

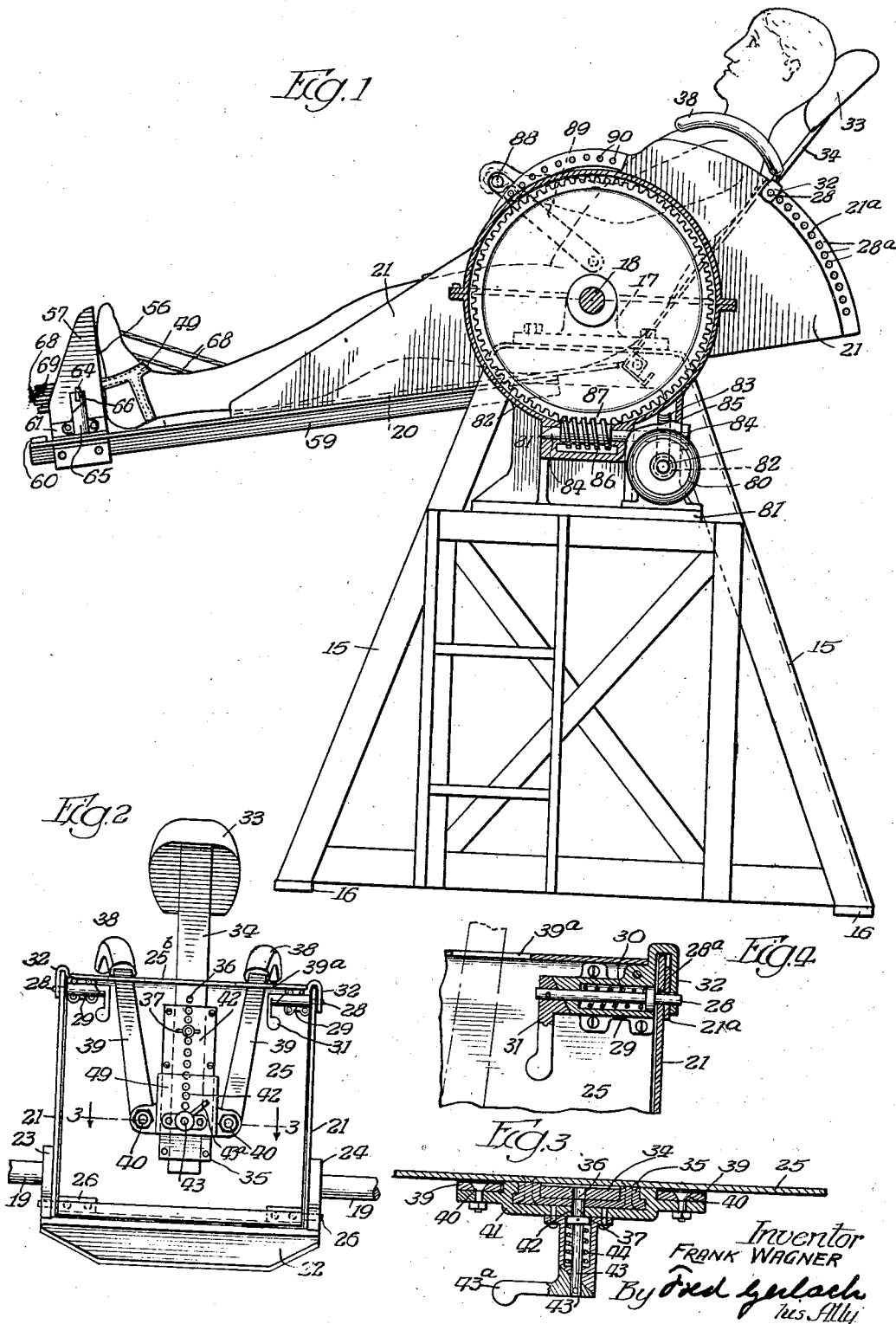
May 19, 1942.

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THERAPEUTIC APPARATUS

2,283,475

Filed July 22, 1940

2 Sheets-Sheet 1



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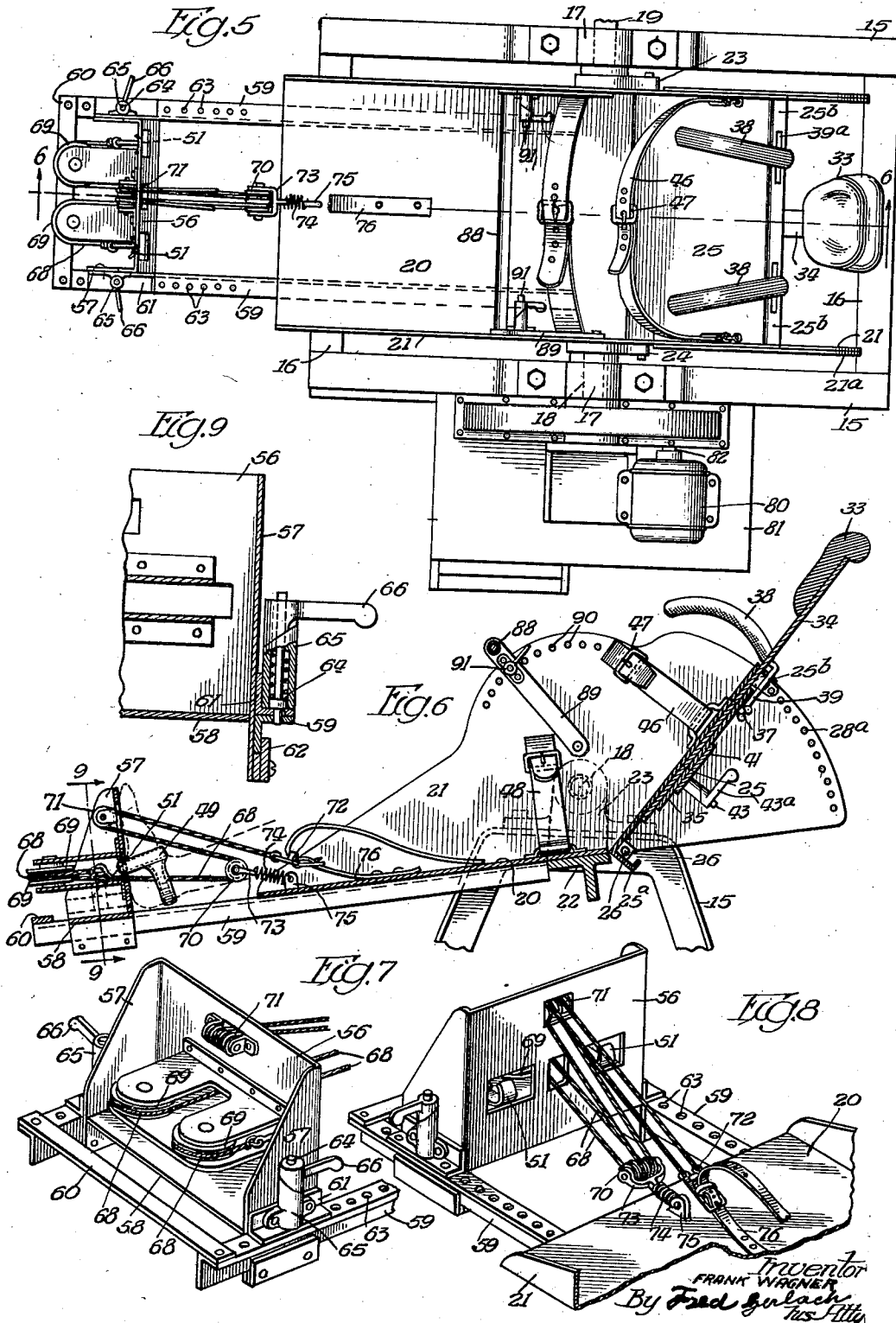
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UNITED STATES PATENT OFFICE

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THERAPEUTIC APPARATUS

Frank Wagner, Chicago, Ill.

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4 Claims. (Cl. 128—33)

The invention relates to therapeutic apparatus.

The object of the invention is to provide apparatus for completely rotating a patient longitudinally and on a transverse axis to promote circulation of the blood of the patient. It has been found that when a patient is rotated through the air longitudinally, the circulation of the blood is greatly improved, with a resultant improvement in general health. This object is attained primarily by providing a supporting structure on which the patient is firmly secured in a lying or recumbent position, and operating the structure on a transverse axis to completely revolve the patient through the air to subject the patient to centrifugal force. This rotation of the patient has been found to increase the activity of the circulatory system and to greatly improve general health.

Another object of the invention is to provide an apparatus for this purpose which includes means for stretching the legs of the patient during rotation.

Another object of the invention is to provide apparatus of this type which is readily adjustable for securing patients of different heights and shapes on the rotatable supporting structure.

Other objects of the invention will appear from the detail description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings: Fig. 1 is a side elevation of apparatus embodying the invention, parts being shown in section for illustrative purposes. Fig. 2 is a rear view of the back section of the rotatable supporting structure and the head-rest. Fig. 3 is a section taken on line 3—3 of Fig. 2. Fig. 4 is a transverse section through one of the locking devices for securing the back section in different angular positions. Fig. 5 is a plan. Fig. 6 is a vertical longitudinal section taken on line 6—6 of Fig. 5. Fig. 7 is a perspective, viewed from its outer end, of the adjustable foot-support and the parts supported thereon. Fig. 8 is another perspective of the foot-support. Fig. 9 is a section taken on line 9—9 of Fig. 6.

The invention is exemplified in apparatus comprising a pair of standards 15 built of structural steel. The standards are spaced apart so that the supporting structure for the patient may be rotated between them through a complete circle and the standards are secured in spaced relation to cross-members 16. Bearings 17 are fixed on

the upper ends of the standards and are adapted to rotatably support a shaft 18 and a coaxial trunnion 19. These trunnions are disposed at a sufficient distance from the floor to permit the supporting structure for the patient to rotate through 360° above the floor.

The rotatable structure for supporting the patient comprises a seat section which has secured thereto a hanger 23 to which trunnion 18 is fixed and a hanger 24 secured to shaft 18; a back section pivotally supported from the seat section so it may extend substantially in the plane of the seat section and adjusted upwardly to support the back of the patient in different inclined positions; a foot-rest carried by the outer end of the seat section and against which the soles of the feet of the patient may be held; and a head-rest carried by the back section; all adapted to be rotated together with a patient secured thereon when the shaft 18 is driven.

The seat section is formed of a plate 20 of heavy steel with integral flanges 21 which form sides of the supporting structure between which the patient is secured. The inner end of plate 20 is welded to a cross-member 22 which is integral with and rigidly connects hangers 23, 24. The back section is formed of a plate of metal 25 which is formed with an integral reinforcing flange 25^a at its inner end and a stiffening flange 25^b at its outer end. Plate 25 is pivotally connected to the seat section by pintles 26 which extend through flanges 21 and the hangers 23, 24, respectively, and are formed on lugs which are riveted to plate 25 and flange 25^a. Plate 25 can be swung from a position substantially aligned with plate 20 to support the patient in a lying position and upwardly to different angular positions for supporting the patient during rotation, in different recumbent positions. The back section is adapted to be locked in different angular positions by locking devices, each of which comprises a pin 28 slidably mounted in a casing 29 and normally pressed by a spring 30 to extend through any of an arcuate series of holes 28^a formed in the side flanges 21 of the seat section. A cam-handle 31 engages casing 29 and is adapted when turned to withdraw the pin 28 from locking engagement with holes 29. Each casing 29 is secured to the back face of plate 25 and is extended at 32 to support the outer end of pin 28. A reinforcing strip 21^a is secured to the outer side of each of the flanges 21 and is provided with holes corresponding to the holes for the locking pin 28. Rotation of handles 31 will withdraw pins 28 from lugs 32 and the holes 27 in

side flanges 21 so the back section may be angularly adjusted. When the handles are released the pins will lock the back section. This exemplifies means for securely locking the back section in different inclined positions. A head-rest and support 33 is fixed to the upper end of a bar 34, which is slidably mounted in a channel in a bracket 35 which is fixed to the back side of plate 25. Bar 34 is provided with a series of holes 36 which are adapted to receive a locking screw 37 to position the head-rest for different persons.

The shoulders of the patient are firmly held on the revoluble support to prevent the patient sliding off the back-rest by a pair of hook-shaped shoulder-engaging members or stirrups 38 which are supported on the plate 25. Each of these stirrups 38 is padded to fit over and partially around the front of the shoulders of the patient and supported by an arm 39 which is pivoted at 40 to a bracket 41. Bracket 41 is slidably adjustable on bracket 35, to permit arms 39 and stirrups 38 to be adjustable longitudinally with bracket 41, so the stirrups 38 can be firmly pressed against and seated on the shoulders of patients of different heights. Guide-bracket 41 is provided with a series of holes 42 for the reception of a spring-pressed locking-pin 43 to secure bracket 41 in different positions. Pin 43 is pressed by a spring 44 into holes 42 and is releasable by a cam-handle 43^a to lock guide-bracket 41 which carries arms 39 to bracket 35. When pin 43 is withdrawn from holes 42 the stirrups can be set against the shoulders and locked. Arms 39 extend through slots 39^a in flange 25^b to permit limited lateral pivotal movement so the stirrups will fit snugly against shoulders of different widths. A strap 46, the ends of which are fixed to eyes which are fixed to plate 25 adjacent the sides 21 and which is provided with a buckle 47, is adapted to extend across the chest and hold the upper portion of the torso of the patient firmly on the back section. A strap 48 provided with a buckle is similarly connected to the body-supporting plate 20 and is adapted to extend around the hips or waist to hold the seat of the patient firmly on the rotatable support. Stirrups 49 formed of stout leather or the like are adapted to fit around the instep and ankle. Hoops 51 are adapted to be passed through the stirrups 49 under the instep for pulling the stirrups to stretch the legs of the patient and press the soles of the feet firmly against the inner face of plate 56.

The foot-rest comprises a transverse upstanding plate 56 against which the soles of the feet of the patient are adapted to be pressed. Plate 56 is formed as a part of a frame which comprises side flanges 57 and a cross-plate 58 between said flanges and secured thereto and to plate 56. This frame is supported for sliding adjustment on a pair of angle-beams 59 which are secured to the underside of plate 20, project longitudinally therefrom, and are connected at their outer ends by a bar 60. This foot-rest frame is slidably supported on beams 59 by angle-members 61 fixed to the outer sides of flanges 57 and adapted to rest on the top flanges of beams 59 and a guide-strip adapted to lap the outer sides of the vertical flanges of beams 59. Beams 59 are each provided with a series of holes 63 which are adapted to receive spring-pressed locking-pins 64. Each locking-pin 64 is slidable in a casing 65 which is secured to one of the angle-members 61 and is operable by a cam-handle 66

to withdraw the pin from engagement with holes 63. When the locking-pins are withdrawn from holes 63 the wall 56 forming the foot-rest can be adjusted inwardly or outwardly to position it for patients of different lengths of legs.

Means comprising a system of cables and pulleys is provided for pulling hooks 51 to which the foot-stirrups 49 are attached for stretching the legs of the patient and pulling the feet against foot-rest 56. This system comprises a pair of cables 68 having one of their ends connected to the hooks 51, respectively. Each cable 68 passes around a pulley or sheave 69 supported in brackets projecting from plate 56, thence through plate 56, and around a pulley 70, thence around a pulley 71 supported from plate 56 and to a buckle 72. Pulleys 70 are supported in a shackle 73 which is connected by a spring 74 to a lug 75 fixed to plate 20. A strap 76 has one of its ends fixedly secured to plate 20 and its other end adjustably secured in buckle 72. When the patient has been secured on the seat and back sections of the supporting structure, and the foot-rest has been adjusted so it will be normally spaced from the feet a distance corresponding to the stretch of the legs desired, the stirrups 49 will be connected to hooks 51, and strap 76 will be taken up at buckle 72 so that the ends of the cables 68, which are connected to buckle 72, will be pulled inwardly and exert an outward pull on hooks 51 and stirrups 49 until the patient's feet are firmly held against the inner faces of wall 57 of the foot-rest. The strap 76 will then be secured in its taken up position in buckle 72. The spring 74 applied to pulley 70, will exert tension on hooks 51 and firmly hold the feet of the patient against wall 56 of the foot-rest. This exemplifies means for stretching the legs of the patient the desired degree and holding the feet firmly against the foot-rest during rotation of the supporting structure and the patient. Strap 76 and pulleys 70 and the reaches of the cables between them are disposed between the legs of the patient and strap 76 is readily accessible for adjustment by the patient.

Power mechanism for revolving the supporting structure with the patient thereon comprises an electric motor 80 mounted on a platform 81 at one side of one of the standards 15; a worm 82 fixed to the shaft of motor 80; a worm-gear 83 engaged by worm 82 and fixed to a shaft 84 which is journaled in a gear-case 85; a worm 86 fixed to shaft 84; and a gear 87 fixed to trunnion shaft 18. The gear-case 85 encloses the gearing and is supported on a platform 81. The motor 80 is preferably of the reversible and variable speed type so that the patient can be revolved forwardly or backwardly on the transverse axis of the supporting structure and at different speeds.

A handle-bar 88 is secured to arms 89 which are coaxially pivoted to the side flanges 21 so that the handle-bar may be adjusted to and from the patient to position it within convenient reach of the hands of the patient. Holes 90 in side-flanges 21 are engaged by locking-pins 91 to lock the handle-bar in its desired position.

In operation the patient is first seated on plate 20. The back plate 25 is adjusted to support the back of the patient in a substantially horizontal or a recumbent position, as may be desired. Strap 46 is secured around the chest of the patient and strap 48 is secured around the waist. The head-rest may also be adjusted

to suit the patient. The stirrups 38 are then adjusted downwardly and locked to firmly engage the shoulders of the patient. Stirrups 49 are then secured to the feet of the patient. The foot-rest is adjusted to a point a short distance from the feet and locked. The strap 76 is then taken up to pull the stirrups 51 outwardly, stretch the patient's legs, and hold the feet firmly against the wall 56 of the frame and then secured in its taken-up position. The spring 73 exerts a tension on the cables 68 to exert a pull on the stirrups 51 and retain the feet of the patient against wall 56. When the patient has been thus firmly secured on the supporting structure, the motor 80 is operated to revolve the supporting structure on the axis of trunnion 19 and shaft 18 at the desired speed. In practice it has been found that a speed ranging from 1 to 4 revolutions per minute produces beneficial results. The revolving of the patient while secured on the supporting structure with the legs stretched, has been found to greatly promote the action of the circulatory system and improve the health of the patient.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In apparatus of the character described, the combination of a supporting seat, an extension rigid with the seat for supporting the patient's legs while extended, a pivotally adjustable support for the patient's back, said supporting seat, extension and back-support forming a substantially continuous rigid supporting structure for the body, back and extended legs of the patient in a lying position, means for locking the back-support in different inclined positions to support the patient in a recumbent position, rigid sides extending along the seat and back-supports, means for securing the patient's legs while extended on the extension, and the central portion of the patient's body on the seat-support, and the patient's shoulders firmly on the back-support, a handle-bar extending transversely across the space between and adjustably connected to the sides, means for supporting the structure on a transverse axis in a vertical plane and at a sufficient elevation for complete rotation of the patient, and means for rotating the structure on said axis with the patient firmly secured thereon.

2. In an apparatus of the character described, a combination of a supporting seat, an extension rigid with the seat for supporting the patient's legs while extended, a support for the patient's

back, said supporting seat, extension and back-support being connected together and forming a substantially continuous rigid supporting structure for the body, back and legs of the patient in a lying position, means for securing the patient's legs while extended on the extension and the central portion of the patient's body on the seat-support, members mounted on the back-support adapted to extend over and fit the patient's shoulders for holding them firmly on the back-support, means for adjusting said members on the back-support to fit the shoulders of different patients, means for supporting the structure on a transverse axis in a fixed vertical plane and at a sufficient elevation for complete rotation of the patient, and mechanism for rotating the structure on said axis with the patient firmly secured thereon.

3. In apparatus of the character described, the combination of a supporting seat, an extension rigid with the seat for supporting the patient's legs while extended, a support for the patient's back, said supporting seat, extension and back-support being connected together and forming a substantially continuous rigid supporting structure for the body, back and legs of the patient in a lying position, means for securing the central portion of the patient's body on the seat-support, back and shoulders on the back-support, means carried on the extension for stretching the patient's legs over the leg-support, means for securing the stretching means so the legs will be held stretched, means for supporting the structure on a transverse axis in a vertical plane and at a sufficient elevation for complete rotation of the patient, and means for rotating the said structure on said axis with the patient firmly secured thereon.

4. In apparatus of the character described, the combination of a supporting seat, an extension rigid with the seat for supporting the patient's legs while extended, a support for the patient's back, said supporting seat, extension and back support being connected together and forming a substantially continuous rigid supporting structure for the body, back and legs of the patient in a lying position, means for securing the central portion of the patient's body on the seat-support, and back and shoulders on the back-support, a foot-rest on the outer end of the extension, means for stretching the patient's legs over the leg-support, and so the feet will engage the foot-rest, means for securing the stretching means to hold the patient's legs stretched and feet against the foot-support, means for supporting the structure on a transverse axis in a vertical plane and at a sufficient elevation for complete rotation of the patient, and means for rotating the said structure on said axis with the patient firmly secured thereon.

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