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E. P. HOLDEN

2,264,570

CRUTCH

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FIG. 1

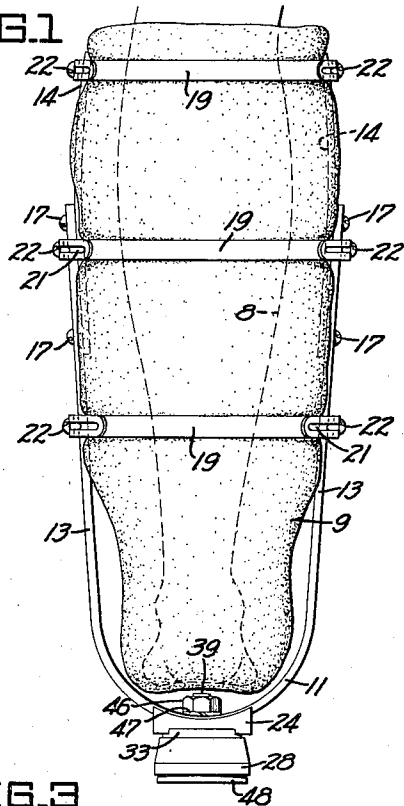


FIG. 2

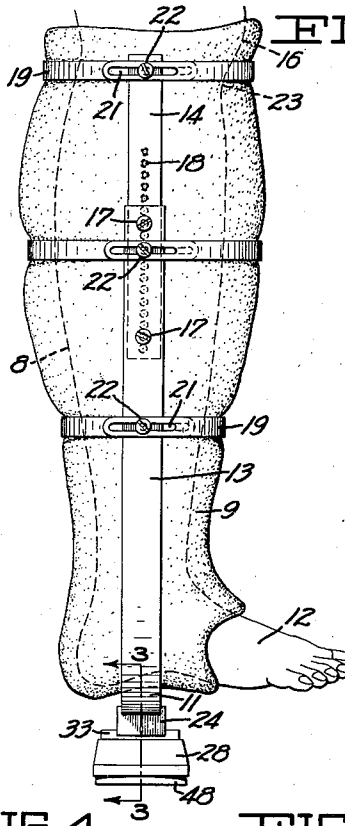


FIG. 3

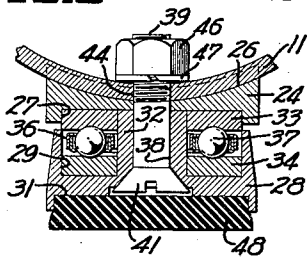


FIG. 4

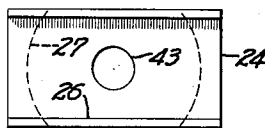


FIG. 6

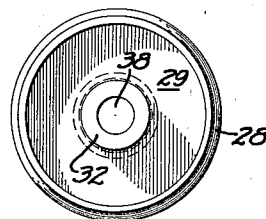


FIG. 5

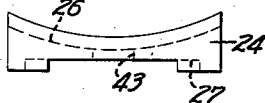
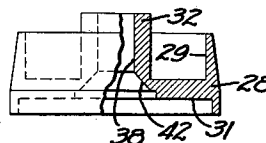


FIG. 7



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CRUTCH

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1 Claim. (Cl. 128—87)

This invention relates to devices, to be used by persons suffering leg injuries, which enable the person to walk without imposing an unbearable portion of the weight of the body on the injured member.

It is an object of the invention to provide a crutch which may be readily attached to a cast enclosing an injured leg.

Another object of the invention is to provide, in a device of the character described, means which permits rapid adjustment so that the crutch may be fitted to various shapes and sizes of casts.

A further object of the invention is to provide, in the type of device referred to, means for preventing the imposition of undesirable torsional strains on a cast-enclosed leg while the patient is engaged in walking exercises.

The invention possesses other objects and features of advantage which, together with the foregoing, will be specifically brought out in the detailed description of the invention hereunto annexed. It is to be understood that the invention is not to be limited to the specific form thereof herein shown and described as various other embodiments thereof may be employed within the scope of the appended claim.

Referring to the drawing:

Figure 1 is a rear elevational view of the improved crutch of my invention showing the same attached to a cast enclosing an injured leg.

Figure 2 is a side elevational view of the structure shown in Figure 1.

Figure 3 is an enlarged fragmental vertical sectional view showing the pivot structure. The plane in which the view is taken is indicated by the line 3—3 of Figure 2.

Figure 4 is a top plan view of the upper block of the pivot structure.

Figure 5 is a side elevational view of the structure shown in Figure 4.

Figure 6 is a top plan view of the lower block of the pivot structure.

Figure 7 is a side elevational view, partly in vertical section so as to more clearly show the interior construction, of the structure illustrated in Figure 6.

In numerous types of leg injuries, such as slight bone fractures and muscular sprains, it is permissible for the patient, after only a short period of confinement, to move about without great danger of aggravating the injury provided the leg has been properly treated and enclosed in a plaster cast. It is necessary however for the patient to use one or a pair of crutches so as to assist him in preventing the cast from striking the ground and thereby imparting un-

desirable and possibly injurious shocks to the injured body member. Maintaining the leg in the rearwardly flexed position necessary to prevent contact of the cast with the ground is very tiring and the patient often succumbs to the temptation of imposing a portion of his body weight on the cast which, in the act of walking, will cause the aforementioned dangerous shocks or impose torsional stresses on the injured limb which may prevent proper healing thereof or cause more serious injury thereto. With the desire of overcoming these difficulties I have provided an improved crutch which permits the patient to impose the full normal weight on the injured leg without great danger of aggravating the injury provided of course that the latter is of a type which permits the patient to move about.

In Figures 1 and 2 I have shown an injured leg 8 enclosed by a plaster cast 9. I provide a crutch member or metal bar formed with an arcuate bight 11, which passes transversely of and below the bottom of the cast 9 or the sole of the foot 12, and with integral side members 13 which rise vertically along opposite sides of the cast 9. The inner concave surface of the bight 11 is spaced a distance below the adjacent portion of the cast or the sole of the foot 12. Extension bars 14 project beyond the upper ends of the side members 13 and terminate preferably adjacent the knee cap 16. Screws 17, which pass through suitable apertures provided therefor in the side members 13, are engaged in selected ones of threaded apertures 18 provided in the extension members 14 so that the degree of extension of the members 14 relative to the side members 13 may be adjustably regulated. Preferably metal, U-shaped, straps 19 are provided peripherally encircling the cast 9 and having elongated slots 21 at their ends through which pass screws 22 tapped into the side members 13 and the extension members 14. The slots 21 provide for diametrical enlargement or contraction of each pair of straps 19 so as to facilitate fitting of the latter to the cast 9. The uppermost pair of straps 19 is preferably positioned at the recess 23 of the leg immediately below the knee cap 16, the reason for which will be presently explained. It is important that the side members 13, the extension members 14 and the straps 19 be all attached together and either embedded in, or impressed as shown in the drawing, into the plaster of the cast while the latter is being applied and is still soft so that when the cast has set, the crutch members will be securely attached thereto. Particular attention should be

given to the uppermost pair of straps and the adjacent portions of the cast to insure that the cast snugly engages the leg directly below the knee cap 16.

An upper pivot block 24 is provided having, in its upper surface, a concave groove 26, in which the bight 11 is seated, and, in its lower surface, a circular counterbore 27. A lower pivot block 28 is provided, positioned below the upper pivot block 24, having in its upper surface a circular recess 29, similar to although deeper than the counterbore 27, and in its lower surface with a relatively shallow circular recessed seat 31. An integral hub 32 rising concentrically with and from the recess 29 engages the upper pivot block 24 within the recess 27 thereof. A thrust bearing, comprising upper and lower disks 33 and 34 and a cage 35 carrying a plurality of balls 37, is provided, the disks being seated, respectively, in the counterbore 27, of the upper pivot block 24, and in the recess 29 of the lower pivot block 28. The cage 35 is positioned between the spaced disks 33 and 34 with the balls 37 resting in the usual race grooves provided in the confronting faces of the disks. The lower pivot block 28 is provided with a bore 38, passing axially through the hub 32, in which is positioned a screw or stud 39 having its conical head 41 seated in a countersink 42 formed at the lower end of the bore 38. The upper end of the screw 39, which passes through an aperture 43 formed in the upper pivot block 24, is threadedly engaged with the bight 11, in a threaded aperture 44 formed therein, and a nut 46 and lock washer 47 are provided for immovably securing the screw to the bight 11. The setting of the screw 39 is such that the lower pivot block 28 is free to revolve thereon. A cushion disk 48 of rubber, leather or similar material is pressed into, or adhesively secured in, the recessed seat 31. The disk 48 provides a resilient ground-engaging pad or tread for the crutch.

It will be seen that when the cast 9 and the upper straps 19 are properly and snugly fitted below the knee of the patient, the latter may impose his full weight on the crutch since this stress will be transmitted through the side members 14 and 13 to the ground without any of the stress being imposed on the injured leg below the knee. It will also be seen that since the upper portions of the crutch are free for rotary move-

ment, relative to the ground-engaging lower pivot block 28, any twisting of the leg occurring during walking will not be imposed as a torsional stress upon the injured member. It will also be seen that a patient may become accustomed to the improved crutch of my invention in a shorter time than is required to become used to the ordinary variety of crutches thereby enabling him to get around more rapidly and with greater ease and less bother.

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

A crutch, to be used with a cast enclosing an injured leg, comprising a crutch bar bent to U-shaped form having the bight thereof positioned below the foot of said leg and side members rising from the bight along opposite sides of said cast, extension bars connected with and adjustably extensible with respect to said side members, pairs of arcuate straps completely encircling said cast having elongated slots in the ends thereof, the uppermost pair of said straps being positioned immediately adjacent and below the knee cap of said injured leg, screws passing through the slots of said straps and threadedly engaged with said side members and extension bars for securing said straps to the side members and extension bars, a stud secured to and depending from the bight of said crutch bar, an upper pivot block having in the upper surface thereof an arcuate groove in which the bight of said crutch bar is seated, having an aperture through which said stud passes, and having in the lower surface thereof a circular counterbore, a cylindrical lower pivot block concentric with and journaled on said stud, said lower pivot block, in the upper surface thereof, having a circular recess and, in the lower surface thereof, having a recessed seat, a thrust bearing comprising upper and lower disks concentric with said stud and positioned, respectively, in the counterbore of the upper pivot block and in the recess of the lower pivot block, balls positioned between and engaging the respective disks, and a disk of resilient material, forming a ground-engaging pad, secured in said recessed seat of the lower pivot block.

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