

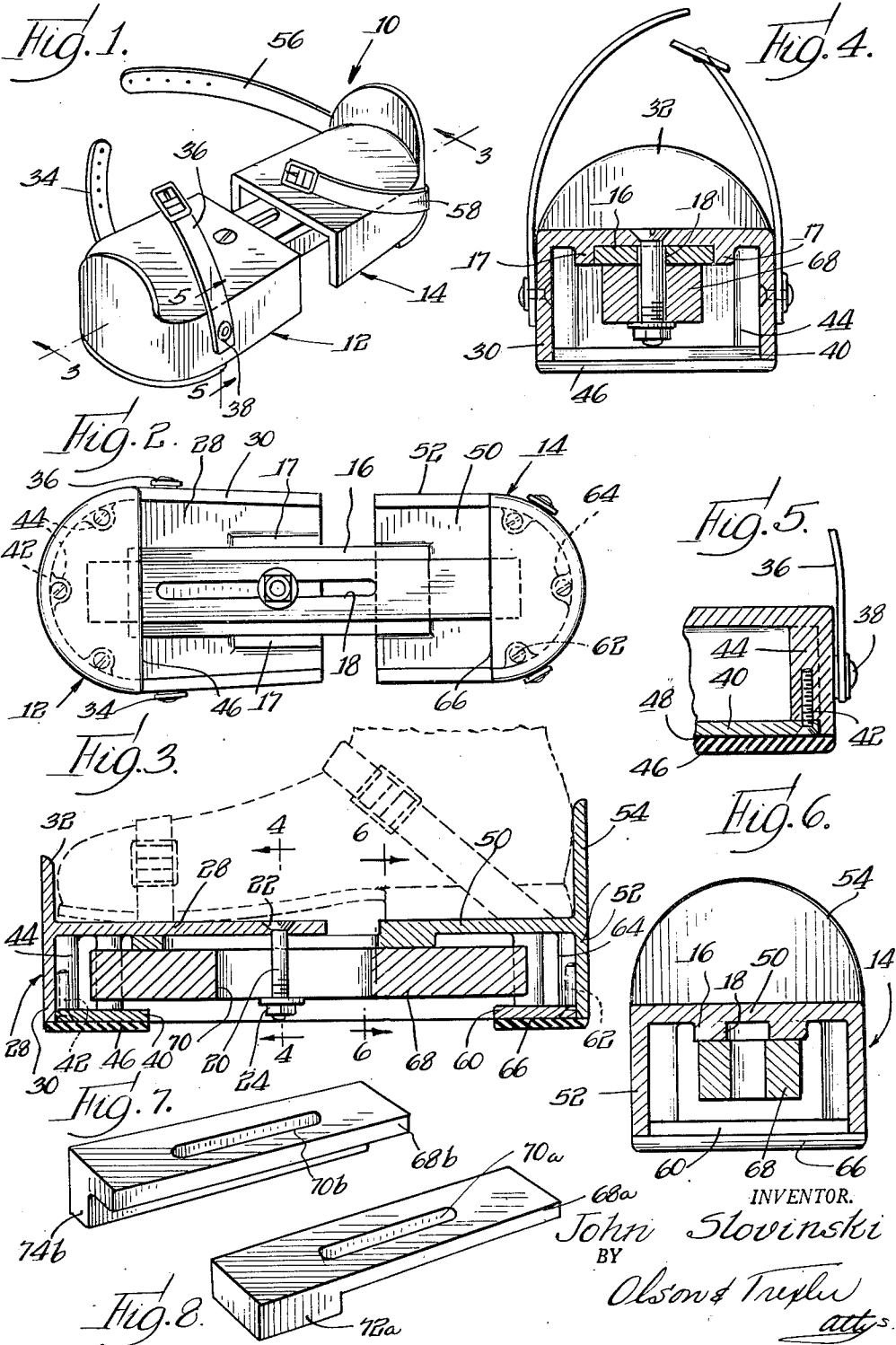
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J. SLOVINSKI

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THERAPEUTIC SHOE

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INVENTOR.
John Slovinski
BY
Olson & Triplett
attys.

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THERAPEUTIC SHOE

John Slovinski, Ottawa, Ill.

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The present invention relates to a novel therapeutic shoe and, more particularly, a novel shoe for use in physical therapy treatments of patients suffering from cerebral palsy and poliomyelitis.

Patients suffering from cerebral palsy and diseases having similar effects often have undeveloped and partially paralyzed leg muscles. When this occurs, it is necessary to build up the leg muscles and the patient must learn to use the muscles so that he can walk. In the past, one method of building up leg muscles was to strap a weight to the patient's foot and have him lift the foot repeatedly. While this method is sometimes adequate for adults, it is often unsuitable for small infants who have a short attention span and cannot be interested in performing the exercise for a sufficient length of time to be beneficial.

When cerebral palsy patients are learning to walk, there is often a tendency for them to move their legs in a more or less uncontrolled manner so that the legs may flail outwardly or cross over. In addition, since such patients do not have a normal feel in their legs, it is often very difficult for them to stand so that at best they stand uncertainly. This nervousness may cause the patient's legs to shake, thereby making it even more difficult to stand or walk. Another difficulty some patients have is that their ankles tend to turn in or out, or they tend to drag either their heels or their toes.

It is an object of the present invention to provide a novel therapeutic walking shoe for patients suffering from cerebral palsy, poliomyelitis and the like, which shoe helps to build up the leg muscles of the patient, and at the same time helps the patient to walk.

Another object of the present invention is to provide a novel therapeutic shoe of the above described type which may be adjusted as to weight and size to fit the requirements of the particular patient.

Still another object of the present invention is to provide a therapeutic shoe of the above described type which may be unbalanced in a predetermined manner to correct the tendency of a patient to turn his foot or drag the heel or toe.

Other objects and advantages of the present invention will become apparent from the following description and the accompanying drawing wherein:

Fig. 1 is a perspective view illustrating the therapeutic shoe embodying the principles of this invention;

Fig. 2 is a bottom plan view of the novel therapeutic shoe;

Fig. 3 is an enlarged vertical cross-sectional view taken along line 3—3 in Fig. 1 and illustrates further in broken lines how a patient's foot may be strapped to the shoe;

Fig. 4 is a vertical cross-sectional view taken along line 4—4 in Fig. 3;

Fig. 5 is an enlarged fragmentary vertical cross-sectional view taken along line 5—5 in Fig. 1;

Fig. 6 is a vertical cross-sectional view taken along line 6—6 in Fig. 3; and

Figs. 7 and 8 are perspective views showing different forms of weights that may be used in the novel shoe of this invention.

Referring now more specifically to the drawings, wherein like parts are designated by the same numerals throughout the various figures, a therapeutic shoe 10 embodying the principles of this invention includes a toe section 12 and a heel section 14. A tongue 16 is secured to or made integral with the heel section 14 and extends forwardly into the toe section 12 between a pair of guides 17. The tongue is provided with an elongated slot 18 adapted to receive

slidably a screw 20 extending through an aperture 22 in the toe section for adjustably connecting the toe and heel sections together. A nut 24 and lock washer 26 are applied to the screw for retaining the toe and heel sections in the desired adjusted positions. With this structure, it is seen that the shoe of this invention may be adjusted to fit the feet of different patients. It is obvious, however, that the shoe may be made in different sizes and, preferably, a relatively small shoe should be made for infants up to the age of about 7 years, a medium size shoe should be made for adolescents and a larger shoe should be made for adults. As shown in the drawings, the toe section 12 is hollow and includes a sole plate 28 having an integral peripheral flange 30 depending therefrom so that the section has a transverse cross section of inverted U-shape. At the forward end of the toe section is an upstanding flange 32 for confining the toe of the patient's foot and suitable strap members 34 and 36 are secured to the toe section by rivets 38 for attaching the toe section to the patient's foot. A toe plate 40 extends across and covers the forward portion of the toe section bottom. This plate member preferably fits within the periphery depending flange 30 and is secured in position by screws 42 which are threaded into bosses 44 formed integrally with the depending flange. In order to facilitate walking on the shoe, a friction pad 46 of rubber or any other suitable material is secured to the toe plate 40 by means of a film of glue 48. The heel section 14 is also hollow and includes a sole plate 50 having a peripheral flange 52 depending therefrom. At the back of the heel section, there is provided an upstanding flange 54 for retaining the patient's foot and suitable strap members 56 and 58 are riveted or otherwise secured to the heel section for attaching this section to the patient's foot. The rearmost bottom portion of the heel section is closed by a heel plate 60 which is secured in place by a plurality of screws 62 threaded into bosses 64. A rubber friction pad 66 is also adhesively secured to the heel plate 60.

In accordance with an important feature of the present invention, a weight member 68 is detachably secured within the hollow sections of the shoe. Preferably, this is accomplished by extending the screw 20 through a slot 70 in the weight. The weight 68, which is preferably made of lead, may be of various sizes and shapes. In the embodiment illustrated, the heel and toe sections are constructed from cast aluminum so that by varying the size of the weight 68, the overall weight of the shoe may be varied through a considerable range to fit the requirements of the particular patient using the shoe. Thus, it should be understood that the weight 68 may be of any size ranging from a few ounces, for example, to two or three pounds, with the only limitation on the size of the weight resulting from the limited volume of lead or the like that may be inserted within the shoe. As shown best in Figs. 2 and 3, the weight 68 extends well into both the toe and heel sections so that the weight is evenly distributed throughout the entire shoe. The elongated slot 70 in the weight enables the weight to be adjusted relative to the screw 20 so that upon adjustment of the toe and heel sections toward or away from each other, the weight may be adjusted to balance the shoe. Alternatively, the weight 68 may be adjusted to overload either the toe or heel section to correct a patient who has a tendency to drag either his toe or heel. This result may also be accomplished by substituting for the weight 68 a weight 68a, shown in Fig. 8. The weight 68a is provided with an enlargement 72a at one end for unbalancing either the toe or heel section of the shoe. While the weight 68 is illustrated as being uniform in size transversely of the shoe, the shoe may be unbalanced at one side by providing a weight 68b, shown in Fig. 7, which has a marginal longitudinal extending enlargement 74b. The weight 68b is useful for correcting any tendency of the patient's ankle to turn either inwardly or outwardly.

The novel shoes of this invention are beneficial to the patient in several ways. For example, as is well known, normal walking does not build up the leg muscles beyond a certain point. However, with the novel shoe of the present invention, the weight of the shoe may be easily changed by substituting weight members of different sizes so that as the patient improves, the weight may be increased to

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encourage further improvement. While the shoe is beneficial to patients of all ages, it is especially useful for small infants. This is because such infants often will not exercise for the required length of time and, with the shoes of the present invention, the infants will receive the desired exercise while at play. In addition to being beneficial for exercising the patients, it has been found that the novel shoes of this invention aid the patients to learn to walk. In the first place, by weighting the feet, the patient is given a relatively secure feeling when he attempts to stand. Thus, with increased confidence, the patient is better prepared to attempt to walk. The additional weight on the feet also helps the patient to move his legs properly for walking since the weighted shoes tend to reduce over-movement or uncontrolled flailing of the legs.

While the preferred embodiment of the present invention has been shown and described herein, it is obvious that many structural details may be changed without departing from the spirit and the scope of the appended claims.

The invention is claimed as follows:

1. A physical therapeutic walking shoe for building up muscles damaged by cerebral palsy, poliomyelitis and the like and for helping patients having such damaged muscles to learn to walk, said shoe comprising a hollow heel section, a hollow toe section, means adjustably connecting said sections together, means for attaching said sections to a foot of a patient, a replaceable weight member disposed within said hollow heel and toe sections, and means for removably retaining said weight member within said heel and toe sections, whereby said weight member may be replaced by another weight member of a different size to adjust the weight of the shoe to the needs of the patient.

2. A physical therapeutic walking shoe, as defined in claim 1, wherein each of said sections has an inverted U-shaped transverse cross section and which shoe includes

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means having friction pads covering forward and rearward bottom portions of the toe and heel sections respectively to facilitate walking on the shoe.

3. A physical therapeutic walking shoe for building up muscles damaged by cerebral palsy, poliomyelitis and the like and for helping patients having such damaged muscles to learn to walk, said shoe comprising a hollow heel section, a hollow toe section, a slotted tongue member secured to one of said sections and extending within the other of said sections, screw means extending through said other of said sections and the slotted tongue member for adjustably retaining said toe and heel sections together, means for attaching said toe and heel sections to a foot of a patient, and a weight member having an opening there-through disposed within said hollow toe and heel sections, said screw means extending through said opening in the weight member for removably retaining the weight member, whereby said weight member may be replaced by a weight member of different size to adjust the overall weight of the shoe to the needs of the patient.

4. A physical therapeutic walking shoe, as defined in claim 3, wherein said opening in said weight member is elongated to permit the position of the weight member within the hollow sections to be adjusted.

5. A physical therapeutic walking shoe, as defined in claim 3, wherein said weight member is provided with an enlarged portion which may be positioned to unbalance the shoe to correct any tendency of the patient to turn or twist his foot improperly.

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