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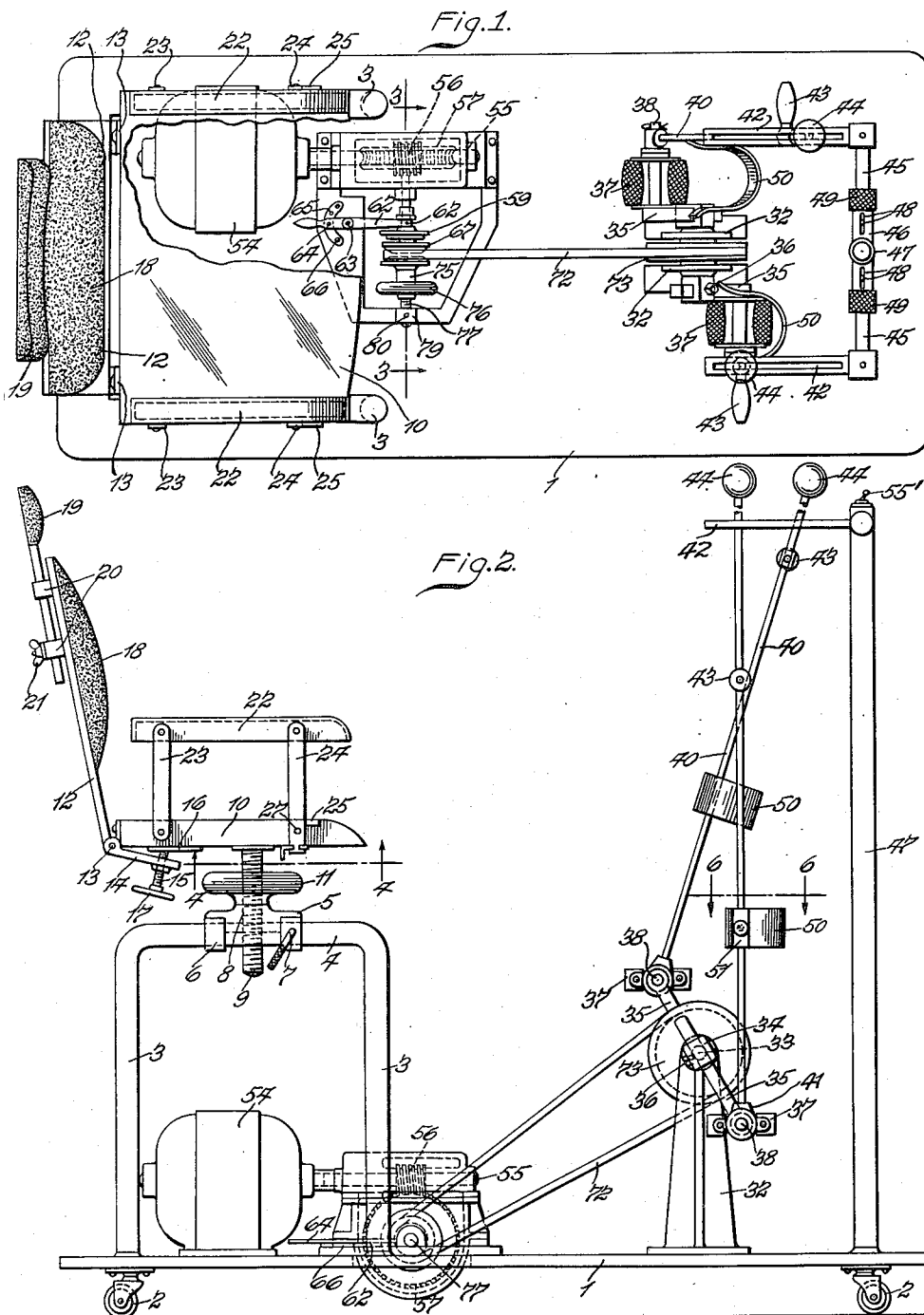
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2,261,355

INVALID'S EXERCISING CHAIR

Filed July 14, 1939

2 Sheets-Sheet 1



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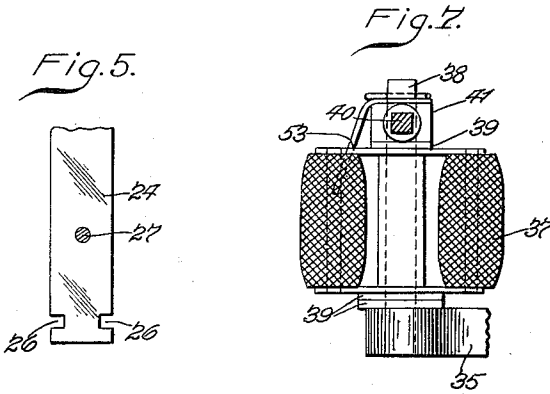
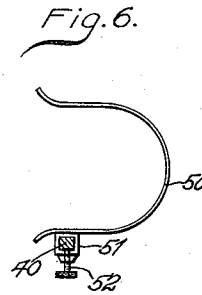
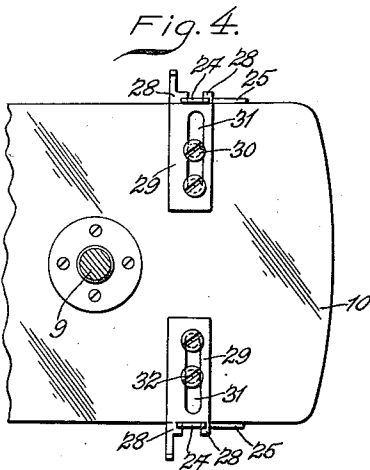
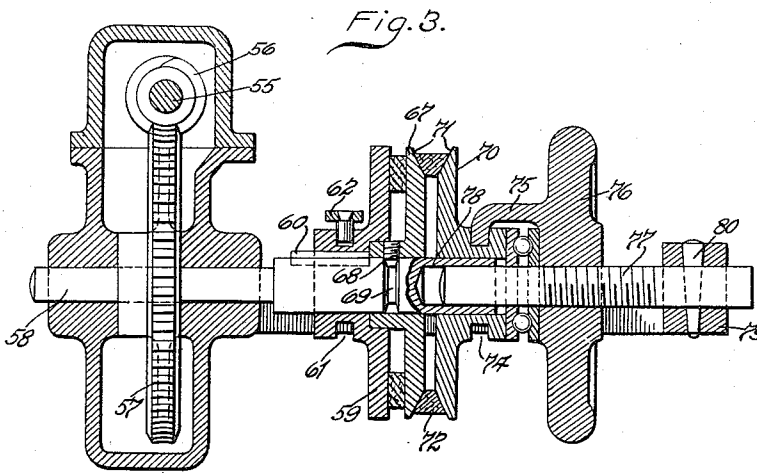
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,261,355

INVALID'S EXERCISING CHAIR

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5 Claims. (Cl. 128—25)

This invention relates to invalids' exercising chairs; and has special reference to chairs for use by persons afflicted with partial paralysis, particularly of the legs or arms, to exercise the afflicted limbs properly to promote recovery thereof.

An object of the invention is to provide an exercising chair for use by invalids having partial paralysis or like afflictions affecting one or both legs, comprising a seat in combination with one or two rotary pedals to support one foot or both feet of the user, and mechanism for rotating said pedal or pedals to bend and straighten the knee joints repeatedly and successively and thereby subject the limbs to exercise of the character ordinarily performed in walking or swimming, or similar activities.

Other objects of the invention are to provide an invalid's exercising chair having a seat in combination with pedals for supporting the feet of the user, and power mechanism for rotating said pedals to exercise the legs of the user when the feet are engaged with the pedals; to provide mechanism for varying the speed of rotation of the pedals to meet different needs or requirements; to provide manual means for assisting or wholly effecting the rotation of the pedals as desired, and also for exercising the arms of the user; to provide means for holding the legs of the user in proper position for exercise and preventing their displacement or distortion in any way by operation of the device; and to provide means for holding said pedals and the chair in different spaced positions for use by persons of different heights.

Other objects of the invention will be readily apparent from the following detailed description, reference being made to the annexed drawings, in which—

Fig. 1 is a plan view with a part of the seat broken away illustrating my improved invalid's exercising chair.

Fig. 2 is a side elevation.

Fig. 3 is an enlarged vertical cross-sectional view of the variable speed driving mechanism for the pedals approximately on the line 3—3 of Fig. 1.

Fig. 4 is a bottom plan view of the chair seat from the line 4—4 of Fig. 2, showing the releasable devices for controlling the arm rests.

Fig. 5 is a side elevation of one of the arm rest links.

Fig. 6 is a view approximately from the line 6—6 of Fig. 2, showing one of the devices for

steadying and retaining the legs in proper position for exercise.

Fig. 7 is a plan view of one of the pedals and the spacers therefor.

My improved chair is readily movable, and comprises a base or frame 1 preferably supported upon caster rollers 2 and of such dimensions as to support the entire chair and other mechanism. A pair of frames comprising standards 3 and horizontal upper portions 4 are attached to the upper side of the base 1 in laterally spaced relationship. A cross member 5 has bearings 6 on its ends. The frame parts 4 extend through the bearings 6 and thereby support the cross member 5 for movement forwardly and rearwardly to different adjusted positions. One or more of the bearings 6 may be equipped with a cross clamp 7 to engage the frame parts 4 and hold the cross member 5, and thereby the chair, in its different adjusted positions. Midway between the frame parts 4, the cross member 5 is formed with a bearing portion 8 to receive the swivel shaft 9 having its upper end attached to the underside of and supporting the chair seat 10. A manually operative adjusting wheel 11 is screwed on the swivel shaft 9 in the familiar cooperative relationship with the bearing 8 to move said swivel shaft, and thereby the chair, vertically to different heights.

A back rest member 12 has its lower end mounted on a pivot 13 supported at the rear end of the seat 10. The lower end of the back rest member 12 has an arm 14 in connection therewith extending forwardly under the chair seat. A screw device 15 extends through the arm 14 and has its upper end engaging an abutment plate 16 attached to the underside of the chair seat 10 and its lower end provided with a handle 17 whereby said screw 15 may be turned to hold the back rest 12 in different adjusted positions. The screw device 15 constitutes means for supporting the back rest at different angles of inclination with respect to the seat. A cushion 18 is preferably secured to the front of the back, and a head rest 19 is supported by frames 20 attached to the rear of the back 12. A set screw 21 is mounted in one of the frames 20 for engaging and holding the head rest in different adjusted positions.

An arm rest 22 is located at each side of the seat 10. Said arm rests are pivoted to the upper ends of links 23 and 24 having their lower ends pivoted to the sides of the seat 10 for swinging movements from horizontal to vertical positions, and vice versa. In their vertical positions, the

links 24 engage against abutments 25 attached to the sides of the seat 10. Each of the links 24 has two notches 26 in its opposite edges below its supporting pivot 27 adapted to receive the arms 28 of a slide 29. The slides 29 are secured to the bottom of the seat 10 by supporting screws 30 passing through slots 31 in said slides and engaging in the seat 10 and leaving the slides 29 free for inward and outward sliding movements. When in their outward positions, the arms 28 are engaged within the notches 26 and embrace the lower ends of the links 24 between them, and thereby support said links 24 vertically against the abutments 25. The arm rests 22 are thereby supported in their upper positions. By moving the slides 29 inwardly, the arms 28 will be disengaged from the links 24, leaving said links 24 and the links 23 free for rearward and downward swinging movements to approximately horizontal positions in which the upper surfaces of the arm rests 22 are nearly level with the top of the seat 10. In such positions, the lower ends of the links 24 are engaged against the undersides of the abutments 25 and thereby supported and held from further downward swinging movements.

A pair of posts 32 are attached to the upper side of the base 1 in front of the chair. A horizontal shaft 33 is journaled for rotation in the upper ends of the posts 32, and has a socket 34 rigid with each end thereof. A pedal crank 35 extends through each of the sockets 34 and is held in different adjusted positions by a set screw 36. These pedal cranks may be formed with graduations thereon to cooperate with the sockets 34, so that said cranks may be more easily located in the same positions. A pedal 37 similar to a bicycle pedal is rotatively supported by a pedal pin 38 projecting from one end of each of the pedal cranks 35. By adjusting the pedal cranks 35 within the sockets 34, the diameter of the orbit of rotation of the pedals 37 may be increased or reduced as desired. Spacers 39 may be mounted on the pedal pin 38 at one or both sides of the pedals 37 to spread the two pedals further apart or hold them closer together or in different spaced relationships, according to individual needs.

Rods 40 have their lower ends engaged with sockets 41 rotatively supported on the pedal pins 38 beyond the outer ends of the respective pedals 37. These rods extend upwardly through yokes 42, and have handles 43 attached thereto below said yokes. These handles project angularly from the rods 40, preferably outwardly from said rods, for convenient manual engagement to exercise the arms, or to assist in rotating the pedals, or to rotate the pedals independently of the operating mechanism. Knobs 44 are attached to the upper ends of the rods 40. The guide yokes 42 are attached to the outer ends of rods 45 which telescope within the ends of a tube 46 attached to a post 47 secured to the base 1 in front of the pedal mechanism. The rods 45 may be adjusted inwardly and outwardly and are held from turning with respect to the tube 46 by pin and slot devices 48, and may be held rigid in any of their adjusted positions by lock nuts 49 of conventional arrangement.

An approximately U-shaped leg support 50 is adjustably mounted on each of the rods 40. A sleeve 51 is attached to each support 50 and is mounted for sliding movements along the adjacent rod 40. A clamping screw device 52 is carried by each socket 51 for clamping engagement

with the rod 40 to secure the leg support 50 in its different adjusted positions along said rod 40. A spring 53 may connect the sockets 41 with the frames of the pedals 37 to hold said pedals yieldingly in proper position to receive the feet of the user of the chair.

An electric motor 54 is mounted on the base 1 beneath the chair, and the circuit for supplying energy to said motor may be controlled by a switch 55 mounted on the upper end of the post 47 as shown in Fig. 2 or arranged elsewhere as desired. The motor rotates a shaft 55 having a worm 56 thereon engaging a worm gear 57 attached to a shaft 58 supported for rotation below and transversely of the plane of the shaft 55. A clutch 59 is mounted for sliding movements on the shaft 58 and connected thereto by a key 60. The hub of the clutch 59 is formed with a circumferential groove 61 operatively connected with a lever 62 mounted on a supporting pivot 63 (Fig. 1) and having a pin 64 adapted to be engaged in and disengaged from holes 65 in a lock device 66. Therefore, the lever 62 is operative to shift the clutch 59 along the shaft 58 to and from clutching engagement with a pulley member 67. The pulley member 67 is mounted on the shaft 58 and is held from longitudinal movement by a pin 68 engaged in a circumferential groove 69 in said shaft 58. When the clutch 59 is moved along the shaft 58 into clutching engagement with the pulley member 67, said pulley member will be rotated by the shaft 58; and, when the clutch 59 is free from the pulley member 67, the shaft 58 may rotate while the pulley member 67 remains stationary.

A cooperating pulley member 70 is mounted on the shaft 58. The outer adjacent margins of the pulley members 67 and 70 have diverging walls 71 forming a V-pulley engaged by a complementarily shaped belt 72 which also engages a pulley 73 attached to the shaft 33 between the posts 32 and essentially between the pedals 37 so as not to interfere with the use of the device when the feet of the user are upon the pedals 37.

The hub of the pulley member 70 is formed with a circumferential groove 74 (Fig. 3) receiving a finger 75 projecting from a manually operative adjusting device 76 which, as shown, is in the form of a hand wheel. The wheel 76 is screwed on a shaft 77 having one end extending into a socket 78 in the shaft 58 and constituting means for holding said shafts 58 and 77 in axial alignment, even though the shaft 58 rotates and the shaft 77 does not. The outer end of the shaft 77 is mounted in a support 79 and held from rotation by a pin 80. When the wheel 76 is screwed along the shaft 77, the pulley member 70 will be moved toward or from the cooperating pulley member 67, depending upon the direction of rotation of said hand wheel 76. Therefore, the effective diameter of the pulley formed by the cooperating members 67 and 70 can be increased or reduced to tension or relax the belt 72 as desired. Thereby the speed of rotation of the pedals 37 may be varied; and when the belt 72 is slack and not under sufficient tension to rotate the pedals having the feet of the user thereon, the lever rods 40 may be manually operated to assist the power mechanism in rotating the pedals. When the pulley member 70 is moved far enough away from the pulley member 67, the space between said pulleys will receive the belt 72 loosely, and both pulley members may be left unoperated by disengaging the clutch 59 from the pulley member

67. This permits the belt 12 to move to the ineffective and lax position shown in Fig. 2, leaving the pedals 37 free for operation by the user independently of the driving mechanism therefor. Then, when it is desired to operate the pedals by the motor, the pulley member 10 is again moved into cooperative relationship with the pulley member 67 to engage the belt 12 in the V-portion of the pulley for operation by the motor.

When the chair is used for exercising the arms or legs of an invalid, the patient is seated on the chair seat 10; his feet are placed on the pedals 37; his lower limbs are engaged within the supports 50; and his hands are engaged with the handles 43 to exercise the arms or to control the rods 40, or for both of said purposes. The legs may be exercised by operating the motor 54 and the connections therefrom to rotate the pedal shaft 33, and thereby the pedals 37 on which the feet rest; or, when the legs of the patient are capable, the pedals may be operated by the legs of the patient without operation of the motor 54. Thus, when the legs of the patient are strong enough, but need exercise, the pedals 37 may be operated by the legs of the patient without operation of the motor. And, when the legs of the patient cannot operate the pedals 37 unaided, the motor may be driven to operate said pedals and thereby exercise the legs of the patient; or, the rods 40 may be operated by the hands to assist in operating the pedals. In either instance, the legs of the patient are engaged in the supports 50. Also, in either instance, the hands of the patient are engaged on the handles 43 so that the arms of the patient will be exercised when such exercise is needed. When the motor 54 is not in operation, the patient may exercise his arms and legs by operating the handles 43 and thereby the rods 40 and pedals 37 by energy applied by his arms. The pedal shaft 33 and the parts connected thereto are located close enough to the seat 10 so that the feet of the person on said seat 10 may be engaged with the pedals 37, his lower limbs engaged in the supports 50, and his hands engaged with the handles 43.

It should be apparent that the arrangement and relationship of the parts may be varied widely within the scope of equivalent limits without departure from the nature and principle of the invention. I contemplate such variations as may be desired in order to adapt the invention for its intended uses.

I claim:

1. A portable invalid's exercising chair comprising a support, a chair, means carried by said support for holding said chair in different adjusted positions above said support, a pair of rotary pedals mounted on said support in front of said chair in position to be engaged by the feet of the occupant of the chair, means for holding said pedals in different spaced adjustments, power mechanism for rotating said pedals, means for varying the speed of rotation of said pedals by said power mechanism, manually operable levers pivotally carried by said pedals for assisting said power mechanism to rotate said pedals, and supports carried by said levers

for engaging and supporting the legs of the user during rotation of said pedals.

2. A portable device of the character described comprising a chair, a rotary shaft supported in front of said chair, pedals attached to said shaft in position for engagement by the feet of the occupant of the chair, mechanism for rotating said shaft and thereby said pedals at different speeds as desired, means for varying the orbits of rotation of said pedals, manually operative connections for operating said pedals independently of said mechanism, supports carried by said connections for engaging and supporting the legs of the occupant of the chair during rotation of said pedals, and devices for guiding said connections properly during operation thereof.

3. A portable device of the character described comprising a supporting frame, a chair mounted on said frame, a horizontal shaft supported for rotation in front of said chair, a pair of pedals attached to the ends of said shaft in positions to be engaged by the feet of the occupant of the chair, mechanism for rotating said shaft and thereby said pedals, devices for varying the speed of rotation of said shaft while said mechanism operates at constant speed, a device controlling operation of said mechanism, means for securing said pedals in different adjusted positions in connection with said shaft to vary the orbits of rotation of said pedals, levers pivotally supported by said pedals for operating the same, supports adjustably carried by said levers for engaging and supporting the legs of the occupant of the chair, and guides for said levers.

4. A portable device of the character described comprising a chair, a rotary shaft in front of said chair, a pair of pedal arms, pedals carried by said arms adapted to be engaged by the feet of the occupant of the chair, means for attaching said arms to said shaft in different adjusted positions to vary the orbits of rotation of said pedals by said shaft, rods pivotally connected with and supported by said pedals, handles attached to said rods for operating the same to rotate said pedals, guides for said rods, supports for engaging and supporting the legs of the occupant of the chair during rotation of said pedals by said rods, and means for securing said supports to said rods in different adjusted positions.

5. A portable device of the character described comprising a chair, a rotary shaft in front of said chair, a pair of pedal arms, pedals carried by said arms and adapted to be engaged by the feet of the occupant of the chair, means for attaching said arms to said shaft in different adjusted positions to vary the orbits of rotation of said pedals by said shaft, rods pivotally connected with and supported by said pedals, handles attached to said rods for operating the same to rotate said pedals, guides for said rods, supports for engaging and supporting the legs of the occupant of the chair during rotation of said pedals by said rods, means for securing said supports to said rods in different adjusted positions, and means for holding said chair in different adjusted positions with respect to said pedals and said rods.

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