June 19, 1962 R. S. LUCE 3,039,456

EXERCISE CHAIR

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Fig.1

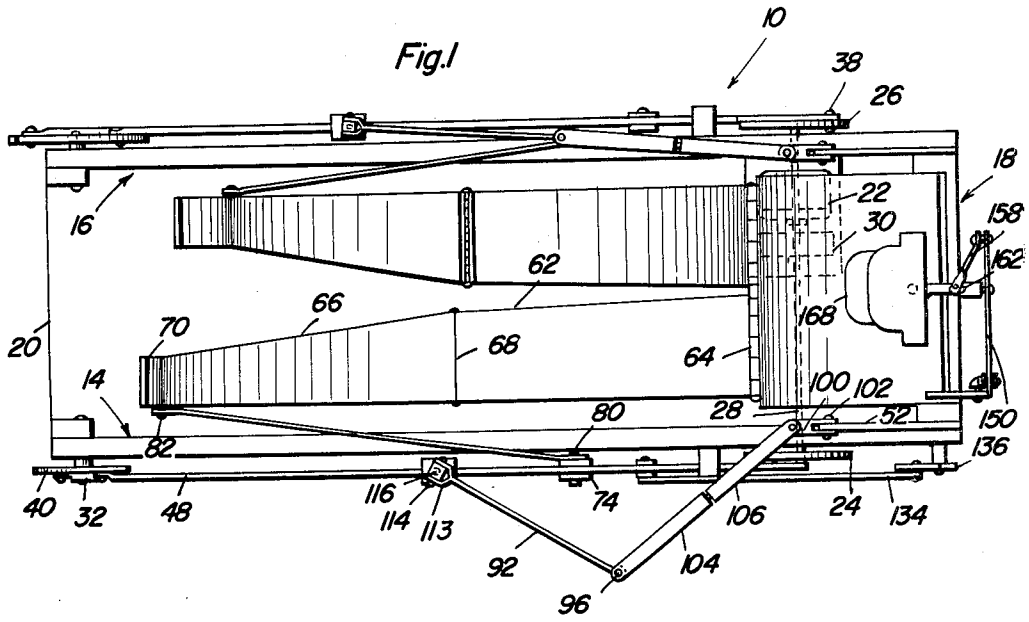
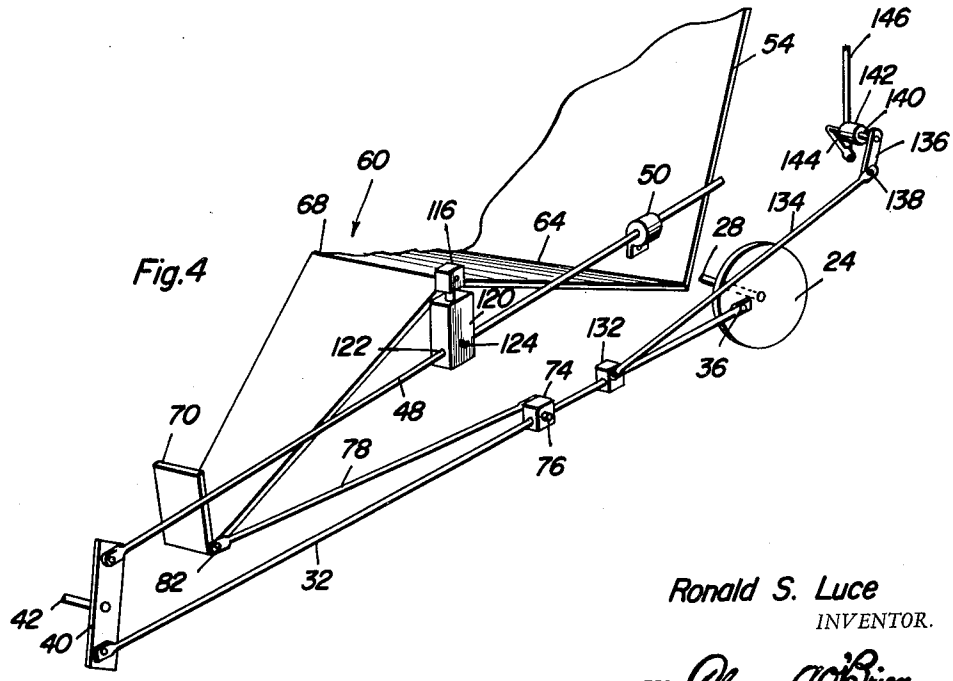


Fig.4



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EXERCISE CHAIR

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Fig.2

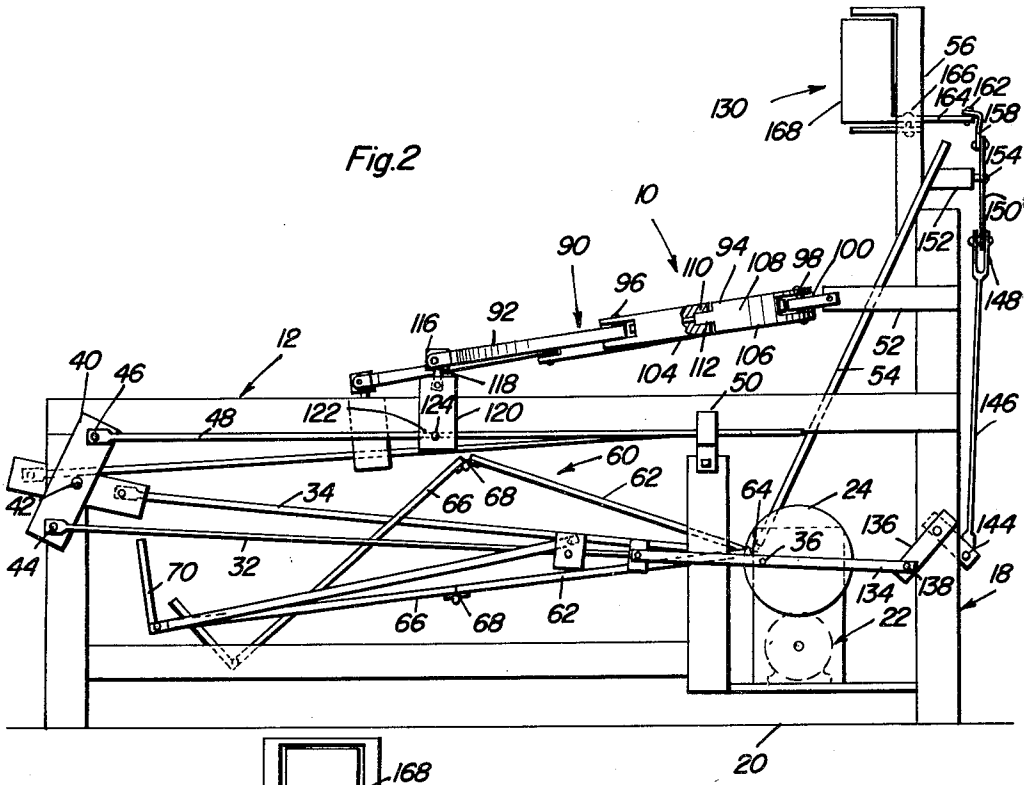
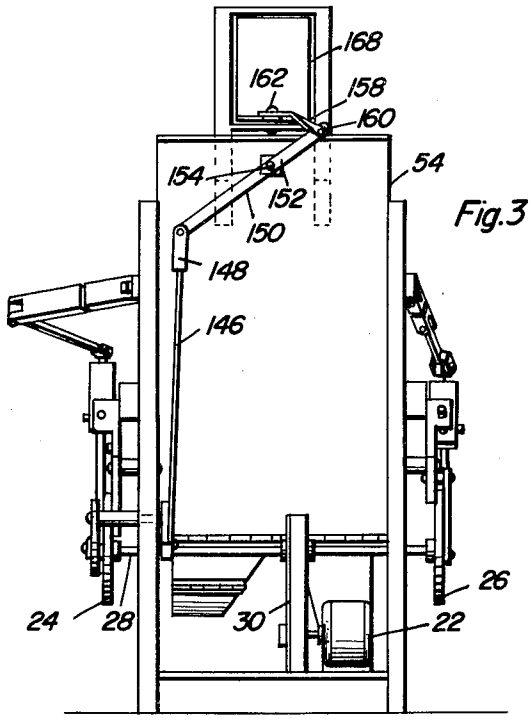


Fig.3



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United States Patent Office 3,039,456 Patented June 19, 1962

3,039,456

EXERCISE CHAIR

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Filed Dec. 24, 1959, Ser. No. 861,996
9 Claims. (Cl. 128—25)

This invention relates generally to exercising equipment and more particularly to a chair device particularly designed for use by paralytics, arthritics, and other cripples.

It is well appreciated that it is often advisable to exercise the affected limbs of cripples. Various procedures have been developed for providing such persons with an adequate degree of exercise without causing exertion of the person and further undesirable effects. Also, mechanical devices have been developed by the prior art and are available on the market for moving the limbs in a desired manner. Often, these devices appear disadvantageous inasmuch as properly functioning models are expensive and complex and less expensive simpler models are unreliable. In view of this, it is the principal object of this invention to provide a novel chair construction particularly designed for use by cripples for the purpose of exercising the various limbs. Also, provision is made for exercising the neck and head area.

It is a further object of this invention to provide a novel exercise chair construction wherein a crippled person may comfortably sit therein and with his limbs positioned in a particular manner, may be subjected to limb exercises with a minimum amount of effort on his part. Drive means, preferably, an electric motor, is carried by the chair support structures and drives the various limb assemblies to bend the various body joints.

It is a still further object of this invention to provide a novel exercise chair construction which is inexpensive to manufacture and maintain and which is reliable in operation. The construction of the chair is relatively simple and the movements utilized are not complex.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is an elevational plan view of the chair construction illustrating the left leg assembly extended, left arm assembly bent, right leg assembly bent, and right arm assembly extended;

FIGURE 2 is an elevational side view of the chair construction in a position similar to that illustrated in FIGURE 1;

FIGURE 3 is an elevational rear view of the chair construction illustrating the chair in a position similar to that of FIGURE 1; and

FIGURE 4 is a fragmentary perspective view illustrating particularly the moving parts of the left portion of the invention.

With continuing reference to the drawings, numeral **10** generally represents the exercise chair comprising this invention and including a support structure **12** having identical side portions, the left side portion being generally designated by the numeral **14** and the right side portion by the numeral **16**. A rear portion **18** bridges the side portions **14** and **16**. A base or bottom **20** is provided and is secured to each of the side portions and the rear portion.

Supported on the base **20** is a driving source **22** preferably an electric motor. The motor **22** operatively drives circular disks, left and right respectively, **24** and **26** through a central shaft **28** and appropriate reduction gears **30**. First tie rods **32** and **34**, left and right respectively,

are pivotally and eccentrically secured to the circular disks **24** and **26** at **36** and **38**, respectively. Inasmuch as the left and right sides of the exercise chair **10** are identical, additional reference will be made only to the left portions and it will be understood that the right portions are constructed and operate in an identical manner. However, it is here to be noted that the connections **36** and **38** representing the connections between the first tie rods **32** and **34** and the disks **24** and **26**, are displaced 180° relative to each other.

A rocker arm **40** is pivoted to the side portion **14** by a pivot pin **42** extending through the center thereof. The tie rod **32** is pivoted to the rocker arm **40** at point **44** proximate the lower end of the rocker arm. Pivoted to the rocker arm **40** at the upper end at point **46** is a second tie rod **48** which extends rearwardly and is slidably passed through a sleeve support **50** secured to the side portion **14**. It will be appreciated then that as the motor **22** rotates the disk **24**, the tie rod **32** being eccentrically pivoted to disk **24** reciprocates longitudinally so as to rock the rocker arm **40** about central pivot point **42**. In turn, tie rod **48** will be slidably moved through sleeve **50**. It is to be noted at this point that although a greater than 90° movement of the rocker arm is illustrated, such illustration is made for the clarity of explanation and actually it is contemplated that the rocker arm movement be considerably less than 90°.

The rear portion **18** has forwardly projecting rigid members **52** and an inclined rigid back **54** is supported between the members **52** and the rear portion **18**. A standard **56** projects upwardly from the back **54** as particularly illustrated in FIGURE 2.

A leg assembly generally designated by the numeral **60** includes an upper leg assembly **62** hinged to the back **54** at **64**. A lower leg assembly **66** is hinged to the upper leg assembly **62** at **68**. The lower leg asesmbly **66** includes a transversely projecting element **70** which defines a foot rest.

A collar **74** in the form of an apertured block is slidably received on the tie rod **32**. A setscrew **76** is provided for securing the collar **74** in a selected position on the tie rod **32**. A link **78** is pivotally connected between the collar **74** at **80** and the lower leg assembly **66** proximate to the heel rest **70** at **82**. It will be appreciated that as the motor **22** rotates the disk **24**, the tie rod **32** will be reciprocated so as to move the collar **74** forward and rearward of the supporting structure. Of course, the connected link **78** will carry the heel element **70** along with it so as to flex the leg assembly **60** at hinges **68** and **64** between an extended and bent position. Inasmuch as the left and right leg assemblies, as noted above, are displaced by 180°, a person sitting in the chair, resting against the back **54**, will have his legs oppositely and alternately extended and contracted.

An arm assembly generally designated at **90** is provided and includes a lower arm assembly **92** and upper arm assembly **94**. An elbow joint is provided at **96** and a shoulder joint is provided at **98**. A link **100** which is bifurcated as is best illustrated in FIGURE 1 receives a pivot pin **102** therethrough which allows pivotal movement about a horizontal axis thereof. The upper arm assembly **94** includes members **104** and **106** having a bolt running longitudinally therethrough. A projection **112** on the member **108** is rotatably received in a socket **110** in the member **104** so as to permit movement about the axis of the upper arm. The lower arm assembly **92** is pivotable about the elbow joint **96** in a manner which is apparent from FIGURE 1. The lower end of the lower arm assembly **92** is bifurcated as at **113** and a pivot pin **114** projects therethrough and includes a block **116** having a stub spindle **118** depending therefrom which is ro-

tatably received in a socket in collar 120 apertured at 122 for receiving tie rod 48 therethrough. A setscrew 124 is provided for securing the collar 120 in a selective position on the tie rod 48. It will therefore be appreciated that as the motor 22 rotates the disk 24, the rocker arm 40 will reciprocate the tie rod 48 and the collar 120 will be moved so as to flex the arm assembly 90 in the manner indicated.

Further exercise means are provided in the form of a movable head assembly generally designated by the numeral 130. A collar 132 is adjustably positioned on the tie rod 32 and a link 134 extends therefrom. The link 134 is pivoted to a rigid member 136 at point 138. The member 136 is fixed to a spindle 140 passing through a bearing 142 carried by the rear support portion 18. The spindle 140 is bent transversely as at 144 and is pivoted to a vertically extending rod 146. The rod 146 is bifurcated at 148 and pivotally secured to a bar 150 pivoted to a rearwardly extending projection 152 secured to the back 54 as at 154. The end of the bar 150 remote from the rod 146 is pivoted to the member 158 at point 160. The member 158 is bent in the manner indicated, inclined upwardly initially and then formed horizontally. The horizontal portion is pivoted at pivot axis 162 to a rearwardly extending operator 164 pivoted at 166 to the standard 56. The operator 164 carries a pillow or padded block 168. It will be appreciated that the operator 164 pivots about point 166 when the disk 24 is rotated inasmuch as the tie rod 32 reciprocates longitudinally so as to reciprocate the rod 146 vertically and pivot the bar 150 about point 154. As bar 150 pivots, it in turn causes operator 164 to pivot about point 166 due to the bent configuration of member 158.

It is thought that the construction of the invention should now be well appreciated. In the operation of the device, it is to be noted that the left side extends the leg assembly when it bends the arm assembly and the right side operates in the same manner, 180° out of phase with the left side. It should therefore be appreciated that the applicant has herein provided novel and simple chair exercise means wherein the limbs of a cripple who is seated therein may be exercised. It of course is to be recognized that the extent of movement of the various portions of the invention may be readily adjusted dependent upon the particular patient and prescribed treatment.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An exercise chair particularly designed for use by paralytics or such comprising a supporting structure, movably mounted limb assemblies and head support carried by said structure and drive means operatively connected to said limb assemblies and head support for moving said assemblies, said limb assemblies defining left and right leg assemblies and left and right arm assemblies, said structure including identical side portions and a rear portion bridging said side portions and extending between said arm assemblies.

2. An exercise chair particularly designed for use by paralytics or such comprising a supporting structure, movably mounted and generally horizontally extending jointed limb assemblies carried by said structure and drive means operatively connected to said limb assemblies for moving said assemblies, said limb assemblies defining left and right leg assemblies and left and right arm assemblies, said supporting structure including identical side portions and a rear portion bridging and connecting said side portions, said drive means including a rotatable shaft, rocker arms pivotally secured to each of said side portions spaced from said shaft, and first tie rods eccentrically and pivotally secured to said shaft connecting said shaft to said rocker arms.

3. An exercise chair particularly designed for use by paralytics or such comprising a supporting structure, movably mounted and generally horizontally extending jointed limb assemblies carried by said structure and drive means operatively connected to said limb assemblies for moving said assemblies, said limb assemblies defining left and right leg assemblies and left and right arm assemblies, said supporting structure including identical side portions and a rear portion bridging and connecting said side portions, said drive means including a rotatable shaft, rocker arms pivotally secured to each of said side portions spaced from said shaft, and first tie rods eccentrically and pivotally secured to said shaft connecting said shaft to said rocker arms, second tie rods pivotally connected to said rocker arms remote from said first tie rods, support means spaced from said rocker arms for slidably passing the free end of said second tie rods, and said second tie rods pivotally connected to at least some of said limb assemblies so as to move them relative to said supporting structure.

4. An exercise chair particularly designed for use by paralytics or such comprising a supporting structure, movably mounted limb assemblies carried by said structure and drive means operatively connected to said limb assemblies for moving said assemblies, said limb assemblies defining left and right leg assemblies and left and right arm assemblies, a fixed back secured to said supporting structure between said side and rear portions, each of said leg assemblies including upper and lower leg assemblies, said upper leg assemblies hinged to said fixed back, said lower leg assemblies hinged to said upper leg assemblies, said right limb assemblies operated 180° out of phase with said left limb assemblies, and said limb assemblies on each side of said structure operated in opposite directions simultaneously.

5. An exercise chair particularly designed for use by paralytics or such comprising a supporting structure, movably mounted limb assemblies carried by said structure and drive means operatively connected to said limb assemblies for moving said assemblies, said limb assemblies defining left and right leg assemblies and left and right arm assemblies, a fixed back secured to said supporting structure between said side and rear portions, each of said leg assemblies including upper and lower leg assemblies, said upper leg assemblies hinged to said fixed back, said lower leg assemblies hinged to said upper leg assemblies, said drive means including a rotatable shaft, rocker arms pivotally secured to each of said side portions spaced from said shaft, first tie rods eccentrically and pivotally secured to said shaft connecting said shaft to one portion of said rocker arms, second tie rods, means pivotally connecting each second tie rod between one of said first tie rods and one of the lower leg assemblies.

6. An exercise chair particularly designed for use by paralytics or such comprising a supporting structure, movably mounted limb assemblies carried by said structure and drive means operatively connected to said limb assemblies for moving said assemblies, said limb assemblies defining left and right leg assemblies and left and right arm assemblies, a fixed back secured to said supporting structure between said side and rear portions, each of said leg assemblies including upper and lower leg assemblies, said upper leg assemblies hinged to said fixed back, said lower leg assemblies hinged to said upper leg assemblies, said drive means including a rotatable shaft, rocker arms pivotally secured to each of said side portions spaced from said shaft, and first tie rods eccentrically and pivotally secured to said shaft connecting said shaft to said rocker arms, second tie rods pivotally connected to said rocker arms remote from said first tie rods, means pivotally connecting said arm assemblies to said second tie rods, and support means spaced from said

rocker arms for slidably guiding the free end of said second tie rods.

7. An exercise chair as defined in claim 5, wherein the outer ends of said arm assemblies are pivotally connected to the rocker arm by a third tie rod.

8. A device as defined in claim 7, wherein a fourth tie rod is connected between a movable head support and said first tie rod.

9. An exercise chair particularly designed for use by paralytics or such comprising a supporting structure, movably mounted limb assemblies carried by said structure and drive means operatively connected to said limb assemblies for moving said assemblies, said limb assemblies defining left and right leg assemblies and left and right arm assemblies, a fixed back secured to said supporting structure between said side and rear portions, each of said leg assemblies including upper and lower leg assemblies, said upper leg assemblies hinged to said fixed back, said

lower leg assemblies hinged to said upper leg assemblies, said drive means including a rotatable shaft, rocker arms pivotally secured to each of said side portions spaced from said shaft, first tie rods eccentrically and pivotally secured to said shaft connecting said shaft to one portion of said rocker arms, and second tie rods connecting portions of said first tie rods to the lower leg assemblies, mechanical means connecting said arm assemblies to said first tie rods, said right limbs operating 180° out of phase with said left limbs.

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