

May 26, 1942.

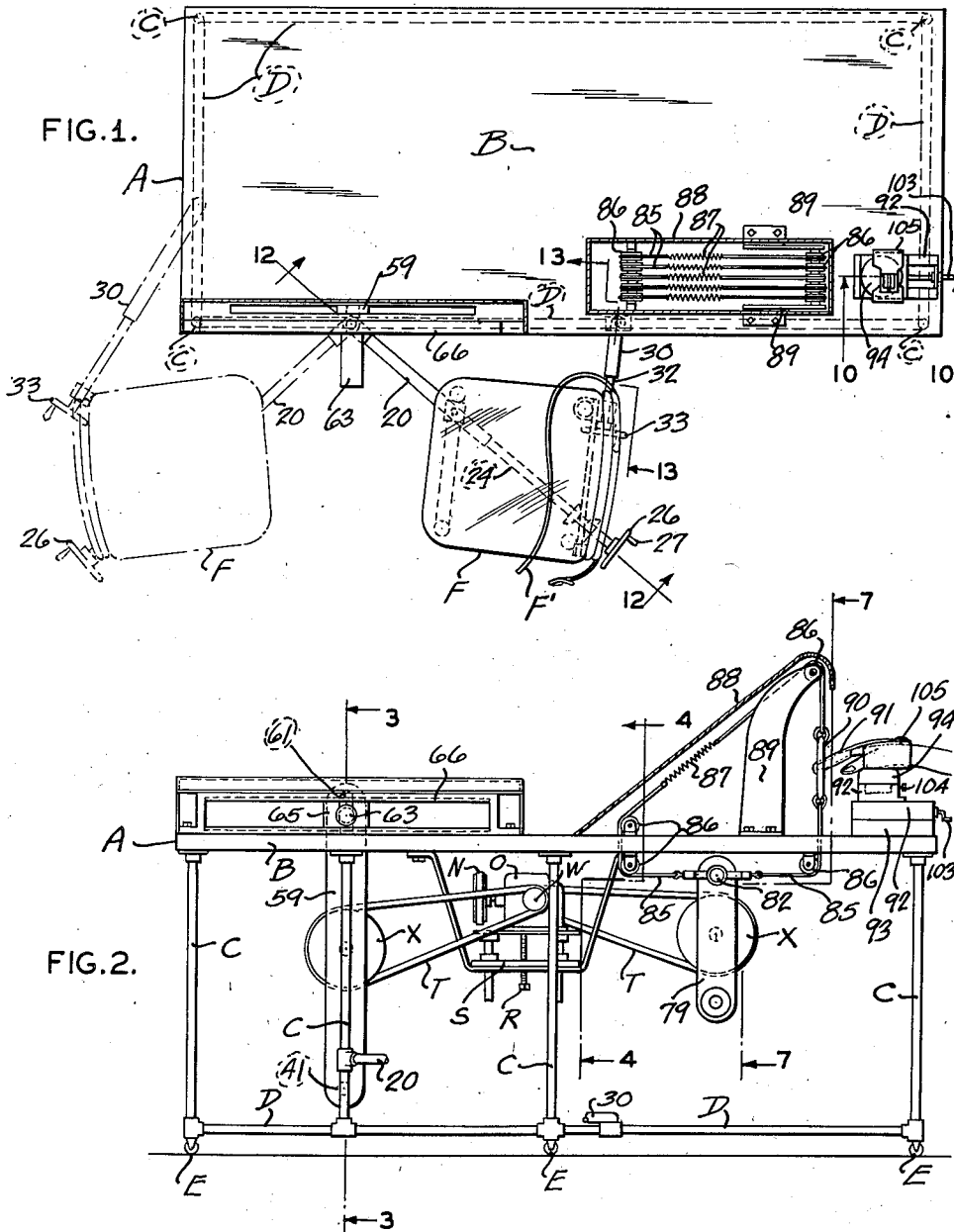
H. C. F. KORTE

2,284,061

MECHANICAL EXERCISING DEVICE

Filed April 24, 1939

4 Sheets-Sheet 1



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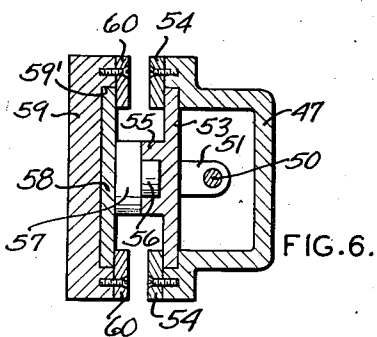
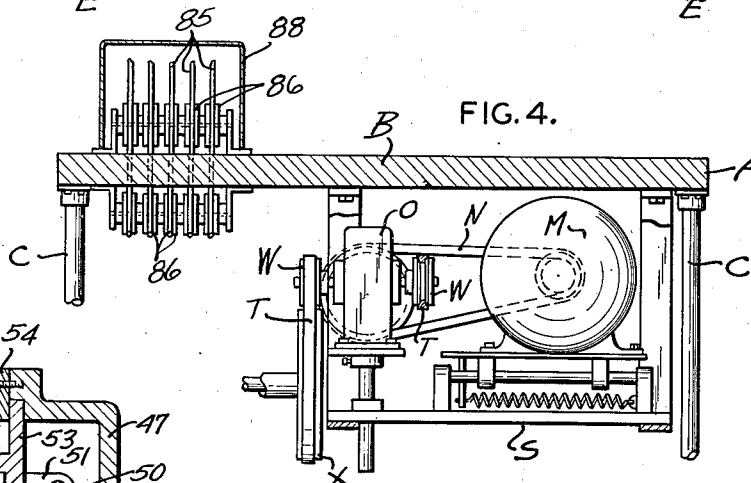
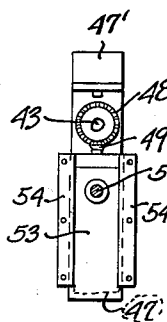
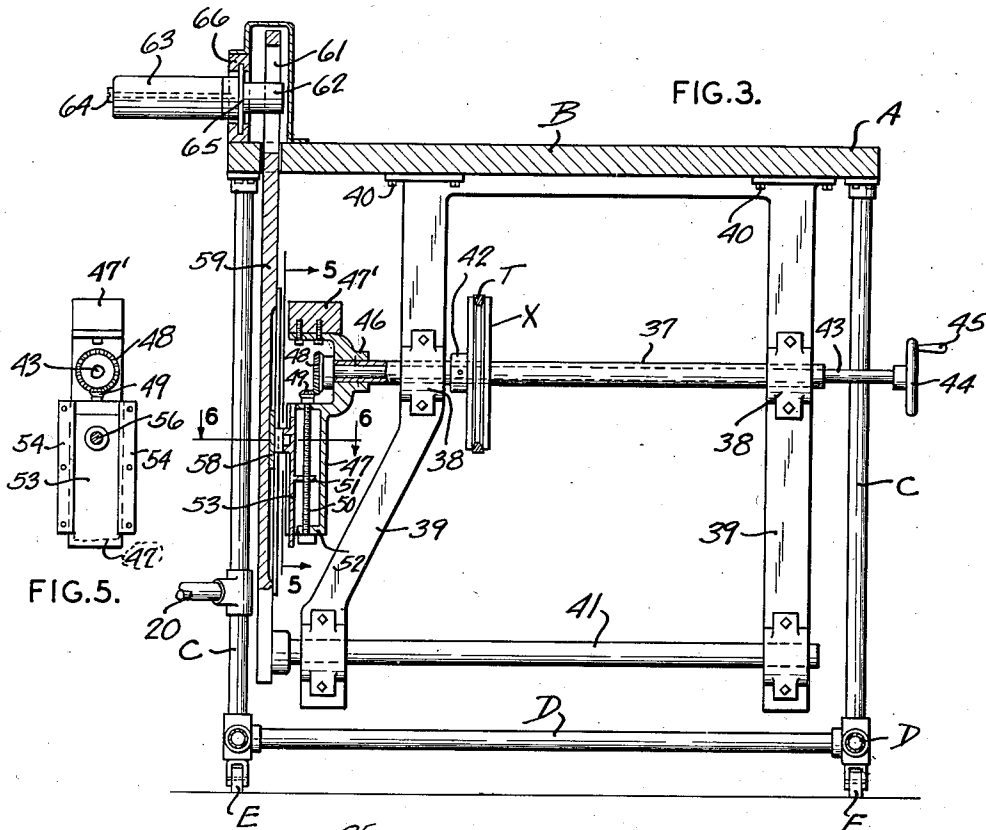
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4 Sheets-Sheet 2



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MECHANICAL EXERCISING DEVICE

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4 Sheets-Sheet 3

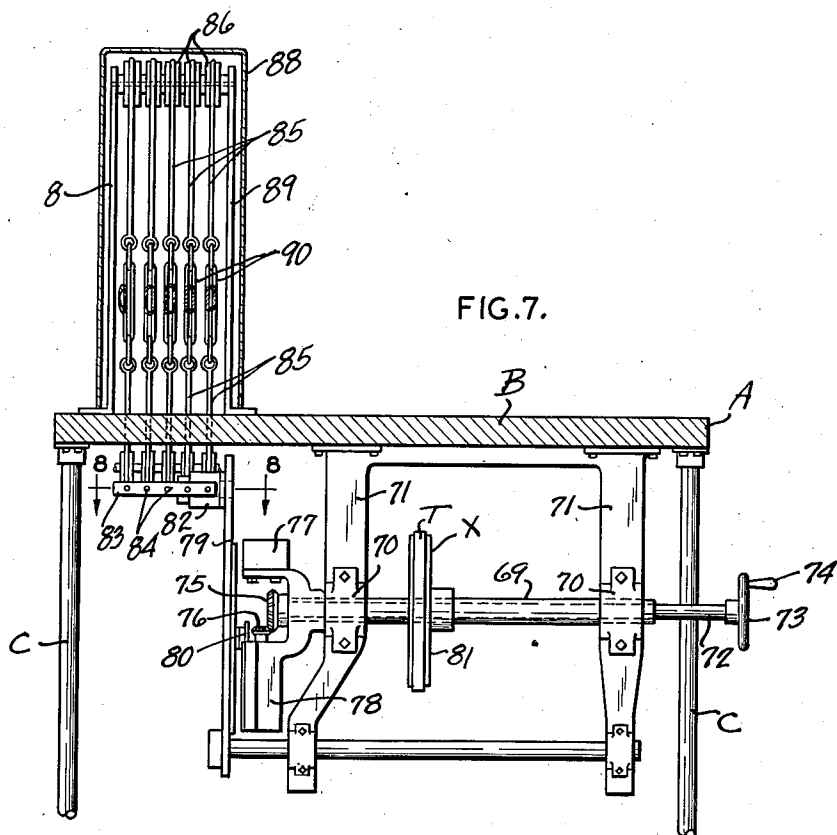


FIG.7.

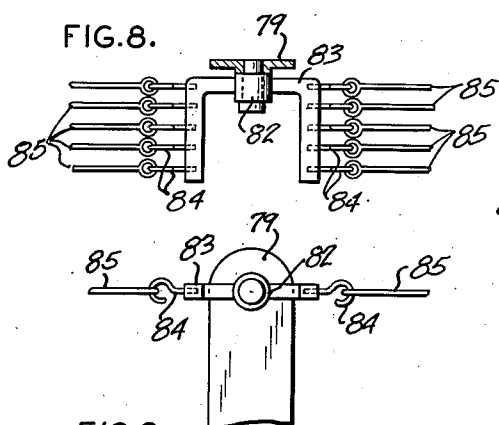


FIG.8.

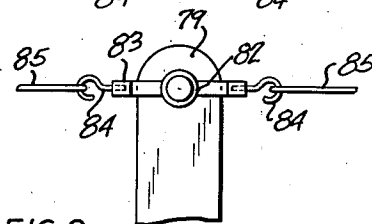


FIG.9.

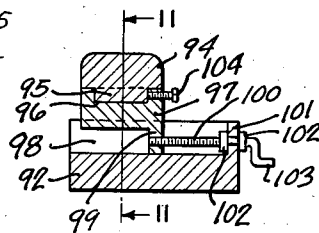


FIG.10

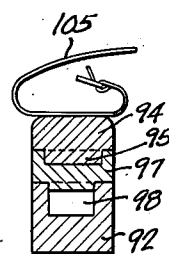


FIG.11.

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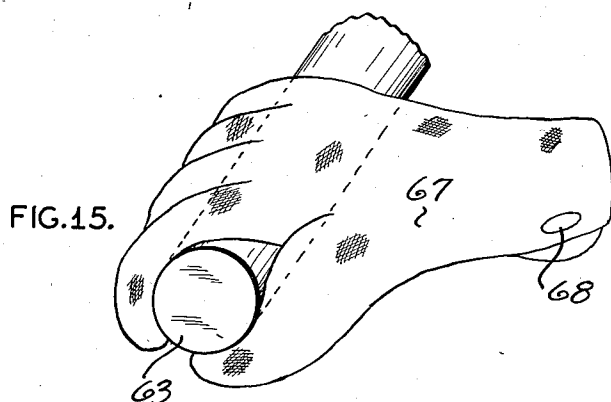
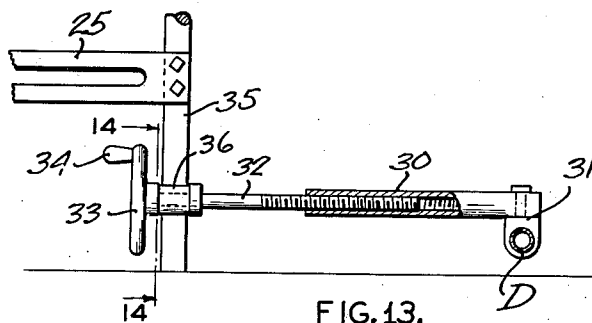
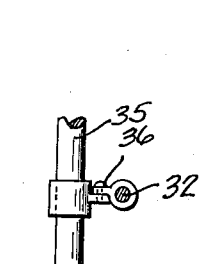
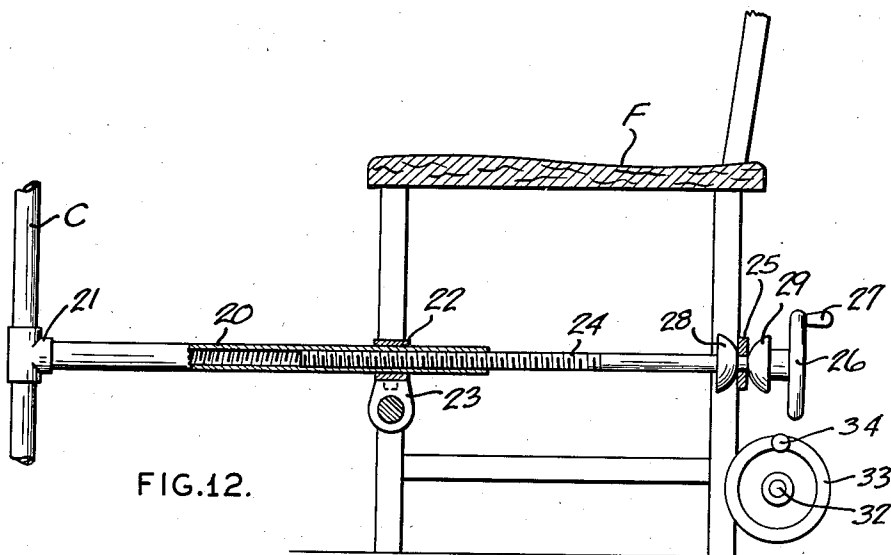
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MECHANICAL EXERCISING DEVICE

Filed April 24, 1939

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,284,061

MECHANICAL EXERCISING DEVICE

Henry C. F. Korte, St. Louis, Mo.

Application April 24, 1939, Serial No. 269,632

4 Claims. (Cl. 128—52)

My invention relates to a new and useful mechanical exercising device, and has for its object the production of a simple and efficient device for the extension and deflection of the fingers and arms, and one which can be adjusted as to length of stroke, so as to give the requisite amount of movement to an arm or to the fingers to adequately exercise the same within such limits as may be necessary. Another object is to provide an adjustable device for seating the user of the mechanism and also for exercising the right or left arm. Another object is to provide a holder for the hand or fingers, and one made of such material as can be easily laundered and sterilized. A still further object is to provide a holder for the hand or fingers that securely retains the same while the arms or fingers are being manipulated by the device.

With these and other objects in view, the invention includes the novel features of construction and arrangement and combination of parts hereinafter described and particularly defined by the appended claims.

Fig. 1 is a plan view of my mechanical exercising device, showing the chair for the patient in two different positions.

Fig. 2 is a side elevation of the same without the chair.

Fig. 3 is a cross-section taken on line 3—3, Fig. 2.

Fig. 4 is a cross-section taken on line 4—4, Fig. 2.

Fig. 5 is a section taken on line 5—5, Fig. 3.

Fig. 6 is a section taken on line 6—6, Fig. 3.

Fig. 7 is a cross-section taken on line 7—7, Fig. 2.

Fig. 8 is a section taken on line 8—8, Fig. 7.

Fig. 9 is an enlarged view of the cord-securing means.

Fig. 10 is an enlarged detail section taken on line 10—10, Fig. 1.

Fig. 11 is a section taken on line 11—11, Fig. 10.

Fig. 12 is an enlarged section taken on line 12—12, Fig. 1.

Fig. 13 is an enlarged detail section taken on line 13—13, Fig. 1.

Fig. 14 is a section taken on line 14—14, Fig. 13.

Fig. 15 is an enlarged perspective of the glove and bar for holding the patient's hand.

Preferably I provide a table A having a top B, legs C, bracing rods D, and casters E. The said casters may be of any well known type which can be so manipulated that the table A

will not be movable on said casters at certain times. A suitable chair F is preferably connected to my device and is adjustable, as will be hereinafter set forth, so that the patient may be moved into the proper position for exercising either the right or left arm, and also to accommodate the length of arm to the exercising mechanism.

The chair F in which the patient is seated is adjustable forwardly and rearwardly and transversely (see Fig. 12). A tubular, internally threaded pipe 20 is attached at 21 to one of the legs C. This pipe 20 passes through a slidable member 22, which is slidably mounted on a cross-bar 23 at the forward portion of said chair F and beneath the seat thereof. The pipe 20 is securely positioned in the member 22. Threaded into the pipe 20 is a rod 24 which passes rearwardly through another slotted cross-bar 25 at the rear portion of said chair F. On the outer end of the rod 24 is a wheel 26 having a handle 27. On one side of the cross-bar 25, and mounted on the rod 24 and closely adjacent the cross-bar 25, is a dish-shaped metal bowl 28. On the same rod 24 and on the opposite side of the cross-bar 25 is another bowl 29 similar in construction to the bowl 28. The purpose of the rounded bowl-like contour of the bowls 28 and 29 is that, as the chair F is moved transversely, the bowls 28 and 29 will accommodate themselves to the different positions of the chair F transversely and always retain their contact with the cross-bar 25.

Below the mechanism just above described is another internally threaded pipe 30, which is pivotally and removably mounted on a longitudinal brace rod D (Fig. 13) and held in place by a bolt, as shown at 31. Into the pipe 30 is threaded the rod 32, to one end of which is affixed a wheel 33 having a handle 34 for manipulating said wheel 33. The rod 32 is held to one leg 35 of the chair F by a pivoted holding member 36 (Fig. 14). By these adjusting devices the chair F may be moved forwardly and backwardly and swung transversely so as to accommodate patients of different ages and sizes, as well as lengths of arm (see Fig. 1). A strap F' is provided for the purpose of holding the patient's body stationary while his arm is being exercised. It will be seen that by the removable connection at 31 the threaded pipe 30 can be removed and fastened to a like member on another cross rod D when the chair is moved to the position shown in dotted lines.

I will now describe the exercising mechanism.

A motor M, preferably electrically operated, is connected by a belt N with a reduction gearing O, all of well known types. The mechanism just described is mounted on a shelf S beneath the top B of the table A, as clearly illustrated in Figs. 2 and 4. By means of the threaded rod R the reduction gear O may be raised or lowered to make the belts N and T fit accurately. As these parts are standard, it is not believed that a detailed description is either necessary or material, as the illustrations in Figs. 2 and 4 show them in detail in so far as their function in operating my mechanism is concerned. The belts T are mounted on grooved wheels W on the reduction gear O extending to the larger grooved wheels X which drive my exercising devices to be hereinafter described. The grooved wheel X shown in Fig. 3 is fixed on a pipe shaft 37 journaled in bearings 38 carried by a frame 39 bolted at 40 to the underside of the top B of the table A. The lower end of the frame 39 supports a rod 41 (Fig. 3). A hub 42 on the grooved wheel X fixes said wheel to the pipe shaft 37. Through the pipe shaft 37 and rotatable therewith extends the rod 43, on the outer end of which is mounted the wheel 44 having a handle 45. The inner end of the pipe shaft 37 is fixed at 46 in a structure 47 which is bolted to a counterweight 47'.

At the inner end of the rod 43 is the bevel gear wheel 48 meshing with the smaller bevel gear wheel 49, which latter is affixed to a threaded rod 50. The rod 50 passes through a lip 51 and the lower end 52 of the structure 47. The perforation through the lip 51 is threaded, so that as the rod 50 is rotated by turning the wheel 44 the member 53, to which the lip 51 is affixed, is moved up or down, according to which way the wheel 44 is rotated. The member 53 is slidably mounted in the member 47 (Fig. 6). The strips 54 held by screws into the member 47 retain the member 53 in place.

A boss 55 is formed on one face of the member 53 and has a central aperture therein to receive a plug 56 extending outwardly from a boss 57 on one face of another plate 58, which is slidably secured in a recess 59' in a long arm 59 by means of the strips 60 held by screws to one face of the arm 59. The lower end of the arm 59 has a recess therein which receives an end of the rod 41. As the member 47 rotates, the long arm 59 is given a back and forth motion through the connection shown in Figs. 3 and 6. The length of the stroke of the upper end of the arm 59 is regulated by manipulating the screw 50 through the gears 48 and 49 when rotated by turning the wheel 44. The upper end of the arm 59 has a slot 61 therein which receives a projection 62 secured to a cylindrical member 63 by a bolt 64. Between the projection 62 and the member 63 is a plate 65 slidably mounted in frame 66.

To the cylindrical member 63 is secured a glove 67 (Fig. 15), preferably formed of canvas or other washable material, whereby said glove may be maintained in a sanitary condition. After the patient's hand has been inserted in the glove 67 it may be secured about the wrist as by a snap button 68. When the arm 59 is oscillated and the hand of the patient is secured in the glove 67, movement is imparted to the arm of the patient corresponding to the length of the stroke of the arm 59. Thus an exercising movement is imparted to the patient's arm, which movement may be varied as to length of stroke depending on the nature of the movement re-

quired at different times during each exercising treatment.

For exercising the fingers and thumbs of a patient the same mechanism for producing the oscillating movement of the parts is employed.

In Fig. 7 a pipe shaft 69 is journaled at 70 in a frame 71 bolted to the underside of the top B of the table A. The shaft 72 extends through the pipe shaft 69 and has the wheel 73, with a handle 74 located on its outer end. The intermeshing bevel gears 75 and 76, counterweight 77, member 78, long arm 79, slidable connection 80 with the member 78, are all operated by the belt T driving grooved wheel 81, with the same character of means for varying the length of the stroke of the long arm 79 by manipulating wheel 73, as previously described in the mechanism illustrated in Fig. 3.

It will be understood that shafts 43 and 72 rotate with the pipe shafts 37 and 69. While the wheels 44 and 73 are turning when the motor M is operating, such turning movement is not rapid and the handles 45 and 74 can be grasped for turning said wheels and operating either of the bevel gears 48 and 49 or 75 and 76.

The upper end of the arm 79 carries a cylindrical block 82 to which is secured a rectangular frame 83 having a series of five hooks 84 in each side thereof (Fig. 7) in which are fastened the cords 85, which cords pass over rollers 86. Springs 87 are provided to give the necessary resiliency to the cords when the device is being operated. A cover 88 is preferably placed over the cords 85 above the top B of the table A. Arms 89 bolted to the top B provide a support for the upper part of the cord-carrying mechanism (Fig. 2). Above the top B the cords are provided with the members 90 carrying the finger grips 91. As the cords 85 are moved by the rocking of the arm 79 the finger grips 91 are moved up and down, and the length of such movement is regulated by the length of stroke of the upper end of the arm 79, which is controlled by moving the wheel 73 and shifting the screw-threaded rod connected with the bevel gears 75 and 76 (Fig. 7).

A support for the hand of the patient is mounted on a block 92 superimposed upon another block 93 attached to the top of the table A (Fig. 2), and adjacent the finger-exercising mechanism. On top of the block 92 is mounted the hand rest 94, which is provided with a projection 95 on the lower face which fits in a recess 96 in another block 97, which in turn is mounted in a recess 98 in the block 92. The lower side of the block 97 is preferably hollowed out as shown in Fig. 10, so as to provide a flange 99 to receive a screw-threaded rod 100, which is mounted in a wall 101 extending above the block 92. The rod 100 is secured by the washers 102 to hold said rod in position. A handle 103 is formed at the outer end of the rod 100 for turning said rod. A screw 104 is mounted in the block 97 and contacts the projection 95 for holding said block in adjusted position. When it is desired to rotate the block 94, the screw 104 is loosened and the block rotated to the desired position, and then the said screw is again tightened. On the top of the block 94 is secured a strap 105 to be buckled about the wrist and part of the palm of the patient's hand. By the rotatable feature of the hand-supporting block 94 said block can be adjusted to provide for the exercising treatment of both the fingers and the thumb of either hand. As previously described, the length of the

stroke for the exercising mechanism for the fingers and thumbs is regulated by the length of stroke of the upper end of the arm 79, which is regulated as previously described.

By means of my mechanism positive means for the extension and deflection of the muscles of the arms and fingers of the patient is provided, and the arm or fingers being exercised are subjected to the treatment as the patient is held firmly in the chair F by the strap F', so that the patient is required to submit to such treatment as called for in his particular case. The block 94 is adjustable forwardly and rearwardly by the threaded rod 100 connected thereto.

I claim:

1. In a device of the character described, an arm mounted for oscillatory movement, a member for exercising the arm of a patient, means for securely holding said patient's arm in operative association with said member during the exercising operation, a support for the member, said member being adapted to move forwardly and backwardly in the support and said member being connected to said arm, a motor, a reduction gear driven by said motor, a driven shaft operable by said reduction gear, a connection between said shaft and said arm for imparting oscillatory movement to said arm, and means for varying the stroke of said arm.

2. In a device of the character described, an arm mounted for oscillatory movement, a member for exercising the extremities of a hand of a patient, means for securely holding said patient's hand in operative association with said member during the exercising operation, said member comprising a series of cords adapted to have an oscillatory movement imparted thereto by said arm to which said cords are attached, supports for said extremities secured to said cords, a motor, a reduction gear driven by said motor, a driven shaft operable by said reduction

gear, a connection between said shaft and said arm for imparting oscillatory movement to said arm, and means for varying the stroke of said arm.

3. In a device of the character described, an arm mounted for oscillatory movement, a hand member for exercising the arm of a patient, means for securely holding said patient's hand in operative association with said hand member during the exercising operation, a frame in which the upper end of the arm oscillates, guides within the frame, said hand member mounted adjacent the upper end of said arm and connected with said arm, said hand member being mounted and movable within said guides within the frame, a motor, a reduction gear driven by said motor, a driven shaft operable by said reduction gear, a connection between said shaft and said arm for imparting oscillating movement to said arm, and means for varying the stroke of said oscillatory arm.

4. In a device of the character described, an arm mounted for oscillatory movement, a member mounted adjacent one end of a said arm and connected with said arm, a motor, a reduction gear driven by said motor, a driven member comprising inner and outer shafts operable by said reduction gear, a third shaft provided with threads and geared to the inner shaft, a connection between the third shaft and the arm comprising a slidable member in said arm having a threaded lip projecting therefrom for threaded connection with said third shaft whereby oscillatory movement is imparted to said arm, and means for varying the stroke of said arm, said means comprising the inner rotatable shaft connected with said third shaft, the inner shaft capable of being rotated independently of the outer shaft whereby the stroke of said arm may be varied.

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