Dec. 27, 1949 R. J. CHUTE ET AL 2,492,916

CRUTCH TIP

Filed Nov. 7, 1946 2 Sheets-Sheet 1

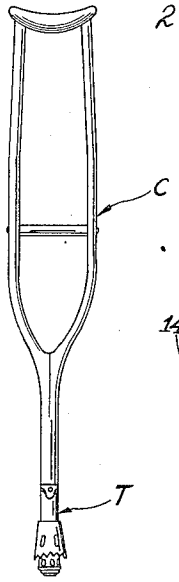


Fig. 1

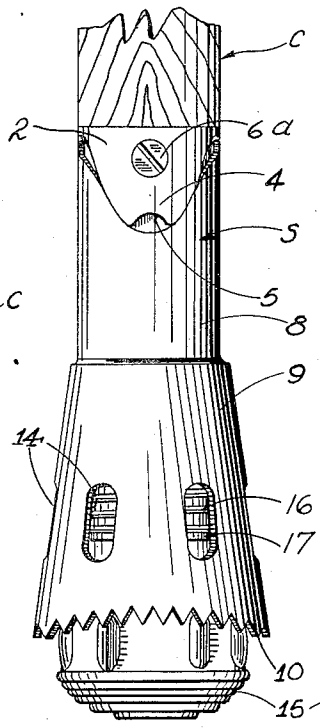


Fig. 2

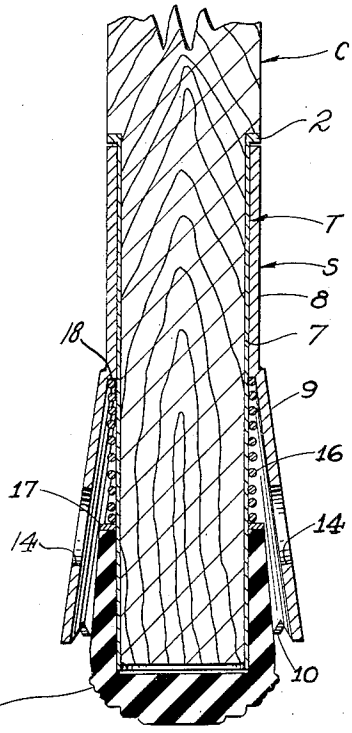


Fig. 3

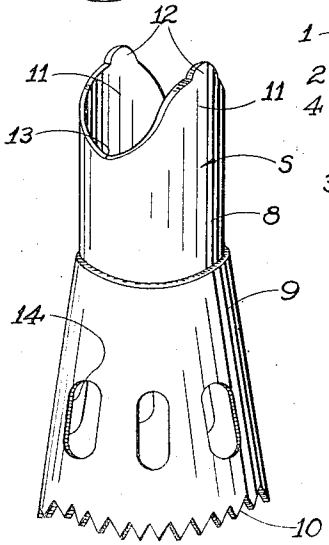


Fig. 4

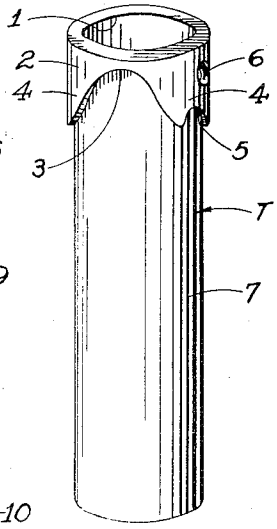


Fig. 5

INVENTORS
ROBERT J. CHUTE
BY & EDWARD I. PECK
Richey & Watts
ATTORNEYS

Dec. 27, 1949 R. J. CHUTE ET AL 2,492,916

CRUTCH TIP

Filed Nov. 7, 1946 2 Sheets-Sheet 2

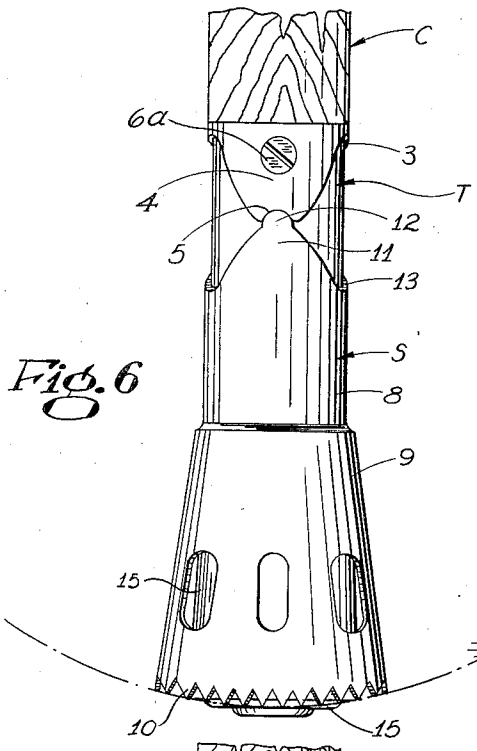


Fig. 6

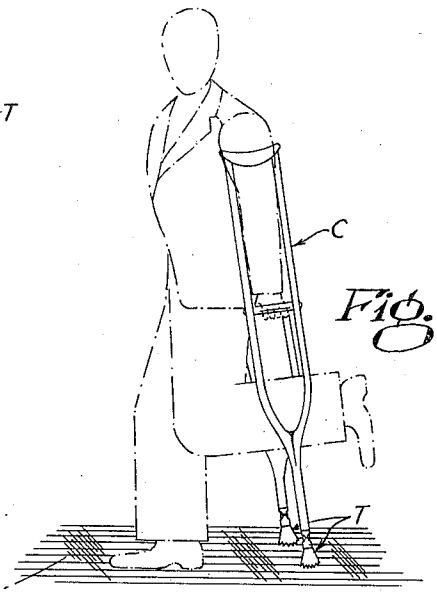


Fig. 6a

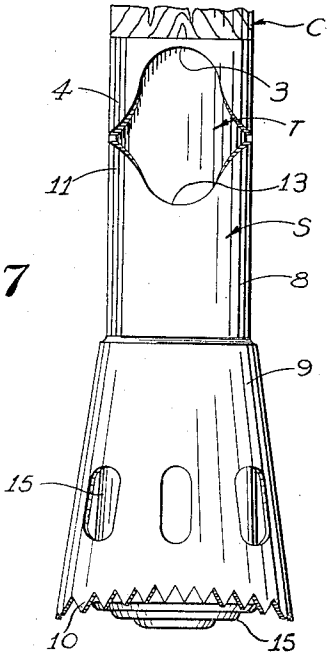


Fig. 7

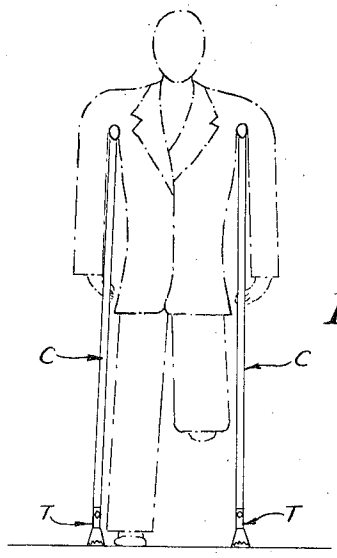


Fig. 7a

INVENTORS
ROBERT J. CHUTE
& EDWARD I. PECK
BY Richey & Watts
ATTORNEYS

Patented Dec. 27, 1949 2,492,916

UNITED STATES PATENT OFFICE

2,492,916

CRUTCH TIP

Robert J. Chute, Shaker Heights, and Edward I. Peck, Cleveland Heights, Ohio

Application November 7, 1946, Serial No. 708,222

9 Claims. (Cl. 135—53)

1

This invention relates to crutches and canes, and more particularly to improvements in retractable gripping shoes to be used on snow, ice or other slippery elements, said tips to be applied to a crutch or a cane.

Prior art devices of the type to which this invention relates have been heavy and clumsy imposing an increased burden on the user to whom such increased burden is particularly objectionable. It is an object of this invention to provide a retractable crutch tip that is of unusually light-weight construction but at the same time is unexpectedly sturdy and dependable in its action. Briefly, this object is accomplished by forming the gripping shoe in the form of a toothed sleeve of relatively short axial extent and of relatively small diameter which is adjustably mounted on the crutch tip itself and is manually advanced or retracted into or out of its operating position.

Devices in the prior art have provided dangerous projections and have increased the actual size of the crutch tip thereby increasing the danger of striking the crutch against objects making it not unlikely that serious injury would ensue to the user. Another object of this invention lies in the provision of a gripping shoe which hugs the crutch and which does not project appreciably therefrom in any direction, so that the maximum safety is attained at all times.

Devices of the prior art have had a grotesque and bizarre appearance so that they have attracted attention. This is particularly objectionable to users of crutches or the like who are generally hypersensitive and would prefer the danger attendant upon using an unprotected crutch to the use of one fitted with cumbersome and obtrusive prior art devices. Accordingly, another object of our invention resides in the provision of a gripping shoe assembly that is compact and unobtrusive.

Another object of the present invention is to provide a gripping shoe assembly which is symmetrically arranged on the crutch so that the crutch can be picked up and used with either side toward the user.

An important object of our invention lies in the provision of a gripping shoe, the ground contacting portion of which is shaped to facilitate fore and aft rocking action imparted to the crutch during its use, and to simultaneously provide a stable base laterally to assist in maintaining the user in an upright position. Briefly, this object is accomplished by forming the gripping teeth so that they lie in a surface that is generally cylindrical with the axis of the cylinder transverse to the crutch.

2

Another object lies in the provision of a gripping shoe assembly in which the gripping element that is subject to wear may be readily replaced and is easily and rapidly moved from its retracted to its advanced position, and vice versa.

These and other objects of our invention will be apparent as the following detailed description of a preferred embodiment proceeds.

In the drawings:

Fig. 1 shows a crutch fitted with our gripping shoe assembly illustrating the unobtrusive appearance of a crutch fitted with our invention;

Fig. 2 is a side elevation of our invention with the gripping skirt in the retracted position;

Fig. 3 is a longitudinal section of the assembly with the skirt in its retracted position;

Figs. 4 and 5 are perspective views of the skirt and sleeve, respectively;

Fig. 6 is a side elevation with the skirt in advanced position illustrating curvature of the tooth portion;

Fig. 6*a* shows the position of the crutch when the tip is disposed as shown in Fig. 6; and

Figs. 7 and 7*a* are similar to Figs. 6 and 6*a* except that the views are taken from the front of the crutch.

Our novel gripping shoe assembly T is fitted to the tip portion of the crutch C as shown in Fig. 1. Our device includes two major parts, a mounting sleeve or thimble T and a skirt member S which is mounted on the sleeve in the manner to be hereinafter described. If our device is to be installed on a standard or conventional crutch, it is usually necessary to turn down a portion of the tip of the crutch slightly so that the thin sleeve T may be slipped thereover. The sleeve T is generally cylindrical and has a bore 1 for reception of the crutch tip. A barrel type cam 2 is formed integrally with the sleeve and is formed with a pair of recesses 3 and a pair of lips 4, each lip terminating in a detent recess 5. One or more screw holes 6 may be provided for attachment of the sleeve to the crutch end.

The skirt S is formed of a cylindrical sleeve member 8 to telescope with cylindrical portion 7 of the sleeve. A flaring skirt 9 is integral with portion 8 and is provided with a plurality of teeth 10 at its lower edge. The upper edge of the skirt has formed thereon a pair of lips 11 which fit into the recesses 3 in the cam. Each lip terminates in a detent nose 12 for cooperation with the recess 5 in the cam. Of course, a pair of recesses 13 is formed by the lips 11. In order that foreign

matter which works its way between the sleeve and the skirt may be expelled, we prefer to provide a plurality of cleaning apertures 14 in the skirt.

In assembling the devices on the crutch after the tip has been turned down, sleeve T is slipped thereover and fastened thereon with a screw or other fastening device. Next the skirt is slipped over the sleeve and a spring 16 and washer 17 follow. One end of the spring 16 rests against the shoulder 18 formed at the junction of the flaring portion 9 of the skirt and the cylindrical portion 8. The other end of the spring bears against washer 17 which, in turn, rests upon the standard or conventional rubber shoe 15. The diameter of the cylindrical portion 7 of sleeve T is made equal to the diameter of a crutch tip so that after our assembly is fitted we merely slip the crutch tip 15 over the portion 7 of the sleeve thereby completing the assembly.

When the lips 11 fit into the recesses 3, the skirt is in its retracted position as shown in Fig. 2. To advance the skirt into operative relationship, it is merely rotated in either direction and the edges of lips 4 on the sleeve and 11 on the skirt act as cams to advance the sleeve longitudinally until detent nose 12 on each lip snaps into its associated recess 5 in the cam. A spring 16 urges the skirt upwardly at all times and causes it to be firmly retained in either its advanced or its retracted position.

As shown in Figs. 6 and 6*a*, we prefer that the teeth lie in a convex generally cylindrical surface, the axis of which is transverse to the crutch, in order to facilitate the rocking motion normally imparted to the crutch when it is used. This arrangement of teeth has the important advantage that it provides a certain degree of lateral stability as seen in Figs. 7 and 7*a* in that the teeth in any transversely aligned pair lie in a straight line so that a firm base is had at all times as the crutch is rocked by the user.

Having completed the detailed description of our novel crutch assembly, it can be seen how the objects of our invention are realized. The assembly is small, light in weight, sturdy and readily manipulated. It is unobstrusive when fitted to the crutch and yet is unusually effective as a gripping device. We prefer that the device be arranged so that the conventional shoe and the teeth are in substantial alignment in the advanced position of the skirt, but this detail can be varied according to the dictates of the user by shortening the crutch tip or by placing washers under the shoe before it is slipped in place. It has been stated that the surface defined by the teeth is generally cylindrical. Applicant contemplates that the term "cylindrical" as employed in this specification and the appended claims is used in its generic geometrical sense as defining a curved surface generated by motion of a straight line parallel to another fixed line or axis.

Those skilled in the art will appreciate that the various design details and fabrication of the parts may be varied in accordance with standard shop practice. We therefore contemplate that the appended claims and not the illustrated embodiment be determinative of the scope of the invention.

What is claimed is:

1. In a crutch or the like, a rubber shoe mounted on the crutch tip, diametrically opposed cam means mounted on said tip and spaced from said shoe, said cam means comprising symmetrical ears extending along said tip toward said shoe, skirt means adjustably mounted on said tip for axial motion between a retracted and an advanced position, said skirt means having teeth on its lower edge and having a pair of diametrically opposed ears arranged to rest between the ears of said cam means, spring means engaging said skirt means and means fixed on said crutch to urge said skirt means away from said shoe, and cooperating detent means formed on the terminal portions of said ears for retaining said skirt means in its advanced position, whereby said skirt can be moved from the retracted position and locked in the advanced position by a quarter turn of the sleeve in either direction.

2. In a crutch or the like, a rubber shoe mounted on the crutch tip, diametrically opposed cam means mounted on said tip and spaced from said shoe, said cam means comprising symmetrical ears extending along said tip toward said shoe, skirt means adjustably mounted on said tip for axial motion between a retracted and an advanced position, said skirt means having teeth on its lower edge and having a pair of diametrically opposed ears arranged to rest between the ears of said cam means, spring means engaging said skirt means and means fixed on said crutch to urge said skirt means away from said shoe, and cooperating detent means formed on the terminal portions of said ears for retaining said skirt means in its advanced position, whereby said skirt can be moved from the retracted position and locked in the advanced position by a quarter turn of the sleeve in either direction, the points of said teeth lying in a surface formed by the intersection of a substantially cylindrical segment and said skirt with the axis of said segment transverse to the plane of forward motion of said crutch with the skirt in its advanced position, said surface appearing convex when viewed along said axis.

3. A ground gripping assembly for attachment to a crutch or the like adjacent the tip thereof, said assembly including an elongated skirt for surrounding the crutch tip and having teeth formed on its lower edge, said assembly including means for retaining the skirt on the crutch in a position with said teeth disposed adjacent the end of the crutch tip, the points of said teeth lying in a surface formed by the intersection with said skirt of a generally cylindrical surface of substantially greater radius of curvature than the radius of said skirt, the axis of said intersecting surface being perpendicular to the axis of said skirt, the axis of said intersecting surface being above said teeth with the latter in ground-engaging position, said means for mounting said skirt on a crutch being adapted to mount said skirt so that the axis of said intersecting surface is perpendicular to the plane of forward motion of the crutch with said skirt in its ground-engaging position, whereby the crutch may have a fore-aft rocking motion combined with lateral stability.

4. A ground gripping assembly for attachment to a crutch or the like adjacent the tip thereof, said assembly including an elongated skirt for surrounding the crutch tip and having teeth formed on its lower edge, said assembly including means for retaining the skirt on the crutch in a position with said teeth disposed adjacent the end of the crutch tip, the points of said teeth lying in a surface formed by the intersection with said skirt of a generally cylindrical surface of substantially greater radius of curvature than the

radius of said skirt, the axis of said intersecting surface being perpendicular to the axis of said skirt, the axis of said intersecting surface being above said teeth with the latter in ground-engaging position, said means for mounting said skirt on a crutch being adapted to mount said skirt so that the axis of said intersecting surface is perpendicular to the plane of forward motion of the crutch with said skirt in its ground-engaging position, whereby the crutch may have a fore-aft rocking motion combined with lateral stability, said assembly including means for retracting said skirt from its ground-engaging position.

5. In a crutch or the like, a rubber shoe mounted on the crutch tip, a skirt having teeth on its lower edge, means mounting said skirt on said tip, cooperating cam means mounted on said crutch and said skirt for moving said skirt axially on said crutch between a retracted and an advanced position, one of said cooperating cam means comprising a curved axially-extending tongue the base of which has a circumference of substantially 180°, the other of said cam means being the wall of a recess complementary to said tongue, whereby a quarter turn of said skirt in either direction relative to said crutch moves said skirt from one of its axial positions to the other, opposed spring base means on said skirt and crutch, spring means extending between said opposed spring base means and arranged to urge said skirt axially toward its retracted position, and cooperating detent means formed on said cam means for retaining said skirt means in its advanced position.

6. A ground gripping assembly for attachment to a crutch or the like adjacent the tip thereof comprising a ferrule for mounting on said crutch, a skirt having teeth on its lower edge, cooperating cam means on said ferrule and said skirt for moving said skirt axially relative to said ferrule between a retracted and an advanced position, one of said cooperating cam means comprising a curved axially extending tongue the base of which has a circumference of substantially 180° degrees, the other of said cam means being the wall of a recess complementary to said tongue, whereby a quarter turn of said skirt in either direction relative to said ferrule moves said skirt from one of its axial positions to the other, spring base means on said skirt adapted to oppose spring base means on the crutch, spring means adapted to extend between the opposed spring base means and arranged to urge said skirt axially toward its retracted position, and cooperating detent means formed on said cam means for retaining said skirt means in its advanced position.

7. A ground gripping assembly for attachment to a crutch or the like adjacent the tip thereof comprising a ferrule for mounting on said crutch, said ferrule having diametrically-opposed cam means in the form of symmetrical ears extending axially toward the crutch tip, skirt means adjustably mounted on said ferrule for motion between a retracted and an advanced position,

said skirt means having a pair of diametrically opposed ears arranged to rest between the ears on said ferrule with the skirt means retracted, spring means for engaging said skirt means and means fixed on the crutch to urge said skirt means toward its retracted position, said skirt means having teeth on the lower edge thereof.

8. A ground gripping assembly for attachment to a crutch or the like adjacent the tip thereof comprising a ferrule for mounting on said crutch, said ferrule having diametrically-opposed cam means in the form of symmetrical ears extending axially toward the crutch tip, skirt means adjustably mounted on said ferrule for motion between a retracted and an advanced position, said skirt means having a pair of diametrically-opposed ears arranged to rest between the ears on said ferrule with the skirt means retracted, spring means for engaging said skirt means and means fixed on the crutch to urge said skirt means toward its retracted position, said skirt means having teeth on the lower edge thereof the points of said teeth lying in a surface formed by the intersection with said skirt means of a generally cylindrical surface of substantially greater radius of curvature than the radius of said skirt means, the axis of said intersecting surface being perpendicular to the axis of said skirt means, the axis of said intersecting surface being above said teeth with the latter in ground-engaging position, and means for mounting said ferrule on a crutch so that the crutch may have a fore-aft rocking motion combined with lateral stability.

9. A ground gripping assembly for attachment to a crutch or the like adjacent the tip thereof comprising a ferrule for mounting on said crutch, the upper end portion of said ferrule having a thickened portion the edge of which forms a generally spiral cam surface of substantially 90° circumferential extent, a skirt having teeth on its lower edge, the upper edge of said skirt being scalloped to form a cam surface complementary to said ferrule cam surface, whereby a quarter turn of said skirt relative to said ferrule moves said skirt from a retracted axial position to an advanced position, spring base means on said skirt adapted to oppose spring base means on the crutch, spring means adapted to extend between the opposed spring base means and arranged to urge said skirt axially toward its retracted position, and cooperating detent means formed on said cams for retaining said skirt in its advanced position.

ROBERT J. CHUTE.
EDWARD I. PECK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
415,511	Howgate	Nov. 19, 1889
701,238	Williams	May 27, 1902
1,717,314	Frantz	June 11, 1929