MULTIPLE POSITION ELEVATING COT

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This invention relates to cots and more particularly to portable cots for use in ambulance and similar vehicles for hospital calls, house calls, emergency cases and removals, and is a continuation-in-part of my application Serial No. 708,237, filed January 10, 1958, and now abandoned.

In recent years the conventional stretcher-like ambulance cot has given way to an elevating type cot wherein the cot frame is mounted to a wheeled undercarriage by means of collapsible legs, the cot having a first or "down" position in which the legs are collapsed so that the cot may be placed in the ambulance and an elevated or "up" position in which the cot frame is at hospital bed or operating table height for readily transferring the patient to or from the cot. An elevating cot requires far less heavy lifting on the part of the attendants, results in less danger of crippling strain and far less chance of jarring or even dropping a patient during transfer. However, such elevating cots have only two positions of use, i.e. the "down" or ambulance position and the "up" or full height position, with the result that many situations are encountered wherein the cot frame cannot be brought into proper alignment for direct transfer of the patient. For example, the ordinary home bed is substantially lower than a hospital bed and yet is substantially higher than the "down" position of the collapsed cot. Consequently, the patient must either be raised or lowered to be transferred from one to the other. Furthermore, the height of home beds varies greatly so that there is no standard intermediate adjustment which would be suitable for all of them. Similar observation may be made with respect to operating tables, examination tables and the like.

It is, therefore, a principal object of the present invention to provide an elevating cot which may be selectively raised and lowered to a plurality of intermediate positions of use between its "down" and "full" "up" positions.

A further object of the invention is the provision of a portable cot structure of the character described which may be quickly and easily adjusted to desired height and, once adjusted, the parts locked in the selected position until such time as the mechanism is released for movement to another position.

Still a further object of my invention is the provision of a multiple position elevation cot in which the cot frame or bed is supported on and elevated by cross-forming or scissors-like frame members which are pivoted together and secured at their lower ends to an undercarriage having sets of wheels, the parts being so arranged that the wheel base of the undercarriage will remain constant irrespective of the movement of the cross-forming frame members, thereby providing maximum maneuverability and at the same time assuring that the carriage will be properly aligned with the cot fasteners in the ambulance.

Yet a further object of the invention is the provision of an elevating cot structure having a readily accessible manually actuated release means for the frame locking mechanism which, in one form of the invention, cooperates with automatically acting secondary locking means to provide a safety factor eliminating the possibility of the cot accidentally dropping the patient.

The foregoing together with other objects of the invention which will appear hereinafter or which will be apparent to the skilled worker in the art upon reading these specifications, I accomplish by that construction and arrangement of parts of which I shall now describe an exemplary embodiment.

Reference is now made to the accompanying drawings wherein:

Figure 1 is a plan view of a cot frame illustrating the manner in which the cross-forming frame members are secured thereto.

Figure 2 is a vertical sectional view taken along the line 2—2 of Figure 1, the cot structure being illustrated in fully extended position (solid lines) and in fully collapsed position (dotted lines).

Figure 3 is a horizontal sectional view taken along the line 3—3 of Figure 2 illustrating the undercarriage and the manner in which the cross-forming frame members are secured thereto.

Figure 4 is an enlarged fragmentary elevational view illustrating the primary locking means in released or unlocked position.

Figure 5 is a fragmentary plan view similar to Figure 3 but illustrating the telescoping end of the undercarriage in extended position.

Figure 6 is a fragmentary view illustrating the positions of both the primary and secondary locking means when the cot is in fully collapsed position.

Figure 7 is a plan view similar to Figure 1 illustrating a modified cot structure incorporating an alternate form of locking means.

Figure 8 is a vertical sectional view taken along the line 8—8 of Figure 7.

Referring first to Figure 1, I have therein illustrated a cot frame 1 which is of generally rectangular shape and provided with suitable mattress supporting straps 2 extending between opposed sides of the frame. The cot frame is preferably formed from aluminum tubing, although from the outset it should be understood that the construction of the cot frame as such does not constitute a limitation of my invention and any standard frame may be employed, inclusive of frames having appurtenances such as a supplementary head elevating frame, side rails, foot rests and the like.

For clarity of illustration the cot frame has been shown in its basic rectangular form.

A pair of fittings 4 and 5 are secured to the opposite sides of the frame 1, preferably toward the head end of the frame, the fittings mounting a horizontally disposed rod 6 which extends between the fittings and lies below the plane of cot frame 1. Sleeve-like fittings 7 and 8 surround the rod 6 adjacent each side of the frame, the fittings mounting sockets 9 and 10 which receive the upper ends of cross-forming frame members 11 and 12. At their lower ends, the frame members 11 and 12 are received in socket parts 13 and 14 of fittings having sleeve portions 15 and 16 rotatably mounted on a tubular frame member 17 forming an extension of the undercarriage now to be described.

As best seen in Figure 3, the undercarriage comprises a generally rectangular frame composed of side frame members 18 and 19 connected together at one end by an end frame member 20, suitable corner joints 21 and 22 connecting the side and end frame members together and also serving to mount caster-wheels 23 and 24. At their opposite ends the side frame members 18 and 19 are provided with T-shaped fittings 25 and 26 which receive an end frame member 27. The fittings 25 and 26 also mount the portions of fittings 25 and 26 which receive the end
of side frame members, and telescoping frame members 30 and 31 are adapted to be telescopically received by the side frame members. At their outer ends the telescoping frame members 30 and 31 carry corner joints 32 and 33 which receive the ends of the tubular frame member 17 which, as already pointed out, which receive the lower ends of the cross-forming frame members 11 and 12. With this arrangement, the length of the undercarriage may be effectively increased by moving the frame 17 outwardly with respect to end frame member 27, the parts being movable from the position illustrated in Figure 3 to the position illustrated in Figure 5. Yet the arrangement is such that the wheels are mounted on the fixed end frame members 20 and 27.

Coating cross-forming frame members 11a and 12a are pivotally connected to the cross-forming frame members 11 and 12 intermediate their ends at the pivot points 11b and 12b, respectively, the coating pairs of frame members 11, 11a and 12, 12a forming scissors-like elevating supports for the cot frame. The cross-forming frame members 11a and 12a are received at their lower ends in fittings 34 and 35 pivotally mounted on fixed end frame member 26. At their upper ends the frame members 11a and 12a are received in fittings 36 and 37 mounted on rod 38 the opposite ends of which project beyond the fittings and ride in elongated slots 39 of bracket members 40 and 41 secured to the sides rails of the cot frame 1 adjacent the foot end thereof, as can be best seen in Figures 1 and 2. By thereby pivotally mounting the cot frame 1 elevated relative to the undercarriage the corresponding ends of the coating cross-forming frame members will move toward each other, the rod 38 on the upper ends of frame members 11a and 12a sliding inwardly in the slots 39, and the lower ends of frame member 11 and 12 moving inwardly against adjustable end frame member 37 as the telescoping frame members 30 and 31 slide within the side frame members 18 and 19 of the undercarriage.

In this embodiment the invention the position of the cot is controlled by a primary locking device in the form of the ratchet arms 42 and 43 which are pivotally connected at their outer ends to frame member 17, the ratchet arms being connected together at their inner ends by means of a connecting member 44. The arms 42 and 43 are each provided on their under surface with a row of large teeth 45 arranged to selectively engage end frame member 27 of the undercarriage. If desired, the locking arms on the rod 38 may be spring biased toward the frame member 27 so that the teeth will be urged into engagement with the frame member. When it is desired to alter the position of the cot frame, i.e. raise or lower it, the attendant moves control handle 46 (Figures 1 and 2) outwardly, thereby pushing axially on control rod 47 connected at its lower end to a finger 48 which, as best seen in Figure 4, may be conveniently formed as an integral part of the ratchet arm 42.

The axial movement of rod 47 causes the ratchet arms to pivot about the frame member 17 in a clockwise direction, thereby raising the teeth out of contact with the frame member 27, whereupon the cot frame may be raised or lowered as desired. Preferably, the ratchet teeth will be pitched in one direction, their direction of pitch being such that the cot may be lifted from a lower to a higher position without having to actuate the hand release. Thus, as should be clear from Figures 4 and 5, the pitch of the teeth will permit them to ride over the frame member 27 as the ends of the coating cross-forming frame members are moved toward each other. The pitch of the teeth is such that on their opposite sides they are under cut, which necessitates the slight raising of the cot frame before the hand release can be actuated to raise the ratchet arms.

Thus, should the control handle be accidentally pulled while the patient is lying on the cot, the ratchet arms will not be released so as to drop the patient. It will be evident, however, that a slight raising of the cot frame will cause sufficient inward movement of the ratchet arms to free the frame member 27 from the undercut of the teeth, whereupon the hand release may be actuated to raise the ratchet arms.

I have, however, found it desirable to make the innermost tooth on each ratchet arm of square character, such tooth being indicated at 45a, so that when the cot frame is the hand release must be activated before the cot frame can be elevated. This prevents accidental elevation of the cot, as when it is in the "down" position and the attendants lift it into the ambulance. If it were not locked, the weight of the undercarriage would tend to expand the cross-forming frame members as the cot is lifted.

As an added safety precaution, I may provide a secondary locking means in the form of teeth 49 (best seen in Figure 2) which form the upper surface of the elongated slots in bracket members 40 and 41. The teeth 49 may be pitched in much the same manner as the teeth 45, although they do not necessarily have to be undercut, and they will be so positioned that their lower edges will normally contact the rod 38 in the manner illustrated in Figure 6. When any weight is placed on the cot frame, the rod 38 will be automatically urged into locking engagement between adjacent teeth, thereby providing a positive lock for the upper ends of the cross-forming frame members. Thus, should for any reason the ratchet arms 42 and 43 be accidentally disengaged, the weight of the patient on the cot frame will hold the teeth 49 in positive contact with the frame member 38, the cot frame 1 will not be raised or lowered as desired.

In Figures 7 and 8, I have illustrated a modified end embodiment of the invention wherein elevation of the cot is controlled by a locking device lying immediately beneath the cot frame 1. This device comprises a yoke 50 pivotally mounted on the rod 6, the yoke in turn being secured to one end of an elongated locking bar 51, preferably formed from aluminum, and twisted through substantially 90° intermediate its ends so as to provide a vertically disposed portion in engagement with the yoke 50 and a horizontally disposed portion extending through a fitting 52 mounted on rod 38a which interconnects the upper ends of cross-forming frame members 11a and 12a.

The outer ends of the rod 38a engage the elongated slots 39 of the brackets 40 and 41.

The fitting 52 has a passageway 53 extending there-through in which the locking bar is received, there being a vertically disposed dowel pin 54 in the opening for selective engagement with the notches or teeth 55 formed in the locking bar. A spring 56 is conveniently arranged to urge the notches in the locking bar into engagement with the dowel. Preferably, the notches 55 will be cut in such a manner that the teeth 45, thereby necessitating the slight raising of the cot frame before the locking bar can be moved laterally to release the cross-forming frame members for movement. Lateral displacement of the locking bar is effected by means of the loop-like release members 57 and 58 positioned to be readily grasped by the cot attendant either at the foot of the cot or along one side thereof.

The embodiment just described operates in essentially the same manner as the embodiment of Figures 1 through 5, in that, as the cot is lowered, the lower ends of the cross-forming frame members 11 and 12 will move outwardly with the extensible portion of the undercarriage, and the frame members will be locked in the desired position by means of the locking device just described.
S and 126. I have also found it desirable to connect the pivot points 116 and 126 by means of a reinforcing cross-bar 60, thereby lending further rigidity to the structure.

From the foregoing it should be apparent that the cot may have a wide range of levels, depending upon the number of teeth or notches provided in the locking member. In a preferred embodiment now in commercial production, the locking device is provided with a series of 8 teeth which provides for 6 levels of adjustment intermediate the “down” and “up” positions. These intermediate positions make patient transfer from home bed, couch or the like much easier.

In view of the above disclosure, it is obvious that modifications may be made in my invention without departing from the spirit of it. Having, however, disclosed my invention in several exemplary embodiments, what I desire to secure and protect by Letters Patent is:

1. In combination in an elevating cot, an elongated cot frame, an undercarriage comprising a generally rectangular frame of fixed length having caster wheels fixedly mounted thereto, said undercarriage being of lesser length than said cot frame and having an adjustable extension at one end thereof movable lengthwise of said rectangular frame so as to effectively increase the length of said undercarriage without altering its wheelbase, coaching cross-forming frame members extending between said cot frame and said undercarriage, said cross-forming frame members being pivotally secured together intermediate their ends so that their corresponding upper and lower ends may be moved toward and away from each other, means securing the upper ends of said cross-forming frame members to said cot frame with one of said ends free for movement lengthwise of said cot frame, means securing the lower ends of said cross-forming frame members to said undercarriage with one of said ends secured to said adjustable extension, and locking means for effectively securing said cross-forming frame members in a plurality of predetermined positions.

2. In combination in an elevating cot, an elongated cot frame, an undercarriage comprising a generally rectangular frame of fixed length having caster wheels fixedly secured thereto, said undercarriage being of lesser length than said cot frame and having an adjustable extension at one end thereof movable relative to said rectangular frame so as to effectively increase the length of said undercarriage without altering its wheelbase, coaching cross-forming frame members extending between said cot frame and said undercarriage, said cross-forming frame members being pivotally connected together intermediate their ends so that their corresponding upper and lower ends may be moved toward and away from each other, means securing the upper ends of said cross-forming frame members to said cot frame, said means including bracket means having longitudinal slots therein extending lengthwise of said cot frame to permit adjusting movement of said cross-forming frame members relative to each other, means securing the lower ends of said cross-forming frame members to said undercarriage with one of said members secured to said adjustable extension, and locking means for effectively securing said cross-forming frame members in a plurality of predetermined positions.

3. The structure claimed in claim 2 wherein said locking means extends between the upper ends of said cross-forming frame members and includes an elongated locking bar fixedly secured relative to one of said cross-forming frame members and movable relative to another of said cross-forming frame members.

4. The structure claimed in claim 2 wherein said locking means extend between the generally rectangular frame of said undercarriage and the said adjustable extension.

5. The structure claimed in claim 4 wherein said locking means comprises ratchet means pivotally connected to said adjustable extension, said ratchet means having teeth selectively engageable with a tooth-engaging member forming a part of said rectangular frame.

6. The structure claimed in claim 5 wherein said ratchet means is normally biased into engagement with the tooth-engaging member of said rectangular frame, and wherein attendant actuated release means are provided to disengage said ratchet means.

7. In combination in an elevating cot, an elongated cot frame, an undercarriage comprising a generally rectangular frame of fixed length having caster wheels fixedly mounted thereon, said undercarriage being of lesser length than said cot frame and having an adjustable extension at one end thereof movable relative to said rectangular frame so as to effectively increase the length of said undercarriage without altering its wheelbase, coaching cross-forming frame members extending between said cot frame and said undercarriage, said cross-forming frame members being pivotally connected together so that their upper and lower ends may be moved toward and away from each other, corresponding upper and lower ends of said cross-forming frame members being disposed to engage a tooth-engaging member forming a part of said undercarriage, respectively, the means at the last named end of said cot frame comprising bracket means having teeth selectively engageable with the tooth-engaging member forming a part of said undercarriage and having elongated slots therein, and locking means for securing the last named ends of said cross-forming frame members in adjusted position.

8. The structure claimed in claim 7 wherein said locking means comprises an elongated locking bar fixedly secured at one end to said cot frame and adjustably secured to the ends of the frame members which are in engagement with said bracket means.

9. An elevating cot comprising, in combination, an elongated cot frame, an undercarriage having a generally rectangular frame of fixed length with caster wheels at the corners thereof, said undercarriage being of lesser length than said cot frame and having an adjustable extension at one end thereof movable relative to said rectangular frame so as to effectively increase the length of said undercarriage without altering its wheelbase, coaching cross-forming frame members pivoted together intermediate their ends extending between said cot frame and said undercarriage, fittings securing the upper ends of corresponding frame members in each pair of said cot frame toward one end thereof, bracket means adjustably securing the upper ends of said cross-forming frame members in each pair toward the opposite end of said cot frame, fittings securing the lower ends of said last named frame members to the end of said undercarriage opposite said adjustable extension, fittings securing the lower ends of said first-named frame members to said adjustable extension, and locking means for securing said pairs of cross-forming frame members in a plurality of predetermined fixed positions.

10. The structure claimed in claim 9 wherein said locking means comprises an elongated locking bar effectively secured at one end to the upper ends of the cross-forming frame members secured to the first-named end of said cot frame, the opposite end of said locking bar being received in a fitting fixedly secured between the upper ends of the cross-forming frame members extending to the opposite end of said cot frame, said bar having a plurality of notches extending lengthwise thereof selectively engageable with an obstruction forming part of said fitting, spring means biasing the notches in said bar in the direction of said obstruction, and attendant actuable means for disengaging said locking bar when it is desired to raise or lower said cot frame relative to said undercarriage.

11. The structure claimed in claim 9 wherein said locking means comprises ratchet arms pivotally secured to said adjustable extension, said ratchet arms having teeth...
engageable with a tooth engaging member forming a part of the rectangular frame of said undercarriage.

12. The structure claimed in claim 11 wherein the teeth of said ratchet arms are pitched in one direction and positioned so that said teeth will ride over said tooth engaging member when said adjustable extension is moved inwardly toward the fixed frame of said undercarriage but will engage said tooth engaging member when said adjustable extension is moved in the opposite direction.

13. An elevating cot comprising in combination, an elongated generally rectangular cot frame of fixed length, a generally rectangular undercarriage of fixed length positioned beneath said cot frame, said undercarriage being of lesser length than said cot frame and having caster-wheels at the corners thereof, coacting pairs of frame members pivoted intermediate their ends extending between said cot frame and said undercarriage, said undercarriage having a telescoping extension at one end thereof, means securing the lower end of one of the cross-frame members in each pair of said extension, means securing the upper ends of said last named members to said cot frame, means securing the lower end of the remaining cross-forming frame member in each pair to the opposite end of said undercarriage, bracket means mounting the upper ends of said last named frame members to said cot frame for movement lengthwise thereof, and locking means for maintaining the extension of said undercarriage in predetermined fixed position.

14. The structure claimed in claim 13 wherein said locking means comprises ratchet means having a plurality of teeth selectively engageable with a coating tooth-engaging member so as to establish a predetermined elevation for said cot frame.

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