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2,817,348

CANE CRUTCH

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fig. 1.

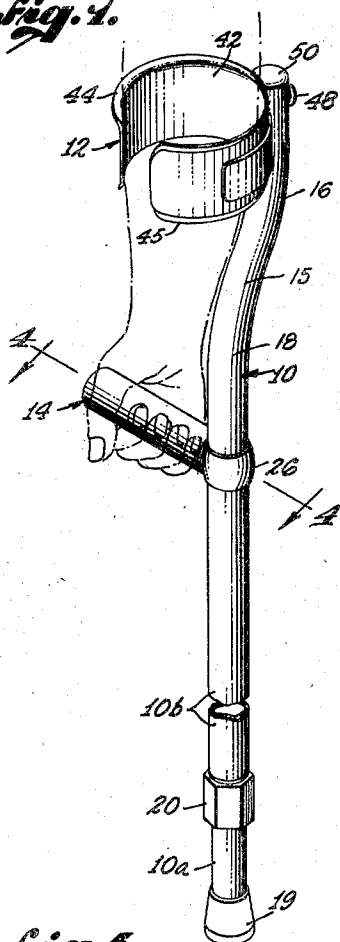


fig. 2.

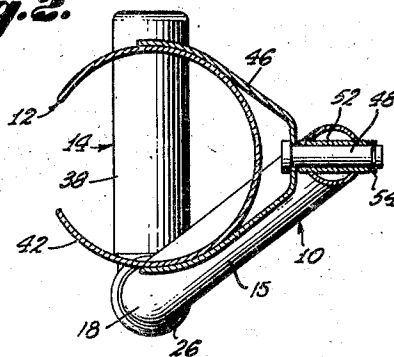


fig. 3.

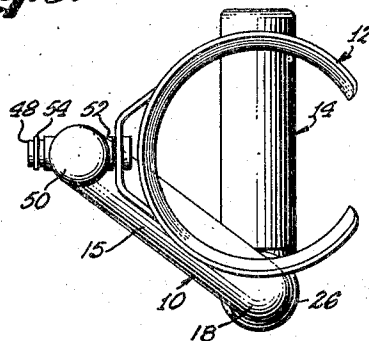


fig. 5.

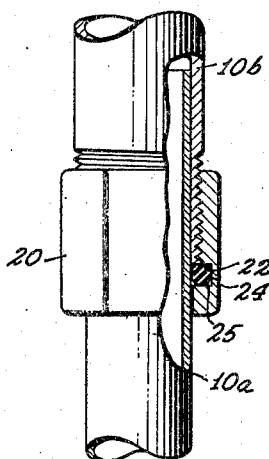
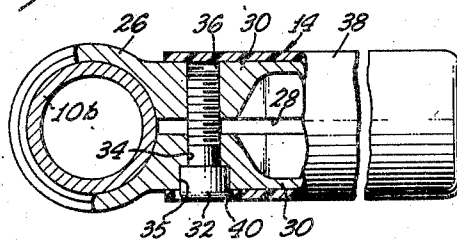


fig. 4.



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1

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CANE CRUTCH

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11 Claims. (Cl. 135—47.5)

This invention relates to a cane crutch of the general type which comprises a shaft, a forearm-encircling member in the form of a split ring or band pivotally mounted on the upper end of the shaft, and a laterally extending rigid handle or hand grip that is spaced below the forearm-embracing member. The handle is at a point that divides the shaft into an upper portion of minor length and a lower portion of major length.

In a cane crutch of the type heretofore prevalent the embracing member for the forearm is mounted on a laterally extending pivot rearward of the position of the user's arm and the pivot axis lies entirely behind the user's arm and completely outside the configuration of the embracing member. The serious disadvantage of this arrangement is that the embracing member does not pivot in a manner to conform quickly and freely to various angles of the forearm in the plane of the forwardly extending handle.

The lack of freedom to conform to a change in angle of the forearm arises from the fact that the lateral pivot axis is spaced rearwardly away from the embracing member instead of lying within the configuration of the member. Consequently the whole embracing member must move bodily along an arcuate path to conform to a change in angle of the forearm. Thus when the user slips on a wet surface or for any purpose loses his balance and instinctively moves the lower tip of the crutch forward or rearward to protect himself, the forearm is brought to bear violently against the embracing member and the embracing member binds on the forearm with the upper and lower edges digging into the flesh instead of the embracing member shifting bodily to a position for lying flat and comfortably against the flesh. This binding action is not only uncomfortable and often painful but is also hazardous since the binding action creates a forceful leverage diagonally across the embracing member. This leverage tends to spread the split ends of the embracing member apart for complete disengagement from the user's arm with the possibility of serious consequences.

Broadly described, the present invention eliminates this inherent disadvantage by mounting the embracing member for the forearm for rotation about a transverse axis that passes through the configuration of the embracing member and therefore intersects the user's arm. Preferably the axis is located at approximately the center of the cross section of the user's arm. By virtue of this new pivotal relationship the embracing member lies flat against the flesh of the forearm and freely conforms to changes in the relative angle of the forearm since the new location of the pivot axis makes it unnecessary for the embracing member to shift longitudinally of the arm to make a change in angle. The embracing member turns freely on the central pivot instead of continuously working against a remote pivot.

There is a further advantage in the highly convenient manner in which the embracing member serves as means to hold the cane crutch in suspension when the user re-

2

leases the handle of the cane crutch to free his hand for some purpose. Thus if the user releases the handle and flexes his arm upward for the purpose of grasping some object higher than the level of the hand grip, the released cane crutch is suspended in a freely pivoted manner that avoids interference with the upward arm movement. This freedom arises from the fact that the suspension pivot passes through the user's forearm centrally of the thickness of the arm. Moreover, when the user subsequently lowers his forearm to again grasp the handle, the handle is automatically guided into a position to be grasped by the hand since the handle lies in or close to the plane of rotation of the embracing member.

A further feature of the preferred practice of the invention is the manner in which the shaft of the cane crutch is offset above the forwardly extending handle to permit the new location of the pivot axis for the embracing member. As will be explained, this offset preferably comprises two opposite bends in a plane that is at an acute angle relative to the forwardly extending handle.

The various features and advantages of the invention may be understood from the following detailed description taken with the accompanying drawing.

In the drawing, which is to be regarded as merely illustrative:

Figure 1 is a perspective view of the right hand cane crutch with the hand and forearm of the user shown in phantom;

Figure 2 is a plan view of the right hand cane crutch in vertical position;

Figure 3 is a similar plan view of the left hand cane crutch;

Figure 4 is a sectional view of the hand grip of the crutch taken as indicated by the line 4—4 of Figure 1; and

Figure 5 is a view partly in cross-section and partly in side elevation showing how the shaft is made in two telescoping sections for adjustment in length.

The principal parts of the selected embodiment of the invention shown in the drawing include a shaft 10 a forearm-embracing member 12 that is pivotally mounted on the upper end of the shaft, and a handle or handgrip 14 that extends rigidly from the shaft at a point spaced below the arm-embracing member. The major portion of the length of the shaft 10 is below the handle 14, and preferably is straight. The upper minor portion of the length of the shaft between the handle 14 and the forearm-embracing member 12 is formed with an offset 15 which preferably comprises two rounded opposite bends 16 and 18 that lie in the same plane. A conventional rubber tip member 19 is shown mounted on the lower end of the shaft 10.

Preferably the shaft 10 is adjustable in length and for this purpose it may be made in two sections comprising a lower section 10a and an upper section 10b that telescopes over the upper end of the lower section. In the present embodiment of the invention the lower end of the upper shaft section 10b is formed with a screw thread for engagement with the internal screw thread of hexagonal bushing 20. As best shown in Figure 5, the hexagonal bushing 20 is formed with an inner circumferential groove 22 to receive a deformable ring member 24, which ring member may be a conventional O-ring of rubber-like material.

It can be seen in Figure 5 that the lower end of the hexagonal bushing 20 extends radially inward close to the periphery of the shaft section 10a so that the lower side wall 25 of the groove 22 overhangs the bottom end of the upper shaft section 10b and may be shifted towards and away from this lower end by rotation of the hexagonal bushing. Thus the groove 22 cooperates with the lower

3

end of the shaft section 10b and the peripheral surface of the lower shaft section 10a to form an annular space in which the ring member 24 is confined and this annular space may be contracted by tightening the hexagonal bushing on the lower end of the shaft section 10b. This contraction in the volume of the space confining the ring member 24 causes the ring member to be deformed into pressure contact with the periphery of the shaft section 10a, the radially inward pressure of the ring member being effective to maintain the two shaft sections 10a and 10b in fixed relation to each other.

Preferably the handle 14 is adjustable on the shaft 10 and the handle may be made of any suitable construction for this purpose. In the present embodiment of the invention, as shown in Figure 4, the handle 14 includes a split ring member 26 having a pair of ends and this split ring member embraces the shaft 10 with a gap 28 between the two split ends. The two split ends have integral extensions 30 directed radially away from the shaft 10 and a suitable screw 32 interconnects the two extensions 30 for the purpose of tightening the ring member into fixed engagement with the shaft 10. The shank of the screw extends through a bore 34 in one of the integral extensions 30 with the head of the screw in a counterbore 35, and the shank of the screw is threaded into a tapped bore 36 in the other integral extension. The handle construction is completed by a hollow handle member 38 of flexible plastic material which telescopes over the two extensions 30 of the split ring 26, this handle member having an aperture 40 for access to the screw 32. It is apparent that the screw 32 may be loosened to permit the handle or hand grip 14 to be shifted along the shaft 10 and that the screw may be tightened to hold the handle at a selected position in a fixed manner. An important advantage of this method of mounting a handle on the crutch shaft is that it does not necessitate weakening the shaft by the removal of material therefrom.

The forearm-embracing member 12 includes a split band 42 of flexible sheet metal which preferably is formed with an upper outwardly turned lip 44 and a similar lower outer turned lip 45 to avoid impingement of abrupt edges on the user's forearm. This split band 42 may be pivotally mounted on the shaft 10 in any suitable manner.

In the present embodiment of the invention, the split band 42 of the forearm-embracing member is carried by a yoke 46 that straddles the split band and is bonded thereto, for example, by spot welding. The central portion of this yoke 46 is mounted on a spindle 48 that extends through the upper end of the shaft 10 and is suitably journaled therein. In the construction shown a plug 50 is mounted in the upper end of the tubular shaft and the spindle 48 is journaled in a sleeve 52 that extends through the plug 50 and through the opposite walls of the tubular shaft. The spindle may be rotatably retained in the sleeve 52 by a split retaining ring 54.

In Figure 2, which is a plan view of a right hand cane crutch in vertical position and in Figure 3 which is a similar view of a left hand cane crutch, it can be seen that the handle 14 extends in a forward direction and that the pivot axis of the forearm-embracing member 12, i. e. the axis of the spindle 48 extends in a transverse direction. The vertical plane of the pivot axis intersects the handle 14 centrally thereof, and the pivot axis passes through the forearm-embracing member 12 substantially diametrically thereof. Thus, when the cane crutch is in use the pivot axis provided by the spindle 48 passes through the user's arm centrally thereof. With reference to the plane of the offset 15 of the shaft, it can be seen that both the direction of the handle 14 and the direction of the pivot axis of the forearm-embracing member 12 are inclined at acute angles relative to this plane, both lying on the same side of the plane and both being inclined toward each other. In this particular instance the inclination of the handle and the inclination of the pivot axis relative to the

4

plane of the offset are nearly equal and the vertical plane of the pivot axis substantially bisects the handle 14.

It is apparent that the flesh of the forearm in contact with the inner surface of the split band 42 may incline at various angles relative to the handle 14 and that the split band 42 will automatically accommodate itself to the particular inclination of the forearm with which it makes pressure contact. It may also be noted that the gap of the split band 42 is positioned to one side instead of being in either a forward or rearward position. Thus the gap in the split band is on the broadside of the user's forearm.

It is apparent that with the user's forearm extending through the forearm-embracing member 12 and with the user gripping the handle 14, the lower straight portion of the shaft 10 below the handle extends in substantially the same direction as the user's forearm. Thus there is a certain naturalness in the use of the cane crutch since it serves in effect as a relatively long extension of the user's forearm.

It is also to be noted that if the user relinquishes his grip on the handle 14 and flexes his forearm upward for some purpose, for example, to grasp an object at a higher level than the handle, the forearm-embracing member 12 will serve as means for pivotally suspending the cane crutch. In this manner the cane crutch remains immediately available for use whenever required and a special advantage of this arrangement is that when the user again lowers his forearm the handle 14 is automatically maintained in the desired forward alignment for convenient grasp by the user's hand.

My description in specific detail of the selected embodiment of the invention will suggest various changes, substitutions and other departures from my disclosure that properly lie within the spirit and scope of the appended claims.

I claim:

1. A cane crutch having: a shaft; a forwardly extending handle on the shaft; and an arm-embracing member pivotally mounted on the shaft with the pivot axis extending substantially perpendicularly of the direction of the handle and passing through the arm-embracing member to intersect the user's forearm.
2. A cane crutch comprising: a shaft; an arm-embracing member; means pivotally mounting said member on the upper end of said shaft in a position extending laterally therefrom for rotation relative thereto about a pivot axis transversely of the shaft; and a handle rigidly mounted on said shaft and extending laterally therefrom at a point spaced below said pivot axis, said handle extending in a direction substantially 90° from the direction of said pivot axis, said shaft being substantially straight below said handle and being offset between the handle and the pivot axis to position said pivot axis in a plane that is parallel with said straight portion of the shaft and intersects said handle.
3. A cane crutch as set forth in claim 2 in which the upper end of said shaft is substantially parallel with said lower straight portion of the shaft.
4. A cane crutch as set forth in claim 2 in which said offset is in a second plane that extends radially of said straight portion of the shaft at an acute angle from the direction of said handle.
5. A cane crutch as set forth in claim 2 in which said offset comprises two opposite bends.
6. A cane crutch as set forth in claim 2 in which said plane intersects said handle at approximately the center of the handle.
7. A cane crutch as set forth in claim 2 in which said arm-embracing member is made of flexible material and has a gap therein on the side thereof away from the shaft.
8. A cane crutch comprising: a shaft; a member forming an opening to embrace the forearm of the user; means pivotally mounting said member on the upper end of said shaft in a position extending laterally therefrom for rota-

5

tion relative thereto about a pivot axis transversely of the shaft; and a handle rigidly mounted on said shaft and extending laterally therefrom at a point spaced below said pivot axis, said shaft being offset between the handle and the pivot means in a longitudinal plane, said pivot axis and said handle being inclined from said plane at acute angles.

9. A cane crutch as set forth in claim 8 in which said pivot axis and said handle incline toward each other with respect to said plane.

10. A cane crutch as set forth in claim 9 in which said pivot axis and said handle extend in directions 90° from each other.

11. A cane crutch as set forth in claim 10 in which the direction of said pivot axis and the direction of said handle are both substantially 45° from the plane of said offset.

6

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