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CRUTCH TIP

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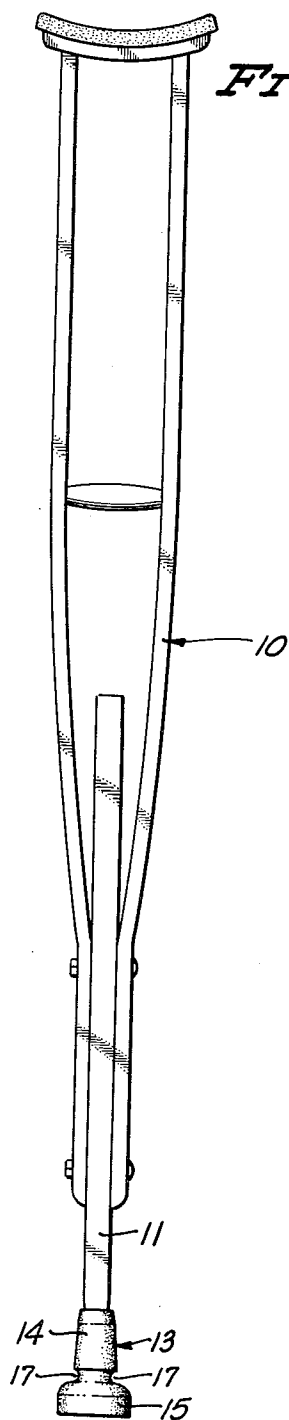


FIG. 1.

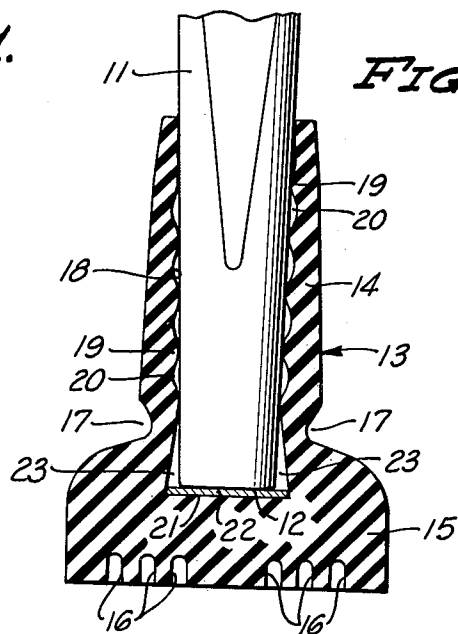


FIG. 2.

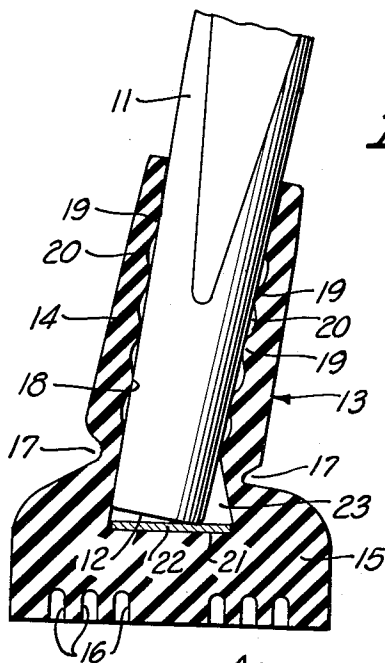


FIG. 3.

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CRUTCH TIP

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This invention relates to a crutch tip.

It is among the objects of my invention to provide a new and improved crutch tip which is so constructed that its stem is capable of 360° swiveling action in any direction as the lower end of the crutch shaft pivots, without such swiveling causing the base of the tip to become unseated from the ground.

It is another object of my invention to provide a resilient crutch tip which is self-centering in the sense that the stem or neck of the crutch tip automatically centers itself with respect to the base whenever the tip is removed from contact with the ground.

It is a further object of my invention to provide such a crutch tip which is capable of being molded satisfactorily and economically in the form of a single piece of rubber or rubber-like material.

Numerous attempts have been made in the past to provide a satisfactory crutch tip, but such devices have proved to be unsatisfactory in some cases because they were cumbersome and unduly complicated in structure, in other cases because they did not provide for a sufficiently great or sufficiently free swivel action and in other cases because the downward force exerted upon the crutch by the user acted to unseat the crutch tip from the ground.

It is an object of my invention to overcome all of these faults and disadvantages by providing a crutch tip which includes means for providing 360° free swiveling action, by providing a crutch tip which is extremely simple in its structure and operation and by providing a crutch tip in which the unseating force exerted upon the tip by the shaft is reduced or substantially minimized.

One of the principal sources of difficulty in designing a satisfactory crutch tip is that the crutch shaft is necessarily directed at an angle when the crutch tip first engages the ground. The weight of the user is applied to the crutch shaft when the shaft is disposed at an angle and this force is directed against the crutch tip. Since this force is angular rather than directly downward, it necessarily has a horizontal component which acts against the crutch tip and which tends to unseat the base of the crutch tip from the ground.

The effect of this horizontal component of unseating force can be reduced or minimized only by varying the construction of the crutch tip.

It is accordingly an object of my invention to provide a crutch tip which has increased stability because the bottom of the crutch shaft is disposed beneath the horizontal axis along which the swiveling of the crutch tip takes place and in which means are provided for 360° angular movement of the bottom of the crutch shaft within the tip.

It is a further object of my invention to provide a crutch tip in which there is a minimum of wear of the crutch shaft against the tip and of the tip against the ground.

It is another object of my invention to provide a crutch tip which provides a soft and effective grip upon the ground, regardless of the angle or movement of the crutch shaft.

My invention also comprises such other objects, advantages and capabilities as will later more fully appear and which are inherently possessed by my invention.

While I have shown in the accompanying drawings a preferred embodiment of my invention, it should be understood that the same is susceptible of modification and change without departing from the spirit of my invention.

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Referring to the drawings, FIG. 1 is a front elevational view of a crutch with my crutch tip mounted thereon;

FIG. 2 is an enlarged side elevational view of the lower end of the crutch shaft in vertical position, with the crutch tip mounted thereon, the crutch tip being shown in section;

FIG. 3 is a similar view, showing the movement of the crutch shaft and crutch tip as the shaft is moved from a vertical to an angular position.

A preferred embodiment which has been selected to illustrate my invention is adapted to be used on a crutch 10, which may be of any conventional construction. The crutch 10 has an elongated crutch shaft 11 having a bottom 12.

My crutch tip 13 is preferably molded of a single piece of rubber or other suitable resilient material. It comprises an elongated stem or neck 14, which tapers slightly toward its upper end and which is formed integrally with a substantially circular base 15. The bottom of the base 15 is provided with a plurality of concentric inwardly directed grooves 16 to improve the grip of the bottom of the base 15 upon the ground.

The crutch tip 13 is provided with an inwardly directed annular groove 17 which extends around the bottom of the neck 14 at the point where it joins the base 15. The walls forming the crutch tip 13 are thinner along the horizontal axis of the groove 17 than along the adjacent portions of the neck 14 and base 15, so that the groove 17 defines the horizontal axis along which the neck 14 will tend to flex with respect to the base 15 in response to angular force directed against the neck 14.

The inside of the crutch tip 13 is provided with a substantially cylindrical hollow crutch receiving passage 18, which is adapted to removably receive and hold the lower portion of the shaft 11 of the crutch 10. The inside of the passage 18 is provided with a series of alternating annular lands 19 and grooves 20. The lands 19 are adapted to engage the sides of the crutch shaft 11 to hold the tip 13 securely in place upon it.

The passage 18 is provided with a flat bottom 21, upon which is mounted a circular metal compression disc 22. In use, the disc 22 is disposed between the bottom 12 of the crutch shaft 11 and the bottom 21 of the passage 18.

The lower end of the passage 18 is substantially frusto-conical, tapering slightly inwardly from the bottom 21 to provide an annular frusto-conical free area 23 which surrounds the lower end of the crutch shaft 11 when the shaft 11 is disposed in vertical position as shown in FIG. 2 of the drawings.

The thick bottom portion of the base 15 acts to reduce the shock to the user when his body weight is applied to the shaft 11.

It should be noted that the bottom 12 of the crutch shaft 11 is disposed beneath the annular groove 17 which defines the axis of swiveling movement of the crutch tip 13. Because of this construction, the downward force exerted upon the crutch shaft 11 by the user is always directed against the compression disc 22 and thus against the base 15, rather than against the neck 14.

It should also be noted that the free area 23 which surrounds the lower end of the crutch shaft 11 permits the shaft 11 to assume an angular position within the passage 18 without substantial interference from the walls of the passage 18. This freedom of movement of the crutch shaft 11 within the tip 13 also acts to prevent force being exerted against the inside of the passage 18 which would tend to unseat the bottom of the base 15 from the ground when the crutch is in use.

In use, when the edge of the base 15 is brought into contact with the ground, the crutch tip 13 flexes along the axis of the annular groove 17 to bring the entire bottom of the base 15 into contact with the ground. The weight

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of the user is transmitted through the crutch shaft 11 to the disc 22 and thus against the base 15. This causes the center of the bottom of the base 15, which normally has a slight upward curve, to be forced downwardly so that the bottom of the base 15 is flattened against the ground and the grooves 16 provide a suction grip.

As the crutch shaft 11 moves through its normal pivoting cycle, the neck 14 flexes along the axis of the groove 17 and the end of the crutch shaft 11 moves from one side to the other of the free area 23. The bottom 12 of the crutch shaft 11 frictionally engages the disc 22, so that wear against the bottom 21 of the passage 18 is prevented. The disc 22 also acts to distribute the crutch load more evenly against the base 15.

I claim:

1. In combination with a crutch shaft having a substantially cylindrical lower end, a crutch tip comprising a base and neck formed of resilient material, said neck normally extending vertically upwardly from the top of said base, said neck being elongated and having a hollow elongated substantially cylindrical passage therein for receiving the lower end of said crutch shaft, said passage extending downwardly into the upper portion of said base, a narrow annular groove extending radially inwardly from the periphery of said neck toward said passage, said groove being disposed directly adjacent to the top of said base, said groove defining a fixed horizontal axis of pivotal movement of said neck with respect to said base, said groove being disposed substantially above the bottom of said passage, said passage being tapered continuously outwardly from said groove to the bottom of said passage to provide a substantially frusto-conical free area surrounding the lower end of said crutch shaft, said neck being adapted to flex with respect to said base along the fixed horizontal axis defined by said groove when said crutch tip is in use, the cross sectional dimensions of said free area being greater than the diameter of the lower end of said crutch shaft, whereby said free area upon the flexing of said neck permits a substantial amount of free angular movement of the lower end of said crutch shaft within said passage before the lower end of said crutch shaft engages the adjacent inner walls of said passage.

2. The structure defined in claim 1, the bottom of said base being circular and having integral gripping means forming a surface engaging area, the diameter of said base being substantially greater than the diameter of said neck,

to prevent the unseating of said surface engaging area when said neck is flexed.

3. In combination with a crutch shaft having a substantially cylindrical lower end, a crutch tip comprising a base and neck formed of resilient material, said neck normally extending vertically upwardly from the top of said base, said neck being elongated and having a hollow elongated substantially cylindrical passage therein for receiving the lower end of said crutch shaft, said passage extending downwardly into the upper portion of said base, at least the lower portion of said neck adjacent to said base having relatively thin walls and said base having relatively thick walls, whereby the junction of said neck with said base constitutes a fixed axis of pivotal movement of said neck with respect to said base, said axis of pivotal movement being disposed substantially above the bottom of said passage, the portion of said passage within said base being enlarged to provide a free area surrounding the lower end of said crutch shaft, said neck being adapted to flex with respect to said base along said axis when said crutch tip is in use, said free area having a diameter greater than the diameter of the lower end of said crutch shaft, whereby said free area upon the flexing of said neck permits a substantial amount of free angular movement of the lower end of said crutch shaft within said passage before the lower end of said crutch shaft engages the adjacent inner walls of said passage.

4. The structure defined in claim 3, the bottom of said base being circular and having integral gripping means forming a surface engaging area, the diameter of said base being substantially greater than the diameter of said neck, to prevent the unseating of said surface engaging area when said neck is flexed.

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