

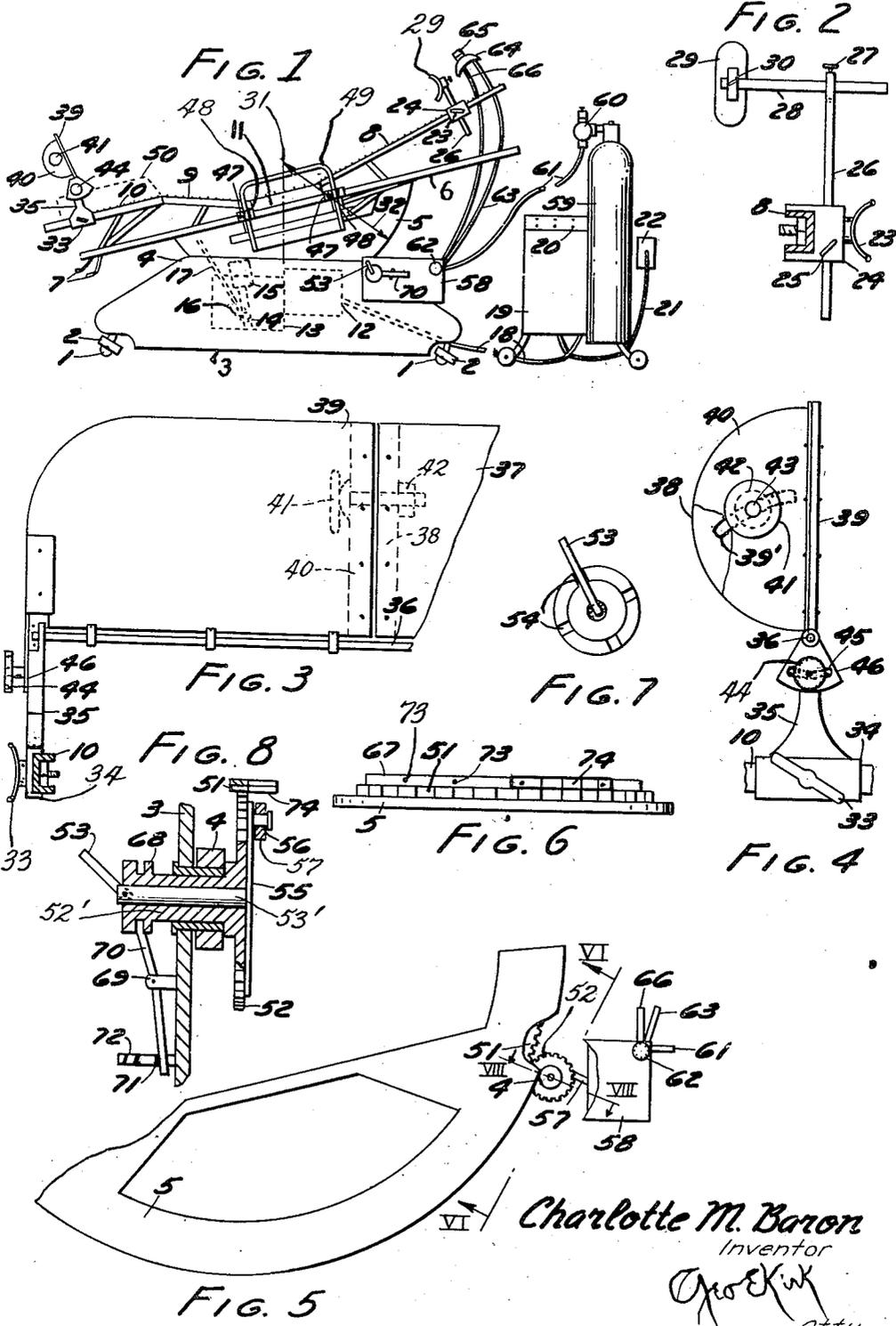
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ROCKING BED STRUCTURE AND SYNCHRONIZED RESPIRATOR

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ROCKING BED STRUCTURE AND SYNCHRONIZED RESPIRATOR

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This invention relates to restoration and promotion of health conditions in an individual, even to the extent of normal breathing and resuscitation.

This invention has utility when incorporated in conjunction with a controllably oscillatable support for a supine individual, specially located, with inhalant supply adapted to be in synchronism therewith.

Referring to the drawings:

Fig. 1 is a side elevation of a readily-shiftable oscillatable support with adjustments and controls therefor;

Fig. 2 shows an adjustable mounting for a shoulder pad for one reclining, or for an arm rest, if the individual approach sitting posture;

Fig. 3 is a fragmentary view of an adjustably mountable foot rest, coacting with the shoulder rest in appropriately locating the individual on the support for therapeutic service;

Fig. 4 is a fragmentary view, from the left of Fig. 3, further illustrating the adjustments for the foot rest assembly;

Fig. 5 is a detail in partial side elevation of that rocker portion identified as projecting upward from the base in Fig. 1;

Fig. 6 is a partial view looking from the line VI—VI, Fig. 5, showing a portion of the rocker face or track, omitting the roller and gear;

Fig. 7 is a detail view on an enlarged scale of the trigger and collar from the left of Fig. 8, and

Fig. 8 is a sectional view taken on the line VIII—VIII, Fig. 5.

Swivel casters 1 with rockable brakes or floor locks 2 portably carry a base frame 3 having rollers 4 to support a rocker 5 portion of a chassis for a support or bed under section 6 provided with two cranks 7; one for shifting a bed head and shoulder section 8, and the other for shifting a thigh section 9 and a lower leg section 10, relatively to a mid section 11. An electric motor 12 is mounted in the base frame 3 and, thru a speed reduction device 13, rotates a crank 14 having thereon an electric motor 15 to adjust a wrist pin 16 in varying the radius for such pin in its action upon a link 17 connected to the bed under section 6. An electric conduit or cable 18 from the section 3 extends to a housing 19 provided thereon with an instrument panel section 20 for determining the oscillation frequency and rock extent effected by the link 17. This electric switch assembly and control has, to the cabinet or housing 19, a power supply line 21 from an outlet fixture 22.

A wing nut handle or screw 23 at a block 24 may serve to anchor such block as slidable along a side rail or the bed head section 8. A wing set screw 25 in the block 24 may fix the up and down adjustment of a rod 26. At its upper end a set screw 27 may adjust and hold a horizontally extending rod 28 as to its slide assembly with the opening in the top of the rod 26. The rod 28, in its extent over the head section 8, has an arc seat or pad 29 adjustably fixed to the rod 28 by a wing set screw

30. There is thus adaptability for concavity of the pad 29 to be toward the bed mid section 11, in thus locating the torso of the individual or patient properly, say so as to have the crest of the ilium at a neutral region or axis 31 for the radii 32 of the rocker 5. Under such circumstances as the patient upper torso be elevated to approach sitting posture as to the mid section 11, say as for eating, the block 24 may be shifted and the pad 29 oriented, for this assembly to serve as an arm rest.

A wing nut 33 is at a block 34 thereby adjustably positioned along a bed section side rail, herein shown as the section 10. A bracket 35, rising from and integral with the block 34, mounts a pivot rod 36 (Fig. 3). A footrest section 37 on the rod 35 (Fig. 3) has fixed therewith an arc back plate 38 with a slot 39' on an arc from the rod 36 as a center (Fig. 4). Parallel to the back plate 38, and in abutting relation thereto, companion footrest section 39 (Fig. 3) has a plate 40 (Fig. 4) carrying a hand wheel 41 rotatable for drawing a head 42 against the opposite side of the plate 38. The plates 38, 40, are on the respective inner ends of the sections 37, 39. An externally threaded stem 43 from the head 42 extends thru the arc slot 39' to be engaged by the handwheel 41 coacting in holding the sections 37, 39, co-planar, or relatively angularly shifted, as may provide comfort rest for the respective feet of the patient at the determined-upon position for the patient with such patient's crest of the ilium at the neutral axis 31. There may be a further or supplemental rock or pitch given to the footrest sections 37, 39, as an assembly or unit thru the operation of a knurled handwheel 44 (Fig. 3) from the bracket 35 below the rod 36. This handwheel 44 has its stem extending thru an arc slot 45 in a fan plate 46 (Fig. 4) fixed with the section 39.

Wing set screws 47 at guides 48 fixed with the bed under section 6 in the region of the mid section 11, provide adjustable mounting for a U-frame 49. There is thus provided a guard against off-side shifting of the patient from the bed sections, say as carrying a mattress 50 thereon. The upward extent of adjustment for the top section of the U-frame 49, as parallel to and rockable with the bed, is in position for convenient grasping by the patient. By thus having something to hold to which is moving with the oscillating structure, there is confidence established for the patient, should the patient become perturbed.

The oscillation disclosure with patient placement effectively coact in promoting respiration as well as normal functioning of the internal organs of the patient. Under this disclosure there is manually controllable interconnection for synchronization with the oscillation respiration promotion, introduction as well as variation thereof over a wide or complementary range of inhalant supply and exhalation assistance.

To this end, one of the rockers 5, on its inner face, is provided with an arc toothed section or rack 51. Coaxial with one of the rollers 4 there is a gear 52 (Fig. 8) which may have a normal mesh relation with the rack 51. Whether the oscillation be full or fractional and whether of more or less frequency, the gear 52, as in mesh with the rack 51, acts in synchronized response. This operation may be taken as idle. To effect control, a manually positionable trigger 53 may be swung from its out throw position (Fig. 8) to engage a notch 54 (Fig. 7). There is thus a positive coupling of the oscillating bed driven gear 52, transmitted thru its sleeve 52' and the notches 54, the trigger 53 and a shaft 53' coaxial with the gear 52 and extending thru the sleeve 52' to a disk 55. The oscillation of the gear 52 in rocking therewith the disk 55, is effective thru wrist pin 56 on the disk 55 to reciprocate a connecting rod 57 thereby operating a pump in

the cabinet 58. The pump may be piston, bellows or diaphragm type. The throw or stroke of the rod 57 measures the volume of the gas thus measured in passing thru the resuscitator 58. The source of supply of this gas may be oxygen in tank 59 as a compressed supply, the pressure of which is brought down to near atmospheric at a reducing valve 60, from which a duct 61 is to a valve having a control handle 62 at the cabinet 58. As the stroke of the rod 57 determines the volume of gas being pumped, oxygen gas supply duct 61, oxygen inhalation gas duct 63 to the patient and exhalation duct 66 from the patient, have their responsive flow inter-connection determined by the position of the handle 62.

From the cabinet 58, the ducts 63, 66, have connection to a mask 64 adapted to be placed over the nose and mouth of the patient reclining on the rocking bed. A fitting 65 on the mask is adjustable to have all or part of inhalation from the atmosphere, thereby affecting the total of oxygen demand for use. This fitting 65 in its adjustment, may have all exhalation to the atmosphere, or to a predetermined extent exhalant passed by the duct 66 back to the resuscitator 58 for recommingling. This commingling in practice is of carbon dioxide exhalant of operative worth as an excitant in promoting respiration cycles.

Thru the connection 53, 54, drive is transmitted from the rocking bed thru the gear 52 to the rod 57 for the pump to dispense oxygen supply volumes in-step with the rocking of the bed. The several notches 54 provide range for locating the wristpin 56 at different connection positions as to the bed, in the manual trigger connection practice. There is provided further enlargement of the range of connections to have the bed movement influence respiratory gas handling. Adjacent and of less radius than the rack 51 is an arc face 67 fixed with the rack 51. The sleeve 52' has a collar 68 (Fig. 8) adjacent the notches 54. From the frame 3 there is a bracket 69 providing fulcrum for a lever 70, at one end engaging the collar groove 68 and at the other engaging in a notch 71 to hold the sleeve 52' for the gear 53 to be in mesh with the rack 51. Upon shifting of the lever 70 to engage a notch 72, the gear 52 is axially shifted clear of the rack 51, say over the face 67 and clear thereof. Bolt holes 73 in the face 67 provide for mounting rack section, or sections 74, fixed with the rack 51. There is thus provided, in addition to the positive throw-out of the gear 52 as to the rack 51, as at the face 67, a range of special or different drive as from a rack section 74.

The disclosure herein is directed generally to the location of the patient upon a rocking bed, especially for the crest of the ilium to be approximately at the neutral axis of rocking for the bed. There is range for changing the extent and frequency of the rocking of the bed.

Besides this placement for the patient to have ensue therefrom special values in the rocking operations, there is brought into this efficient treatment imposable respiration in synchronism, as a major step from resultant respiration developing from the rocking. In carrying forward in this synchronized control, a mask 64 is placed over the nose and mouth of the patient as properly positioned on the rocking bed. The rocking of the bed is then started by turning on the motor 12 from the control cabinet 19. Assuming that the means 53 and 70 are engaged as shown in Figs. 7 and 8, respectively, for the connection and operation of the resuscitator 58 in synchronism with the rocking of the bed through the gears 51 and 52 and crank 57, the rocking of the bed operates

the pump in the resuscitator 58 so that as the bed is tilted into the position with the head of the patient down, air is exhaled and exhausted from the mask 64, and when the bed is tilted in the other direction with the head of the patient up, a predetermined measured amount of air or oxygen from the tank 59 is introduced into the mask 64 for the patient to breathe. Oxygen gas as under pressure of several atmospheres in tank 59 has flow therefrom thru reducing valve 60 to approximate inhalation pressure in supply to the resuscitator 58 which including some type of reciprocating pump to dispense oxygen gas volumes intermittently in step with the rocking of the bed in the flow of oxygen as to the cabinet 58 by the duct 61, passing therefrom by inhalation duct 63 to the mask 64. A fitting or valve control 65 at the mask 64 may nullify the dispensing action of the pump in the cabinet 58. This fitting 65 may nullify exhalation from the mask back to the cabinet 58 by the duct 66. The treatment of the patient effected at the mask 64 may be determined by the valve handle 62 at the cabinet 58. The gas handling may be carried thru as above suggested. The technical advance is based on the inter-connection control (Figs. 5, 6, 7, 8) whereby there may be selected a wide range of synchronized response triggered from the rocking of the bed in breathing gas to the patient.

What is claimed and it is desired to secure by Letters Patent is:

1. An oscillating bed having an axis of rock, and positioning means for the torso of an individual to be treated by placement relatively to said axis, said means including a pair of brackets, one rising from each side of the bed, a rod extending between the brackets, a pair of foot rest sections independently pivoted on the rod for primary adjustment of one of said sections relatively to the other on the rod, and bracket-engaging adjustable means for swinging the primary adjusted pair of foot rest sections simultaneously as a unit into a secondary adjustment angle as to the bed from said rod as an axis.

2. The combination with a rockable bed for a patient to be treated, a respiratory gas supply, motor means connected to the bed for rocking said bed, a breathing mask for the patient, a gas connection between said mask and said supply, a reciprocating pump in said connection, and means connecting said pump to said bed and operated by the rocking of said bed for driving said pump in synchronism with the rocking of said bed.

3. A bed according to claim 2 wherein said means connecting said pump to said bed comprises a sector gear mounted on said bed and a pinion and crank cooperating therewith and connected to said pump for operating said pump.

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