Dec. 22, 1953 J. R. HARRISON 2,663,294

DROP FOOT BRACE

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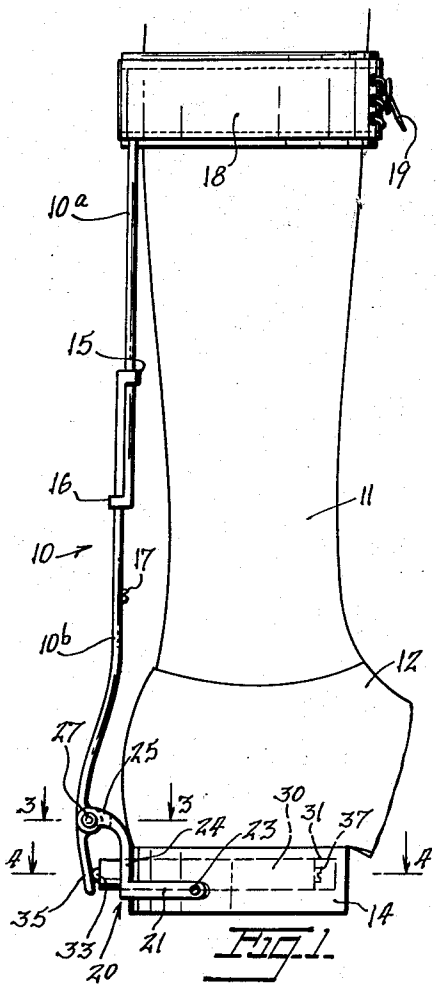


FIG. 1

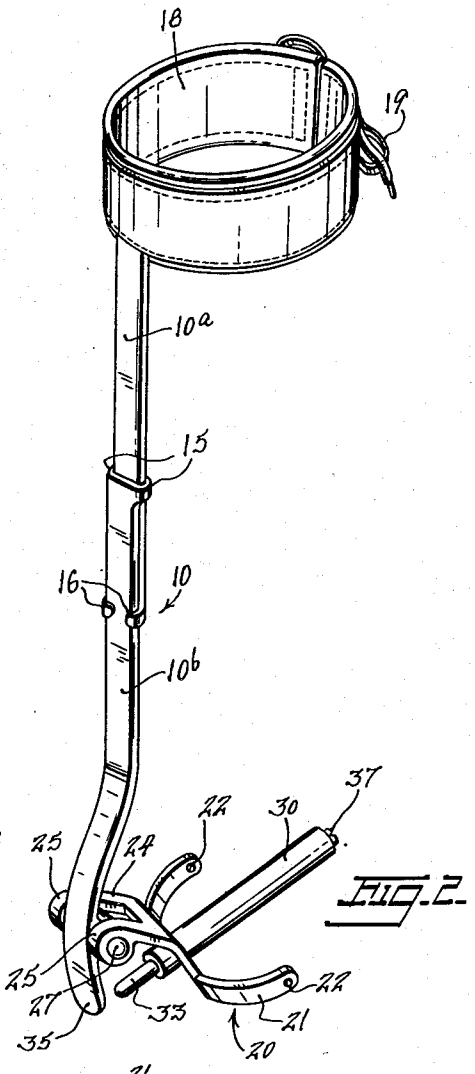


FIG. 2

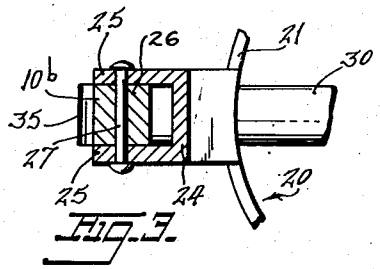


FIG. 3

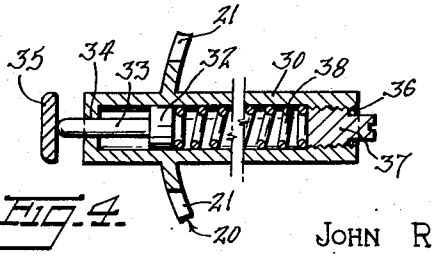


FIG. 4

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DROP FOOT BRACE

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3 Claims. (Cl. 128—80)

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This invention relates to new and useful improvements in a drop foot splint.

More specifically, the present invention proposes certain improvements in braces or splints of the type worn by persons suffering from drop foot so as to support the foot, where the muscles have been weakened or destroyed by certain diseases, against downward movement about the ankle joint causing the toe of the shoe to be dragged across the floor surface. Braces or splints for the purpose set forth are known, but all prior constructions, due to the rigid formation thereof, have proven uncomfortable to wear due to the tightness with which the top of the brace has had to be anchored to the leg resulting in impaired blood circulation in the leg and foot so equipped and chaffing of the leg flesh when the anchorage of the top end of the brace has been loosened to permit freer blood circulation.

The present invention has as its primary purpose the construction of an improved splint which is capable of extending and retracting its length as the foot turns on the ankle during each walking step so as to overcome the objections to the prior art braces and splints.

Still further, the present invention proposes constructing the splint to have an elongated bar for extension along the rear of the wearer's leg and which is formed of end aligned sections having adjacent ends overlapped and slidably connected together so as to be capable of extending their length as required by the pivotal movement of the foot during each walking step.

Another object of the present invention proposes the pivotal mounting of a bracket on the bottom end of the elongated bar for attachment to the heel of a shoe and which is resiliently urged into a forwardly inclined position in a manner to raise the toe end of the shoe and the foot positioned therein during each step.

It is a further object of the present invention to provide a drop foot splint which is simple and durable, which is effective for its intended purpose and which can be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

On the accompanying drawing forming a material part of the present disclosure:

Fig. 1 is a side elevational view of a shod foot

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provided with a drop foot splint in accordance with the present invention.

Fig. 2 is a rear perspective view of the drop foot splint, per se.

Fig. 3 is an enlarged horizontal sectional view of the splint, per se, taken on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged horizontal sectional view of the splint, per se, taken on the line 4—4 of Fig. 1.

The drop foot splint, according to the present invention, includes an elongated bar 10 for extension vertically along the back of the leg 11 upon the foot of which a conventional shoe 12 is mounted. The shoe 12 is provided at the rear thereof with the usual heel 14. The bar 10 is formed of end aligned metallic sections 10a and 10b which have adjacent ends overlapped.

Means is provided for slidably joining the adjacent overlapped ends of the sections 10a and 10b so that the bar 10 will be capable of extending and retracting its length with each walking step. The slidable joining means comprises a pair of laterally extended ears 15 formed on the top end of the bottom section 10b and bent about the sides of the top section 10a. Similarly, the bottom end of the top section 10a is formed with a pair of laterally extended ears 16. The ears 16 are bent about the sides of the bottom section 10b. Thus, the sections 10a and 10b are free for sliding movements relative to one another to adjust the length of the bar 10.

Contact of the sets of ears 15 and 16 with one another upon outward movement of the sections 10a and 10b retains the sections from being pulled completely apart. Stop means 17 is provided on one of the sections of the bar 10 for restricting sliding movements of the sections 10a and 10b in a direction to reduce their operative length. In Fig. 1, the stop means 17 is illustrated as comprising a small screw threaded into the inner face of the lower section 10b to be engaged by the bottom end of the top section 10a so as to restrict downward movement of the upper section 10a relative to the lower section 10b.

Mounted on the top end of the top section 10a of the bar 10, there is a padded leg engaging member 18 for engagement about the leg 11 at the calf thereof. The leg engaging member 18 is C-shaped and arranged to have its open side closed about the leg at the front thereof by a lace 19. Any other means can be employed for closing the leg engaging member 18 about the leg without departing from the scope and intent of the present invention.

A bracket 20 for attachment at the heel 14

of the shoe 12 is pivotally supported on the lower end of the bottom section 10b of the bar 10 to pivot on a horizontal axis. The bracket 20 includes a main U-shaped portion 21 shaped to fit snugly about the rear face of the heel 14. The ends of the U-shaped portion 21 are formed with holes 22, see Fig. 2, through which screws 23 are passed. The screws 23, see Fig. 1, are threaded into the sides of the heel 14 fixedly joining the bracket to the heel.

At the back of the heel 14, the U-shaped portion 21 is formed with an upwardly and rearward extended arcuate lug 24 having a pair of laterally spaced apertured tines 25, see Fig. 3. The tines 25 are located at the ends of a horizontally extended tubular boss 26 formed on the lower end of the bottom section 10b of the bar 10. A rivet 27 is extended through the boss 26 and the apertures of the tines 25 pivotally join the bracket 20 to the bar 10. The pivotal attachment of the bracket 20 to the bar 10 permits the foot and shoe 12 carried thereby to have freedom of pivotal movement about the ankle of the leg 11. It will be appreciated, of course, that as the foot pivots to raise the toes thereof, the sliding connection of the bar sections 10a and 10b will permit the bar to adjust itself to increase its length accordingly.

Similarly, as the foot pivots to lower the toes, the sliding connection of the sections 10a and 10b will permit the bar 10 to shorten its length as required by the degree of pivotal movement of the foot.

Resilient means is provided for holding the bracket 20 in an upwardly inclined position relative to the bar 10 to similarly raise the toe end of the foot and the shoe. The resilient means is characterized by a tube 30 which has its length extended forward and rearward and which is integral with the bracket 21 intermediate of its ends. The tube 30 can be made integral with the U-shaped portion 21 of the bracket or it can be a separate tube welded in position within a complementary aperture formed in the U-shaped portion of the bracket. The portion of the tube 30 which extends from the front face of the U-shaped portion 21 of the bracket 20 is housed within a complementary cavity 31 formed in the heel 14. The tube 30 is circular in cross-section and has a block 32 freely slidably positioned within the tube 30. Extended concentrically from the rear face of the block 32, there is a pin 33. The free end of the pin 33 is slidably extended through a concentric reduced bore portion 34 to bear against the inner face of a depending tail portion 35 of the lower bar section 10b.

The front end of the tube 30 has internal threads 36 and an adjustment nut 37 is threaded into that threaded front end of the tube 30 closing the same. An expansion spring 38 positioned concentrically within the tube 30 operates between the inner face of the nut 37 and the face of the block 32 opposed to the face from which the pin 33 extends. The spring 38 exerts a force on the block 32 tending to slide it rearward within the tube 30 and extending the pin 33 to bear rigidly against the inner face of the tail portion

35. Thus, when the foot is raised off the ground and tends to drop forward, the action of the spring 38 will be to raise the bracket 20 into an inclined position and raise the toe end of the foot and the shoe 12.

From the foregoing description, it is apparent that the present invention proposes an improved drop-foot splint which will function at all times to raise the toe end of the foot and the shoe mounted therein. The extendable nature of the rear bar 10 eliminates the necessity for excessively tightening the leg engaging member 18 about the calf of the leg as to arrest the free circulation of blood in the lower leg and foot. Notwithstanding the compartively loose engagement of the leg engaging member 18 with the leg 11, the extendable nature of the back bar 10 eliminates the tendency of the leg engaging member 18 to slide relative to the leg 11 causing the same to be chaffed thereby. Thus, the splint of the present invention can be comfortably worn and accomplish its intended purposes at all times.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as set forth in the appended claims.

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

1. A drop foot brace including a leg engaging member comprising an upper bar secured to said leg engaging member, a bottom bar member slidably secured to said upper bar member and terminating adjacent the heel portion of a shoe, an arcuate yoke member pivotally secured adjacent the lower end of the bottom bar member, said yoke member including a U-shaped bracket to be secured to a shoe and a hollow tube retained between the U-bracket and including plunger means adapted to engage the bottom of said bar member whereby the toes are maintained in raised position and stop means on the lower bar member to limit vertical movement.

2. The combination of claim 1 wherein said bar member includes an extension adjacent said yoke member and fitting therein, and a pivot pin extending between said yoke and extension to provide pivoted movement for said foot.

3. The combination of claim 2 wherein said tube includes compression means and a pin plunger engaging said tension means and bar member.

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