

March 14, 1950

M. D. BEEM ET AL

2,500,743

INVALID'S BED

Filed Sept. 12, 1945

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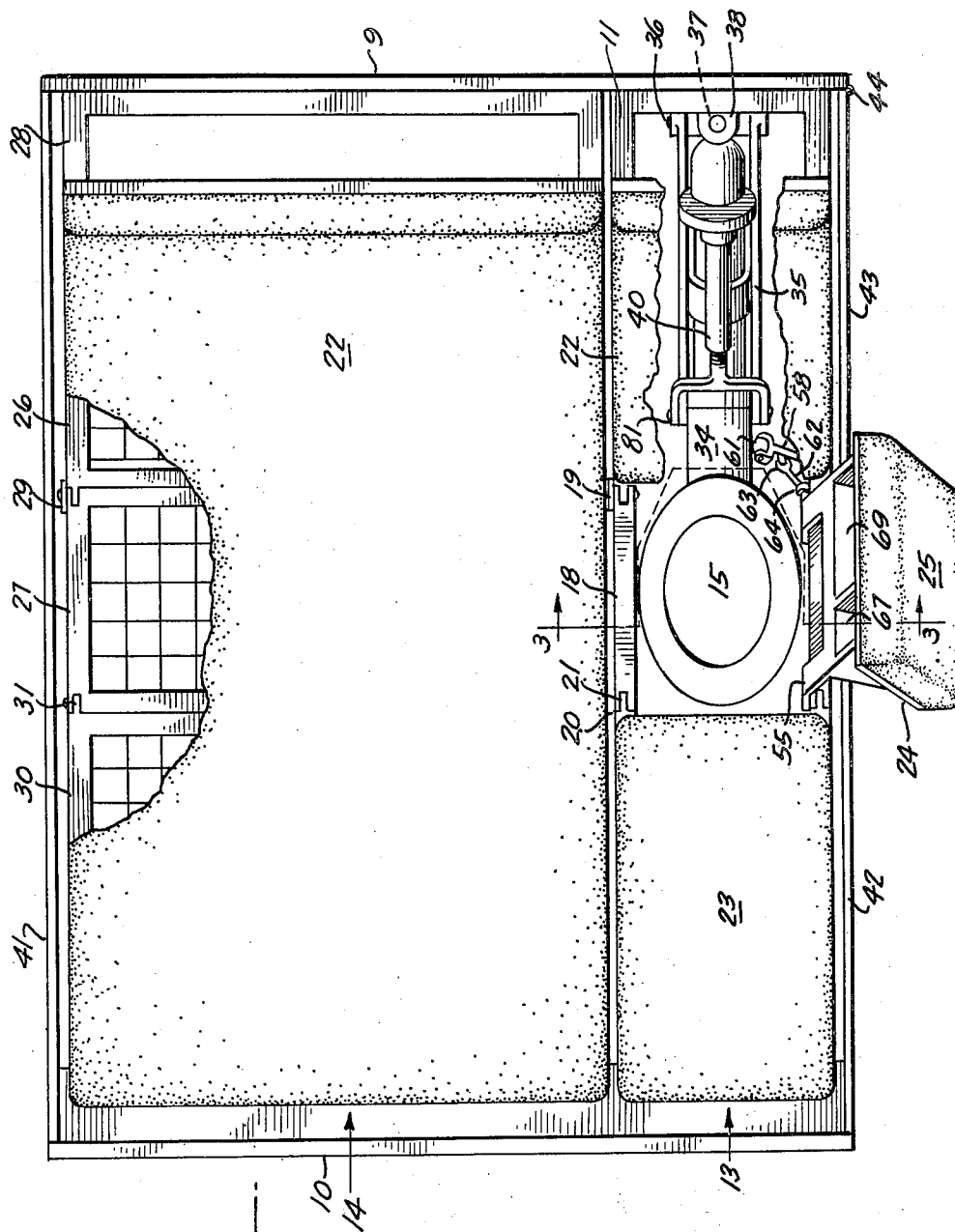


Fig. 1

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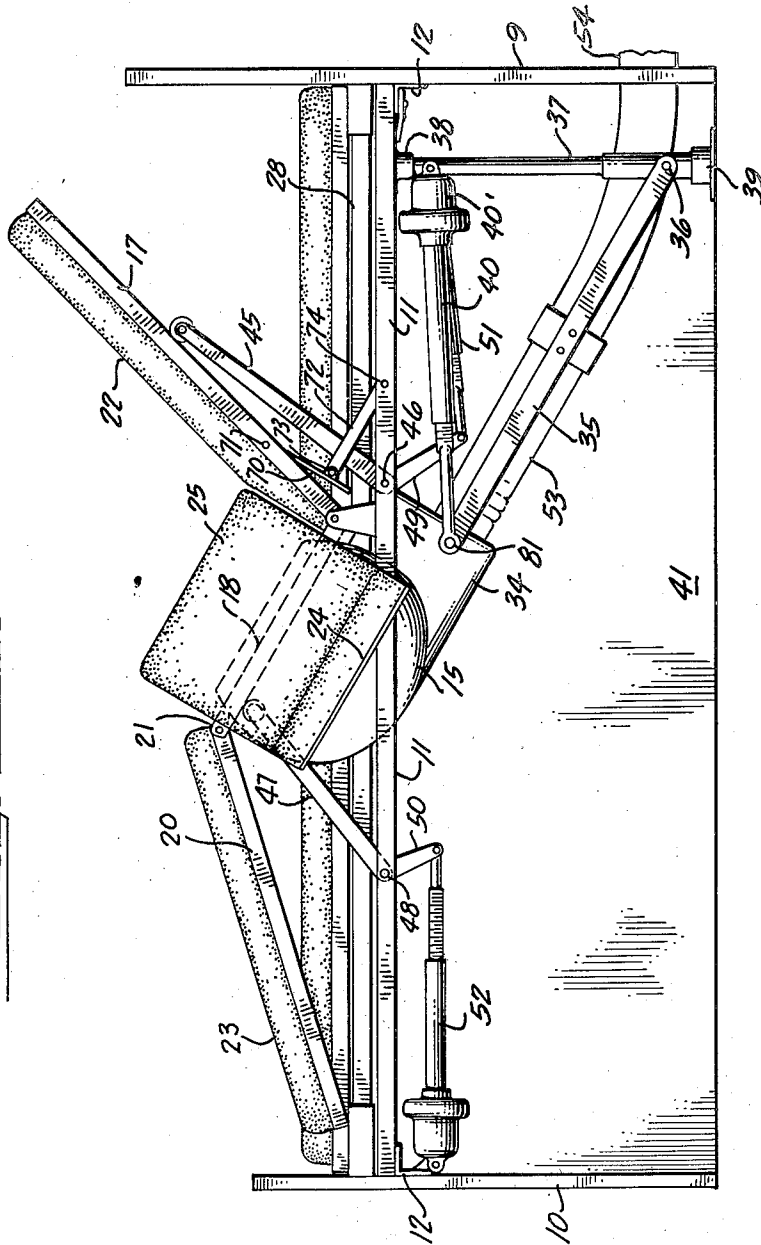
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Fig. 2



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Fig 3

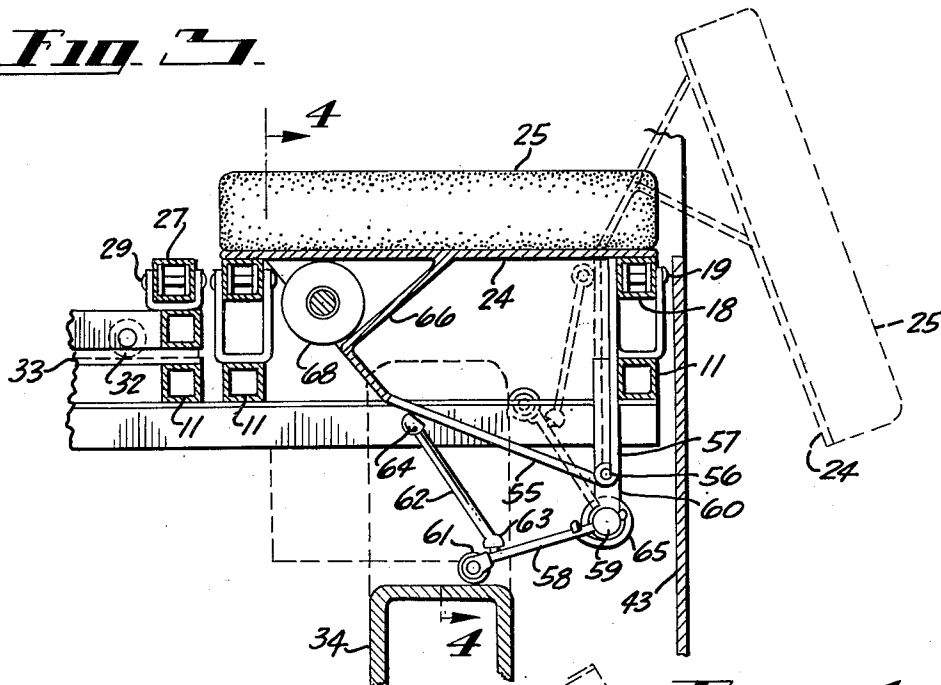
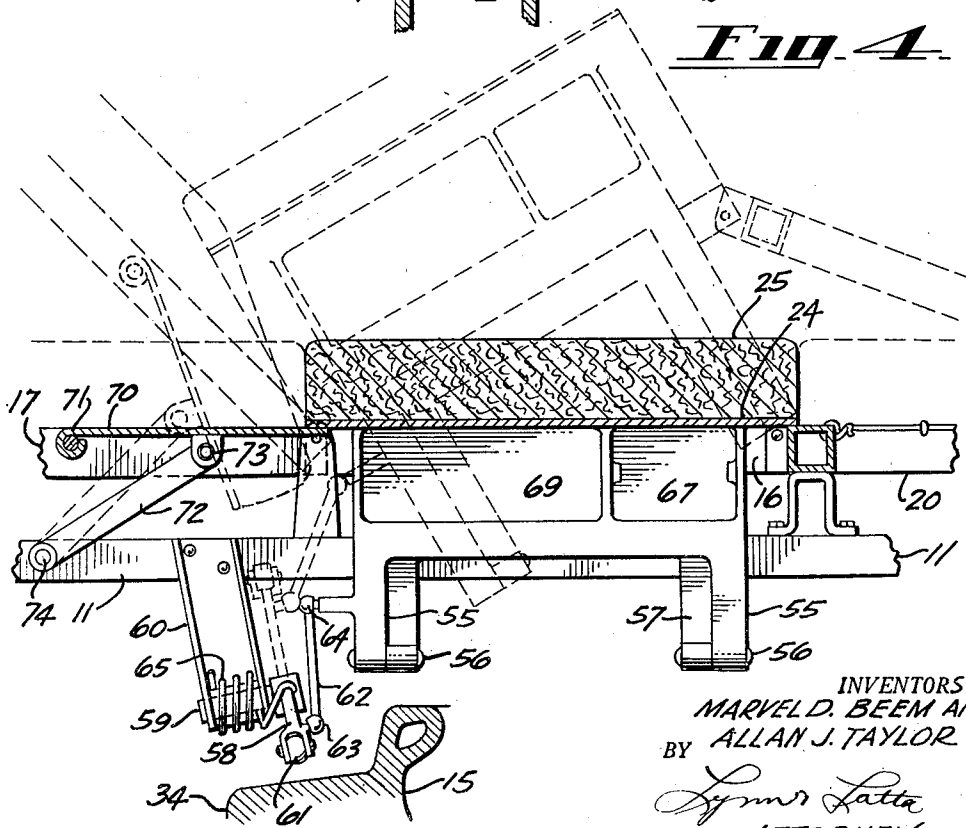


Fig 4



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2,500,743

INVALID'S BED

Marvel D. Beem and Allan J. Taylor, Los Angeles, Calif., assignors, by direct and mesne assignments, of one-half to said Beem and one-half to The Beem Foundation, Los Angeles, Calif., a charitable trust of California

Application September 12, 1945, Serial No. 615,787

13 Claims. (Cl. 5—90)

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This invention relates to invalid beds of the type having a flushable toilet incorporated therein, eliminating the necessity for the use of a bed pan. The invention is directed particularly to the problem of uncovering an opening in the bed, to which a toilet bowl is presented from below. The general object of the invention is to provide a bed wherein the cover for the toilet opening will be automatically moved out of the way when the bowl is elevated to the opening.

A specific object of the invention is to provide an arrangement wherein the elevating movement of the toilet bowl will move the cover to an open position through mechanical linkage adapted to be engaged by the bowl or a member associated therewith, and to transmit movement from the bowl to the cover.

Another object of the invention is to provide a bed wherein the toilet may be swung horizontally from beneath the bed in order to permit of its being used by an ambulatory patient. This necessitates the use of linkage which is not actually attached to the toilet bowl. The bowl must be capable of swinging away from the linkage in order to reach the horizontally projected position. Consequently, another of the objects of the invention is to provide a cover elevating mechanism which is arranged to receive bowl movement from the toilet bowl and yet is not directly connected thereto.

Another object of the invention is to provide a normally concealed receptacle for toilet tissue and other similar utilities. A further object is to provide such a receptacle which will be moved to a position where the patient may have ready access to it upon using the toilet. With these general objects in mind, a further object of the invention is to provide a receptacle for toilet tissue and the like which is incorporated directly beneath the cover for the toilet opening and which is adapted to be moved to a position for convenient use as the result of moving the cover away from the opening.

Another object of the invention is to provide a bed having articulated parts that are movable to any of a number of positions (of varied degree of elevation) wherein they cooperate to form a reclining seat for supporting a patient comfortably for use of the toilet. Some patients can be brought to a position of maximum uprightness. Others, because of their condition, can be elevated only slightly, or can have only the back elevated while the thighs must be maintained in a horizontal position. Another object is to provide cover raising mechanism which is adapted to

operate equally as well in any of the several positions to which the thigh or seat portion of these articulated parts can be raised.

Another object is to provide a bed having articulated parts including a back rest portion adapted to be raised to a semi-upright position and having a hinged panel adjacent a toilet opening, which panel is adapted to be retracted downwardly and rearwardly as the back rest is elevated, in order to more fully accommodate the moving of the upper portion of the toilet upwardly into the opening.

Other objects of the invention will appear in the ensuing specification when considered in connection with the appended drawing, wherein:

Fig. 1 is a plan view of an invalid's bed embodying the invention;

Fig. 2 is a side elevation of the bed;

Fig. 3 is a cross sectional view of the seat raising mechanism, taken on the line 3—3 of Fig. 1 and showing the mechanism in the closed position in full lines and in the open position in dotted lines;

Fig. 4 is a longitudinal sectional view taken on the line 4—4 of Fig. 3.

As an example of one form in which the invention may be embodied, I have shown in the drawings an invalid's bed including a head 9, a foot 10, longitudinal rails 11 connected to the head 9 and foot 10 by angle brackets 12, and a pair of top portions 13 and 14 which collectively constitute the top of the bed upon which a patient is supported.

The top portion 13 also provides a seat for supporting a patient for use of the toilet mechanism which includes a bowl 15 that is adapted to be elevated from an inoperative position below the bed to a position in which it is presented to an opening 16 in the top portion 13. This top portion 13 comprises a back rest 17 and the thigh section 18 hinged to each other and to brackets 19 which are attached to the fixed frame rails 11, and a leg rest 20 which is hinged to the thigh section 18 at 21. The back and leg rests 17 and 20 are adapted to support mattress members 22 and 23. The opening 16, which is in the thigh section 18, is normally covered by a cover 24 to which is secured a mattress section 25.

The removable top section 14 comprises a back rest 26 and a thigh section 27 hinged together and to brackets 29 which are secured to a sub frame 28, together with a leg rest 30 which is hinged at 31 to the thigh section 27. The sub frame 28 has rollers 32 which travel in tracks 33 that are secured upon the rails 11 in positions ex-

tending transversely of the bed. Thus the removable top portion 14 may be moved horizontally from the bed onto an ambulatory cart having suitable tracks positioned to register with the tracks 33.

The bowl 15 has a trap portion 34 which is hinged at 81 between the spaced arms of a swinging bracket 35. The other end of the bracket 35 is hinged, at 36, to a vertical post 37 which is pivoted in bearings 38 and 39 to permit the entire toilet assembly to swing laterally so as to project the bowl 15 horizontally from beneath the bed. A screwjack unit 40 has one end attached to the post 37 and its other end attached to the bracket 35 or bowl 15. The screwjack unit 40 includes a reversible electric motor 40', operation of which is effective to raise or lower the bowl 15.

The bed is provided with side panels 41, 42 and 43, the panel 43 being hinged at 44 to the head of the bed so that it may swing outwardly to permit the horizontal projection of the bowl 15 from beneath the bed.

The head rests 17 and 26 are adapted to be raised by a series of arms 45 mounted on a shaft 46 which is journaled in the rails 11. The knee areas of the top portions 13 and 14 (the areas where the leg rests 20 and 30 are hinged to the thigh sections 18 and 27) are adapted to be lifted by arms 47 which are mounted upon a shaft 48 journaled in the rails 11. The swinging ends of the arms 45 engage the under sides of the back rests 17 and 26, and the swinging ends of the arms 47 engage the under sides of the thigh sections 18 and 27. Levers 49 and 50 are attached to the shafts 46 and 48 respectively, extend downwardly, and are connected at their lower ends to screwjack units 51 and 52. The screwjack units 51 and 52, like the unit 49, embody reversible motors by means of which they may be operated in either direction. Operation of the unit 51 in one direction will cause the arms 45 to move counterclockwise, raising the back rests 17 and 26 to inclined positions such as that shown in Fig. 2. Operation of the screwjack 51 in the opposite direction will permit the back rests 17 and 26 to return to horizontal positions. Operation of the screwjack 52 in one direction will swing the arms 47 counterclockwise, raising the knee areas of the top portions 13 and 14 to positions such as those shown in Fig. 2, and operation of the screwjack 52 in the opposite direction will permit the knee areas to return to the horizontal positions.

The toilet bowl 15 is adapted to cooperate with the thigh section 18 in any position that may be assumed thereby. For the average patient, the thigh section may be elevated to a position of maximum inclination (approximately the position shown in Fig. 2). For certain conditions, however, it may be desirable to elevate the thigh section 18 to only a portion of the elevation shown in Fig. 2, or in some cases, it may be advisable to leave the thigh section horizontal and elevate only the back rest 17. Suitable mechanism, such as that shown in the pending application of Allen J. Taylor, Serial No. 607,847, filed July 30, 1945, may be employed for causing the bowl 15 to assume the angular position of the thigh section 18. For the sake of simplicity, such mechanism has been omitted from the present disclosure. A feature of the present invention is the arrangement of the mechanism for elevating the cover 24 so as to adapt itself to operation in any of the various positions of an-

gularity that may be assumed by the thigh section 18.

The trap 34 has an outlet to which is connected one end of a flexible drain tube 53. The other end of the tube 53 is connected to a sewer outlet which is indicated at 54.

The cover 24 is carried by a pair of arms 55 which, in the closed position of the cover, extend downwardly and toward the door panel 43. The ends of the arms 55 are hinged, at 56, to the lower ends of a pair of brackets 57 which are secured to and depend from the outer side member of the thigh section 18. It will now be apparent that the axis of the hinges 56 will at all times remain parallel to the thigh section 18, that the cover 24 may swing about this axis from the closed position shown in full lines in Fig. 3 to the open position shown in dotted lines in Fig. 3, irrespective of the angularity of the thigh section 18, and that the relationship between the cover 24 and the thigh section 18 in the open position of the cover will be the same in all cases. In the open position, the arms 55 will contact the brackets 57 to support the weight of the cover 24 and the mattress section 25 which, in that position will hang over the side of the thigh section 18 as indicated in Fig. 3.

Movement is transmitted from the bowl trap 34 to the cover 24 through linkage including an arm 58 which is mounted in a stub shaft 59 journaled in a bracket 60 that is secured at its upper end to the outer longitudinal rail 11. Thus the axis of the shaft 59 remains fixed at all times. The swinging end of the arm 58 carries a roller 61 which, in the lowered position of the bowl 15, is spaced slightly above the upper surface of the trap 34 as shown in Fig. 3. As the bowl is elevated, the upper surface of the trap 34 will engage the roller 61 and swing the arm 58 upwardly. This upward movement is transmitted from the arm 58 to the cover 24 through a link 62 having a universally pivotal connection at 63 with the arm 58 and having a universally pivotal connection 64 with one of the arms 55.

The upward swinging movement of the arm 58 is resisted by a coil spring 65 one end of which is hooked above the arm 58 and the other end of which is hooked into the bracket 60. The coil spring 65 encircles the stub shaft 59 and urges the arm 58 downwardly.

In the lowered position of the bowl 15, the arm 58 is suspended out of contact with the upper surface of the trap 34, thus permitting the bowl to be swung horizontally from beneath the bed, without interference from the cover elevating mechanism as the bowl is elevated.

The back rest 17 is provided with a panel 70 which is hinged thereto at 71. A link 72 is pivoted at 73 to the panel 70 and at 74 to the outer longitudinal rail 11, in such a manner as to cause the panel 70 to drop below the plane of the back rest 17 when the latter is elevated. This is indicated in full lines in Fig. 2 and in broken lines in Fig. 4. When the back rest 17 is returned to its normal horizontal position, the panel 70 will be moved back into the plane of the back rest 17.

The panel 70 supports the end of the mattress section 22 which lies adjacent the opening 16, and when the panel is dropped below the plane of the back rest 17, it permits this end portion of the mattress 22 to recede from the opening 16, thereby providing additional space to receive the upper section of the bowl 15.

As the bowl is elevated, the trap 34 will come

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into contact with the roller 61. The continued elevation of the bowl will cause the arm 58 to swing upwardly, the roller 61 rolling against first the upper surface and then the side surface of the trap 34, until, in the fully raised position of the toilet bowl, the cover and the raising linkage will have assumed the position shown in broken lines in Fig. 3. It may be noted at this point that the movement of the cover linkage will terminate when the roller 61 has moved to a position in engagement with the side face of the trap 34, and that further upward movement of the bowl is therefore possible without causing further movement of the cover 24. This makes it possible to arrange the mechanism to move the cover to the fully open position irrespective of the height of elevation of the thigh section 18 and the height to which the bowl 15 is raised. The opening movement is accomplished in an initial stage of bowl elevating movement, and a final stage of bowl elevating movement takes place after the cover has been fully opened.

As the bowl is lowered back to its inoperative position, the spring 65 will act to move the cover 24 back to its closed position, maintaining the roller 61 in engagement with the trap 34 and the connecting linkage in a taut condition so that the return movement of the cover may be smooth and continuous.

The cover 24 is provided with a receptacle section 66 on its under side. The receptacle section 66 is divided into a compartment 67 for toilet paper 68 and a compartment 69 which may be used for holding other articles of convenience to a bed-ridden patient.

The receptacle portion 66 of the cover is brought to an operative position wherein its contents are accessible to the patient, when the cover 24 is raised to the open position. It may be noted that in this position, approximately half of the cover projects above the upper surface of the thigh section 18 while the balance projects downwardly beyond the side of the bed, out of the way. The upwardly projecting portion of the cover serves not only to present the receptacle mechanism in an accessible position, but also serves as a guard to prevent the patient falling over the side of the bed when moving on to the toilet seat. The upper edge of the mattress section 25 may, in the open position of the cover, also serve as an arm rest.

We claim as our invention:

1. In an invalid's bed, a toilet seat section occupying an area at one side of the bed, said section having an opening, a toilet bowl, means for elevating said bowl from a lowered, inoperative position to a position presented to said opening, a cover hinged upon said toilet seat section on an axis disposed below said section and at the outer side thereof, and means actuated by raising of said toilet bowl for raising said cover and swinging it over the side of the bed to a position removed from above said opening.

2. In an invalid's bed, a fixed frame, a toilet seat section including a thigh portion and a back rest portion hinged to each other and to said fixed frame, and a leg portion hinged to said thigh portion, said thigh portion being adapted to be elevated to provide a reclining seat, said thigh portion having an opening, a toilet bowl, means for elevating said toilet bowl from a lowered, inoperative position below the bed to an operative position presented to said opening, a cover for said opening, and means actuated by elevating movement of said bowl for raising said

cover and moving it to a position removed from above said opening.

3. In an invalid's bed, a fixed frame, a toilet seat section including a thigh portion and a back rest portion hinged to each other and to said fixed frame, and a leg portion hinged to said thigh portion, the respective portions of said seat section being adapted to be elevated to provide a reclining seat arrangement, said thigh portion having an opening, a toilet bowl, means for elevating said toilet bowl from a lowered, inoperative position below the bed to an operative position presented to said opening, a cover hinged to said thigh portion on an axis therebelow and at the outer side thereof, and means actuated by elevating movement of said bowl for raising said cover and swinging it outwardly to a position beyond the side of the bed.

4. In an invalid's bed, a fixed frame, a toilet seat section including a back rest portion and a thigh portion hinged to each other and to said fixed frame and a leg portion hinged to said thigh portion, said several portions being adapted to be raised to positions collectively defining a reclining seat arrangement, said thigh portion having an opening, a toilet bowl, means upon which said toilet bowl is suspended for movement from a lowered, inoperative position to either a raised position presented to said opening or a position projected horizontally beyond the side of the bed for use by an ambulatory patient, a cover for said opening, hinged to said thigh portion and means connected to said cover and adapted to be engaged by said toilet bowl as the latter moves upwardly and to transmit to said cover, upward and lateral swinging movement to a position in which said opening is uncovered, the last mentioned means being supported out of contact with said bowl in the said inoperative, lowered position thereof.

5. In an invalid's bed, a fixed frame, a toilet seat section including a back rest and a thigh portion hinged to each other and to said fixed frame, and a leg portion hinged to said thigh portion, said thigh portion having an opening, a cover hinged upon said thigh portion and normally covering said opening, a toilet bowl, means for elevating said toilet bowl from a lowered, inoperative position to a position presented to said opening, and means actuated by elevating movement of said bowl for moving said cover to an inoperative position in which said opening is uncovered, the last mentioned means being operative irrespective of the position of inclination of said thigh section.

6. In an invalid's bed, a normal occupancy section and a toilet seat section including a back rest, a thigh portion and a leg portion hinged to each other in the order named, a fixed frame to which said back rest and thigh portion are hinged, said thigh portion having an opening, a toilet bowl, means for elevating said toilet bowl from an inoperative position below the bed to a position presented to said opening, a cover for said opening, hinged to said thigh portion for swinging movement from a normal position covering said opening to a position projected beyond the side of the bed and extending downwardly, and mechanism carried by said cover and thigh section in a position to be engaged by said toilet bowl as the latter is elevated, said mechanism being operated, upon elevation of the bowl, to move said cover from said normal, closed position, to said open position, and being free of en-

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gement with the bowl when the latter is in its lowered position.

7. In an invalid's bed, a toilet seat section including a thigh portion having an opening and a back rest and a foot rest hinged to respective ends of said thigh portion, a fixed frame to which said back rest and thigh portion are hinged, a cover supported for upward and lateral swinging movement from a position covering said opening to a position displaced to one side of said opening, a toilet bowl, means for elevating said bowl from a lowered, inoperative position beneath the bed to a position presented to said opening, an arm hinged to said fixed frame, and a push rod universally pivoted to said arm and to said cover and adapted, upon elevation of said bowl, to transmit to said cover movement to said displaced position in which said opening is uncovered.

8. In an invalid's bed, a toilet seat section including a thigh portion having an opening and a back rest and a foot rest hinged to respective ends of said thigh portion, a fixed frame to which said back rest and thigh portion are hinged, a cover supported for upward and horizontal swinging movement from a position covering said opening to a position displaced from above said opening, a toilet bowl, means for elevating said bowl from a lowered, inoperative position beneath the bed to a position presented to said opening, means including an arm hinged to said fixed frame, and linked to said cover and adapted, upon elevation of said bowl, to transmit to said cover, movement to said displaced position in which said opening is uncovered, and spring means acting between said fixed frame and said arm for moving the arm and said cover back towards a closed position upon lowering of the bowl to its inoperative position.

9. In an invalid's bed, a toilet seat portion including a thigh section having an opening, a leg rest and a back rest hinged to said thigh section at the respective ends thereof, a fixed frame to which said thigh section and said back rest are hinged, a toilet, means for elevating said toilet from a lowered, inoperative position below the bed to a raised position presented to said opening, said back rest including a hinged panel having an edge defining a portion of the margin of said opening, and means for causing said panel to shift in a direction to increase the area of said opening when said back rest portion is elevated.

10. An invalid's bed as defined in claim 9 wherein said last means comprises a link forming a connection between said hinged panel and said fixed frame.

11. In a bed, a fixed frame, a toilet seat section including a thigh portion and a back rest portion hinged to each other and to said fixed frame and a leg portion hinged to said thigh portion, said thigh portion being adapted to be elevated to provide a reclining seat, said thigh portion having an opening, a toilet bowl, means for ele-

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vating said toilet bowl from a lowered, inoperative position below the bed to an operative position presented to said opening, a cover for said opening, and means actuated by elevating movement of said bowl for moving said cover to a position removed from above said opening.

12. In a bed, a fixed frame, a toilet seat section including a thigh portion and a back rest portion hinged to each other and to said fixed frame and a leg portion hinged to said thigh portion, said thigh portion being adapted to be elevated to provide a reclining seat, said thigh portion having an opening, a toilet bowl, means for guiding said bowl from a lowered, inoperative position below the bed to an operative position presented to said opening, a cover for said opening, means for moving said cover from a position covering said opening to a position removed from above said opening, and common control means for simultaneously effecting the raising of said bowl and the actuation of said cover moving means to effect movement of said cover to its last mentioned position.

13. In a bed, a fixed frame, a toilet seat section including a back rest and a thigh portion hinged to each other and to said fixed frame and a leg portion hinged to said thigh portion, said thigh portion having an opening, a cover mounted upon said thigh portion for movement from a normal position covering said opening to an inoperative position in which said opening is uncovered, a toilet bowl, means for guiding said toilet bowl from a lowered, inoperative position to a position presented to said opening, means for moving said cover from said normal position to said inoperative position and back to said normal position, and common control means for simultaneously effecting the raising movement of said bowl and the actuation of said cover moving means to effect movement of said cover to its inoperative position and for simultaneously effecting the lowering of said bowl back to its inoperative position and releasing said cover moving means to permit said cover to move back to its normal position.

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