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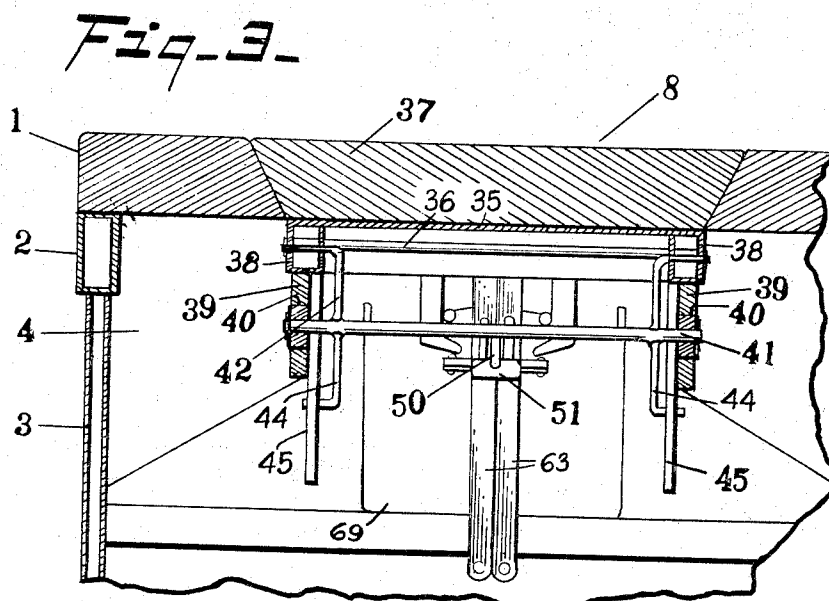
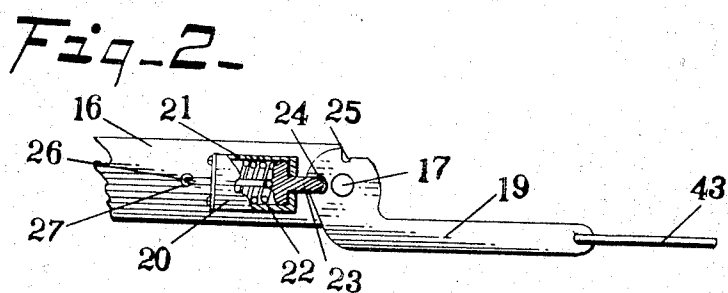
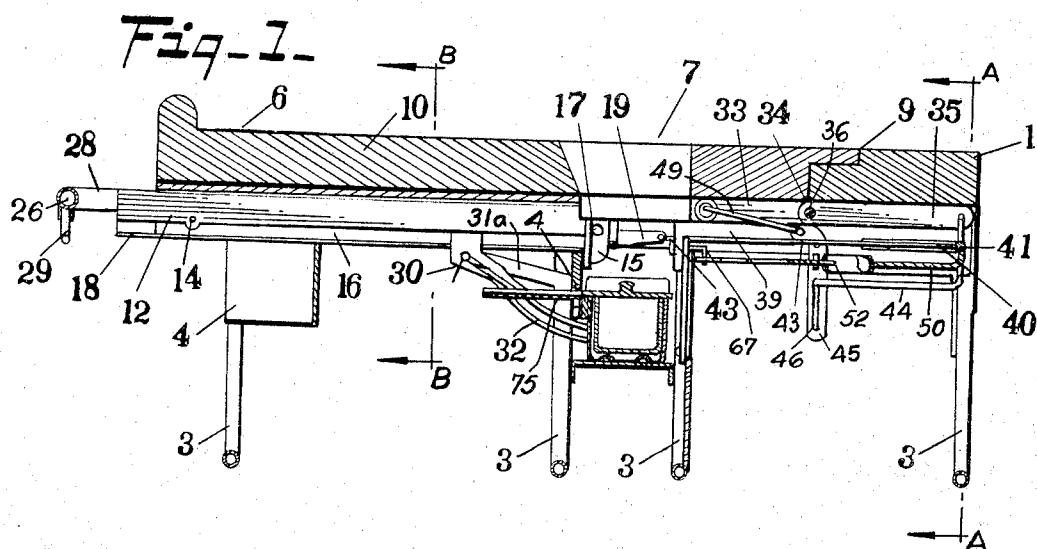
SADAJI HIRAGA

3,345,652

CLINICAL COMMODE

Filed July 22, 1965

4 Sheets-Sheet 1



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Fig-4-

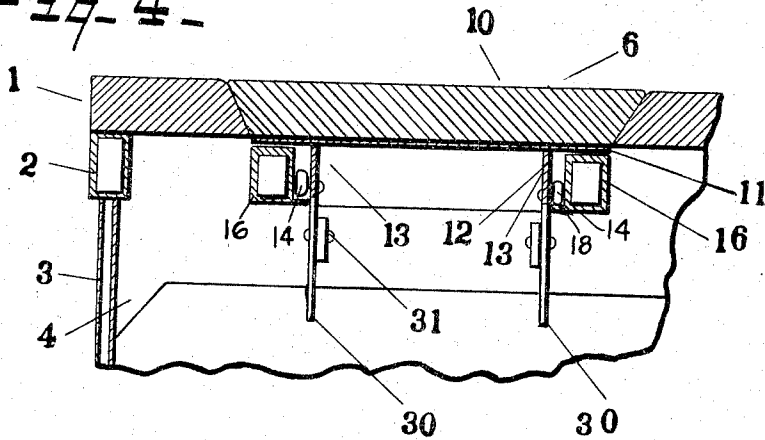
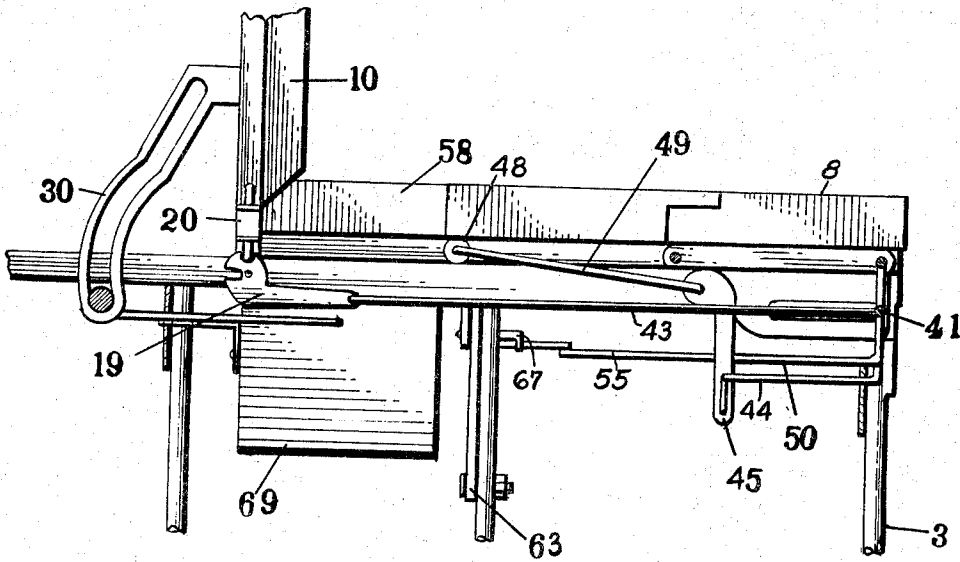


Fig-10-



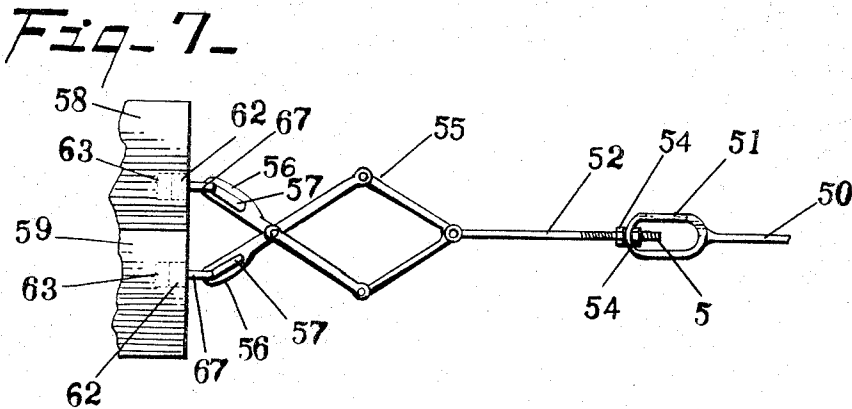
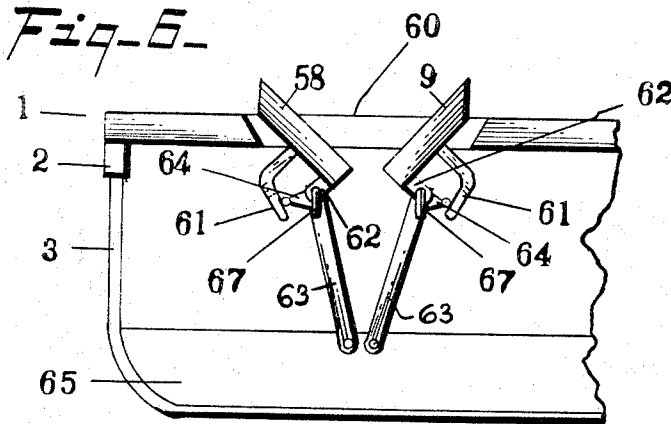
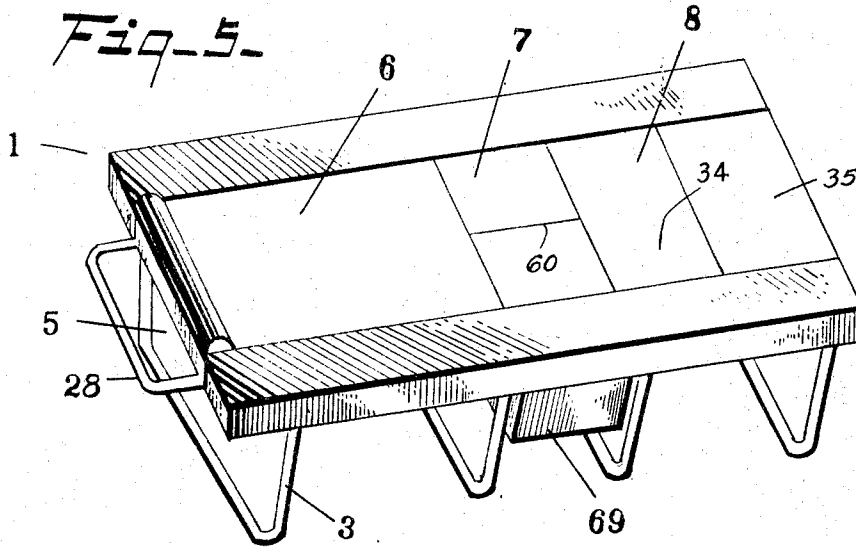
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Fig. 9-

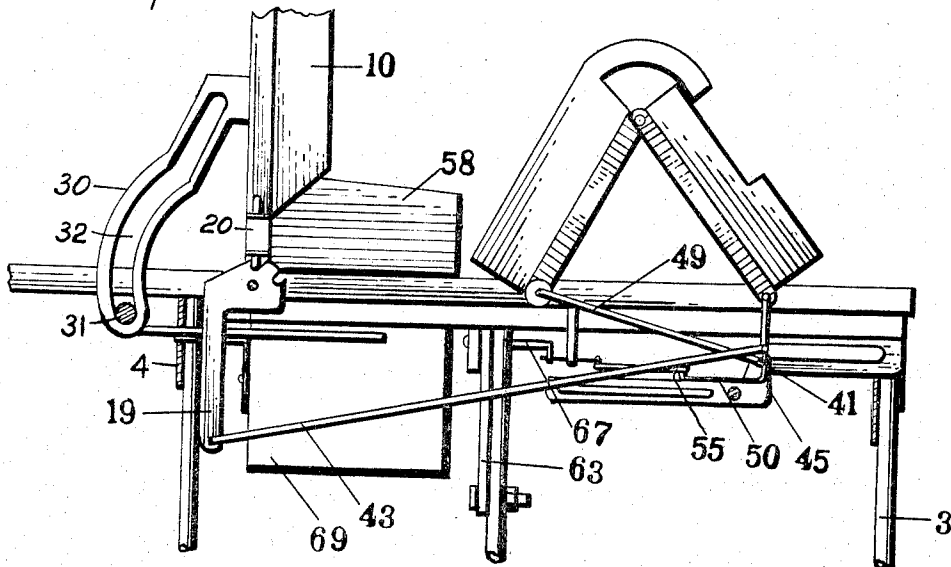
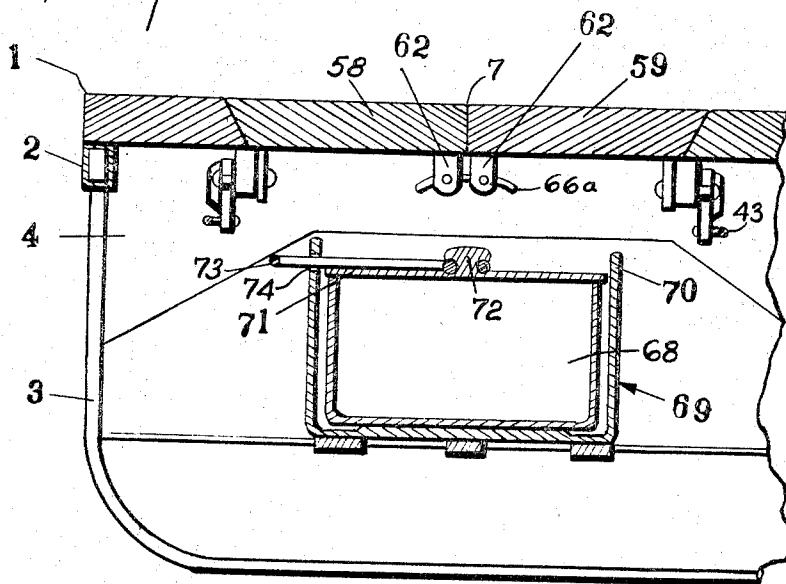


Fig. 8-



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CLINICAL COMMODO

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Filed July 22, 1965, Ser. No. 474,031

Claims priority, application Japan, May 25, 1965,
40/30,993

4 Claims. (Cl. 5—90)

The present invention relates to a hospital bed and commode that allows a patient to carry through particular physiological phenomenon while lying on his or her back in bed.

More particularly, the invention relates to a hospital bed and commode device that allows a patient to carry through the abovementioned phenomenon while being held in a comfortable posture in bed. To effect the abovementioned function, I propose a device, the construction of which will hereinafter be described in detail.

The hospital bed and commode of the present invention comprises a frame, a back-supporting platform adapted to support the upper half of the patient's body, a hip-supporting platform and a leg-supporting platform positioned adjacent each other along said frame in the recited order, said back-supporting platform being rotatably mounted on the frame at the end thereof toward the foot of the bed, said leg-supporting platform consisting of a thigh supporting part and a calf supporting part hinged to the thigh supporting part along an axis transverse of the frame, the free ends of said leg-supporting platform parts being movable along the length of the frame, said hip-supporting platform being movable from a closed position in which it forms a continuation of said back-supporting platform and said leg-supporting platform to an open position in which it leaves an opening through said frame, a commode beneath said hip-supporting platform, a cover movably mounted over said commode movable transversely to the vertical axis between said commode and said hip-supporting platform, and a linkage connected between said back-supporting platform, said leg-supporting platform, said hip-supporting platform and said commode cover for raising the hinged joint between the leg-supporting platform parts, moving the hip-supporting platform from the closed to the open position and moving the commode cover laterally of the commode when the back-supporting platform is pivoted upwardly around the pivotal mounting thereof on said frame.

The hospital bed and clinical commode device of the present invention will now be described in further detail, reference being had to the accompanying drawings, in which:

FIG. 1 is a sectional view of the clinical bed of this invention;

FIG. 2 is a schematic view, on an enlarged exaggerated scale, showing the stopper plate of the commode device of the invention;

FIG. 3 is a partial sectional view, on an enlarged scale, taken on the line A—A of FIG. 1;

FIG. 4 is a partial sectional view, on an enlarged scale, taken on the line B—B of FIG. 1;

FIG. 5 is a perspective view of the clinical bed of this invention;

FIG. 6 is a diagrammatic representation illustrating the hip supporting part of the clinical bed of this invention in an open position;

FIG. 7 is a plan view illustrating the linking mechanism of this invention;

FIG. 8 is a partial sectional view of the commode casing of this invention; and

FIGS. 9 and 10 are partial elevational views illustrating the working mechanism of the clinical bed of this invention in various positions.

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Referring to the accompanying drawings and to FIG. 1 in particular, a bed 1 has a pair of side frames 2 (see FIGS. 3 and 4) having a required number of legs 3 and a suitable number of supporting plates 4 adapted to support a working mechanism 5 (see FIG. 5) for the bed.

The above-mentioned working mechanism 5 is divided into distinct elements at joints 9, said elements being a back supporting platform 6 adapted to support the upper half of the patient's body, a hip-supporting platform 7, and a leg-supporting element 8. This arrangement is illustrated in general in FIG. 5.

In FIG. 4, the back supporting platform 6 adapted to support the upper half of the patient's body consists, in the main, of a cushion 10 and a horizontal plate 11 attached to the bottom side of said cushion. Angle plates 12 and 12 having vertical legs 13 and 13 disposed in facing relation are attached to said horizontal plate 11. Rollers 14 and 14 are mounted on said vertical legs. Projections 15 and 15 (in FIG. 1) extend from the respective supporting plate 4 and each of said projections 15 is connected rotatably to a hollow frame 16 by a pivot 17 (FIG. 1) in such a manner that each of said rollers is held in contact with a rail 18 located at the lower edge of the respective frames 16.

Referring now, to FIG. 2, a stopper plate 19 is rotatably attached to the rear end of said frame 16 and at a small distance toward the head of the bed (to the left in FIG. 1) from said stopper plate, a stop pawl housing or cylinder 21 having a cover 20 is fixed securely to said frame 16. A pawl 23 is provided in said cylinder and is urged by a spring 22 in a direction to engage the pawl grooves 24 and 25 provided in said stopping plate. A wire 26 secured fixedly to the base of said pawl extends outwardly of said cylinder 21, entering into the frame 16 through a bore 27 and then into a handle 23 (see FIGS. 1 and 5) mounted on the head end of hollow frame 16. The extended end of said wire is secured fixedly to the base of a lever 29 for said handle 28. To the lower end of the vertical leg 13 of each of said angle plates 12 is fixedly secured one end of a guide plate 30 having a long slit 32, in which a guide pin 31 provided on a bracket 31a on one of said legs 3 is slidably positioned. The leg supporting platform 8 consists of a thigh plate 34 and a calf plate 35, the joint 33 between them extending along the line normal to the length of the working mechanism and the plates having cushions 37 thereon overlapping near the upper surface of the platform. The two plates are connected with one another about a pivot 36 as shown in FIG. 1.

Referring to FIG. 3, the plates 34 and 35 have frames 38 and 38 on the under side of the cushion 37 and extending between two legs 3 and 3. Parallel rails 39 extend between two legs 3 and the ends thereof are secured fixedly to supporting plates 4 and 4. Rails 39 and 39 have long slots 40 therein at the rear ends to permit the free movement of a shaft 41, which is positioned in said slots. An L-shaped pin 42 on each side of the calf plate has the bent end loosely fitted in an opening provided in the frame 38 at the rear end of said calf plate 35. The free end of each of said pins is secured to the shaft 41. One end of a connecting rod 43 is pivotally attached to the free end of the stopping plate 19 (FIG. 2), the other end of said rod 43 being loosely connected to said shaft 41. The bent end of each of two rods 44 extending downwardly from said shaft 41 is slidably fitted into a slot 46 in a thrust cam 45, and to the lower edge of rails 49 at approximately the center thereof, is pivotally mounted said cam 45. The ends of said frames 38 of said thigh plate 34 toward the head of the bed are provided with wheels 48 mounted on an axle. To each end of said axle is pivotally connected one end of a connecting rod 49, the other end of which is pivotally secured to said cam 45 eccentrically of said pivot point. The wheels are engaged

with said rails 39. The pivotal portion of said thigh and calf plates 34 and 35 is so constructed that the upper portion of said plate 34 extends a short distance over a recess formed in the upper portion of said plate 35.

Referring, now, to FIG. 7, a stationary rod 50 extends toward the head of the bed from the center of said shaft 41 and is provided, at its forward end, with a ring 51, in which is fitted a threaded base 53 of the thrust rod 52 and nuts 54 are installed in such a manner that said base is tightly secured in position from both sides of said ring 51. On the forward end of this thrust rod 52 is pivotally mounted a diamond-shaped flexible linking mechanism. Slots 57 are formed in the ends of rods 56, which extend from said linking mechanism.

Referring, now, to FIG. 6, the hip-supporting platform 7 is divided into two halves along a central line 60 along a central axis parallel to the length of the bed-operating mechanism 5, said halves being a left-hand tiltable plate 58 and a right-hand tiltable plate 59. The edge of each tiltable plate butting the side frame is slanted when viewed in section in correspondence with the slanted edge of the frame. In the neighborhood of the central line 60, opening-closing elements 61 are provided which extend symmetrically downwardly and then inwardly, and adjacent line 60 downwardly extending projections 62 are provided. At the lower end of each of said projections is pivotally attached a downwardly extending link 63, and a projection 64 extends from the end of each said link 63 toward the respective opening-closing element 61. The lower ends of said links 63 are pivotally secured to mounting plate 65 secured to the lower end of a pair of legs 3. An L-shaped pin 66 (see FIG. 8) extends from each projection 62 on the other side of said opening-closing plates 58 and 59 and is fitted slidably in a slot 66a provided in the supporting plate 4. The upper ends of said links 63, said projections 62 and said rods 56 are pivotally connected by means of L-shaped pins 67 the ends of which extend through said slot 57.

Referring, now, to FIG. 8, there is provided a commode casing 69 containing a commode 68 positioned below said hip-supporting platform 7 and having upwardly-extending lateral walls 70 extending along the length of said platform. In a slot 74 formed in said lateral wall 70 is slidably positioned an operating rod 73 carrying a knob 72 on a slidable top 71. A slidable door guide plate 75 extends toward the head of the front end of said casing. The other end of said rod 73 extends to and is secured to the shaft 41.

The operation of the clinical bed of the present invention will hereinafter be described in sequence and in relation to the structure hereinbefore outlined.

In the first place, when the platform 6 adapted to support the upper half of the patient's body is raised upward about the pivot 17 by means of said handle 28, the connecting rod 43 pivotally attached to the rear end of said stopping plate 19 moves forward with the pawl 23 remaining engaged in the pawl groove 24 in said stopping plate 19 and the shaft 41 pivotally connected to said connecting rod slides forward in the slot 40, causing the stationary rod 44 secured to said shaft 41 to move forward. The bent end of said rod 44 slides in the slot 46 of said thrust cam 45, whereby the upper end of said thrust cam pushes from below on the pivot 36 between the two plates 34 and 35 of said leg-supporting platform 8 so that the two plates start pivoting about said pivot 36. At the same time, the connecting rod 49 connected to the front end of said thrust cam 45 is caused to recede a short distance as the thrust cam turns and the axle to which one end of said connecting rod is pivotally connected is caused to recede so that the wheel attached to said axle slides on the rail 39. Thus, the frame 38 of said plate 34 to which the axle is connected recedes so as to incline the two plates 34 and 35 symmetrically upward about said pivot. It is to be understood that since the L-shaped pin 42, one end of which is secured to said shaft 41 is loosely fitted into the opening at the rear end of the said plate

35, the rear end mentioned just above is caused to travel forward, assuring a perfectly symmetrical upward inclination of the plates.

Secondly, when the above-mentioned operation is performed, the stationary rod 50, the rear end of which is connected to the shaft 41 moves forward and, therewith, the ring 51 and the thrust rod 52 also move forward, with the result that the flexible diamond-shaped linking mechanism 55 provided at the end of said thrust rod is moved in the direction of said movement. Thus, the opening-closing connecting rods 56 connected to the end of said mechanism 55 are opened, whereby the links 63 and projections 63 pivotally connected through the L-shaped pins 67 having the ends extending through said slots 57 in said rods 56 are moved. Thus, around the pivots between the lower ends of said links 63 and the links 65, the upper ends of the pushing plates open laterally as the connecting rods 56 are operated, and through the intermediary of the projections 62 on the left-hand plate 58 and right-hand plate 59 which are also pivotally connected to the upper ends of said links, respectively, the two plates 58 and 59 are inclined relative to the central line 60. At that moment, as the projection 64 secured fixedly to said links push the opening-closing elements 61 and 61, the plates 53 and 59 are inclined by degrees until a space of sufficient size is formed therebetween.

Thirdly, the supporting plate 4 supports the bed-operating mechanism 5 and, at the same time, reinforces the leg 3.

Fourth, the legs 13 of the angle plates 12 of the platform 6 have rollers 14 thereon, and since the rollers are slidable on the rails 18 provided at the lower end of said frame 16, the platform is only raised, notwithstanding the fact that the front end of the hip-supporting platform remains in contact with the rear end of said platform 6 at all times. Thus, as the platform 6 is raised, its rear end is moved a short distance forward on said rollers and rails, thereby facilitating its upward inclination.

Fifth, at the joint between the above-mentioned plates 34 and 35, since the upper portion of said plate 34 extends a short distance over the upper recess of said plate 35, the patient's legs are protected from being pressed or pinched when the plates 34 and 35 are raised.

Sixth, since the threaded base 53 of the thrust rod 52 is fitted in the ring 51 of said stationary rod 50 and the base is secured by nuts 54 on both sides of said ring, the length of the pushing rod 52 may be easily adjusted by means of said nuts and, accordingly, the amount of opening of said diamond-shaped linking mechanism and therefore, of said plates 58 and 59 may be adjusted as desired.

Seventh, because the L-shaped pin 66 extending from the projections 62 on the other side of said plates 58 and 59 is slidably fitted in the slot 66a formed in said supporting plate 4, during the opening of the plates 58 and 59 from one side they are supported on the other side.

Eighth, the rear end of the vertical element 13 of the angle plate 12 of said platform 6 is fixed to one end of the slotted guide plate 30, and the guide pin 31 extending from the rear end of the supporting plate 4 of said leg 3 is slidably fitted in the slot 32 in said guide plate 31 so that the platform 6 is raised through the intermediary of the movement of said guide pin in said slot 32, whereby the upward inclination of the platform 6 is facilitated.

Ninth, since the front end of the operating handle extending forward from the shaft 41 engages the knob 72 of said slidable door 71, and the operating rod is caused to travel forward in synchronism with the forward movement of said shaft 41, the knob 72 and, therefore, the door 71 are caused to travel forward so that the commode 68 is opened below the hip-supporting part of the bed. The slidable door 71 slides on the guide plate 75 extending forward from the commode casing. On the other hand, when the lever 29 of the handle 28 is moved, the wire 26 attached to said lever is moved forward and, in the casing 21, the pawl 23 is disengaged from the groove 24 against the action of said spring 22 whereby the former is allowed

to recede. After the platform 6 is raised by said handle 28, operation of the lever 29 is suspended and the pawl 23 is brought into engagement in the groove 25. When the above operation is performed, the hip-supporting platform and the leg-supporting platform are not operated in conjunction. However, when the platform 6 is raised by means of the handle 28 with the pawl 23 remaining engaged with the groove 24, the two plates 58 and 59 of said hip-supporting platform 7 are opened in synchronism, forming the necessary space therebetween and, at the same time, the thigh plate 34 and calf plate 35 of said leg-supporting platform 8 are symmetrically inclined about the joint therebetween. At the same time, the door 71 of the commode casing 69 in said space below the hip-supporting platform 7 is also opened. In this manner, the clinical bed of the present invention makes it possible for the patient who cannot walk to effect excretion while lying on his or her back in the bed. Furthermore, since the two plates 58 and 59 of said hip-supporting platform 7 are symmetrically inclined, the patient is permitted to effect excretion with his hips securely supported by said plates. Still further, since the space for excretion communicates directly to the commode in the casing 69, the equipment of the present invention is not soiled and, therefore, may be maintained in a sanitary condition.

Tenth, when the patient effects excretion, the two plates 34 and 35 of said leg-supporting platform 8 are held in a hill-like shape with the joint forming a ridge so that the thighs and calves of the patient are bent in an easy posture, thereby enabling him to effect excretion in comfort.

Eleventh, all the elements of the bed may be operated in one operation by means of the handle 28. When the patient himself cannot perform the operation, the nurse may do the required job without moving the patient out of the bed. Lastly, in case the other elements 7 and 8 need not be operated, the lever 29 may be operated as described above to disengage the pawl 23 from the groove 24 through the intermediary of said wire and bring the pawl 23 into engagement with the groove 25 so that only the platform 6 is inclined to let the patient sit up on the bed.

I claim as my invention:

1. A hospital bed and commode, comprising a frame, a back-supporting platform adapted to support the upper half of the patient's body, a hip-supporting platform and a leg-supporting platform positioned adjacent each other along said frame in the recited order, said back-supporting platform being rotatably mounted on the frame at the end thereof toward the foot of the bed, said leg-supporting platform consisting of a thigh supporting part and a calf supporting part hinged to the thigh supporting part along an axis transverse of the frame, the free ends of said leg-supporting platform parts being movable along the length of the frame, said hip-supporting platform being movable from a closed position in which it forms a continuation of said back-supporting platform and said leg-supporting platform to an open position in which it leaves an opening through said frame, a commode beneath said hip-supporting platform, a cover movably mounted over said

commode movable transversely to the vertical axis between said commode and said hip-supporting platform, and a linkage connected between said back-supporting platform, said leg-supporting platform, said hip-supporting platform and said commode cover for raising the hinged joint between the leg-supporting platform parts, moving the hip-supporting platform from the closed to the open position and moving the commode cover laterally of the commode when the back-supporting platform is pivoted upwardly around the pivotal mounting thereof on said frame.

2. A hospital bed and commode as claimed in claim 1 in which said hip-supporting platform consists of a left-hand plate and a right-hand plate which abut along a longitudinal centerline of said bed, and the part of said linkage connected to said hip-supporting platform comprises a projection projecting downwardly from each platform, a link pivotally connected between said projection and a point on said frame below said hip-supporting platform, and guide means with which said pivotal connection between said link and said projection are engaged and guiding said pivotal connection downwardly and outwardly of said centerline, the remainder of said linkage being connected to said pivotal connections for moving them laterally of said centerline when said back-supporting platform is raised, whereby the parts of the hip-supporting platform are pivoted so that the portions thereof adjacent the centerline are moved downwardly and outwardly from the centerline.

3. A hospital bed and commode as claimed in claim 1 in which said commode includes a commode casing having a guide plate thereon level with the said commode top and along which said commode top is moved to open and close the commode, and the part of said linkage connected to said commode top comprises a link having one end attached to the commode top and having the other end attached to the remainder of said linkage.

4. A hospital bed and commode as claimed in claim 1 in which said linkage includes locking means for releasably locking the linkage between said back-supporting platform and the other platforms, whereby when said locking means is released, said back-supporting platform can be raised without actuating the other platforms.

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