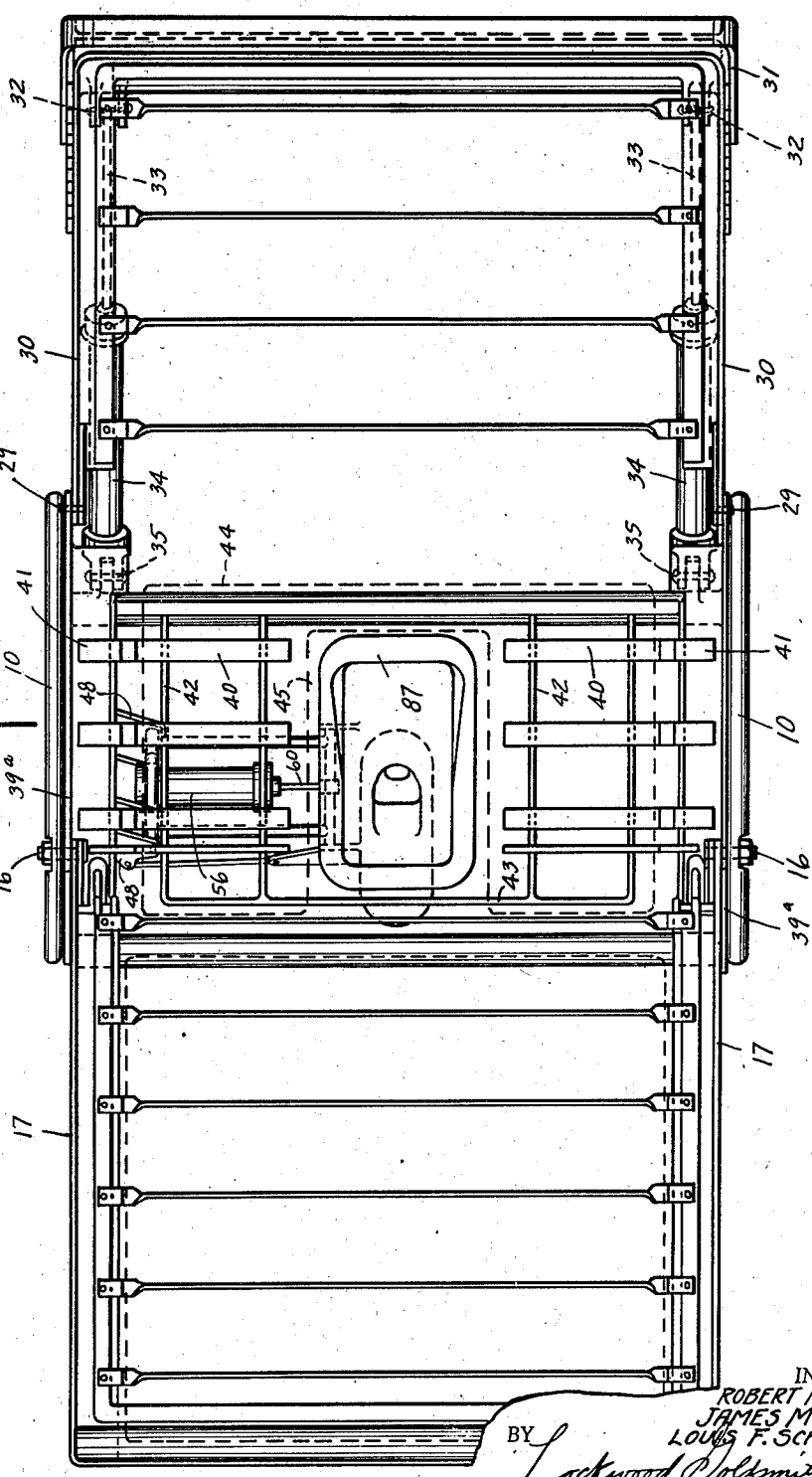
June 22, 1948. R. R. FREUND ET AL 2,443,905

SANITATION HOSPITALIZATION BED

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FIG. 1



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FIG. 2

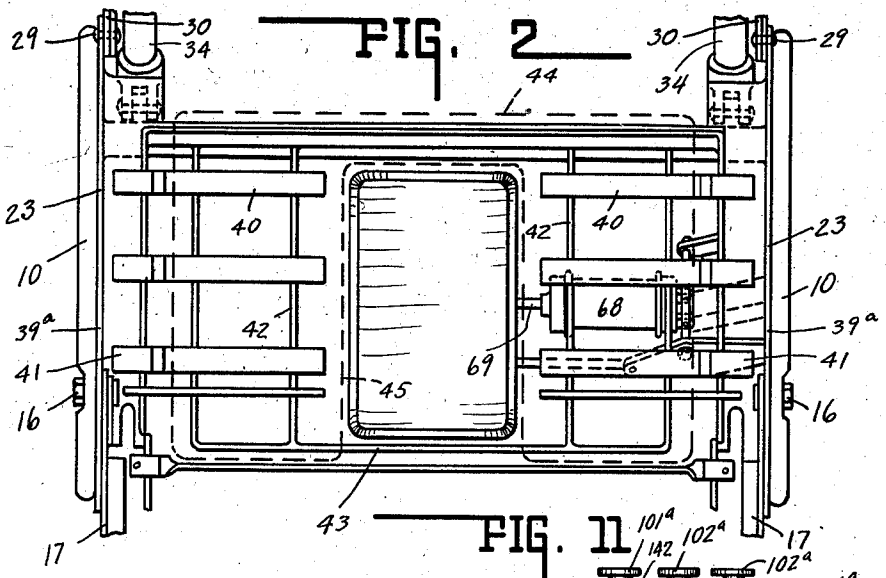


FIG. 11

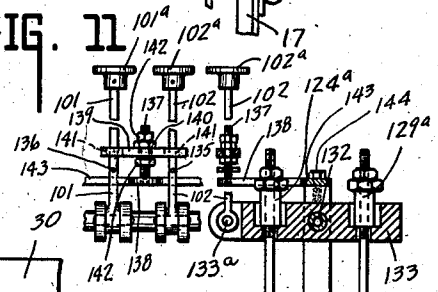


FIG. 3

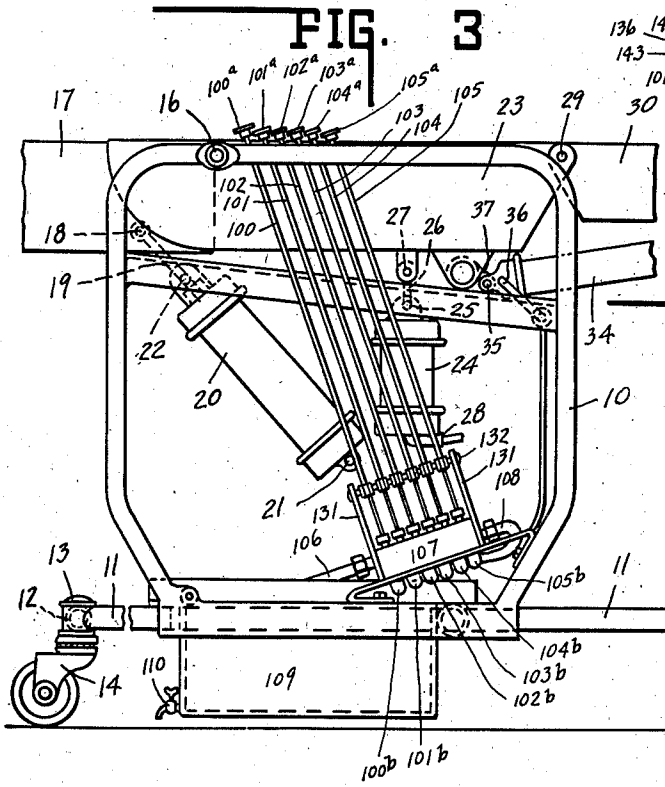
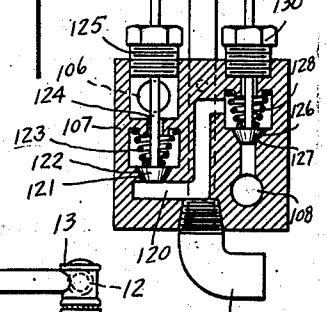


FIG. 10



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FIG. 4

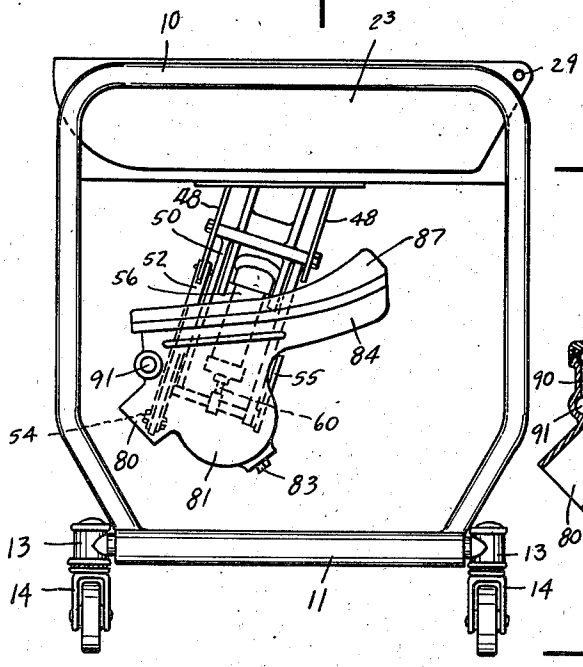


FIG. 8

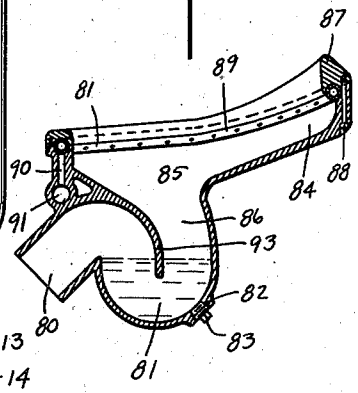


FIG. 5

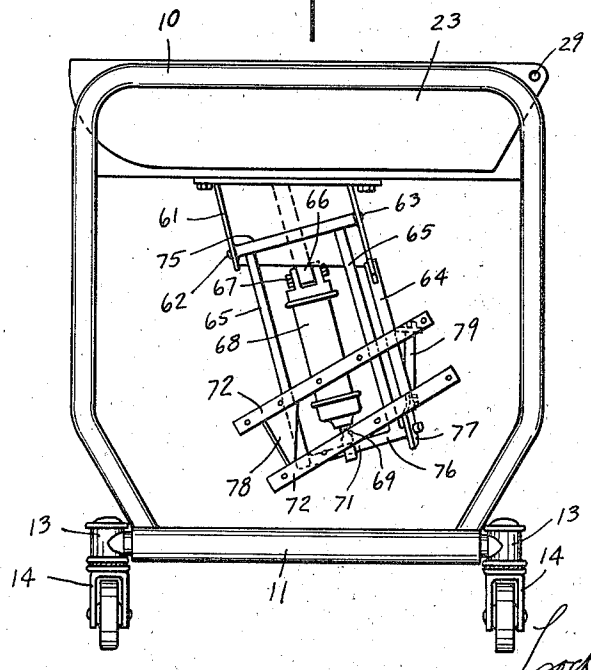
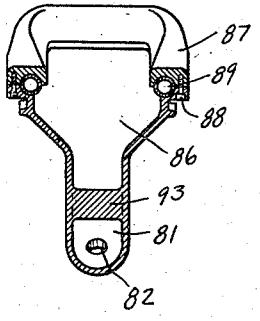


FIG. 9



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FIG. 6

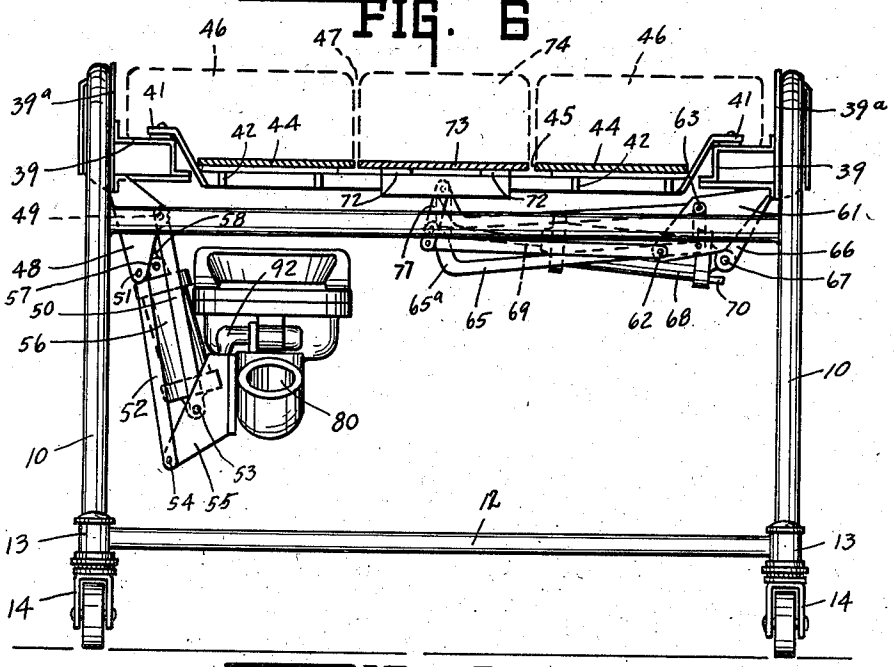
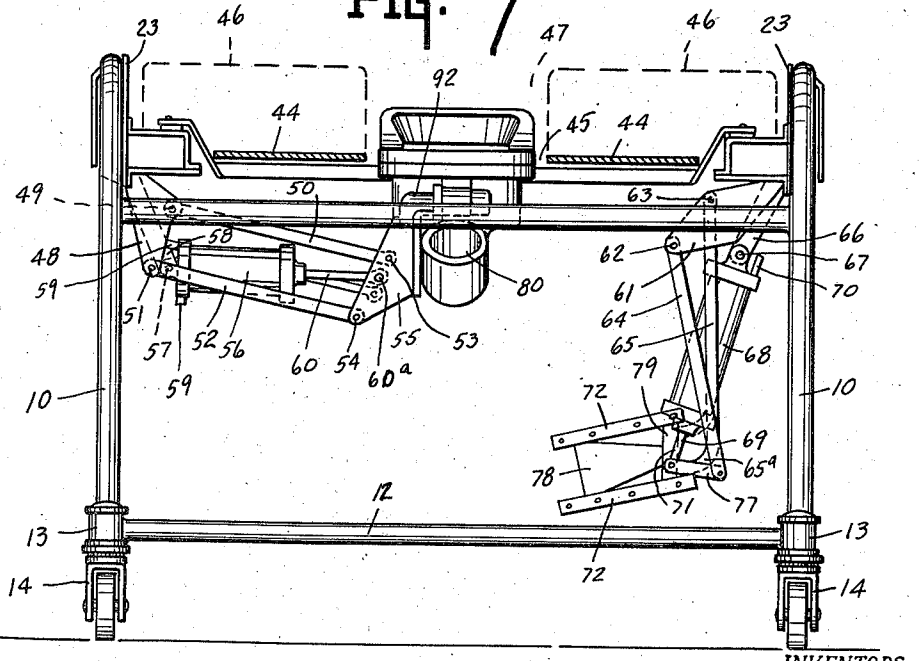


FIG. 7



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UNITED STATES PATENT OFFICE

2,443,905

SANITATION HOSPITALIZATION BED

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Application July 21, 1944, Serial No. 545,970

6 Claims. (Cl. 5—90)

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This invention relates to a sanitary articulated hospital bed.

The chief object of this invention is to provide a bed of the aforesaid character with an opening in an intermediate section, which opening is selectively supplied with a plug for closing the same, or a toilet vessel.

The present invention is peculiarly characterized by the fact that the section provided with the opening is movable and this section in turn movably supports the plug closure and the sanitary vessel and these two are selectively associated with the opening, or neither may be associated therewith, so that the opening may be utilized for rectal treatment and the like of the patient on the bed.

Another feature of the invention resides in the patient selectively controlling the power for positioning either the plug or the toilet vessel, such as a pan, in registration with the opening.

Another feature of the invention resides in an interlocking arrangement whereby both pan and plug cannot simultaneously be moved to opening registration.

Other objects and features of the invention will be set forth more fully hereinafter, such as the means for flushing the pan and the waste discharge therefrom.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings

Fig. 1 is a top plan view of the bed with all of the sections fully extended and in the bed forming position and with the bed pan in registration with the opening aforesaid.

Fig. 2 is a similar view of the central portion only of the bed and with the plug in registration with the opening.

Fig. 3 is a side elevational view of the bed, or rather the central portion thereof, the frame supporting same and with the legs extended outwardly and the respective controls for manipulating the several bed sections and the plug and pan, the interlock being omitted for clearness.

Fig. 4 is a side elevation of the bed structure and more particularly of the bed pan and its support, same being shown in lowered position.

Fig. 5 is a similar view of the plug structure, etc., and similarly lowered.

Fig. 6 is a sectional view of a portion of the bed, the frame being shown in elevation, the rear section being omitted, and bed pan structure being shown in lowered position while the plug

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structure is shown in elevated position and registered with the bed central opening.

Fig. 7 is a view generally similar to Fig. 6 and of the pan in opening registration position and the plug support in retracted position, the plugs per se being omitted for clearness.

Fig. 8 is a longitudinal central sectional view of the pan structure.

Fig. 9 is a transverse sectional view of the same.

Fig. 10 is a transverse sectional view through the valve controlled header structure and a pair of single unit control valves and the singular control therefor, parts being shown in elevation.

Fig. 11 is an elevational view of the bed pan and pad or plug singular controls and an interlock therebetween.

The bed structure herein disclosed is fully illustrated, described and claimed in the copending application Serial No. 537,220, filed May 25, 1944, and entitled Hospitalization bed.

Referring to the several figures, it will be noted that the frame of the bed consists of two side members 10, which at their lower ends are provided with parallel sockets to slidably receive the elongated members 11, the same being connected at their outer ends by the transverse members 12. The junctions 13 thereof constitute caster sockets adapted to receive and retain the caster structures 14.

Near the upper rearward portion of the side frames 10 there is provided the aligned pivots 16. These pivots 16 pivotally support a head and back section 17 that is movable upwardly and forwardly into chair-forming position, by way of example, or may be aligned horizontally, as shown in Figs. 1 and 3 more particularly. The details of construction of this back section are relatively immaterial insofar as the present application is concerned and no further reference will be had thereto, except to point out that each side of the section 17 and at some distance from the pivot 16 there is carried as at 18 a rod 19. This rod 19 extends into a cylinder 20 that is suitably supported by the frame, all as set forth in the aforesaid application, and illustrated herein.

Within the cylinder 20 is mounted a piston, not shown, and to which the rod 19 is connected. The opposite end of the cylinder 20 is provided with a combination intake and outlet 21. When pressure fluid is supplied to this cylinder the piston is advanced therein and, since the piston is pivotally supported as at 22, it is quite obvious that the piston and rod 19 elevates the back section 17 to the desired degree. Cutting off

pressure application stops back movement and holds the back section in the elevated position. Release of the pressure at 21 permits the return of the back section to the horizontal or bed-forming position.

The seat section of this invention also is pivotally supported at 18 and is broadly designated by the numeral 23. A cylinder 24 is pivotally supported at 25 and a piston rod 26, connected to a piston within said cylinder 24, in turn is pivotally connected at 27 to the seat section 23. The cylinder 24 has the combination intake and outlet 28. In like manner pressure fluid may be supplied to cylinder 24, held therein or exhausted therefrom, for raising the seat section 23, holding the same in the elevated position, or lowering the said seat section to the horizontal position, in the same manner as previously described for the back section and all as more fully described in the copending application referred to.

The control for the two cylinders 24 is of the same type as for the two cylinders 20 and reference will be had thereto hereinafter.

Pivotally supported at 29 on the forward end of the seat section is the inner end of the leg section 30. The detailed construction of this section may be as illustrated in Fig. 1, or of any other desired type of construction.

The forward free end of this section may detachably support a foot rest indicated generally by the numeral 31, see Fig. 1. At each side of said section there is pivotally connected, as at 32, the piston rod 33, which mounts a piston within a cylinder 34. The latter cylinder is pivotally supported at 35. The cylinder 34 has a combination inlet and outlet 36. The pivotal support 35 is carried by the seat section 23 as at 37, so that regardless of the elevated position of the seat section, the leg section power means moves therewith and the leg section may be moved relatively to the seat section and in the manner comparable to the back section and seat section movements.

The seat section indicated generally by the numeral 23 includes side frame members, see Figs. 6 and 7, indicated generally by the numeral 39, and these are so arranged as to constitute tubular elements from front to rear with upwardly projecting exterior sides 39a. A grill work includes a pair of parallel members 40, see Figs. 1 and 2, the outer ends of which are offset as at 41, see Figs. 6 and 7, and suitably carried by the tubular structures aforementioned. These members 40 are also connected transversely by the portions 42 and these portions 42, toward the rear end of the bed seat portion, see Figs. 1 and 2, are connected as at 43. It will be observed that the inner ends of the members 40 terminate in spaced relation and that the several members are aligned. Supported thereon, see Figs. 6 and 7, is a U-shaped fibre sheet 44 with a cutout 45 therein. This defines the opening. In Fig. 1 this sheet is shown dotted for clearness in illustrating other parts therebeneath.

The mattress may be of any desired type and the same is indicated by dotted lines in Figs. 6 and 7 and by the numeral 46, and it has a central opening 47 therein.

Reference will now be had more particularly to Figs. 1, 4, 6 and 7. In these figures it will be observed that depending from the right hand tubular structure and side plate 39a are a pair of parallel brackets 48 of dissimilar length, see Fig. 4. These several brackets constitute a rigid support depending from the seat section for the

pan support structure and they are of unequal length, so as to pitch all the pivotal connections 49, 51, 53 and 54 rearwardly and downwardly, although all of them are parallel to each other and disposed when the pan is lowered near and in planes parallel to the plane including the side of the bed, see Figs. 6 and 7. Such pitching is shown more particularly in Fig. 4. Pivotally supported at 49 are a pair of links 50. Pivotally supported therebeneath and closer to the side frame, as at 51, are another pair of links 52. These two pairs of links are pivotally connected as at 53 and 54, respectively, to the parallel bracket portions 55 to which the pan structure is directly connected.

A cylinder 56 has a piston therein, not shown, and one end of said cylinder is pivotally connected at 57 to a depending member 58. The same end of this cylinder is provided with a combination intake and outlet 59. The opposite end of this cylinder has extending therethrough a piston rod 60, which is pivotally connected as at 60a to the unitized bracket structure including the several bracket portions 55.

The weight of the pan structure is such that normally the support mechanism is collapsed, as it were, and upon collapse is positioned toward the right hand side of the bed, this being the left hand side of Fig. 6. Upon the application of pressure fluid to the cylinder 56, the piston is caused to move toward the pan structure and in this movement the entire structure is elevated by reason of the parallelogram arrangements previously described. Now, when the pan structure is elevated and it is desired to hold the same elevated, the pressure supply is cut off and the pressure fluid is held in the cylinder 56. This holds the pan structure elevated.

When it is desired to lower the pan structure following use, the pressure is released and gravity lowers the aforesaid, as shown in Fig. 6.

When the pan structure is elevated, as shown in Fig. 7, it will be noted that it has moved upwardly into and through the central opening of the seat section and the central opening, as it were, of the fibre board plate 44 and upwardly into the opening 47 in the mattress 46 upon the seat section.

In like manner the mattress plug section, mounted on the left side of the bed, may be raised and lowered as follows:

Reference now will be had more particularly to Figs. 2, 5, 6 and 7. It will be observed that the spaced brackets 61 again are of unequal length, are parallel and are inclined downwardly and rearwardly. These are rigid with the left hand tubular structure constituting the side frame portion of the seat section, and in Figs. 6 and 7 these appear on the right side of said illustrations. A pair of parallel pivots 62 and 63 are provided and pivotally supported thereon are the links 64 and 65, respectively. Depending from the tubular structure is the member 66 and at its lower end same pivotally supports at 67 a cylinder 68 from which projects at the opposite end a piston rod 69. A piston, not shown, is mounted within said cylinder 68 and the pivoted cylinder end is provided with combination inlet and outlet 70. The outer end of the piston rod 69 is pivotally connected to the member 71.

A pair of members 72, see Figs. 5, 6 and 7, are suitably connected together and serve as a base to which is secured a plate 73, see Fig. 6, having the mattress plug portion 74 secured thereto.

The two members 65 have curved lower ends, as at 65a, see Fig. 6, and at their upper ends are welded to a spacing tube 75, see Fig. 5, pivoted at 62 to brackets 61. Their lower ends are similarly connected by tube 71, see Fig. 5. Note there is but one member 64. A member 77 is pivotally connected at one end to member 64 at the lower end thereof and at its opposite end to an axial extension, as it were, of tube 71. The other end of tube 71 is mounted in plate 78 rigid with members 72 near one end thereof. The other ends of members 72 are connected together at 79.

By the aforesaid mechanism, as the piston is pressure advanced, the entire structure, supporting the pad 74, moves upwardly on brackets 61 and the pad, etc., is tilted to a horizontal position and brought forwardly when fully elevated as shown in Fig. 6.

From the foregoing, therefore, it will be obvious that when pressure fluid is supplied at 70 to cylinder 68, the piston rod 69 is extended or projected outwardly and this projecting movement causes the plug 74 to be elevated and turned sufficiently to finally register and align with the mattress 46 in the opening 47 thereof, as shown particularly in Fig. 6. Normal operation contemplates maintenance of this plug in this position. Whenever it is desired to remove the plug and expose the opening for rectal examination of the patient or other purposes, the pressure is released through the outlet 70 and gravity, operating upon the several parts, including the plug, causes the said parts to lower and return the plug to the position shown in Figs. 5 and 7. If desired, an interlock may be provided so that both plug and pan cannot be simultaneously elevated and said interlock is not of such character that it will prevent both pan and plug remaining in lowered position.

It will be quite apparent from Fig. 6 that when the pan is lowered and when the back section is elevated that the pan can be readily covered if desired. However, this may be and usually is not necessary because the pan structure is not a conventional bed pan or a modification thereof. It is, in fact, a toilet bowl structure. The detailed construction of this toilet bowl structure is shown more particularly in Figs 8 and 9. In these figures it will be noted that there is an outlet 80 and a goose neck portion 81 that has an outlet 82 closed as at 83.

The bed pan proper has an outwardly and forwardly directed portion 84 and the rearward portion is at a slightly lower elevation, see Fig. 8. A wide basin effect 85 is thus provided, which discharges at 86 to the goose neck portion. A conforming rim 87 is detachably secured as at 88 to the upper end of this bowl structure and adjacent such connection there is provided the peripherally arranged supply tube 89. This supply tube 89 communicates as at 90 with a supply conduit 91, which is adapted to supply water under pressure by means of the conduit 92, see Figs. 6 and 7. After use of the toilet, water under pressure, supplied to the spray pipe 81, which may be termed the rim, flushes the surface of the bowl and the increased water places sufficient pressure upon the water in the gooseneck so that it overflows to the conduit 80 and wastes. It may then waste from the outlet 80 to a suitable reservoir containing disinfecting chemicals and the like.

Continued flushing will not only secure proper cleansing, but also will refill the goose neck to the dotted line, which is above the end of the wall 93, thus forming a liquid seal to prevent the escape of any vapors from the waste receiving tank into the room through the opening in the bowl. With this type of connection, pan removal previously described or pan covering is not necessary and the action is all automatic.

Reference will now be had to Fig. 3 wherein several of the manual controls for fluid pressure power purposes is illustrated. This is also described in the copending application and herein the rod 100 controls a valve arrangement therebeneath, said rod including a knob 100a. In like manner rods 101, 102, 103, 104 and 105 with hand engageable portions bearing the subscript a similarly control valves. Fluid under pressure is supplied from a reservoir, or household pipe connection by line 106 to the valve body 107 and the waste therefrom exhausts at 108 and to a sump 109, the latter being drainable as at 110.

The combination supply and waste line interposed between each of the several cylinders and the valve body 107 is illustrated and designated by the corresponding previous numerals 100 to 105, inclusive, with the subscript b, except that the line 100b is a supply line only as hereinafter pointed out.

In general the several valve structures are in multiple and each is of multiple construction, such as illustrated in Fig. 8 of said aforementioned application, so that when selectively actuated fluid pressure may be supplied to any one or all of the pairs of cylinders 20, 24 and 34, singly, doubly or simultaneously, and each pair may be held under pressure, or the pressure in each pair may be exhausted as at 108. By this means the head section, seat section and/or the leg section may each be independently, doubly or simultaneously elevated, held in elevated position or lowered respectively.

Herein rod 105 controls the fluid pressure supply to and from the cylinders 34, in other words, controls the position of the leg section. The rod 103 controls the fluid pressure supply for the cylinders 20. The rod 104 controls the fluid pressure supply to the cylinders 24 for controlling the seat section. Herein rod 102 controls the fluid pressure supply to the singular piston 56 for the raising and lowering of the bed pan structure. The rod 101 similarly controls the fluid pressure supply to the singular cylinder 68 for raising and lowering the plug or mattress structure. The rod 100 controls the flush water supply to the conduit 92.

Fig. 8 of the copending application shows in detail in general the particular construction of all of the valve arrangements and same is substantially duplicated herein as in Fig. 10 hereon.

It is to be observed that the so-called waste from the flush valve to the conduit 106 is not completed, but same is blocked, since the waste to the toilet bowl is otherwise disposed of as hereinbefore set forth.

Fig. 11 is included herein because it shows the interlock. Briefly this interlock is such that either of the rods 101 or 102 may be depressed to exhaust the fluid supply to the respective cylinders and without any interference. However, fluid pressure cannot be supplied simultaneously by reason of the interlock, to both the bed pan elevating and the plug elevating cylinders.

Referring more particularly to Figs. 10 and 11 (note the interlock is intentionally omitted from Fig. 3 for clearness) header 107, see Fig. 10, includes a Z-shaped passage 120. An inlet port 121 is controlled by inlet valve 122 normally con-

strained to closed position by spring 123. Stem 124 extends through stuffing box 125. When stem 124 raises the valve 122 pressure fluid from conduit 106 enters passage 120 and passes out conduit 102b to the bed pan cylinder, since exhaust conduit 108 is then sealed off by valve 126 seating on seat 127 through spring 128. This valve is carried by stem 129, which passes through stuffing box 130.

At opposite ends of header 107 there extends upwardly standards 131, see Fig. 3, and the upper ends thereof support a pivot member 132 upon which is pivotally mounted the several cross-bars 133, each at one end 133a connecting to one end of the appropriate control rod, as rod 102, see Fig. 10. The upper ends of stems 124 and 129 are also loosely mounted in said cross-bar and adjustable stops 124a and 129a on the stems provide the lost motion connection for selective operation of the inlet and outlet valves.

When rod 102 is elevated from the position shown in Fig. 10, stem 124 is elevated and the inlet valve is opened and the bed pan is raised. When returned both valves are closed, as shown, and the pan is held elevated. When rod 102 is depressed stem 129 is raised and the outlet valve is opened and the bed pan is lowered by gravity. Return of rod 102 to the position shown in Fig. 10 retains the bed pan in lowered position.

Referring to Figs. 10 and 11 and the top left hand portion of Fig. 10, it will be noted that rod 102 mounts a cross pin 135. In Fig. 11, rod 101 mounts a cross pin 136. A stud 137 is carried by and is rigid with tongue 138 and extends upwardly and between the rods. The stud is coplanar with rods 101 and 102 and sloppily mounts cross-bar 139 as at 140. Each rod passes through an opening 141 in the adjacent end of cross-bar 139. Stud 137 mounts nuts 142 for adjustment and fulcrum purposes. Tongue 138 is carried by cross member 143 bolted at 144 to arms or uprights 131. This is the interlock structure.

When either rod is elevated its pin engages cross-bar 133 and tilts same so that the opposite end drops down to immediately overlie the pin on the other rod. This prevents other rod elevation. Hence, both pan and plug cannot simultaneously be elevated. When the elevated rod is lowered to neutral or exhaust position the interlock is inoperative. When desired, naturally, both rods may be depressed. This is to insure bed pan and plug lowering or removal from the mattress opening so that both are then lowered.

While the invention has been illustrated and described in great detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein as well as others which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. In an articulated bed having a frame, tiltable sections supported thereby, one of said sections having a central opening therethrough, a bed pan structure, and a plug structure, the combination of support means independently supporting the structures upon said opening provided section, and means for moving the structures into and out of registration with the opening, said support means being at opposite sides of the opening, each of the moving means including a cylinder and piston structure, the piston thereof being normally constrained toward one end of the cylinders and pressure fluid movable in the opposite direction, a valve means controlling the supply of pressure fluid to a cylinder holding the pressure therein and exhausting the pressure fluid therefrom, and interlock means between the valve means of both cylinders preventing simultaneous pressure fluid supply to both cylinders.

2. In an articulated bed having a frame, sequentially connected sections, certain of the same being tiltable, an intermediate section having a central opening therethrough, a bed pan structure, and a plug structure, the combination of means at each side of and beneath the said intermediate section and supporting the structures, and means at opposite sides of the bed and within the frame outline for moving said structures into and out of registration with the section opening, each of the structures being movable inwardly toward the center of the bed and upwardly and forwardly into the opening, each of the moving means including a cylinder and piston structure, the piston thereof being normally constrained toward one end of the cylinder and pressure fluid movable in the opposite direction, a valve means controlling the supply of pressure fluid to a cylinder, holding the pressure therein and exhausting the pressure fluid therefrom, and interlock means between the valve means of both cylinders preventing simultaneous pressure fluid supply to both cylinders.

3. In a bed having a mattress supporting section with an opening therethrough, the opening being disposed between the sides thereof, and side members defining the section, a pan structure the upper portion of which is receivable by the opening, and a plug structure the upper portion of which is receivable by the opening, the combination of support means for one structure at one side of the section and depending from and directed inwardly of the side member at that side of the section, a second support means at the other side of the section and similarly disposed and for the other of the structures, said support means for each structure comprising a structure supporting bracket, means at each side of said bed supporting said bracket, two pairs of elongated, substantially parallel links connecting the bracket to said mattress supporting section, and a cylinder and piston mechanism between the bracket and the section, and fluid pressure control means for said cylinder and piston mechanism operable for link actuation and structure elevation into the opening, the structure and links being gravity lowerable, the support means-side member connections being disposed in longitudinally offset relation to the opening.

4. A bed as defined by claim 3 wherein each fluid pressure control means comprises a valve for the control of pressure fluid to and from and holding same in said cylinder, and interlock means is provided between the two valves of the two control means for preventing simultaneous actuation of both valves and simultaneous supplying of pressure fluid to both cylinders and simultaneous elevation of both structures.

5. A bed as defined by claim 3 wherein each support means between the parallel links and the mattress supporting section includes a pair of substantially parallel bracket members of dissimilar length, link pivoting means carried by said bracket members and biased relative to the adjacent supporting side member and offset inwardly therefrom whereby the link supported

structure, when the mechanism is elevated, simultaneously moves upwardly toward the section opening, inwardly toward the center thereof and longitudinally from its lowered position.

6. A bed as defined by claim 5 wherein each fluid pressure control means comprises a valve for the control of pressure fluid to and from and holding same in each cylinder, and an interlock is provided between the two valves of the two control means for preventing simultaneous actuation of both valves and simultaneous supplying of pressure fluid to both cylinders and simultaneous elevation of both structures.

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