Aug. 6, 1940. B. M. TAYLOR 2,210,269

MEANS TO AID IN REGAINING NORMAL BODY LOCOMOTION

Filed Feb. 1, 1938 2 Sheets-Sheet 1

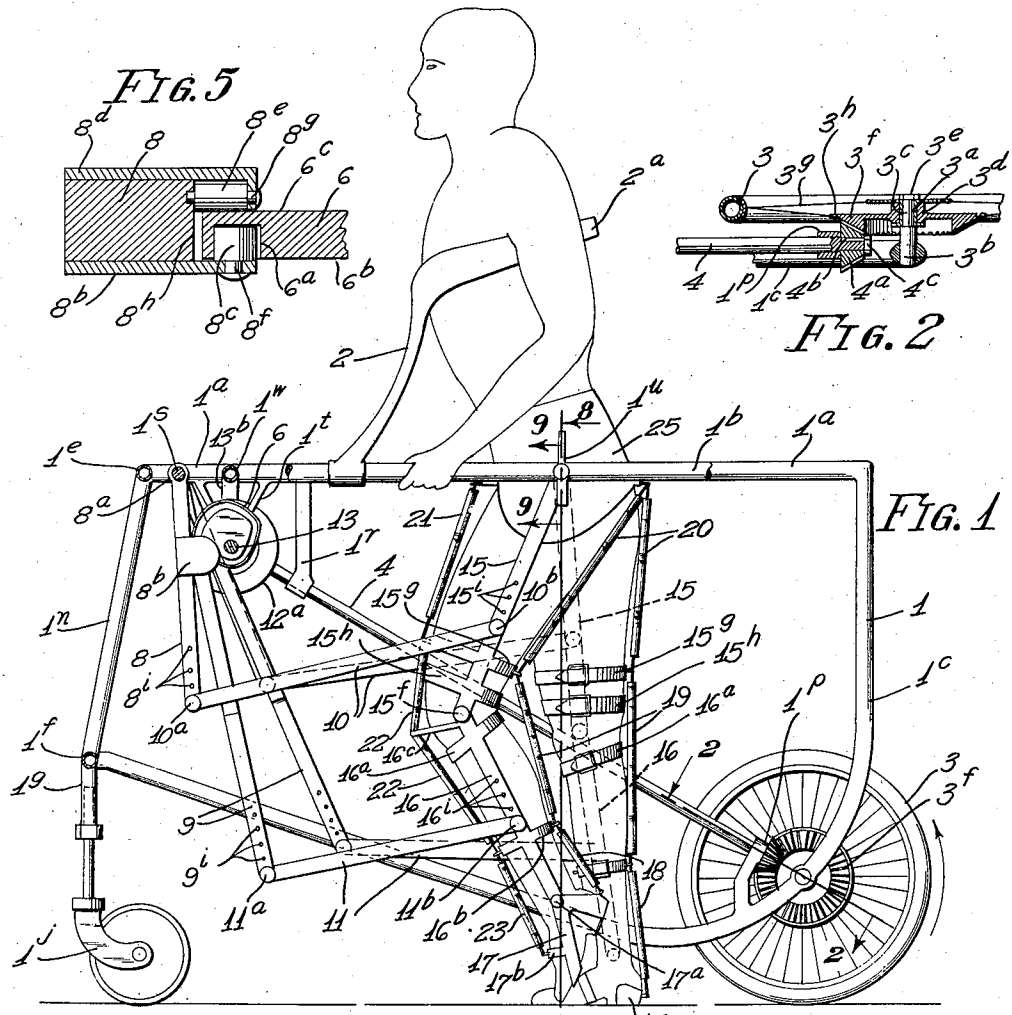

FIG. 1

FIG. 5

FIG. 2

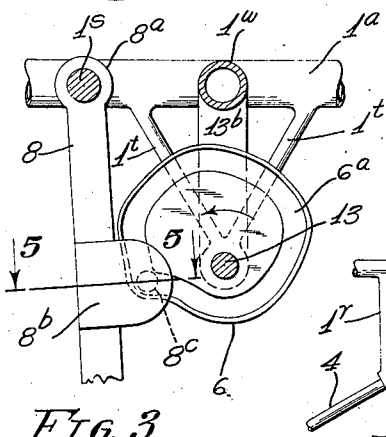

FIG. 3

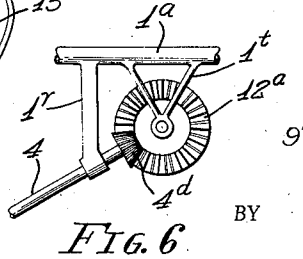

FIG. 6

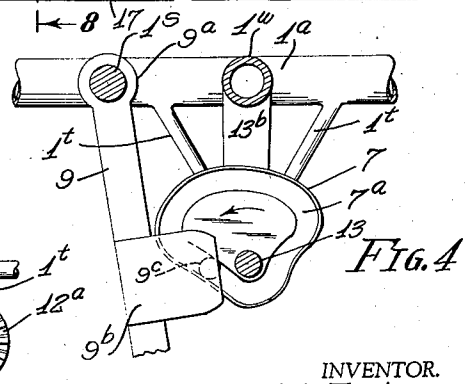

FIG. 4

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MEANS TO AID IN REGAINING NORMAL BODY LOCOMOTION

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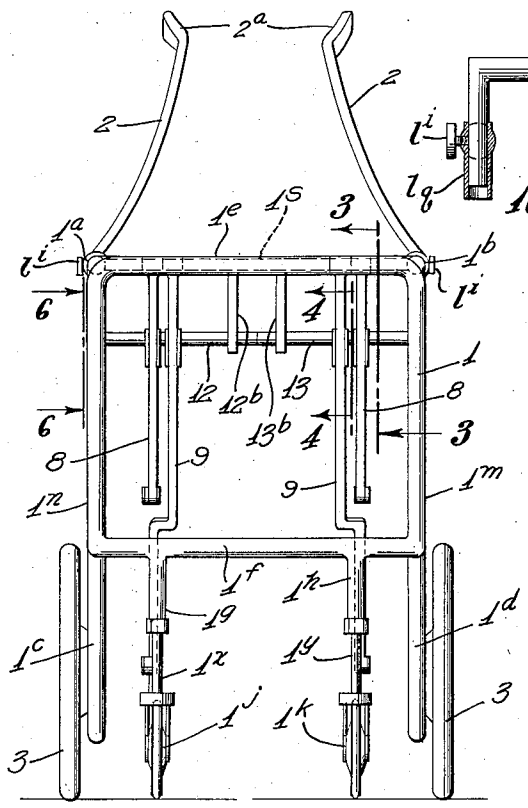

FIG. 7

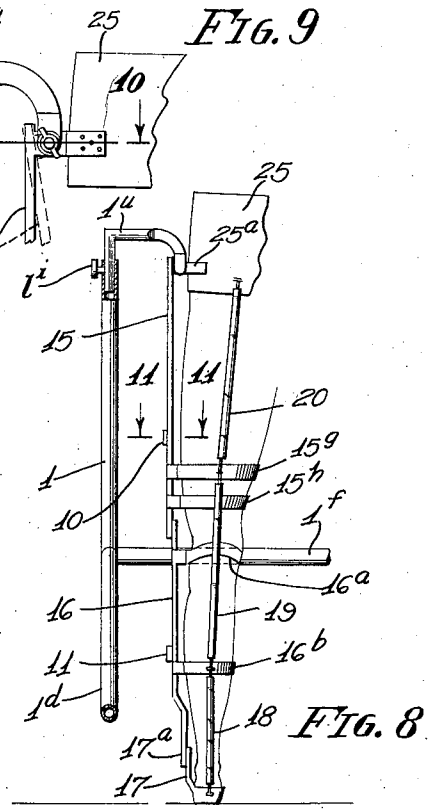

FIG. 8

FIG. 9

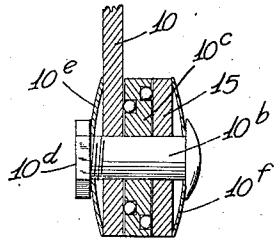

FIG. 11

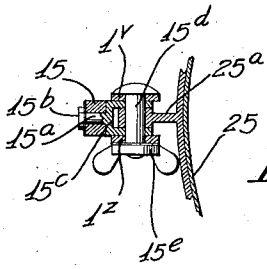

FIG. 10

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UNITED STATES PATENT OFFICE

2,210,269

MEANS TO AID IN REGAINING NORMAL BODY LOCOMOTION

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Application February 1, 1938, Serial No. 188,082

8 Claims. (Cl. 128—40)

My invention relates to means to aid a person in regaining normal body locomotion who has lost the power of self locomotion because of the effect of infantile paralysis or the like.

From a physiological point of view every body movement of a person is the result of balanced contraction and inhibition of numerous opposed muscles or opposed groups of muscles as effected by their controlling nerves. The poise and readiness for instant action of any person's body depends upon the condition of the numerous balanced sets of opposing muscles and nerves in a person's body. This state of opposed muscle balance is known as muscle "tone" or "tonic contraction"; and in moving any part of the body, which is done by these opposed muscle groups, when one muscle or one set of muscles contracts, the tone of its antagonist is inhibited and the relative degree of contraction and inhibition depends upon the mass and speed of the organ in action. Thus in walking, the whole action of the leg and foot depends upon the relative degree of tone or elasticity of opposing muscles connected to the bones of the hip, leg, and foot. These opposing muscles are continuously taut like stretched rubber bands. In infantile paralysis when one of these opposing muscle groups has been attacked leaving its opposing group unaffected, soon thereafter the affected muscle, because the disease prevents normal stimulation by the nerves, loses its elasticity and becomes flaccid. Then its antagonist having no opposition, sharply contracts, thereby overstretching the defective muscle and pulling their skeletal member, such as the foot, out of its normal position. Pathological literature stresses the fact that not until sometime later does atrophy of the affected muscle and other attendant evils begin. Because the affected muscle or muscles are abnormally stressed, the result is enfeebled circulation of the blood and constriction of the nerves. Because of these abnormal stresses thus set up, there is malnutrition of the bones. These abnormal stresses, plus immobility, over a period of time may cause ankylosis of the joints and deformities, such as clubfoot. Under conditions such as these, not only will the affected muscle atrophy, but its overly-contracted and disused antagonist will, after a time, also atrophy.

Modern treatment, to hold the affected organ in normal position begins by putting the affected organ in plaster casts and braces; but such casts do not permit any movement of the affected muscle, and such immobility and disuse will of itself result in regressive metamorphosis and atrophy.

Accordingly it is proposed to provide a means of skeletal-muscular reenforcement in the form of an articulated brace means which may be applied to the patient at the end of the acute stage of the disease as soon as the affected group of muscles is discovered, which articulated brace means will not only support the affected body member, but which articulated brace means will also have yieldable tension members to substitute for the loss of elasticity of the affected muscle or group of muscles.

By providing such a means the over-extension of the affected muscle and the over-contraction of its antagonist will be prevented, normal circulation will be maintained, abnormal strains and stresses in muscles and deformities of bones will not occur; and because the limb will be held in a natural position, it may be exercised while the patient is convalescing; and with the patient kept in a normal position, all of his energy may be thus directed toward combatting the ravages of the disease itself.

Because of the muscle tone of a person, the skeletal and muscular system of each body member, as a leg or arm, is maintained in a state of equilibrium sometimes known in the science of anatomy and physics as tone or "resonance." By varying the tone or elasticity of the muscles, a "tuned" system is thus provided within the body for any particular function, such as walking or running, and this system accounts for the quickness and smoothness of bodily actions and for the tremendous amount of exercise the body can do by expending a comparatively small amount of energy. If a muscle or group of muscles loses its tone or elasticity, the tone of a body member actuated by those muscles is destroyed for all those actions which the affected member would normally perform, and its movement will then require excessive energy and will be awkward, jerky, and spasmodic. In walking for example, under such conditions the entire complex system becomes unbalanced and distorted. In order to walk at all, the body is compelled by integrative adaptation, to ignore the affected factors and to alter the unaffected factors and thus evolve a new system of locomotion resulting in a perverted function of the body members.

It is proposed in addition to applying a means of skeletal muscular reenforcement to the affected organ so that tonic unbalance will be prevented, to also provide for the adjustment or variation of the said means so that resonance of the entire system, natural and artificial, be gained thus enabling the person to maintain normal

movement and positions of the affected limb, or member of the body.

At first an attendant will merely exercise the affected limb or member after the means of skeletal muscular reenforcement has been adapted thereto. Because the tension of the yieldable means of the articulated brace means may be altered, the limb or member may be moved at different rates, and because the system is maintained at resonance, comparatively little energy will be required for movement, so that the patient will soon be able to aid in the exercise. During the later stages of convalescence, if in spite of the affected organ being kept and exercised in a state of resonance, the patient is too weak to resume normal locomotion alone, it is proposed to provide a means which attaches to the body and limbs of the patient and which aids and forces him through the normal environment of locomotion and which is to be used in combination with the means which maintains tonic balance and muscular skeletal resonance so that the patient can re-educate himself in all the complicated reactions of self-locomotion.

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 side elevational view of the means to aid in regaining normal body locomotion, with parts and portions broken away to facilitate the illustration; Fig. 2 is an enlarged sectional view taken along the line 2—2 of Fig. 1; Fig. 3 is an enlarged sectional view taken along the line 3—3 of Fig. 7; Fig. 4 is an enlarged sectional view taken along the line 4—4 of Fig. 7; Fig. 5 is a further enlarged view taken along the line 5—5 of Fig. 3; Fig. 6 is a fragmentary view taken along the line 6—6 of Fig. 7; Fig. 7 is a front elevational view; Fig. 8 a fragmentary sectional view taken along the line 8—8 of Fig. 1; Fig. 9 is an enlarged fragmentary sectional view taken along the line 9—9 of Fig. 1; Fig. 10 is a fragmentary sectional view taken along the line 10—10 of Fig. 9; and Fig. 11 is a fragmentary sectional view taken along the line 11—11 of Fig. 8.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings:

Frame 1, support members 2, rear wheels 3, cam drive shaft 4, cam shafts 12 and 13, cam members 6 and 7, cam levers 8 and 9, link members 10 and 11, brace members 15 and 16, foot supports 17, springs 18, 19, 20, 21, 22, and 23 and the belt 25 constitute the principal parts and portions in my means to aid in regaining normal body locomotion.

The frame member 1 is of tubular construction and has the two parallel and horizontally positioned bar members 1*a* and 1*b*. These two bar members 1*a* and 1*b* are secured together at their forward ends by the cross bar member 1*e* but not at their rearward ends. Also to the forward end of the bar member 1*a* is secured the upper end of the post member 1*n* and to the forward end of the bar member 1*b* is secured by its upper end the other post member 1*m*. The lower ends of these two post members 1*m* and 1*n* are secured together by the cross bar member 1*f*. Secured to the rearward end of the bar member 1*a* is one end of the member 1*c*. The other end of this member 1*c* is secured to the lower end of the post member 1*n* at its junction with cross bar member 1*f*. To the rearward end of the horizontal bar member 1*b* is secured a member 1*d* similar in shape to the member 1*c*. This member 1*d* is secured by its forward end to the lower end of the post member 1*m* at its junction with the cross bar member 1*f*. Thus the tubular member 1*a*, 1*c* and 1*n* all form one side of the frame member 1 and all lie substantially in a vertical plane and the members 1*b*, 1*d*, and 1*m* all form the other side of the frame member 1 and all lie substantially in a vertical plane, and these two sides of the frame 1 are secured together at their forward ends by the cross bar members 1*e* and 1*f* as hereinbefore described. This is all shown best in Figs. 1 and 7 of the drawings. The side of the frame 1 which includes the member 1*c* is supported at its rear end upon the wheel 3. This wheel 3 is revolubly mounted upon the stub shaft 3*a*, which shaft is rigidly secured by its end 3*b* through the frame member 1*c* as shown best in Fig. 2 of the drawings. The portion 3*c* of the stub shaft 3*a* is of smaller diameter than the portion 3*b* of the stub shaft 3*a*. The hub 3*d* is journalled over this reduced portion 3*c* and is held upon this stub shaft 3*a* by the nut 3*e*. Secured upon this hub 3*d* is the bevel gear 3*f*, which gear 3*f* revolves as the wheel 3 turns. Some of the spokes 3*g* of the wheel 3 connect with the hub 3*d* and some of these spokes 3*g* connect with the bevel gear 3*f* at the periphery of its flange 3*h*. Meshing with this bevel gear 3*f* is the pinion gear 4*a*. This pinion gear 4*a* is keyed to the lower end of the cam drive shaft 4 by means of the key 4*b* and is secured upon the lower end of this drive shaft 4 by means of the nut 4*c*. This shaft is journalled within the support 1*p* at its lower end, and this support 1*p* is integral with the frame member 1*c*, all as shown best in Figs. 1 and 2 of the drawings. Hence, as the wheel 3 revolves, the shaft 4 will also revolve because of the beveled gear 3*f* and the pinion gear 4*a* meshing therewith.

The side of the frame 1 which includes the member 1*d* is supported at its rear end by a wheel 3 similar to the one supporting the side of the frame 1 which includes the member 1*c*. And, the wheel 3 supporting the side of the frame 1 including the member 1*d* also has bevel gears like 3*f* and 4*a*. This wheel is supported upon a stub shaft similar to 3*a*, which shaft is rigidly secured by one end in frame member 1*d*.

Secured to the underside of the cross bar member 1*f* at the forward end of the frame 1 are the downwardly depending post members 1*g* and 1*h* as shown best in Figs. 1 and 7 of the drawings. To the lower end of the post 1*g* is secured the caster wheel 1*j*, the rod 1*x* thereof telescoping into the tubular post 1*g* and secured therein by an adjustment nut. To the lower end of the post 1*h* is secured the caster wheel 1*k*, the rod 1*y* thereof telescoping into the tubular post 1*h* and secured therein by an adjustment nut, thus providing support for the front end of the frame 1 and also providing a means by which the front end of said frame may be adjusted up or down.

The cam drive shaft 4 is supported at its lower end by the journal member 1*p*, which member 1*p* is integral with the frame member 1*c* and at its upper end by the journal member 1*r*, which member 1*r* is integral with the horizontal bar 1*a*. This shaft 4 lies in the vertical plane defined by the frame member 1*a*, 1*c*, and 1*n* as hereinbefore described. To the upper end of this cam drive shaft 4 is secured the pinion 4*d* to rotate therewith. This pinion 4*d* drives the bevel gear 12*a* and is shown in Figs. 1 and 6 of the drawings.

This bevel gear 12a is keyed to the cam shaft 12 to revolve therewith.

The cam shafts 12 and 13, as shown best in Fig. 7 of the drawings, lie in a common axis, which axis extends transversely across the forward end of the frame 1, the one ends of said shafts being adjacent to each other midway along their common axis between the members 1a and 1b. The cam shaft 12 is revolubly positioned between the bearing brackets 1t and 12b. The cam shaft 13 is revolubly positioned between a bearing bracket (not shown) similar to 1t and downwardly depending from the under side of the bar 1b and the bracket 13b. The bracket 1t is downwardly depending from the under side of the bar 1a as shown best in Fig. 3. The brackets 12b and 13b are both secured to and downwardly depending from the tubular bar member 1w, which bar 1w extends transversely between bars 1a and 1b and is secured thereto.

The shaft 12 is driven through shaft 4 from the wheel 3 supported by frame member 1c as hereinbefore described. The shaft 13 is similarly driven from the wheel 3 supported by frame member 1d. Hence, the two shafts 12 and 13 revolve independently of each other.

The cam shaft 13 is provided with cams 6 and 7 and the cam shaft 12 is provided with cams like 6 and 7. The cam 6 is provided with a groove 6a in the face 6b near its periphery. This groove 6a receives the roller member 8c. The cam 7 is also provided with a groove 7a near its periphery to receive a roller member 9c over a construction similar to roller 8c.

Transversely positioned across the upper front end of the frame 1 between the horizontal bar members 1a and 1b is the cam lever shaft member 1s. This shaft 1s is rigidly secured between these members 1a and 1b. The cam levers 8 and 9 are journalled upon this shaft 1s by their upper ends 8a and 9a respectively as shown best in Figs. 1, 3, 4, and 7 of the drawings. In Figs. 1 and 7 a pair of cam lever members 8 and a pair of cam lever members 9 are shown. Near the upper ends of each of the pair of cam lever members 8 are secured a pair of roller support members 8b and 8d, these members 8b and 8d being positioned on opposite sides of the cam levers 8 as indicated best in Fig. 5 of the drawings. It will be noted particularly in Fig. 5 that these support members 8b and 8d extend beyond the edge 8h of the cam levers 8. The member 8b has secured to its inside face the roller 8c by means of the pin 8f. This roller, as hereinbefore described, engages with the groove 6a of the cam member 6. The support member 8d carries one end of the roller pin 8g, which pin carries the roller 8e and which extends into the cam lever 8 as shown best in Fig. 5. This roller 8e engages the face 6c of the cam member 6. The cam levers 9 are provided with roller members similar to roller members 8c and 8e to engage the cam 7.

To the lower end of each of the cam levers 8 is secured a link member 10. To the lower ends of each of the cam levers 9 is secured the link members 11.

In Fig. 1 of the drawings, the figure of a person is illustrated in the relative position the figure will take with respect to the frame 1. It will be noted in Figs. 1 and 7 that support members 2 are shown. One support member is secured to the horizontal bar 1a and the other support member is secured to the horizontal bar 1b. The upper ends 2a of each of these support members 2 will engage the body of the person under the arm pits, as shown best in Fig. 1 of the drawings. Secured about the hips and abdomen of the person is a belt 25. Secured to each side of the belt 25 so as to be on opposite sides of the wearer and over each hip bone are a pair of lug members 25a. The lug 25a shown in Fig. 10 of the drawings is bored to receive the bolt 15d. To each of the horizontal bar members 1a and 1b and directly opposite each other are secured by their one ends the support members 1u by set screws 1i within sleeve 1q. The sleeves 1q are integral with the respective bar members 1a or 1b and the members 1u may slide therein when released by set screw 1i for adjustment up or down. A member 1u is shown best in Figs. 1, 8, and 9 of the drawings. The other end of each of these support members 1u is bifurcated and these bifurcated portions 1v and 1z are bored to receive the bolt 15d as shown best in Fig. 10 of the drawings. Extending between the bifurcated arms 1v and 1z of the member 1u and the lug 25a are the ends of the bifurcated member 15c, the bolt 15d and the wing nut 15e serving to hold these members in the position shown for them in Fig. 10 of the drawings. The bifurcated member 15c is provided with the stud 15a which extends through a bore in the upper end of the brace member 15 and is secured thereto by the nut 15b. Thus the upper end of this brace member 15 may pivot about the stud 15a and it may also swing about the axis of the bolt 15d. The axes of the stud 15a and of the bolt 15d are at right angles to each other and both lie in the same plane. The position the brace member 15 will assume as it swings about the axis of the bolt 15d is shown by dotted outline in Fig. 9 of the drawings.

The brace member 16 is pivotally connected to the lower end of the brace member 15 at 15f. One end of the link member 10 is secured to the brace member 15 at 10b, and the other end of the link member 10 is secured to the lower end of the cam lever 8 as shown best in Fig. 1 of the drawings. One end of the link member 11 is pivotally secured to the brace member 16 at 11b and the other end of the link member 11 is secured to the lower end of the cam lever 9 at 11a as shown best in Fig. 1 of the drawings.

For purposes of adjustment the brace member 15 is provided with a plurality of bores 15i through any one of which the pin 10b may be journalled to secure link 10 to brace 15. Similarly cam lever 8 is provided with a plurality of bores 8i through any one of which the pin 10a may be journalled to secure link 10 to cam lever 8. The brace member 16 is provided, in like manner, with a plurality of bores 16i to receive pin 11b to secure link 11 to brace 16, and cam lever 9 is provided with a plurality of bores 9i to receive pin 11a to secure link 11 to cam lever 9.

The thigh of the individual is secured to the brace member 15 by means of the straps 15g and 15h, and the leg of the individual is secured to the brace member 16 by means of the straps 16a and 16b. To the lower end of the brace member 16 is pivotally secured the foot supports 17 by means of the pivot 17a. The individual's foot is secured within this foot support by means of the strap 17b. Between the heel portion of the foot support 17 and the strap 16b is secured the tension spring 18. Between the straps 16b and 15g is secured the tension spring 19. Between the straps 15g and the back portion of the belt 25 is secured the tension spring 20. Between the front portion of the belt 25 and the front portion of the strap 15g is secured the tension spring 21. Be-

tween the front portion of the strap 15*g* and the front portion of the strap 16*b* and extending over the support 16*c* is another tension spring 22. Between the front portion of the strap 16*b* and the strap 17*b* of the foot support 17 is secured a tension spring 23.

The pivotal joints at 10*a*, 10*b*, 11*a*, 11*b*, 15*f*, and 17*a* are similar in construction to the pivotal joints disclosed in Fig. 11 of the drawings. The Fig. 11 is a sectional view taken along the line 11—11 of Fig. 8 and shows the link member 10 pivotally secured to the brace member 15 by means of the bolt 10*b*. Between the link member 10 and the brace member 15 is positioned the bearing member 10*c*. Between the head of the bolt 10*b* and the side of the brace member 15 is positioned a washer member 10*f*. Between the face of the link member 10 and the nut 10*d* is the washer 10*e*.

The means to aid in regaining normal body locomotion is to be used in the following manner:

After the muscles affected by infantile paralysis or the like are discovered, and should those muscles so affected be in the lower limbs of a person's body, the articulated brace means consisting of the belt 25, the braces 15 and 16, the foot support 17, and the readily removable spring members 18 to 23 inclusive may be secured to the limb affected by infantile paralysis or the like. This may be done as soon as the fever caused by the disease has subsided and should be done before the affected members become atrophied. The belt 25 may be of any suitable type and is to fit over the hips of the person and around his abdomen. The articulated brace members 15 and 16 are secured to the affected limb by means of the strap member 15*g* and 15*h*, 16*a* and 16*b*, and by means of the foot support 17 and its strap 17*b*. The brace member 15 will be secured to the belt 25 by means of the pin 15*d* and wing nut 15*e*, as shown in Fig. 10 of the drawings. This articulated brace means is to be worn by the afflicted individual while still confined to his bed. Obviously it will be worn only upon the limb afflicted by infantile paralysis or the like, although in Fig. 1 of the drawings it is shown on both of the lower limbs for illustrative purposes only. The tension spring members 18 to 23 inclusive are attached as hereinbefore described. It should be noted that the springs 20 and 21 are opposed to each other as are the springs 19 and 22, and 18 and 23, so that when the limb is forced through the normal motion of walking that these opposed pairs of springs will be acting against each other in much the same manner as the muscles of the limb would be. Any spring tension desired may be attained simply by substituting a different spring having a different spring tension wherever desired.

The individual wearing this articulated brace means may have the affected limb exercised by aid of an attendant, such attendant forcing the affected limb through the normal motions of walking.

In addition to the use of the articulated brace means, there is to be provided for use in connection therewith, a means which will force the affected limb through the normal motions of walking when the individual is in an upright position and when the individual is moving forward. This means consists of the frame 1, the support member 2, the rear wheel 3, the cam drive shaft 4, cam shafts 12 and 13, cams 6 and 7, cam levers 8 and 9 and links members 10 and 11. This means is open at its rearward end as has been hereinbefore described so that the individual may be walked into this means between the horizontal bar members 1*a* and 1*b* so that the support members 2 and particularly the portions 2*a* thereof come into engagement with the individual beneath the arm pits. When in this position the articulated brace means may be connected to the horizontal bar members 1*a* and 1*b* by the pin 15*d* being connected with the bifurcated portions 1*v* and 1*z* of the members 1*u*, as shown best in Figs. 8, 9, and 10 of the drawings. At the same time the link members 10 may be connected with the brace members 15 and the link members 11 may be connected with the brace members 16 all as hereinbefore described. While in Fig. 1 for illustrative purposes, the person shown is wearing two of the articulated brace means, one upon each of his lower limbs, and while the link members 10 and 11 are shown connected to each of these, it is to be understood that this may be varied from depending upon which of the limbs of the individual is affected.

As the individual moves forward while in connection with the means to aid in regaining normal body locomotion, the rear wheels 3 in turning will revolve the cam shafts 12 and 13, all as hereinbefore described, so as to revolve the cam members 6 and 7 about their said cam shafts 12 and 13. As the cam 6 revolves, the cam lever 8, because of its engagement with said cam member 6 will oscillate about the shaft 1*s* and will move the link member 10 so as to cause the brace member 15 in connection therewith to simulate the normal movement of walking. At the same time the cam 7 will be revolved about its cam shaft and because of its connection with the cam lever 9 will cause lever 9 to oscillate about the shaft 1*s* so as to force the brace member 16 through its connection with link 11 to simulate the normal motion of walking. The pattern for the cams 6 and 7 are such as to give to their respective brace members 15 and 16 the proper coordinated motion for walking when the cams 6 and 7 are themselves properly coordinated with respect to each other upon cam shafts 12 and 13.

While the inventive idea has received expression in a particular application; namely, to walking, it is clear that the means to aid in regaining normal body locomotion can be applied to any other body movement than walking. And further, that the means can be applied to other members of the body than the lower extremities. Also the means of skeletal reenforcement may be applied likewise to other members of the body than the lower extremities to hold the affected member in a normal position and to maintain tonic balance in that member. The adaptation of the means to aid in regaining normal body locomotion for the motion of walking is for the purpose of illustrating the inventive idea.

Though I have shown and described a particular construction, combination, and arrangement of parts and portions, I do not wish to be limited to this particular construction, combination, and arrangement, but desire to include in the scope of my invention, the construction, combination, and arrangement substantially as set forth in the appended claims.

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

1. In a means to aid in regaining normal body and limb locomotion, a mobile frame mounted upon wheels, a cam and lever means in cooperative connection with one of said wheels and op-

erated therefrom by the motion of said wheel, an articulate brace means in operative connection with said cam and lever means and supported by said mobile frame member.

2. In a means to aid in regaining normal body and limb locomotion, a mobile frame, wheels upon which said frame is movably supported, said frame including a pair of upwardly extending spaced apart body support members arranged to engage a person's body beneath the arm pits, said mobile frame being open at its rearward portion to permit a person's body to move into engagement with said body support members, an articulated brace means arranged to fit the limbs of the body and cam, gear and lever means cooperatively connecting said wheels with said brace means adapted to simulate the motion of walking supported by said mobile frame.

3. In a means to aid in regaining normal body and limb locomotion, an articulated brace means including a belt arranged to fit about a person's abdomen and over the hips, a brace member pivotally connected with said belt, said brace member provided with strap members to be secured to a person's limb above the knee, another brace member pivotally connected to the aforesaid brace member adjacent the knee and having strap members to be secured about a person's limb below the knee, a foot support member in pivotal connection with the last mentioned brace members, and a plurality of opposed yieldable means connected between the aforesaid belt brace member and foot support at the front and back sides of the limbs.

4. In a means to aid in regaining normal body and limb locomotion, a mobile frame member mounted on wheels including a pair of longitudinally extending spaced apart parallel bars, a shaft mounted between said bars and operated by one of said wheels, a plurality of cam levers supported at their upper ends on said frame arranged to oscillate about the axis of said shaft, and a plurality of cam members one for each cam lever in operative engagement with said cam levers to oscillate said levers as said cam members rotate.

5. In a means to aid in regaining normal body and limb locomotion, a mobile frame member mounted on wheels including a pair of longitudinally extending spaced apart parallel bars, a shaft mounted between said bars and operated by one of said wheels, a plurality of cam levers supported at their upper ends on said frame arranged to oscillate about the axis of said shaft, a plurality of cam members one for each cam lever in operative engagement with said cam levers to oscillate said levers as said cam members rotate, and a plurality of link members, one for each cam lever member in pivotal connection therewith and articulated brace means operatively connected with said link members.

6. In a means of skeletal muscular reenforcement, a pair of articulated brace members including means for securing said brace members to a person's body and limbs, and yieldable tension members in connection with said articulated brace members, positioned in opposed tension relation to each other on the front and back sides of the limbs of said body and extending longitudinally of said limbs.

7. In a means to aid in regaining normal body locomotion, a mobile frame member mounted on wheels and supported thereby, a cam and lever means to simulate a normal body movement supported by said mobile frame member, and an articulated brace means in connection with said cam and lever means.

8. In a means to aid in regaining normal body locomotion, a mobile frame member mounted upon wheels and a cam and lever and articulate brace means to simulate a normal body limb movement in cooperative connection with one of said wheels and operated therefrom by the motion of said wheel, said cam and lever means supported by said mobile frame member.

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