

[54] **CRUTCH WITH RETRACTABLE ICE GRIPPER**

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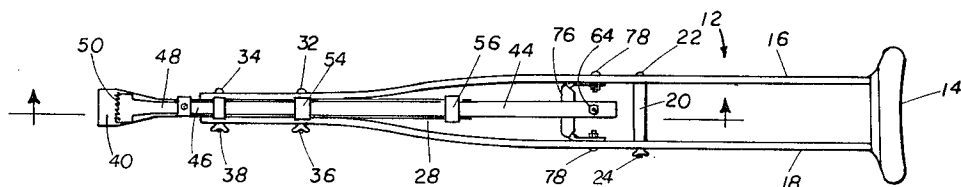
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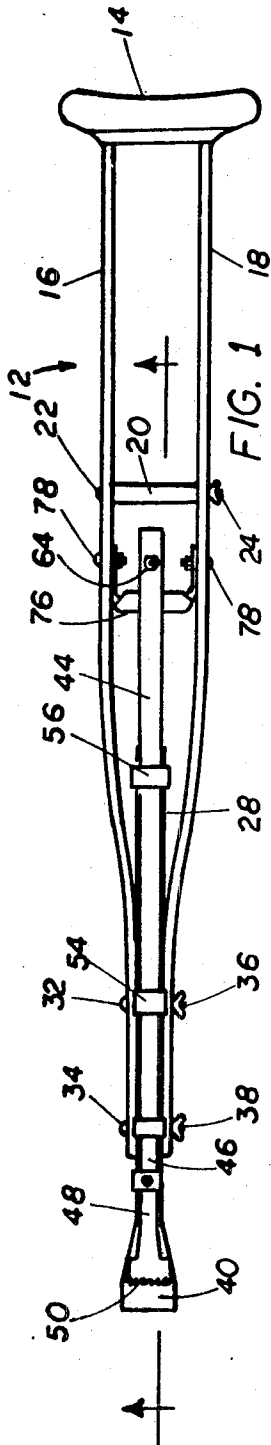
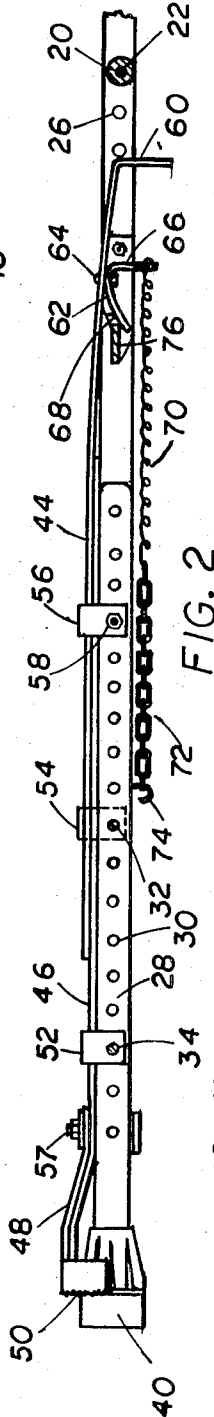
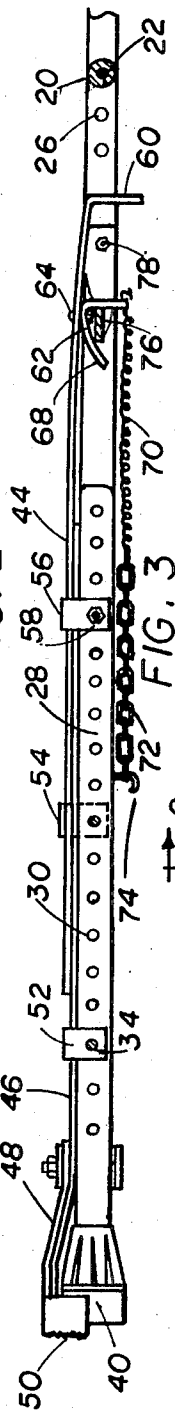
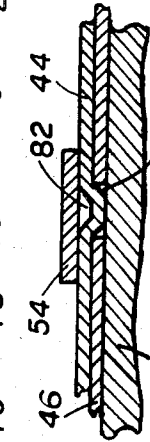
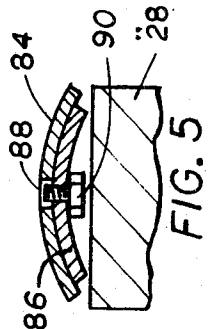
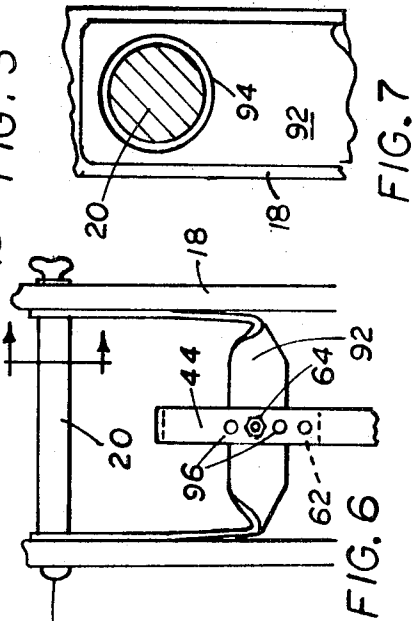
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ABSTRACT

A crutch having a retractable ice gripper operable by the user as he normally uses the crutch while being supported by the crutch. The ice gripper is fixed on the end on an adjustable longitudinal support which is biased downwardly with respect to the crutch with an adjustable biasing means. A latch controls the disposition of the ice gripper with respect to the bottom of the crutch.

12 Claims, 7 Drawing Figures





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CRUTCH WITH RETRACTABLE ICE GRIPPER

This invention relates to a crutch with a retractable ice gripper. In one of its aspects, the invention relates to a retractable ice gripper on an adjustable crutch wherein the ice gripper has a support which is adjustable with respect to the crutch to facilitate operation of the ice gripper when the crutch is adjusted for users of different heights.

In another of its aspects the invention relates to a crutch with a retractable ice gripper wherein the ice gripper has an adjustable biasing means to resiliently force the ice gripper into contact with icy surfaces.

Due to an increase in the skiing activity in northern areas of the United States, leg fractures in the winter time have increased in recent years. In addition to skiing accidents, many other types of accidents occur in the winter and require the use of crutches by accident victims. During the winter months, ice on sidewalks and streets creates a very serious hazard for persons dependent on crutches. The crutches heretofore available have no practical provision for use on icy surfaces, thereby forcing persons who are dependent on crutches to remain indoors during inclement weather.

It has been proposed to attach an ice-gripping element to the bottom of a crutch in lieu of the conventional rubber cap. This would be satisfactory for icy surfaces but would have to be removed when entering a house. The user must relinquish support of the crutch while changing the ice-gripping element thereby subjecting the user to a hazard.

Various other devices have been proposed to solve the problem of the use of crutches on icy surfaces. Some of these solutions have required restructuring of the conventional crutches or construction of a new and different crutch in order to accommodate the ice-gripping element. Other solutions have been impractical in that they were not adapted for different adjustable positions of an adjustable crutch. Still other solutions were impractical because the gripping elements were maintained rigidly in contact with icy surfaces.

By various aspects of this invention one or more of the following, or other, objects can be obtained.

It is an object of this invention to provide a crutch with a retractable ice gripper which can be easily actuated while supporting the user for gripping or nongripping positions.

It is further object of this invention to provide a retractable ice gripper which is easily incorporated into a conventional crutch design.

It is still a further object of this invention to provide an adjustable crutch having a retractable ice gripper with an actuating handle which is adjustable to maintain the same relationship between the handle and the crutch handle to facilitate actuation of the ice gripper into operating positions while the crutch is being used.

It is yet another object of this invention to provide a crutch having a retractable ice gripper which is resiliently biased into contact with the icy surfaces and the biasing means is itself adjustable to compensate for persons of different weight.

In accordance with the invention, there is provided a combination of a conventional crutch with an ice-gripping element. The conventional crutch includes an armrest, longitudinal support members including a lower support member having an end for contacting a supporting surface and an upper support member supporting the armrest, there being means for securing the upper and lower support members together. The inventive retractable ice-gripping means according to the invention comprises a longitudinal support means, and an ice-gripping plate at one end of the longitudinal support means. The ice-gripping plate has at one end a plurality of pointed members for engaging and gripping icy surfaces and at least partially encircles the bottom end of the lower support. The longitudinal support means are slidably retained on the longitudinal support members for longitudinal reciprocation with respect thereto between upper and lower positions. In the lower position, the pointed members extend below the lower support member end. In the upper position, the pointed members extend to a point above the lower sup-

port end. Means are provided to bias the ice gripper means downwardly with respect to the support members.

Still further according to the invention, a latch means is provided to retain the ice gripper support means in the upper position, and to limit the downward movement, of the support means to the lower position.

Still further according to the invention, the biasing means is adjustable to regulate the force by which the ice-gripping means contacts the icy surfaces.

The invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a front view of a crutch with an ice gripper attached thereto in a retracted position;

FIG. 2 is a slightly enlarged cross sectional view taken along lines II—II of FIG. 1;

FIG. 3 is a view similar to FIG. 2 showing the ice gripper means in the extended position;

FIG. 4 is an enlarged partial sectional view taken along lines IV—IV of FIG. 1;

FIG. 5 is a lateral cross-sectional view of a modified form of the ice gripper supporting elements of the invention;

FIG. 6 is a partial front view of a second modification of the invention; and

FIG. 7 is a view taken along lines VII—VII of FIG. 6.

Referring now to the drawings and to FIGS. 1-4 in particular, there is shown an adjustable crutch 12 having an armrest 14 joined to the upper end of side supports 16 and 18. A handle 20 is affixed between the side supports 16 and 18 by a screw 22 and a wingnut 24. Each of the side supports 16 and 18 have a plurality of holes 26 for adjusting the position of the handle grip 20 on the side supports.

A central support member 28 is affixed between bottom portions of the side supports 16 and 18 through screws 32 and 34 which extend through holes 30 in the central support member 28. Wingnuts 36 and 38 are secured to the ends of the screws 32 and 34 respectively. A rubber end cap 40 is affixed to the bottom end of the central support member 28.

The foregoing has been a description of a conventional adjustable crutch design that is in wide use throughout the United States. The height of this crutch is adjusted by changing the relative position of the central support member 28 with respect to the side supports 16 and 18. This is accomplished by removing the screws 32 and 34, changing the relative position of the central support member 28 with respect to the side support members 16 and 18 and reinserting the screws and the wingnuts. At the same time, the position of the handle grips 20 on the side supports 16 and 18 can be changed.

According to the invention, a novel and inventive ice gripper construction is easily and quickly fixed to the conventional crutch design without restructuring the design or modifying the basic crutch structure. The ice gripper has a top bar 44 and a bottom bar 46 in overlapping relationship these bars 44 and 46 are rigidly maintained in fixed relationship by a hole 80 in the bottom bar 46 and an indentation 82 in the top bar 44 (FIG. 4). A gripper member 48 having jagged bottom edges 50 is fixed to the lower end of the bottom bar 46 through conventional fastening means 50.

The bars 44 and 46 are slidably retained on the central support member 28 by L-shaped brackets 52, 54 and 56. Bracket 52 has a leg extending between the central support member 28 and the side support member 18 and is securely held in that position by screw 34. The L-shaped bracket 54 has a leg extending between the central support member 28 and the side support 16. This bracket 54 is securely held on the central support member 28 by a screw 32. Bracket 56 is secured by a fastening member 58.

The upper portion of the top bar 44 is bent inwardly forming a handle 60 beneath the handle grip 20.

A latch member 62 is secured to the top bar 44 through a conventional fastening means 64. The latch member 62 contains a lateral extension 66 at right angles to the top bar 44. A downwardly extending catch flange 68 extends at an acute angle from the top bar 44 engaging a U-shaped latch bar 76.

Fastening member 78 securely holds the latch bar 76 between the side supports 16 and 18.

A tension spring 70 is secured at one end to the lateral extension 66 of the latch member 62 and at the other end to a chain 72. One end of the chain 72 engages a hook 74 which in turn is secured to the central support member 28. The chain can be removed from the hook 74 and attached at different portions of the chain to adjust the tension in the spring 70. In the alternative, the connection between the chain 72 and the spring 70 can be changed in order to adjust the tension in spring 70. The spring 70 functions to resiliently bias the ice-gripping means downwardly with respect to the central support member 28 of the crutch.

In operation, the crutch would normally be used with the ice gripping element in the position illustrated in FIG. 2. When an icy surface was encountered, the user of the crutch would grasp the handle 60 with his hand, lift it slightly to disengage the catch flange 68 from engagement with the latch bar 76, and then pull the top 84 44 outwardly slightly in order to clear the latch bar 76. The handle is then let down until the jagged edges 60 contact the icy surface. The jagged edges 50 are maintained resiliently in contact with the icy surfaces by the spring 70. The ice-gripping element is retracted by grasping handle 60 and lifting the same upwardly until the catch flange 68 engages the latch bar 76.

Reference is now made to FIG. 5 which shows a modified means in which the ice gripper supporting bars can be secured together. This figure represents a lateral cross section through two longitudinal, overlapping bars. In this modified form of the invention an arcuate top bar 84 has a plurality of openings or holes 88, only one of which is shown in FIG. 5. A bottom bar 86 is also arcuate in shape and concave downwardly providing a space between the central portion of the bar 86 and the central support member 28. A screw 90 threadably engages the arcuate bottom bar 86 and extends upwardly into the hole 88 in the arcuate top bar 84. The head of the screw 90 is positioned within the recessed formed by the concave bar 86. Although not specifically illustrated in FIG. 5, the bars 84 and 86 are arcuate shaped in lateral cross section throughout the entire length thereof.

Reference is now made to FIGS. 6 and 7 which show a still further modification of the invention. In these figures, like numbers have been used to designate like parts. In this modification, a U-shaped latch bar 92 has holes 94 in the upper portions thereof. The handle grip 20 extends through the holes 94, thereby supporting the latch bar 92.

The function of the latching mechanism is identical with that described above with reference to FIGS. 1 through 4. However, in this modification, the latch bar 92 is automatically transferred to different positions when the handle grip 20 is adjusted to different positions. Thus, with the modification of FIGS. 6 and 7, there is no necessity of making a separate adjustment for the latch bar when moving the handle grip 20.

As shown in FIG. 6, the fastening member 64 extends through one of a plurality of holes 96 in the top bar 44 and secures the later member 62 to the bar 44. Each of the holes 96 is spaced about one-fourth inch apart. The latch member 62 can be attached to the bar 44 through any of the holes 96. In this manner, the extent to which the jagged edges will extend below the end of the end cup 40 can be adjusted.

It will be appreciated from the foregoing that there has been devised an improved ice gripping construction to be attached to a conventional crutch without making modifications thereto. The gripper elements are adjustable for different adjustments of the crutch length to maintain the relationship between the handle grip on the crutch and the handle for the ice gripper actuator.

The spring bias for the ice gripper provides a resilient engaging force of the ice gripper on an icy surface. The spring bias is adjustable for the requirements of different people.

The handle arrangement on the ice gripper support permits easy actuation of the gripper assembly into gripping and non-gripping position while the crutch itself is being employed as a

support. Thus the ice gripper element can be easily operated while the crutch is in its conventional use.

Reasonable variation and modification are possible within the scope of the foregoing disclosure, the drawings, and the appended claims without departing from the spirit of the invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In combination with an adjustable crutch having an arm rest, longitudinal support members including a lower support member having an end for contacting a supporting surface and an upper support member, means for securing said upper and lower support members together;

a retractable ice-gripping means comprising: a longitudinal support means, an ice-gripping plate at one end of said longitudinal support means, said ice-gripping plate including at one end a plurality of pointed members for engaging and gripping icy surfaces;

means slidably retaining said ice-gripping means on one of said longitudinal support members for longitudinal reciprocation with respect thereto between upper and lower positions, said pointed members extending below said lower support member end in said lower position, and said pointed members extending to a point above said lower support end when in said upper position; and means biasing said ice gripper means downwardly with respect to said support members.

2. The combination of claim 1 wherein said means for securing said upper and lower members engage said retaining means for said gripping means.

3. The combination of claim 1 wherein said longitudinal support means comprises first and second bars in overlapping relationship to each other, and means for adjustably securing said bars together so that the length of said longitudinal support means can be adjusted for different lengths of said adjustable crutch.

4. The combination of claim 3 wherein said securing means comprises a plurality of holes in one of said bars and at least one indentation in the other of said bars in registry with said holes in said one bar.

5. The combination of claim 3 wherein each of said bars is arcuate in longitudinal cross section, both of said bars being concave downwardly with respect to said support members, the upper of said bars having a plurality of apertures, and said securing means including a fastener member have a head between said support member and the lower bar, and a portion of said fastener member extending through said lower bar and into an aperture in said upper bar.

6. The combination of claim 1 further comprising latch means for retaining said gripping means in said upper position.

7. The combination of claim 6 wherein said latch further includes means for limiting the downward movement of said ice gripping means with respect to said support members at said lower position.

8. The combination of claim 1 further comprising means to adjust the bias on said biasing means.

9. The combination of claim 7 wherein said adjustable crutch includes a handle and said latch means includes a U-shaped bar having legs engaging said handle.

10. In combination with a crutch, a retractable ice gripper comprising: a longitudinal support means; means slidably retaining said support means on said crutch for reciprocatory movement along the length of said crutch; ice-gripping edges at a bottom end of said support means adapted to move above and below the bottom end of said crutch; means to bias said support means downwardly with respect to said crutch; and latch means to retain said support means in a position wherein said ice-gripping edges are above the bottom end of said crutch, and to stop the downward movement of said support means at a position where said ice-gripping edges are a spaced distance below the bottom end of said crutch.

11. The combination of claim 10 further comprising means to adjust said biasing means so that said ice gripper is adjustable for persons of different weight.

12. In combination with a crutch, a retractable ice gripper comprising: a longitudinal support means; means slidably retaining said support means on said crutch for reciprocatory movement along the length of said crutch; ice-gripping edges at a bottom of said support means adapted to move above and 5

below the bottom end of said crutch; means to bias said support means downwardly with respect to said crutch; and means to adjust said biasing means so that said ice gripper is adjustable for persons of different weight.
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