Sept. 21, 1937. J. J. FLATLEY 2,093,830

APPARATUS FOR TREATMENT OF INFANTILE PARALYSIS

Filed May 28, 1935 3 Sheets-Sheet 1

Fig. 1.

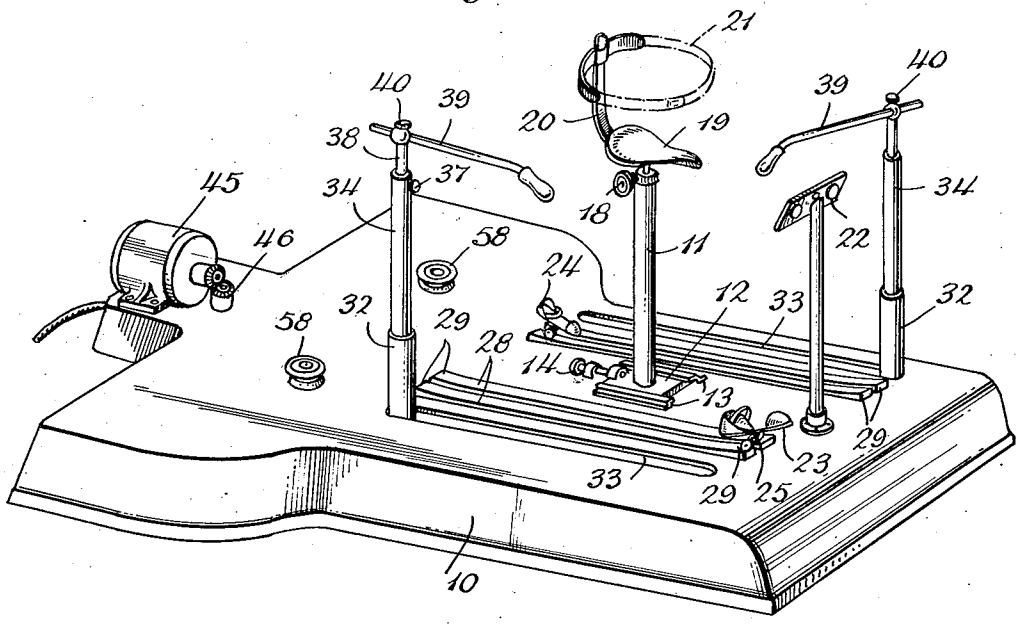
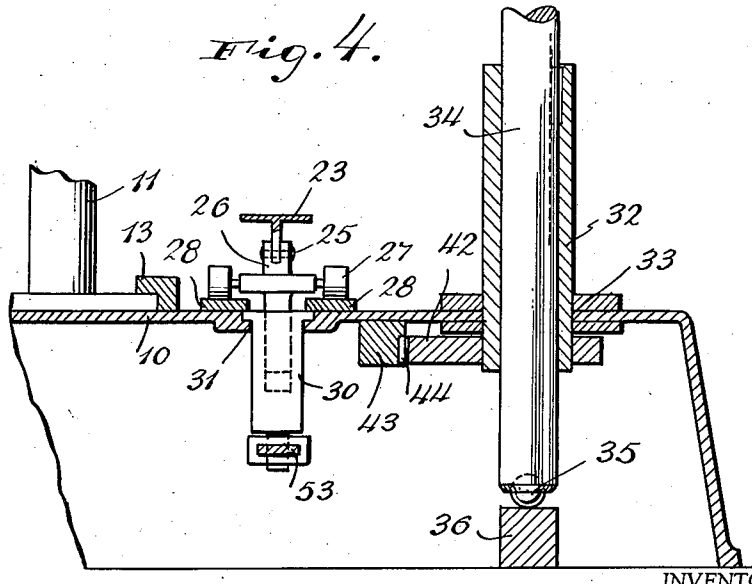


Fig. 4.



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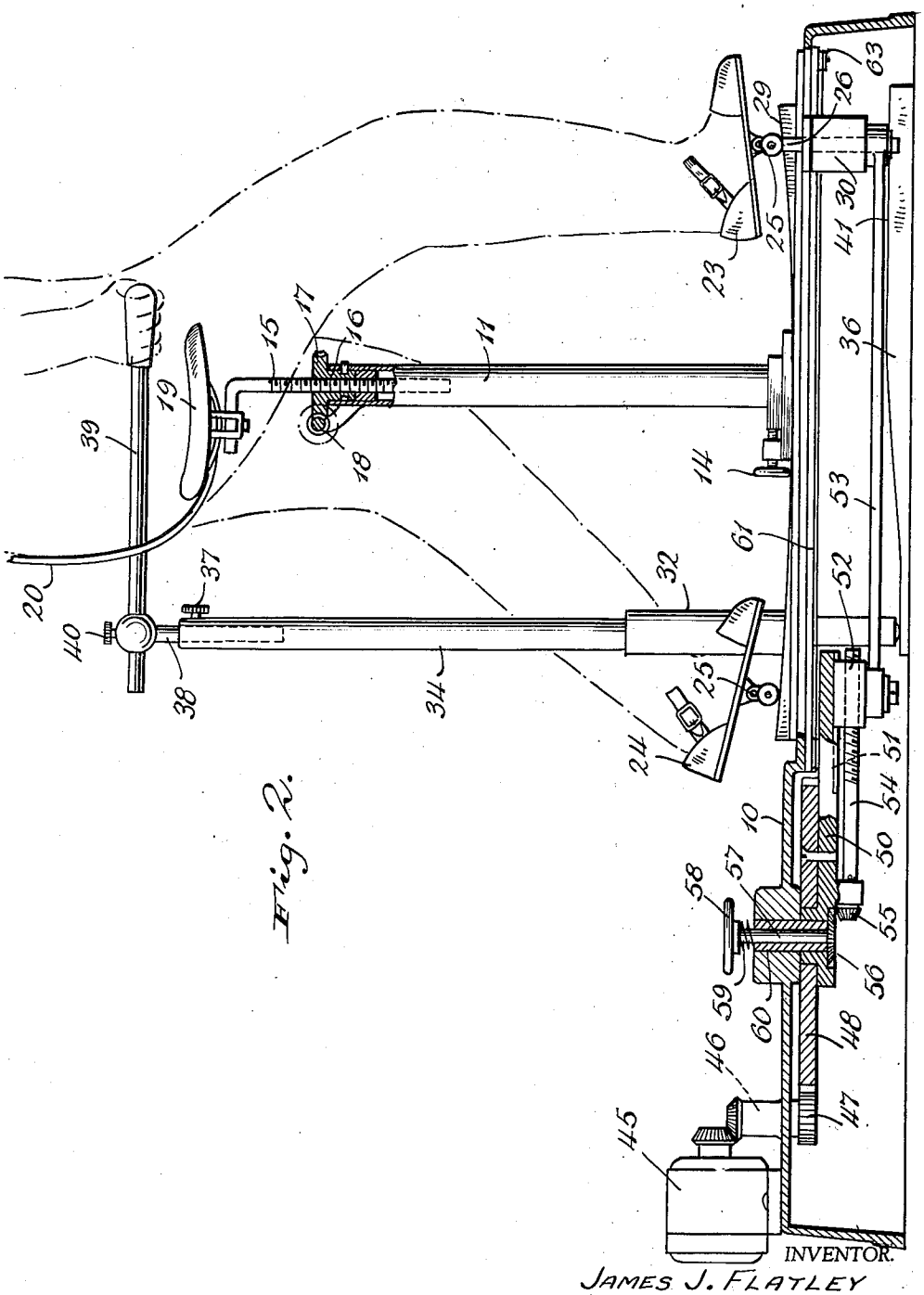


Fig. 2.

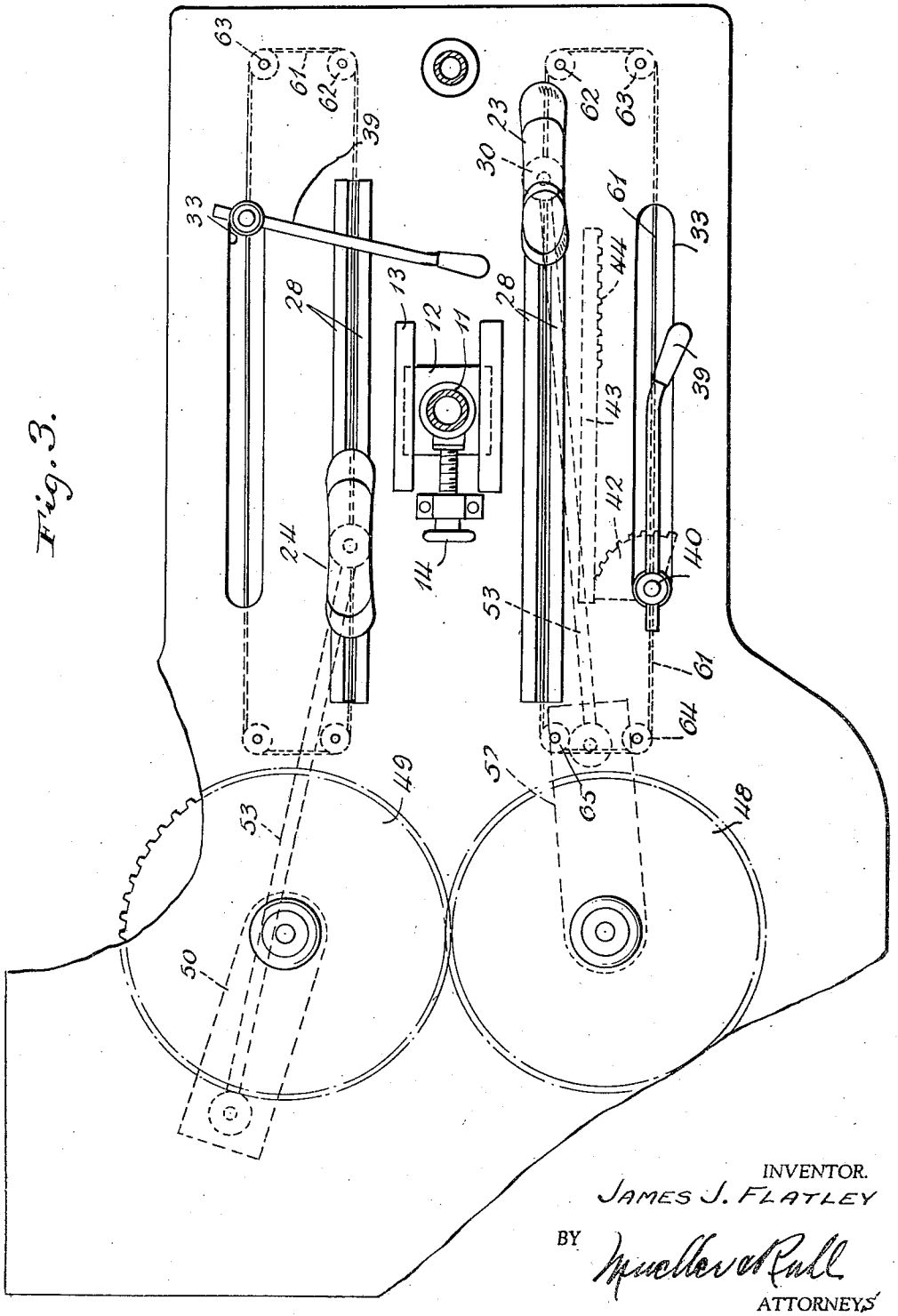
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Fig. 3.



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APPARATUS FOR TREATMENT OF INFANTILE PARALYSIS

James J. Flatley, New York, N. Y.

Application May 28, 1935, Serial No. 23,811

7 Claims. (Cl. 128—25)

This invention relates to improvements in the treatment of infantile paralysis patients.

One of the methods heretofore utilized for the treatment of persons afflicted with infantile paralysis involves the injection of serums. Such treatment has met with considerable success but it is believed that, due to the inability of the patient to obtain sufficient exercise following injections, the efficacy of such serums is reduced and improvement in the patient's condition correspondingly retarded.

Accordingly, it is proposed by the present invention to facilitate the action of the injected serum by forcibly imparting to the patient's limbs movements simulating those of walking.

The inventive idea involved is capable of receiving a variety of expressions one of which, for purposes of illustration, is shown in the accompanying drawings wherein:

Figure 1 is a perspective view of an exercising machine by means of which walking exercises are imparted to the patient's limbs.

Figure 2 is a view partly in elevation and partly in longitudinal section of the machine shown in Figure 1.

Figure 3 is a fragmentary top plan view of the machine with parts broken away.

Figure 4 is a fragmentary transverse section illustrating one of the handle-bar standards and one of the shoes by means of which movement is imparted to a leg of the patient.

The machine illustrated in the drawings, upon which the patient is supported in a substantially standing position, is shown in its preferred form as comprising a base or platform 10. From a point forwardly of the center of said base there extends upwardly a standard 11 the base plate 12 of which is mounted in guides 13 so that the standard may be shifted back and forth to properly locate the patient, this adjustment being effected by means of a screw bolt 14. The standard 11 carries at its upper end the saddle post 15 having screw threads which engage in a nut 16 disposed within the standard and having a worm gear 17 thereon. This gear is engaged by a worm 18 carried by the standard 11 and adapted to be manipulated to adjust the height of the saddle 19 carried by said post. A back brace 20 is secured to the saddle 19 and may carry a belt 21 employed to encircle the waist of the patient so as to hold him in the desired position. In front of the standard 11 there may be mounted a board 22 which may carry instruments, such as a pedometer and the like, for recording the number of steps taken by the patient and the distance traveled.

On opposite sides of the standard 11 there are arranged the right and left shoes 23 and 24 adapted to receive the patient's feet and these shoes are positively driven in opposite directions, in a manner to appear in the course of the description, to forcibly impart a walking action to the patient's legs. Each of the shoes is rockingly supported as at 25 upon a carrier 26 so as to allow for a free movement of the ankles and said carrier is provided on opposite sides thereof with rollers 27 engageable with the tracks 28. The opposite ends of each track are inclined upwardly as indicated at 29 so that as the shoe approaches the extremities of its reciprocating movements the same will be elevated to further simulate the walking action. In order that the shoe may have this vertical movement imparted to it, the carrier 26 has its lower end slidably mounted in the guide 30 which is supported upon the base 10 and moves along the slot 31 as said guide is propelled by the operating mechanism later to be described.

A pair of handle-bar-carrying standards 32 are mounted for reciprocating movement on the base 10 and each of these standards is arranged exteriorly of one of the trackways 28 and adapted to move in a slot 33 in the base which parallels said trackway. As best shown in Figure 4, said standard has a sleeve member 34 keyed therein for vertical sliding movement relative thereto with the lower end of said sleeve projecting downwardly through the base 10 and carrying a ball bearing 35 in its lower extremity adapted to engage a track 36. In the upper end of the sleeve 34 there is adjustably secured, by means of a set screw 37, a post 38 which carries a handle-bar 39 extending laterally with respect to said post and adjustable relative thereto to vary the effective length of the bar, the latter being secured in its adjusted positions by means of a set screw 40.

Each handle-bar is adapted to be gripped in one of the patient's hands and as the standards 32 are reciprocated in opposite directions relative to each other and to the adjacent shoe 23 or 24, coordinate linear and rotative movements are imparted to the handle-bars to simulate the swinging movements of the arms when walking. These coordinating movements are effected as each standard 32 is moved back and forth and the linear movement is in two different horizontal planes. The linear movement imparted to the handle-bar in two planes is accomplished by

providing a part of the track 36 with an upwardly inclined portion 41 over which the bearing 35 rides. Thus as the standard moves forwardly the sleeve 34 will be raised relative thereto and a similar motion will be imparted to the associated handle-bar. Concurrently with this upward movement, the handle-bar is swung or rotated in a horizontal direction with the post 33 as an axis. To accomplish this swinging movement, the portion of each standard 32 extending beneath the base 10 is provided with a segmental gear 42 (Figures 3 and 4) with which is associated a bar 43 having a row of teeth at its forward end. The gear 42 assumes the position shown in Figure 3 while the standard is in the rear area of its movement and said gear slides along the portion of its bar 43 which is not provided with teeth and is unaffected thereby. However, as the gear 42 engages the first tooth 44 during the forward movement of the standard, which engagement takes place during the time that the bearing 35 contacts the inclined portion 41 of the track 36, said gear has imparted thereto a rotative movement which is transmitted to the standard 32 and from thence through the sleeve 34 to the handle-bar 39. Thus the patient's hand will be moved upwardly and, at the same time, across the front of the body to simulate the natural forward swinging movement of the arm when walking. Upon the return of the standard 32 toward its rear position the coordinated movements just described are reversed as the bearing 35 travels downwardly upon the incline 41 and the gear 42 is rotated in opposite direction by the teeth 44, said rotative movement ceasing when the gear has again reached the position shown in Figure 3 and has disengaged from said teeth.

The mechanism for reciprocating the shoe carriers and handle-bar standards will now be described. A suitable source of power such as an electric motor 45, the speed of which may be regulated so that the movements of said carriers and standards may be made faster or slower as desired, is mounted upon the rear of the base 10 and is geared to a shaft 46 extending through said base. The lower end of said shaft carries a pinion 47 meshing with a large gear 48 supported beneath the base 10 and rotated by said pinion to transmit a reciprocatory movement to the shoe 23. Said gear 48 meshes with a similar gear 49 associated with the shoe 24 and driven in an opposite direction so that the two shoes 23, 24 will be moved in opposite linear directions. Secured to the under surface of the gear 48 is an arm 50 which rotates with said gear and has one end projected beyond the periphery thereof. In said end, said arm is provided with a radially extending groove 51 in which is slidably mounted a block 52 and pivotally connected to said block is one end of a pitman rod 53 the other end of which is similarly connected to the guide 30 of the shoe carrier 23. Thus as the gear 48 is rotated and carries the arm 50 therewith, the rod 53 transmits the necessary linear reciprocation to the guide 30 and hence to the shoe 23. The block 52 is made adjustable with respect to the arm 50 in order to vary the length of the reciprocating movement of the shoe so that the length of the steps of various-sized patients may be regulated. This adjustment is accomplished through the medium of a screw-threaded shaft 54 engaged with the block 52 and supported by the arm 50. The rear end of said shaft carries a pinion 55 adapted to be engaged by a gear 56 which is normally spaced from said pinion. Said gear 56 is carried by a shaft 57 which projects upwardly through the base 10 and has a hand wheel 58 at its upper end. A spring 59 is interposed between said wheel 58 and the bushing 60 of the shaft and exerts an upward pressure upon said hand wheel to maintain the gear 56 in normal position. When an adjustment is desired the wheel 58 may be depressed to engage the gears and then rotated so as to turn the shaft 54 in the desired direction whereby the block 52 will be shifted longitudinally with respect to the arm 50 and thereby vary the effective length of said arm. The mechanism associated with the gear 48 for transmitting the reciprocating movement to the shoe 23 is duplicated in connection with the gear 49 so that a similar movement may be imparted to the shoe 24.

The movements of the shoes 23 and 24 under the influence of the driving mechanism just described are utilized to transmit the reciprocating movements to the handle-bar standards 32. Thus, to operate the standard 32 associated with the right hand shoe 23, the guide 30 of the latter has connected thereto one end of a flexible element 61 which extends forwardly from said guide and around pulleys 62 and 63. From thence, said element 61 extends rearwardly and is connected to the standard 32. From thence, said element 61 or another similar element is passed around the rear pulleys 64 and 65 and then forwardly to the guide 30 to which it is joined. With the standard 32 thus connected to the shoe 23, it will be apparent that as said shoe is moved along its trackway 28 in either direction a pull will be exerted upon the standard 32 to move the same in an opposite direction. Through the same instrumentalities just described, the movements of the shoe 24 are utilized to reciprocate the standard 32 associated with the latter shoe.

What is claimed is:

1. In an exercising machine, a pair of handle-bars, and means to impart to each of said bars coordinate reciprocating movements in different planes with respect to the horizontal to simulate the swinging of a person's arms when walking.

2. In an exercising machine, a pair of handle bars, means to impart to said bars coordinate movements in horizontal and rotative directions, and further means to elevate said bars during movement thereof in the latter direction.

3. In an exercising machine, a pair of standards, handle-bars carried thereby, means to reciprocate said standards and bars horizontally and in opposite directions, and means to oscillate said bars during portions of their reciprocating movements.

4. In an exercising machine, a pair of standards, handle-bars carried thereby, means to reciprocate said standards and bars horizontally and in opposite directions, a rack bar associated with each standard and handle-bar and a segmental gear carried by each standard and engageable with the associated rack bar to oscillate its standard and handle-bar during reciprocation thereof.

5. In an exercising machine, a base, means to support a person above said base in a substantially standing position, a pair of shoes for receiving the feet of said person, a pair of handle-bars to be grasped by said person, means to reciprocate said shoes in opposite directions, and a connection between each shoe and one of said handle-bars to transmit to the latter reciprocating movements in opposite directions to said shoes.

6. In an exercising machine, a base, means to

support a person above said base in a substantially standing position, a pair of shoes for receiving the feet of said person, a pair of handle-bars to be grasped by said person, means to reciprocate said shoes in opposite directions, a connection between each shoe and one of said handle-bars to transmit to the latter reciprocating movements in opposite directions to said shoes, and means to elevate said shoes adjacent the ends of the reciprocating movements thereof.

7. In an exercising machine, a base, a pair of shoes above said base and adapted to receive the exerciser's feet, reciprocating carriers for said shoes supported by said base, interengaging gears beneath said base each connected to one of said carriers, means to drive said gears, handle-bars supported above said base for reciprocating and oscillatory movements, means connecting said carriers with said bars to reciprocate the latter as said carriers are operated, and means to oscillate said bars.

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