July 11, 1950 S. ISRAEL 2,514,870

CORRECTIVE ORTHOPEDIC APPARATUS

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Fig. 1

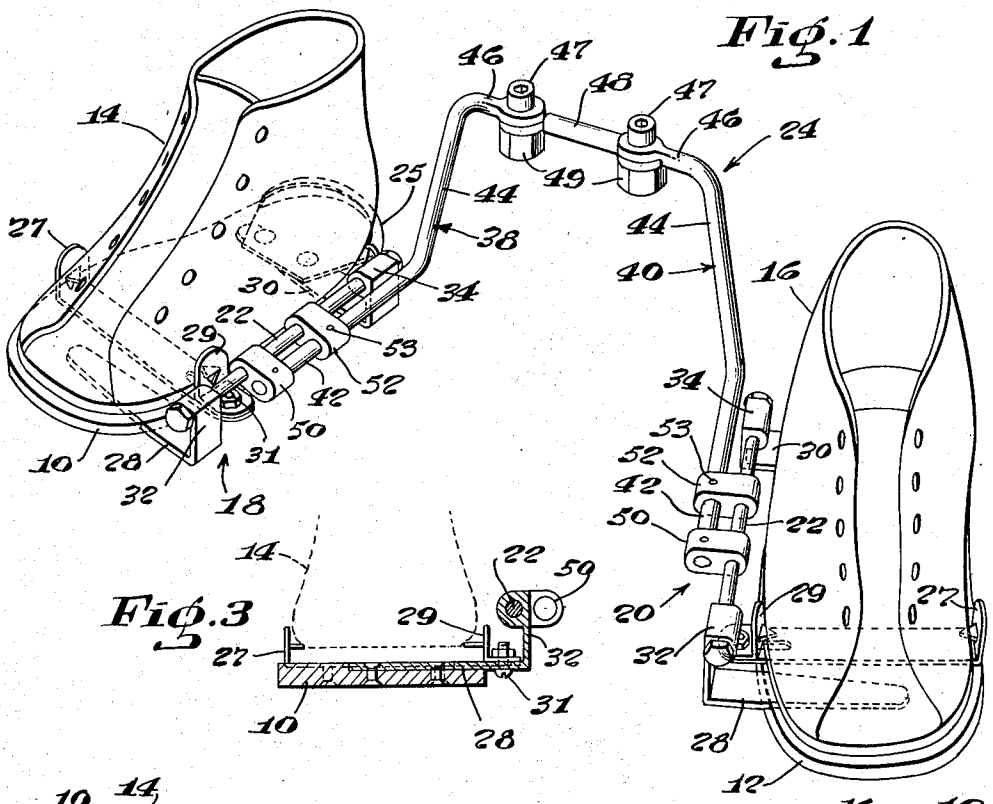
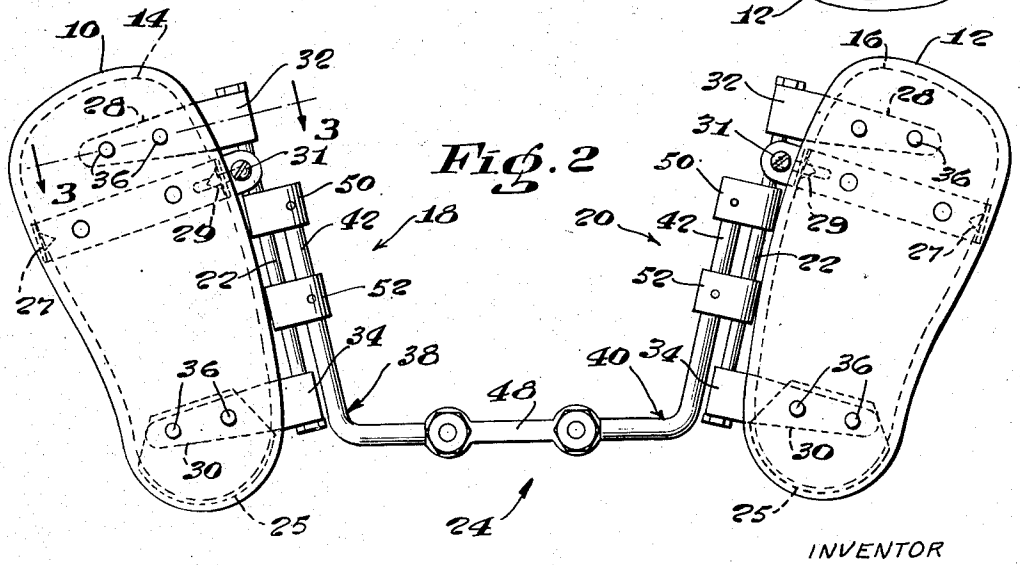


Fig. 3

Fig. 2



INVENTOR
Saul Israel
BY J. Stanley Churchill
ATTORNEY

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CORRECTIVE ORTHOPEDIC APPARATUS

Saul Israel, Medford, Mass.

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9 Claims. (Cl. 128—80)

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This invention relates to corrective orthopedic apparatus and more particularly to apparatus for use in the correction of club feet.

The invention has for an object to provide a novel and improved orthopedic corrective apparatus for use in the correction of deformed feet and which is characterized by structure enabling the user to move its lower limbs in a substantially normal manner while exerting corrective pressure upon the deformed feet.

With this general object in view and such others as may hereinafter appear, the invention consists in the orthopedic corrective apparatus hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a perspective view of an orthopedic corrective apparatus embodying the invention; Fig. 2 is a plan view of the same, as seen from the underside, and Fig. 3 is a cross-sectional detail view taken on the line 3—3 of Fig. 2.

In general, the present invention contemplates an orthopedic corrective apparatus particularly adapted for the correction of a club foot condition and which is designed to be secured to the shoes of the patient and adjusted to a position to exert corrective pressure on the afflicted foot or feet to an extent determined by the orthopedic surgeon, to thereby effect the muscular corrections. Prior to the present invention it has been the usual corrective practice for club foot conditions to have the child wear a splint structure comprising a relatively narrow flat elongated bar adjustably secured at its ends to the sole of each shoe adjacent the heel, the adjustments being made at each end to hold the feet at the desired positions. This prior structure has been found unsatisfactory for the reason that it does not permit the patient to move or kick his legs and feet while lying in bed and since the adjusting elements project from the underside of the shoes, the splint must be removed when the child starts to walk.

In accordance with the present invention, the foot corrective apparatus is designed to enable the appliance to be worn continuously by the child with minimum interference with normal actions, permitting the child to kick and move its legs and feet without handicapping muscular coordination. The apparatus also permits the child to stand and also to ambulate while the correction of the deformity is being accomplished. In practice, the apparatus may and preferably will be used with corrective shoes which are especially designed to hold the foot in an outwardly turned position, the forward portion of the shoes having a distinct outward flare.

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Referring now to the drawings, the orthopedic corrective apparatus herein illustrated comprises in general a pair of base or supporting members 10, 12 for the right and left feet respectively and to which the shoes 14, 16 of the child may be attached. Each base member 10, 12 is provided with a hinged structure, indicated generally at 18, 20, the hinge pins 22 being disposed substantially parallel to the inner edge of each shoe and a short distance above the base members. The two hinged structures are connected by a brace unit, indicated generally at 24, arranged to be adjusted to maintain the feet at the desired angle and to permit lateral rocking and reciprocation of the feet relative to one another while maintaining the feet in a predetermined outwardly spread angular position. The shoes 14, 16 used with the apparatus may and preferably will comprise commercially available corrective shoes particularly adapted for the correction of club feet, the illustrated shoes having an outward flare at the forepart, and as herein shown, the soles of each shoe may be detachably secured to its base members 10, 12 in any convenient manner, herein shown as by a clamp including a heel plate 25 attached to the base and turned upwardly and inwardly to embrace the heel end of the shoe sole between the sole and the upper, and a transversely extended clamp secured to the forepart of the base having a stationary clamp portion 27 arranged to embrace one side of the shoe sole and an adjustable clamp portion 29 arranged to embrace the other side of the shoe sole, the clamp portion 29 being locked in its adjusted position by a bolt 31. The heel plate 25 and the clamp member may be fitted into recesses formed in the upper surface of the base members and may be attached by flush rivets, as illustrated.

Each hinged structure 18, 20 is similar in construction and operation and as herein shown, comprises a pair of transversely extended and spaced strap members 28, 30 attached to the upper surface of their base members, the straps being disposed substantially at the toe and heel ends of the base. The inner ends of the straps are extended a short distance beyond the inner edge of the base and are provided with upwardly bent portions 32, 34 forming supports at their upper ends for the hinge pin 22 secured to and extended therebetween. As herein shown, the strap members 28, 30 may be secured to the upper surface of the base member by rivets 36 or

the like, the base member being preferably recessed, as indicated in Fig. 3, on its upper side to receive the strap members and to dispose the top of the straps flush with the top of the base member, thus providing a flat upper surface to which the sole of the shoe may be detachably connected as described, and also providing a flat bottom surface for the base members to permit the child to stand and walk with minimum impedance by the corrective apparatus.

The brace unit 24, as herein illustrated, comprises two brace rods 38, 40 each rod having a straight portion 42 arranged substantially parallel to and hingedly and slidably connected to its respective hinge pin 22. Each rod is further provided with upwardly and inwardly bent portions 44, 46 connected at their inner ends by bolts 47 and nuts 49, to an intervening tie piece 48. The straight portions 42 are hingedly and slidably connected to the hinge structures 18, 20 by a pair of spaced links 50, 52 secured to the straight portions as by pins 53 and rockingly and slidably mounted on the hinge or slide pin 22. Angular adjustment of the brace unit may be effected at either or both of the points of connection to the intervening tie piece 48 by loosening the bolts and swinging the rods 38, 40 to the desired angle and thereafter again tightening the connections. It will be observed that the entire operating structure is disposed above the base members 10, 12 so that there is no obstruction to impede the child from standing on the floor or walking while wearing the apparatus.

From the above description it will be seen that in operation, the apparatus can be adjusted angularly to the desired position as determined by the doctor, and that the slidably hinged structure permits laterial rocking and relative longitudinal movement of the feet and legs while maintaining the feet in the desired position of correction. In practice, when the child kicks its legs in opposed directions the hinge pins 22 will slide in the links 50, 52 until one link, 52, of the rod 38 engages the end of the rear support 34 and the link 50 of the opposite rod 40 engages the forward support 32 the operation being reversed when kicking in the opposite direction. In a similar manner, when walking, the feet may be alternately lifted and extended forwardly within the limits of the hinge rod supports 32, 34 while maintaining the feet in the corrective position, the pivotal arrangement permitting the wearer to lift one foot relative to the other while wearing the apparatus.

The feature of detachably connecting the child's shoes to the base members 10, 12 is of distinct advantage in permitting the device to be easily removed and replaced when desired. However, it will be understood that the shoes may be permanently attached to the base members, if desired, in any convenient manner, such as by riveting the soles of the shoes to the base members.

Although the invention has been herein illustrated and described as primarily designed for correction of a club foot or talipes condition, or for a pigeon-toed or metatarsus varus deformity, it will be apparent that the apparatus may be used with equal advantage in correcting a splay-foot condition by merely adjusting the brace rods inwardly to the desired position.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. Orthopedic corrective apparatus comprising a pair of supporting members attachable to the patient's shoes, a brace connected to and extending between said supporting members for maintaining the supporting members in a spaced and predetermined angular position relative to each other, and connecting means between the brace and the supporting members for permitting lateral rocking and relative longitudinal movement of the supporting members while maintaining the same in said predetermined angular position.

2. Orthopedic corrective apparatus comprising a pair of supporting members attachable to the patient's shoes, brace means connected to and extending between said supporting members for maintaining the supporting members in a spaced and predetermined angular position relative to each other, and connecting means between the brace and the supporting members for permitting lateral rocking and relative longitudinal movement of the supporting members while maintaining the same in said predetermined angular position, and means for angularly adjusting said brace means to effect the predetermined angular position desired.

3. Orthopedic corrective apparatus comprising a pair of supporting members attachable to the patient's shoes, brace means connected to and extending between said supporting members for maintaining the supporting members in a spaced and predetermined angular position relative to each other, and connecting means between the brace and the supporting members for permitting lateral rocking and relative longitudinal movement of the supporting members while maintaining the same in said predetermined angular position, said brace means and said connecting means being disposed above the bottom of said supporting members to permit the patient to stand and walk while wearing the apparatus.

4. Orthopedic corrective apparatus comprising a pair of supporting members attachable to the patient's shoes, brace means connected to and extending between said supporting members for maintaining the supporting members in a spaced and predetermined angular position relative to each other, and connecting means between the brace and the supporting members for permitting lateral rocking and relative longitudinal movement of the supporting members while maintaining the same in said predetermined angular position, and means for detachably connecting the shoes to said supporting members.

5. An orthopedic device for the correction of deformed feet comprising a pair of supporting members attachable to the patient's shoes, brace means connected to and extending between said supporting members for maintaining the supporting members in a spaced and predetermined angular position relative to each other, connecting means between the brace means and the supporting members for permitting lateral rocking and relative longitudinal movement of the supporting members while maintaining the same in said predetermined angular position, and adjusting means disposed intermediate the connected ends of said brace means for effecting angular adjustment of each foot supporting member to the position of correction required.

6. A foot corrective device of the character described comprising a pair of base members detachably connected to the sole of each shoe, a hinge structure attached to each base member

including a hinge pin supported above and substantially parallel to the inner edge of each base member, and brace means extending between and rockingly and slidably connected to said hinge pins adapted to permit lateral rocking and relative longitudinal movement of the base members while maintaining the same in a spaced and predetermined angular position relative to each other.

7. A foot corrective device of the character described comprising a pair of base members detachably connected to the patient's shoes, a hinge structure attached to each base member including a hinge pin supported above and substantially parallel to the inner edge of each base member, and brace means extending between and rockingly and slidably connected to said hinge pins adapted to permit lateral rocking and relative longitudinal movement of the base members while maintaining the same in a spaced and predetermined angular position relative to each other, and adjusting means carried by said brace means for effecting individual adjustment of each base member to the desired angular position.

8. A foot corrective device of the character described comprising a pair of base members detachably connected to the patient's shoes, a hinge structure attached to each base member including a hinge pin supported above and substantially parallel to the inner edge of each base member, and brace means extending between and rockingly and slidably connected to said hinge

pins adapted to permit lateral rocking and relative longitudinal movement of the base members while maintaining the same in a spaced and predetermined angular position relative to each other, and adjusting means carried by said brace means for effecting individual adjustment of each base member to the desired angular position, said hinge structure and said brace means being disposed entirely above the bottom of said base members to permit the wearer to stand and walk while wearing the device.

9. An orthopedic corrective apparatus comprising a supporting member for each of the patient's feet, and brace means connected to the supporting members having provision for maintaining the supporting members in spaced and predetermined angular position relative to one another while permitting the patient to effect substantial movement thereof with relation to one another.

SAUL ISRAEL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
9,472	Hussey	Dec. 14, 1852

FOREIGN PATENTS

Number	Country	Date
314,669	Germany	Aug. 8, 1919