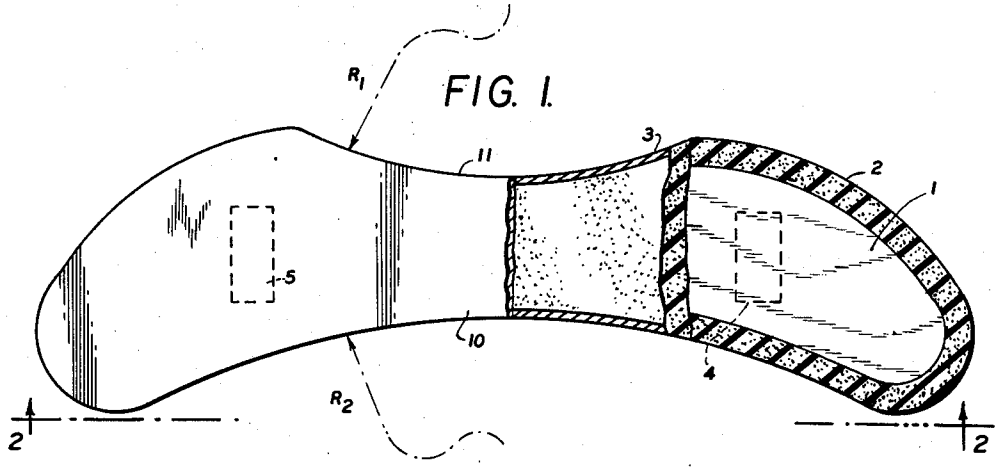
Sept. 29, 1964 A. J. JOHNSON, JR 3,150,672

CONTOUR CRUTCH

Filed Dec. 4, 1961

FIG. 1.



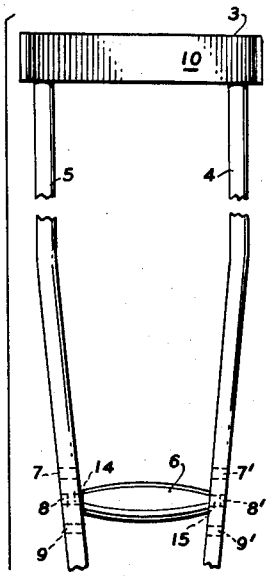


FIG. 2.

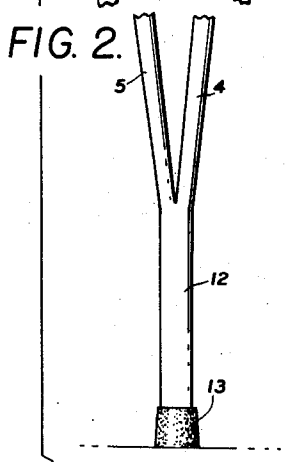


FIG. 3.

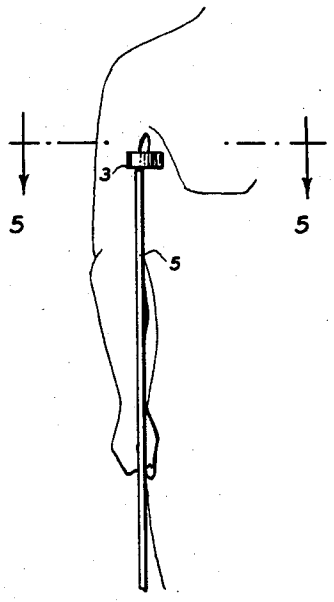
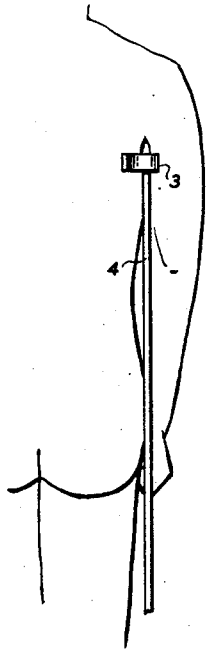


FIG. 4.



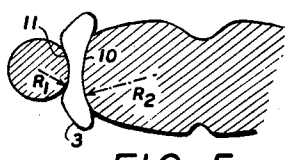


FIG. 5.

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CONTOUR CRUTCH

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2 Claims. (Cl. 135—52)

This invention relates to a new principle in the construction of crutches whereby a crutch head contour is provided which embraces both the rib cage and the arm of the user to stabilize the crutch.

Heretofore, the conventional crutch head contour has provided only an upward curvature having its radii of curvature lying substantially in a vertical plane, so that the crutch head will embrace the arm pit when the body weight is allowed to rest downwardly on the head of the crutch.

However, this traditional construction overlooks the important fact that in walking with crutches, the body weight is periodically borne by the hands acting on the crutch handles so as to lift the armpits clear of the crutch head contour. This action allows the crutch to pivot until the upwardly curved contour of the conventional crutch head strikes either the front or back of the shoulder, resulting in the familiar abrasion and discomfort heretofore suffered by crutch users.

The present invention overcomes this objectionable instability by providing a contour of crutch head having two curvatures in the horizontal plane, one of which embraces a portion of the cylindrical contour of the rib cage and the other of which embraces a portion of the cylindrical contour of the arm.

This novel geometry in effect provides a vertical keyway so that, contrary to the normal vertically reciprocating displacement of the crutch head into and out of the arm pit in the act of walking with crutches, the crutch head of this invention remains keyed to the body, providing the stabilizing moment necessary to prevent the hands and wrists from bearing the reaction torques of crutch walking and to prevent flailing against the body by the crutch head.

It is the principal object of the present invention to provide a crutch construction affording superior comfort and convenience in use.

It is another object of the invention to provide a crutch construction which is both inexpensive to manufacture and superior in performance.

It is still another object of the invention to provide a crutch head contour which embraces the body regardless of displacement of the crutch head away from the arm pit.

It is a further object of the invention to provide in a crutch construction, the combination of an adjustable crutch handle and a crutch head contoured partially to embrace both the rib cage and the arm.

It is still a further object of the invention to provide a crutch head contour having its radii of curvature lying substantially in a plane normal to the long axis of the crutch.

For other objects and a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing, in which

FIGURE 1 is a plan view of the contour of the preferred embodiment of the crutch head invention, showing the outer flexible covering broken away to reveal a layer of resilient padding, and showing the padding broken away to show the body of the crutch head.

FIG. 2 is a broken view taken in elevation of a crutch incorporating the invention as viewed on line 2—2 of FIG. 1,

FIG. 3 is a front perspective view of the contour crutch showing its relation to the user during the act of walking,

FIG. 4 is a back perspective view of the contour crutch showing the doubly embracing action of the crutch head contour relative to the body of the user, and

FIG. 5 is a plan view cross section of the contour crutch taken on line 5—5 of FIG. 3.

Referring now to the drawings, it may be seen that the crutch head of the preferred form of the invention consists of a body **1**, preferably of wood, covered by a resilient padding **2** such as sponge rubber, over which is secured a flexible outer covering **3**, which may be leather or plastic.

The inner vertical surface **10** is contoured to fit the average contour of the rib cage, and is shown to have a single radius of curvature R_2 lying in a horizontal plane normal to the long axis of the crutch. The outer vertical surface **11** of the crutch head also has a concave contour to fit the average contour of the arm, and is shown to have a single radius of curvature R_1 also lying in a horizontal plane normal to the long axis of the crutch.

It is to be noted that although the conventional upwardly curved contour, having its radii of curvature in a vertical plane lying in the long axis of the crutch, has been omitted in the drawings as unnecessary, it is within the scope of the invention to add this vertical contour in addition to the horizontal curvatures shown.

The crutch head body **1** is secured, preferably by keying and adhesives, to the vertical side support members **4** and **5** which merge to form the foot **12** of the crutch. A non-skid ferrule **13** is provided on the foot **12**.

Foot **12** may also be provided with any of the adjustable length features well known in the art.

In order that the keyed horizontal contour of the crutch head be able to slide properly against the body under the lateral constraint of the arm and rib cage, it is important that the user grasp the crutch handle **6** at a distance from the crutch head such that, with the arm straightened, the top of the crutch head not be seated in the arm pit. For this reason, and as a cooperating part of this crutch, the handle **6** is provided with disengageable pins **14** and **15** which may be engaged by the spreading of members **4** and **5**, with any pair of a plurality of spaced pairs of socket holes **7**, **7'**, **8**, **8'**, **9**, **9'** piercing members **4** and **5** so as to provide an adjustment between the position of handle **6** and the doubly curved crutch head **1**.

The front and rear views of FIGS. 3 and 4 respectively, are drawn to show the moment in walking with the crutch at which the body weight is largely supported by the hand thereby straightening the arm and drawing the arm towards the body. Under these circumstances, and as seen in the plan cross section of FIG. 5, the two concave surface contours **10** and **11** are firmly clamped against fore and aft motion between the rib cage and arm respectively.

It should now be apparent that this clamping action is widely independent of contact between the top of the crutch head and the seat of the arm pit.

In contradistinction to the foregoing, the fore and aft clamping action of the conventional vertically curved crutch head immediately diminishes and disappears as soon as any vertical clearance takes place between the seat of the arm pit and the top of the conventional crutch head.

While various changes may be made in the detailed construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. In a crutch, spaced vertical side support members merging into a foot at the bottom end thereof, a handle adjustably mounted between said side support members at an intermediate location therealong, and a crutch head secured to the top end of said support members at a point normally substantially below the arm pit of the user, said crutch head including an elongated body with a wide radius concave surface on one side thereof extending substantially the length of said crutch head body, contoured to substantially embrace the rib cage of the user, and with a convex surface on the other side thereof, said convex surface having a concave portion centrally thereof of a radius substantially less than that of said first-mentioned concave surface contoured to substantially embrace the medial portion of the arm of the user.

2. The structure of claim 1 wherein said crutch head body is covered with a resilient padding over which is secured a flexible outer covering.

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