of cams are forced into said second notches for locking the back rest in folded position.

8. The locking mechanism as claimed in claim 7 wherein an anti-rattle device is included comprising a pair of spring pressed levers carried by opposite sides of the base each of which is adapted to press against one of said second mentioned cams for holding the cams in tight relation to said notches and thereby preventing rattling of the mechanism.

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