Dec. 22, 1953 T. M. CURLEY 2,663,376

TRAINING DEVICE FOR CRIPPLED CHILDREN

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FIG. 1.

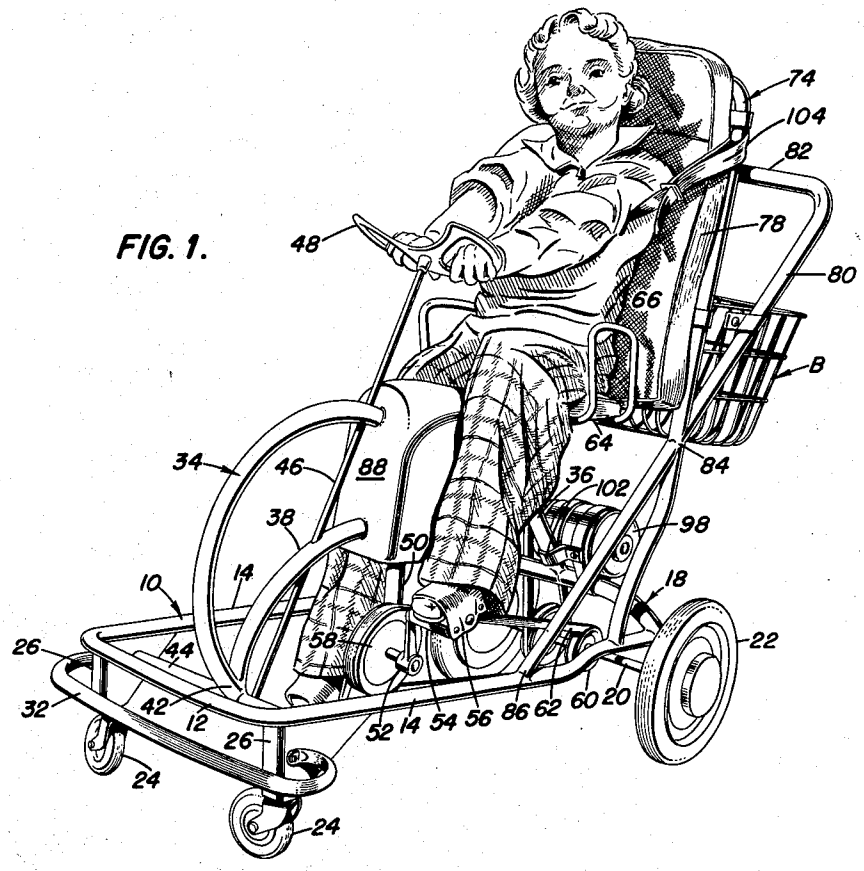
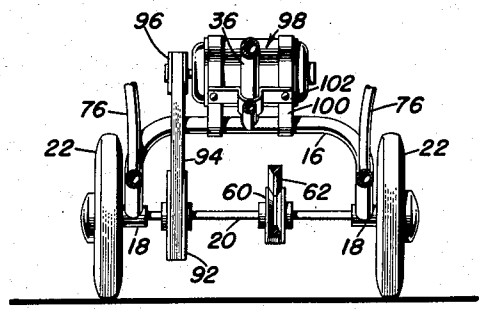


FIG. 4.



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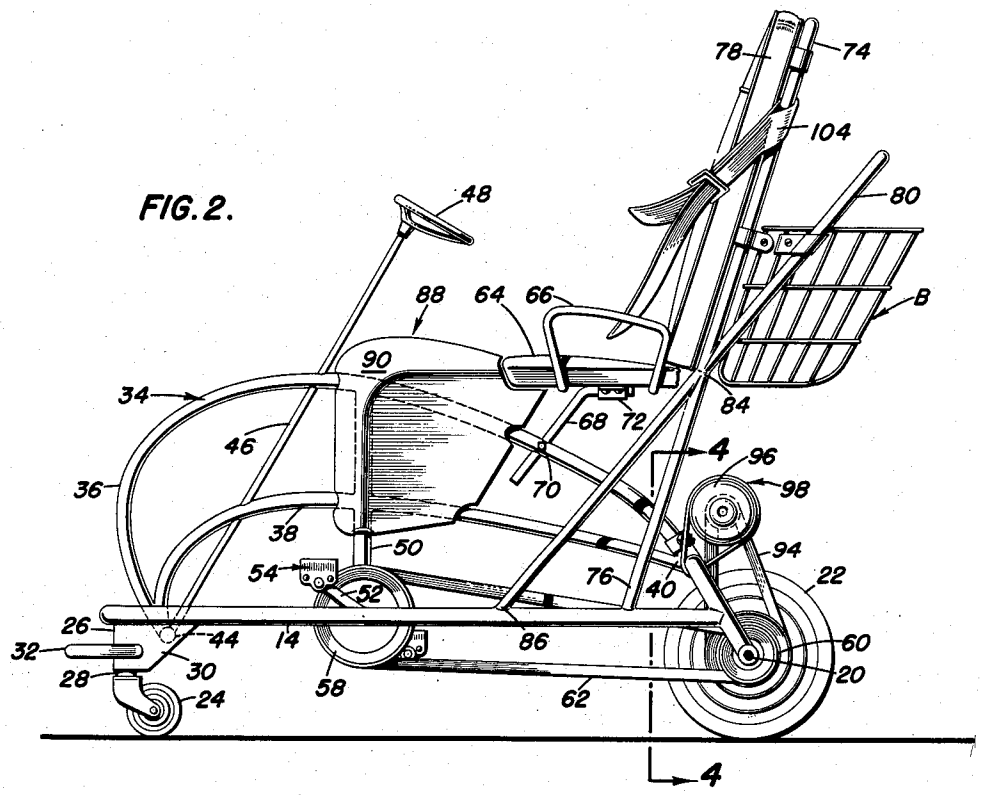
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FIG. 2.



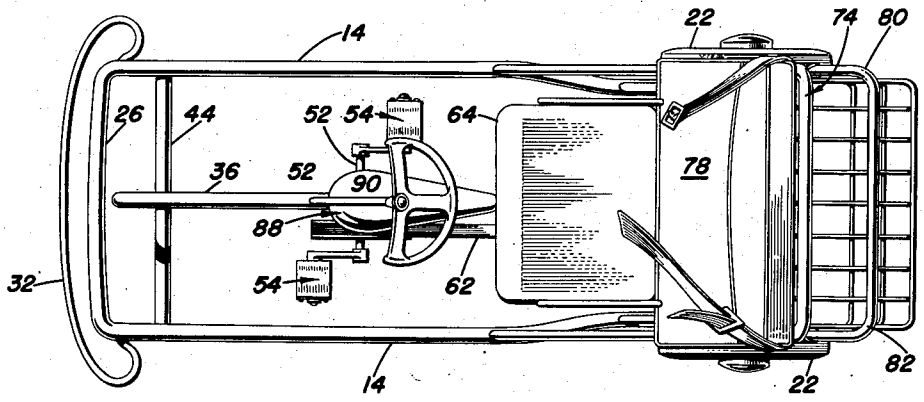


FIG. 3.

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TRAINING DEVICE FOR CRIPPLED CHILDREN

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10 Claims. (Cl. 180—19)

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This invention relates to a training device for crippled children, particularly those who are afflicated with cerebral palsy or similar disability. It is intended primarily for use of those children who have lower extremity disability, resulting from congential traumatic or mental defect, in the age group of five years and upward.

It is the principal object of this invention to provide a vehicular form of training device which will accomplish gradual training of atrophic limbs while relieving the parent or other attendant of the burden of carrying the child and daily massage treatment. The conveyance of vehicular device provided by this invention makes it possible to get the palsied child out of bed and into an upright position thereby promoting a ready adaptation of the child to normal muscular movements of the body. Progressive training of the deficient limbs then follows in a simple manner which is entertaining to the child.

It is a further object of the invention to provide a vehicular type of training device having the features of a perambulator, velocipede and exercising machine combined. It provides an adequate conveyance for the palsied or physically disabled child, exercise of the muscles of the pelvis and lower extremities, particularly calf, ham-strings and anterior thigh muscles, combined transportation and active exercise of the lower half of the body of the child, and entertainment for the child either indoors or out.

A particular object of the invention resides in the provision of a wheel-supported chassis frame having an upwardly extending central framework supporting in operative relation a seat, a leg separating and guiding member formed and arranged to be engaged by major portions of the inner sides of the child's legs, rotating pedals having means for securing the feet in responsive following engagement, and driving means connected between the pedal and a wheel of the chassis for producing rotation of the pedals in response to movement of the training device.

A further object is to provide in a vehicular type device of the character described a rigid handle bar arranged in cooperative relation to the leg separating and guiding member and a seat grasping and holding the child as a means of further support.

An additional and specific feature of the invention is the provision of alternative electric motor driving means permitting full use of the exercising functions without conveyance, when only a limited amount of space is available or conditions do not permit outdoor use.

These and other beneficial objects and features contributing to maximum utility and convenience in use will be more fully understood from the following detailed description of a preferred embodiment of the invention, when taken in connection with the accompanying drawings, in which:

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Fig. 1 is a side perspective view of the vehicular type training device showing a child being conveyed and exercised;

Fig. 2 is a side elevation of the training device of Fig. 1, partially sectioned;

Fig. 3 is a top plan view of the training device as seen in Fig. 2; and

Fig. 4 is a partial across sectional view of the rear end portion of the training device taken on line 4—4 of Fig. 2.

In Figs. 1 and 2 of the drawings a chassis 10 of rectangular outline and tubular frame construction is shown to have a front bar 12, opposite side bars 14 and an upwardly arched rear transverse bar 16. The meetings of the rear transverse bar 16 with the rear ends of the side bars 14 provide downward and rearward extensions, 18, 18 at each side of the frame.

An axle shaft 20 passes through and is rotatably supported in the rearward extensions 18, 18. A large, rubber-tired wheel 22 is mounted on each outwardly extending end of the axle shaft 20 as best shown in Fig. 4.

At the front of the chassis frame 10 small swiveled wheels or casters are mounted for castering rotation in socket formations 26, 26 at each corner by means of vertical swivel shafts 28. Each socket formation 26 includes a rearwardly extending brace plate 30 of integral construction secured also to the respective side bar 14. A bumper bar 32 extends beyond the wheels or casters 24 at the front end and may be used as a means for pulling the training device.

Above the chassis frame 10 an arched central framework 34, comprising upper and lower upwardly arched bars 36 and 38, has the rearward ends of the bars integrally joined at 40 with the center of the rear frame bar 16. In similar manner the forward ends of arched bars 36 and 38 are integrally joined at 42 to a forward transverse bar 44 extending between plates 30, 30 (Fig. 1).

A rigid and preferably non-turning steering post 46 has its lower end secured to the transverse bar 44 and passes upwardly through the central framework bars 38 and 36 to terminate at its upper end in the form of a wheel or half-wheel steering bar 48.

A vertical hanger bar 50 of tubular form bridges the midportions of the framework bars

36 and 38 rearwardly of the steering post 46 and terminates on a level with the side bars 14 in a bearing formation (not shown) rotatably receiving and supporting a pedal crank 52 provided at each end with a pedal 54 rotatably mounted thereon. It is essential to the purposes of this invention that the pedals 54 be provided with easily attachable and detachable foot-securing means, which may take the form of the snap-on instep straps 56 shown best in Fig. 1. Where it is desired to provide longitudinal adjustment of the position of the pedal crank 52 to accommodate growth in the crippled child, previously known means such as the clamps and slides of E. J. Weller, Jr., Patent No. 2,311,424 may be used.

It will be noted that a large pulley wheel or sheave 58 is mounted on one side of the pedal crank 52 inwardly of the pedal 54. Another pulley wheel or sheave 60, preferably smaller than wheel 58, is secured centrally on axle shaft 20 for rotation therewith. The pulley wheels 58 and 60 are connected in driving relation by a flexible pulley belt 62. In this manner the pedal crank 52 carrying the pedal and foot securing means 54 and 56 is caused to turn in response to movement of the training device over a supporting surface.

It will now be observed that a large, rectangular and padded seat 64 having side frames 66, 66 is carried on a rearwardly extending seat post 68 mounted on the upper frame bar 36 by passage therethrough and securing by a bolt 70 extending through the bar and the post, as indicated in Fig. 2. A clamp 72 on the bottom of the seat 64 engages a horizontally extending portion of the post 68 in a detachable manner. A back frame 74 for the forwardly facing seat 64 is provided by means of an inverted, U-shaped tubular member including lower ends, 76, 76 joined integrally with rear end portions of side frames 14, 14. A padded seat back 78 is mounted on the front of back frame 74 by the conventional means indicated and rests on the rear edge portion of seat 64. The seat construction thus provided affords a full back and head rest for the child user, lateral support for the hips, and freedom for the intended up and down movement of the knees and legs.

If desired, a pushing and guiding frame 80, also of inverted U-shape and having a rearwardly accessible horizontal hand rail portion 82 may be mounted on the chassis frame 10 and braced by central junctures 84 with the legs of the back frame 74, and integral end junctures 86 with the respective side frames 14.

One of the most important parts of the training device is a vertical knee guide or center element 88 having the preferred configuration and relative disposition best illustrated in Figs. 2 and 3. This leg separating and guiding member 88 may be formed of sufficiently stiff sheet metal having the upper framework bar 36 passing lengthwise therethrough for mounting and support at its upper end portions, and the lower framework bar 38 similarly passing through the bottom portion of reduced length. Further anchoring and securing in operative relation of the leg guiding member 88 is obtained by the passage through the bottom thereof of the lower end of the crank hanger rod 50. Figs. 2 and 3 further show the forwardly diverging, generally triangular outline of the convex top and body of the guide member 88, and the notching of the rearward portion thereof to receive the forward edge portion of the seat 64. The steering bar 48 overlies the central portion of the guide member 88 and its steering post 46 passes through the arched central framework 34 a short distance in advance of the guide member.

In order to give the training device of this invention even greater utility it may be provided with means for rotating the pedal crank 52 and pedals 54 without the necessity for movement of the wheel device over a supporting surface. For this purpose an auxiliary crank driving pulley 92 is secured on the axle shaft 20 within the frame 10 and adjacent one wheel 22. A flexible belt 94 extends over the auxiliary pulley 92 and onto a drive pulley 96 mounted thereabove on the shaft of a horizontally extending electric motor 98, shown best in Fig. 4. The motor 98 is secured to the rear transverse bar 16 by strap means 100, and to the rear end of the upper arched bar 36 by strap means 102. A relatively small diameter is used for the drive pulley 96 on the motor shaft in order to provide a reduction ratio.

A supporting belt or strap 104 is passed around the upper end portions of the back frame 74 in a position to extend across the chest under the arms of a child user to provide additional support and maintenance of a desired position. The use of the supporting belt 104 is shown clearly in Fig. 1. Where desired a framework basket D or other article carrying means may be mounted on the pushing frame 80 for the convenience of the person attending the child on the street.

The operation of the training device of this invention may be summarized by reference to Fig. 1 showing a child using the same. This child supported by the padded seat 64, the side frames 66, and the extended and cushioned rearwardly inclined back frame 74, is held in place by the strap or harness 104 extending under the armpits. The legs are disposed on the opposite sides of the guiding member 88 with the hands grasping the non-turning steering bar 48 and the feet secured to the pedals 54 by the detachable straps 56. When the device is pushed over a supporting surface, turning of the axle shaft 20 with the rear wheels 22 will cause the pulley 60 to drive the belt 62 and thus turn the larger pulley 58 on the pedal crank 52. This in turn will produce up and down movement of the legs and knees in response to turning of the crank 52 and as accommodated by the rotating pedals, and thus exercise the lower leg structure and the upper limb portion of each leg. The size, configuration and arrangement of the center member 88 is such as to maintain separation of the legs while at the same time comfortably supporting and guiding them in their up and down movement. The small swiveling front wheels 24 make steering of the vehicular device easy without other provision for turning means.

When the training device is to be used in a stationary position, all that is necessary is to elevate the rear portion of the frame 10 by blocks or other secure means so that the wheels 22 and axle 20 may turn freely. The drive is then shifted to the electric motor 98 and pulleys 92 and 96, by connection of the motor to an electric source.

Use of this training device under all conditions has adequately demonstrated that from a physiotherapeutic standpoint it is the answer to the need for an all purpose vehicle that will provide exercise with pleasure for the cerebral palsied

child, and convenience for his parents or other attendants.

While a preferred embodiment of the invention has been shown and described in full detail, it will be understood by those skilled in the art that numerous changes may be made in details of construction and arrangement of parts without departing from the principles of the invention and the scope of the appended claims.

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

1. A training device for crippled children, comprising a chassis frame, a pair of swivel mounted wheels mounted on the front end of the chassis frame, a shaft rotatably mounted across the rear end of the chassis frame, a wheel mounted on each end of the shaft for rotation therewith, an upstanding frame extending medially of and joined by its end portions to the front and rear ends of the chassis frame, a frame member depending from the midportion of the underside of the central frame, a pedal crank rotatably mounted in the depending frame member, a pedal including foot securing means rotatably mounted on each end of the pedal crank, a forwardly extending seat mounted on the upper rear portion of the central frame, a leg separating and guiding member extending along the midportion of the central frame and rearwardly of the pedal crank to adjacent the front edge of the seat, a fixed handle bar member secured to the forward end portion of the central frame and arranged above the leg separating and guiding member in advance of the seat, and driving means connected between the pedal crank and the wheel shaft rotating the pedal crank in response to movement of the training device over a supporting surface.

2. A training device for crippled children, comprising a generally rectangular chassis frame, a pair of swivel mounted wheels mounted on the corner portions of the front end of the chassis frame, a shaft rotatably mounted across the rear end of the chassis frame, a wheel mounted on each end of the shaft for rotation therewith, an upwardly arched central frame extending medially of and joined by its end portions to the front and rear ends of the chassis frame, a frame member depending from the midportion of the underside of the arched central frame, a pedal crank rotatably mounted in the depending frame member, a pedal including foot securing means rotatably mounted on each end of the pedal crank, a seat post secured in the upper rear portion of the central frame, a forwardly extending seat mounted on the seat post, a leg separating and guiding member extending along the midportion of the central frame and rearwardly of the pedal crank to adjacent the front edge of the seat, a fixed handle bar member secured to the forward end portion of the central frame and arranged above the leg separating and guiding member in advance of the seat, a pulley wheel secured on the pedal crank, a drive pulley secured on the rear end shaft, and a belt connecting the pulleys.

3. A training device for crippled children, comprising a generally rectangular chassis frame, a pair of swivel mounted wheels mounted on the corner portions of the front end of the chassis frame, a shaft rotatably mounted across the rear end of the chassis frame, a wheel mounted on each end of the shaft for rotation therewith, an upwardly arched central frame extending medially of and joined by its end portions to the front and rear ends of the chassis frame, a frame member depending from the midportion of the underside of the arched central frame, a pedal crank rotatably mounted in the depnding frame member, a pedal including foot securing means rotatably mounted on each end of the pedal crank, a seat post secured in the upper rear portion of the central frame, a forwardly extending seat mounted on the seat post, a leg separating and guiding member extending along the midportion of the central frame and rearwardly of the pedal crank to adjacent the front edge of the seat, a fixed handle bar member secured to the forward end portion of the central frame and arranged above the leg separating and guiding member in advance of the seat, a pulley wheel secured on the pedal crank, a drive pulley secured on the rear end shaft, a belt connecting the pulleys, an electric motor mounted on the rear end of the chassis frame, said motor having a drive shaft pulley, an auxiliary pulley on the rear end shaft, and an auxiliary belt connecting the drive shaft pulley and the auxiliary pulley, whereby the electric motor will rotate the pedal crank when the rear wheels are elevated above the supporting surface.

4. A vehicular type training device, comprising a wheel-supported chassis frame, an upwardly and longitudinally extending central framework rigidly secured to the chassis frame, a forwardly facing seat mounted above the rearward portion of the central framework, a vertically disposed leg separating and guiding member mounted on the central framework and constructed and arranged to extend longitudinally forward as a continuation of the seat and downwardly for engagement by the respective major portions of the inner sides of a user's legs, a pedal crank supported rotatably at the lower side of the central framework forwardly of the seat and beneath the leg-engaged portions of the guiding member, a pedal including foot securing means rotatably mounted on each end of the pedal crank, and driving means connected between the pedal crank and a wheel of the chassis frame rotating the pedal crank in response to movement of the training device over a supporting surface.

5. The combination of claim 4 in which the leg separating and guiding member has spaced lateral sides diverging in a forward direction in advance of the seat.

6. The combination of claim 4 in which a fixed handle bar is mounted above the leg separating and guiding member in a longitudinal position approximating that of the pedal crank.

7. A vehicular type of training device for crippled children, comprising a wheel-supported chassis frame, an upright framework extending above the chassis frame, a forwardly facing seat mounted on the framework above and centrally of the chassis frame, a longitudinal leg separating and guiding member mounted centrally on the framework and extending downwardly in advance of the front of the seat, a pedal crank having a rotatable pedal on each end and supported rotatably by the framework below the leg separating and guiding member in a position to be engaged by the feet of a child occupying the seat, foot securing means on each pedal, and driving means connected between the pedal crank and a wheel of the chassis rotating the pedal crank in response to movement of the training device over a supporting surface.

8. The combination of claim 7 in which the seat is generally rectangular and has side supports,

and a back construction adapted to support the back and head of a child extends upwardly at the rear of the seat.

9. A vehicular type of training device for crippled children, comprising a wheel-supported chassis frame, an upright framework extending above the chassis frame, a forwardly facing seat mounted on the framework above and centrally of the chassis frame, a longitudinal leg separating and guiding member mounted centrally on the framework and extending downwardly in advance of the front of the seat, a fixed handle bar mounted above the leg separating and guiding member for engagement by the hands of a child occupying the seat, a pedal crank having a rotatable pedal on each end and supported rotatably by the framework below the leg separating and guiding member in a position to be engaged by the feet of a

child occupying the seat, foot securing means on each pedal, and driving means connected between the pedal crank and a wheel of the chassis rotating the pedal crank in response to movement of the training device over a supporting surface.

10. The combination of claim 9 in which the seat has a back construction adapted to support the back and head of a child extending upwardly at the rear of the seat.

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