Jan. 22, 1963 C. GOTTMAN 3,074,420

KNEE CRUTCHES

Filed July 27, 1960

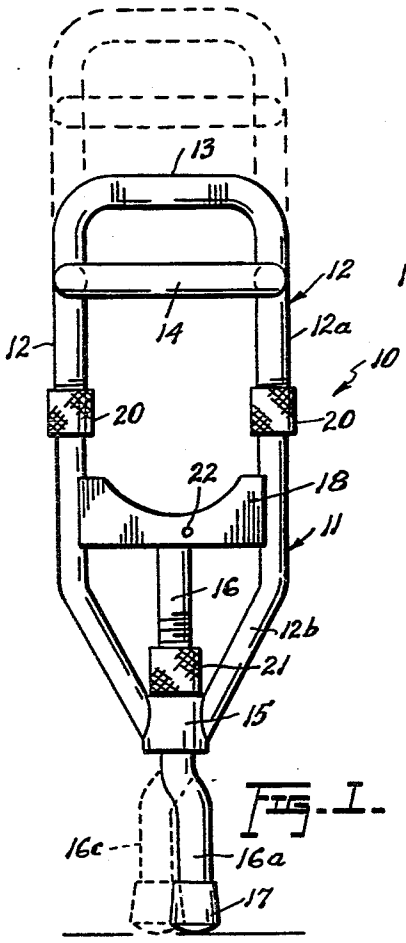

FIG. 1.

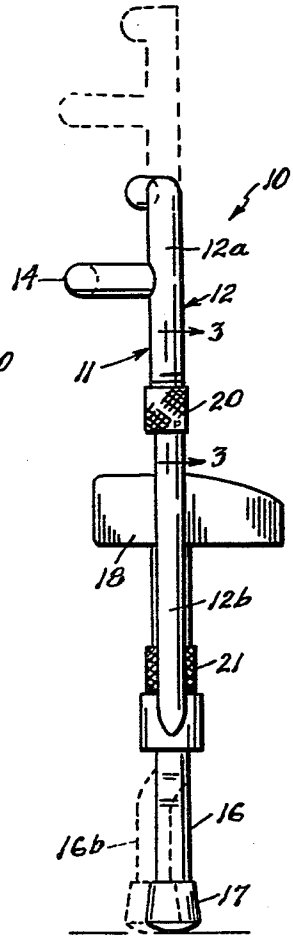

FIG. 2.

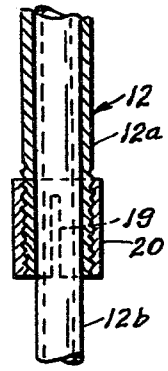

FIG. 3.

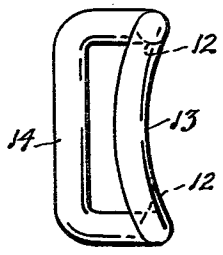

FIG. 4.

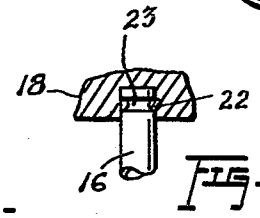

FIG. 5.

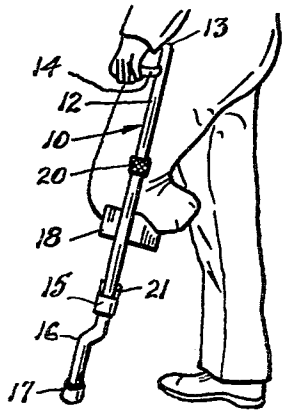

FIG. 6.

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KNEE CRUTCHES

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3 Claims. (Cl. 135—50)

This invention relates to new and useful improvements in crutches, and the principal object of the invention is to provide what may be referred to as a knee crutch or a walking aid for persons with a leg amputation below the knee.

As such, the invention provides a knee crutch in the form of a vertically elongated frame which includes a pair of spaced side members and a transverse top member adapted to supportably engage the thigh of a user, a convenient hand grip and a padded knee rest provided between the side members in downwardly spaced relation from the top member, and a single leg member connected to the lower ends of the side members and adapted at its lower end to contact the ground.

An important feature of the invention resides in the provision of means for vertically adjusting the side members so that the top member engages the user's thigh at the desired height or level and so that the hand grip is conveniently accessible, while another important feature resides in the provision of means for adjusting the leg member together with the knee rest relative to the side members of the frame, so that the knee rest may comfortably seat the user's knee.

Another important feature of the invention lies in a rotatable connection of the leg member to the crutch frame and to the knee rest, and in the provision of a laterally offset lower portion on the leg member, whereby upon rotational adjustment of the leg member, its point of contact with the ground may be varied relative to the crutch frame so as to enable the user to walk with proper balance, both forwardly and rearwardly as well as laterally, regardless of whether the user is a left leg or a right leg amputee.

Some of the advantages of the invention reside in its simplicity of construction, in its efficient and dependable operation, and in its adaptability to economical manufacture.

With the foregoing more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention will be understood from the following description taken in conjunction with the accompanying drawings, wherein like characters of reference are used to designate like parts, and wherein:

FIGURE 1 is a front elevational view of a knee crutch in accordance with the invention;

FIGURE 2 is a side elevational view thereof;

FIGURE 3 is a fragmentary sectional view, on an enlarged scale, taken substantially in the plane of the line 3—3 in FIGURE 2;

FIGURE 4 is a top plan view showing the upper end portion of the crutch frame, particularly the top member and hand grip thereof;

FIGURE 5 is a fragmentary vertical sectional detail illustrating the connection of the upper end of the leg member to the knee rest; and

FIGURE 6 is a fragmentary perspective view showing the invention in use.

Referring now to the accompanying drawings in detail, the knee crutch in accordance with the invention is designated generally by the reference numeral **10** and embodies in its construction a vertically elongated frame **11** including a pair of spaced side members **12** integrally connected together by a top member **13**, the latter preferably being curved or arcuated somewhat, as is shown

in FIGURE 4, so that it may comfortably engage the front portion of a user's thigh and thereby assist in adapting the device to an amputated leg. A suitable, substantially U-shaped hand grip **14** is rigidly secured to the upper end portions of the side members **12** in downwardly spaced relation from the top member **13**, the use of the hand grip being apparent from FIGURE 6.

The lower end portions of the side members **12** are mutually convergent and secured to a tubular member **15** which has a vertical axis disposed centrally between the side members and has extending therethrough a leg member **16**, provided at its lower end with a ground engaging tip **17**. The upper end of the leg member **16** is connected to a knee rest **18** which is suitably padded and disposed between the side members **12**, as will be clearly apparent.

The entire device, with exception of the tip **17** and rest **18**, may be formed from light weight, tubular material, having the various components thereof rigidly secured together such as by riveting, welding, or the like, in the event that it is "custom made" to suit the physical requirements of a particular individual and no adjustments thereof are necessary. However, the device preferably embodies certain adjustments such as are usually required to be made not only from time to time for a particular user, but also for possible use of the same device by different persons having different physical characteristics.

Thus, as one feature of adjustability, the side members **12** are preferably made in pairs of upper and lower slidably telescoped sections **12***a*, **12***b*, the lower section being slidable in the upper section and the lower end portion of the upper section being tapered and split as indicated at **19** in FIGURE 3, as well as being externally screw-threaded to accommodate a locking nut or sleeve **20** which, when tightened, serves to lock the sections **12***a*, **12***b* in a pre-adjusted position, whereby the effective height or vertical dimension of the crutch frame **11** may be varied so that the top member **13** engages the user's thigh at the appropriate level and the hand grip **14** is convenient to reach.

As another feature of adjustability, the leg member **16** is screw-threaded into the tubular member **15** so that it may be raised or lowered relative to the side members **12** and thereby vary the height of the knee rest **18** above the ground. A suitable lock nut or locking sleeve **21** is provided on the leg member **16** in abutment with the member **15** to lock the parts in a pre-adjusted position. Rotational adjustment of the leg member **16** in the member **15** is facilitated by a rotational connection of the upper end of the leg member to the knee rest **18** which, for example, may consist of a keeper pin **22** provided in the rest **18** in engagement with an annular groove **23** formed in the leg member, as exemplified in FIGURE 5.

Moreover, in conjunction with the last named adjustable feature, the lower end portion of the leg member **16** is preferably provided with a laterally offset region as indicated at **16***a*, the region **16***a* being equipped with the aforementioned tip **17** and the arrangement being such that when the leg member **16** is rotated in the tubular member **15**, the offset region **16***a* may be oriented either forwardly or rearwardly as exemplified at **16***b* in FIGURE 2, or laterally to either side, as exemplified at **16***c* in FIGURE 1, so as to vary the point of contact of the tip **17** with the ground accordingly, in relation to the crutch frame **11** and to the affected leg of the user. In this manner, the device may be adjusted not only to suit left leg as well as right leg amputees, but also in terms of maintaining proper balance in a forward and

rearward direction for an amputee regardless of which leg is affected.

While in the foregoing there has been described and shown the preferred embodiment of the invention, various modifications may become apparent to those skilled in the art to which the invention relates. Accordingly, it is not desired to limit the invention to this disclosure, and various modifications may be resorted to, such as may lie within the spirit and scope of the appended claims.

What is claimed as new is:

1. In a knee crutch, the combination of a vertically elongated frame including a pair of spaced side members having mutually convergent lower end portions, an open-ended vertical tubular member secured to the convergent lower ends of said side members, said tubular member having a screw-threaded bore, a rod-shaped vertical leg member having a screw-threaded intermediate portion extending through and operatively engaging the screw-threaded bore of said tubular member, said leg member having a laterally offset lower end portion terminating in a ground engaging tip, a knee rest slidable vertically between the side members of said frame, means rotatably connecting the upper end of said leg member to said knee rest whereby the knee rest may be raised and lowered relative to the frame upon rotation of the leg member in said tubular member and whereby the direction of lateral offset of said ground engaging tip relative to the axis of said tubular member may be adjusted also by rotation of said leg member in the tubular member, and releasable means for locking the leg member against rotation in said tubular member.

2. The device as defined in claim 1 wherein said last mentioned means comprise a lock nut provided on said screw-threaded portion of said leg member in locking abutment with one end of said tubular member.

3. The device as defined in claim 1 wherein said frame also includes a curved top member connecting together the upper ends of said side members, said curved top member being arched in a horizontal plane for engagement with the front surface of a user's thigh inserted between said side members.

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