April 9, 1968 W. STARK 3,376,880

NONSKID ATTACHMENT FOR THE GROUND-ENGAGING ENDS OF CANES, CRUTCHES AND THE LIKE

Filed April 27, 1967

FIG. 1

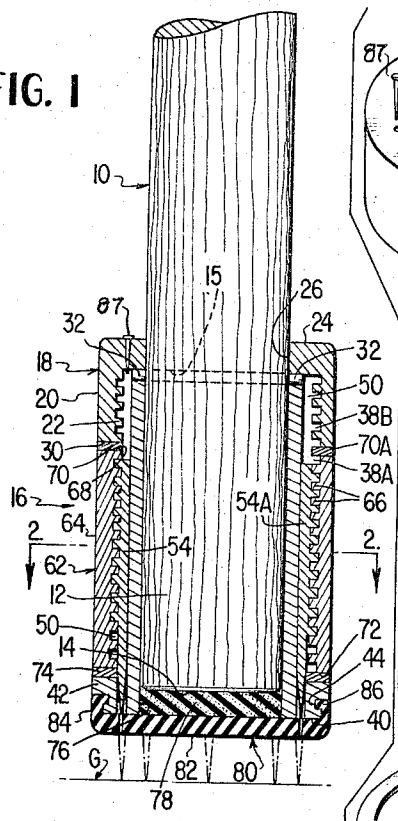


FIG. 2

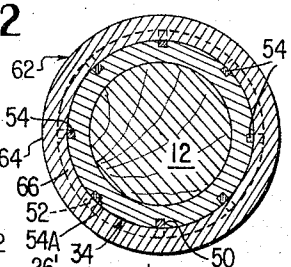
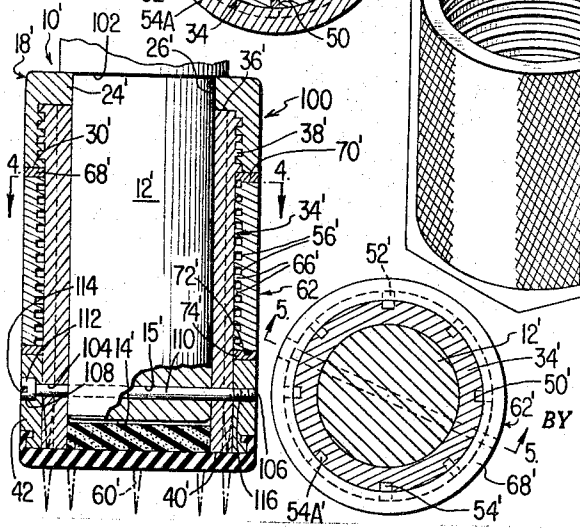


FIG. 5



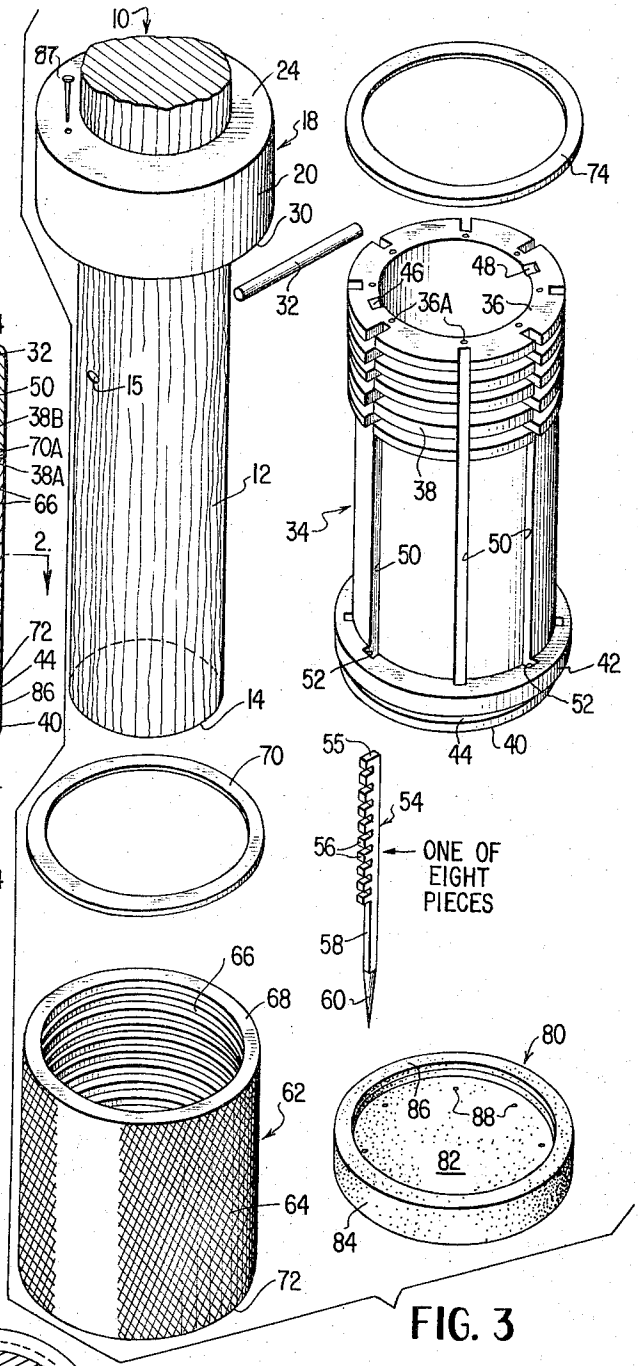


FIG. 3

FIG. 4

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NONSKID ATTACHMENT FOR THE GROUND-ENGAGING ENDS OF CANES, CRUTCHES AND THE LIKE

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ABSTRACT OF THE DISCLOSURE

A friction attachment for the ground-engaging end of a cane, the attachment comprising spike means extendable and retractable axially of and relative to the ground-engaging end of a cane, and manually operable means selectively controlling the movement of the spike means.

The background of invention

This invention relates to the general field of aids for ambulatory persons and, more specifically, the instant invention relates to a nonskid attachment for the ground-engaging ends of canes, crutches and related devices.

Conventional canes and crutches are usually constructed of wood or light weight metal materials, and the ground-engaging ends thereof are generally provided with a friction device to prevent the ground-engaging end of the cane or crutch from skidding when the weight of the person is shifted or transferred to the walking aid. Frequently these non-skid devices take the form of a button formed of rubber or of other suitable materials, the button generally being secured to the ground-engaging end of the cane by means of a ferrule. Again, it is not uncommon for the ground-engaging ends of canes and crutches to be encased within a flexible rubber cap. Under conditions of favorable weather such friction or nonskid devices are generally sufficient and well serve their intended purpose and function. However, such devices fail and become useless for all practical purposes under inclement weather conditions, especially in snow and ice.

It is, therefore, one of the primary objects of this invention to provide an antiskid attachment or device for the ground-engaging ends of canes, crutches and the like, the antiskid attachment being of a type adapted to penetrate a ground surface.

Another object of this invention is to provide an attachment for the ground-engaging ends of canes and crutches wherein the attachment includes, in combination, a nonskid friction element adapted to make surface contact with a ground surface and, selectively, to provide means in the nature of ground surface penetrating means when conditions of ice and other slippery ground surfaces are encountered.

A further object of this invention is to provide an attachment for the ground-engaging ends of canes and crutches wherein the attachment includes spike means to penetrate a ground surface, and means for selectively and adjustably moving the spike means axially of the cane or crutch.

A still further object of this invention is to provide an attachment for the ground-engaging end of canes and crutches, the attachment including a flexible ground-engaging friction member employed where the ground surface is dry, and spike means axially adjustable relative to the cane for extension and retraction through the flexible member when inclement weather conditions are encountered producing slippery ground surfaces.

This invention contemplates, as a still further object thereof, the provision of means of the type generally described supra, the means being noncomplex in construction and assembly, inexpensive to manufacture, and which are rugged and durable in use.

Other and further objects and advantages of the instant invention will become more evident from a consideration of the following specification when read in conjunction with the annexed drawing.

Specification

In the drawing:

FIGURE 1 is a vertical medial transverse detailed cross-sectional view of the cane or crutch attachment constructed according to this invention, FIGURE 1 illustrating the attachment as being mounted on the ground-engaging end of a cane or crutch and with the non-skid spike elements shown in full lines disposed in their inoperative position, the dotted line representation thereof showing the operative positions of the ground-engaging spikes;

FIGURE 2 is a detail transverse cross-sectional view, FIGURE 2 being taken substantially on the horizontal plane of line 2—2 of FIGURE 1, looking in the direction of the arrows;

FIGURE 3 is an exploded perspective view of the attachment and including a fragment of the ground-engaging end of a cane or crutch on which the attachment is mounted;

FIGURE 4 is a transverse detail cross-sectional view of a second embodiment of this invention, FIGURE 4 being taken substantially on the horizontal plane of line 4—4 of FIGURE 5, looking in the direction of the arrows; and

FIGURE 5 is a vertical transverse detail cross-sectional view of a crutch or cane nonskid attachment constructed according to the second embodiment of the invention, FIGURE 5 being similar to FIGURE 4 in showing the attachment as being mounted on the ground-engaging end of a cane or crutch and with the nonskid spike element shown in full lines disposed in their respective inoperative positions, the dotted line representation thereof showing the operative positions of the ground-engaging spikes.

Before explaining in detail the apparatus of the present invention, it is to be understood that this invention is not limited in this specification to the illustrated and described details of construction and arrangement of parts, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it will be understood that the phraseology or terminology employed herein is merely for the purpose of clarity of description and is not to be construed as being by way of limitation.

Thus, and referring now more specifically to the drawing, reference numeral **10** designates a fragment of a lower cylindrical ground-engaging end of a conventional cane, crutch or similar aid generally used by persons whose walking is impaired. While the cane herein illustrated is shown as being constructed of wood, this invention contemplates the use of the disclosed attachment in association with canes or crutches formed of metal or other suitable materials.

As is shown in FIGURE 1 of the drawing, the lower end **12** of the cane **10** terminates in a transverse planar surface **14**, and disposed adjacent to but spaced inwardly and axially from the planar end **14**, the lower end **12** is provided with a transversely extending bore **15** which serves a function to be described infra.

The nonskid tip or attachment constructed in accordance with the teachings of this invention is here indicated, in general, by the reference numeral **16**. The attachment **16** is seen to include an upper cap **18** having an axially elongated substantially hollow cylindrical side wall **20**, the side wall **20** being internally threaded at **22**, and having a closure wall **24** extending transversely across one end thereof. The closure wall **24** is also centrally apertured as at **26**.

As is seen in FIGURE 1 of the drawing, the lower or ground-engaging end 12 of the cane 10 is adapted to be inserted through the aperture 26 and is, preferably, telescoped therein. In mounting the cap 18 on the end 12, the cap is moved axially with respect to the end 12 until the lower end 30 of the side wall 20 is moved above the opposed ends of the bore 15 after which an elongated pin 32 is driven or inserted in the bore 15. As is seen in FIGURE 1, the axial length of the pin 32 is greater than the diameter of the lower or ground-engaging end 12 of the cane 10 so as to provide diametrically opposed pin projecting ends.

Reference numeral 34 denotes an elongated substantially hollow cylindrical sleeve having an enlarged upper end 36 externally threaded as at 38, and at its opposed lower end 40 the sleeve 34 is integrally formed or connected with an enlarged circumferential outwardly flaring flange 42. The outer side of the flange 42 is formed with an outwardly opening circumferential groove 44 which serves a function to which further reference will be made.

The upper end 36 of the sleeve 34 is provided with a pair of diametrically opposed radially extending and upwardly opening grooves or notches 46, 48, and the external side thereof is provided with a plurality of circumferentially spaced axially extending outwardly opening substantially U-shaped ways 50, the ways 50 being in open communication with the upper end 36 at one of their respective ends, and opening at their other or lower ends into the upper ends, respectively, of a plurality of axially extending substantially rectangular guide passages 52 which are circumferentially spaced around flange 42 and through which they extend. The lower ends of the guide passages 52, in turn, open into the planar lower end 40 of the sleeve 34.

Each way 50 slidably receives one of the uniformly constructed and elongated substantially rectangular inserts 54, each insert 54 having a threaded upper edge portion 56 which projects beyond the outer cylindrical plane of sleeve 34. As is seen in FIGURE 1, the inserts 54 normally occupy those portions of the ways 50 located below the threads 38, and the outer edges of the threads 38 and 56 are preferably contained in a common cylindrical plane.

Each of the inserts 54 have a lower end portion 58 which continues into an integrally formed tapered spike 60 at its lower free end, the spikes 60 comprising the ground surface penetrating means to which reference has been made supra.

As has been mentioned immediately above, the inserts 54 are adapted for sliding movement in each of their respective ways 50, and by virtue of this sliding movement, the inserts 54 are adapted for movement from an inoperative position such as that illustrated in FIGURE 1 to a selected operative position wherein the spike ends 60 are moved to the dotted line position of the last mentioned figure.

In thier respective inoperative positions shown in full lines in FIGURE 1, the upper ends of the inserts 54 are disposed immediately adjacent the lowermost one of the threads 38 and the spikes 60 thereof are fully housed within, respectively, one of their immediately adjacent guide passages 52. In their respective operative positions, the inserts 54 are moved axially downwardly in their respective ways 50 causing the spikes 60 to project beyond the planar lower end 40 of the sleeve 34 and the thread-free lower end portions 58 to enter the guide passages 52.

A free running axially elongated hollow cylindrical collar is designated by reference numeral 62, see FIGURES 1 and 3. The collar 62 is externally knurled as at 64 and is internally threaded at 66. The collar 62 is mounted on the sleeve 34 in concentric relation relative thereto with the threads 66 of the collar 62 meshing with the threads 56 of each of the inserts 54. The arrangement is such that the upper end 68 of the collar 62

preferably extends slightly above the upper ends of the inserts 54 whereby the upper end 68 engages flushly against the underside of the sealing gasket 70 mounted on the sleeve 34 and having a portion 70A engaged between the first two threads 38A, 38B (see FIGURE 1) disposed immediately adjacent the upper end 68 of the collar 62.

With the collar 62 mounted on the sleeve 34 and with the collar threads 66 meshing with the sleeve threads 38, the lower end 72 sealingly engages a flexible annular gasket 74 which is mounted on the sleeve 34 and which seats on the upper side of the circumferential flange 42.

The sleeve 34 and the component elements integrally formed therewith or mounted thereon may now be handled as a unit and slidably mounted on the ground-engaging end 12 of the cane 10.

To this end, the ground-engaging end 12 is inserted through the upper end 36 of the sleeve 34 and telescopes therein until the upper end 36 engages the underside of the pin 32 at which time the lower planar end 14 is moved to a point adjacent to but spaced inwardly from the lower planar end 40 of the sleeve 34. As this relative axial movement between the end 12 and the sleeve 34 takes place, the sleeve 34 may be rotated about its longitudinal axis until the pin 32 seats within the notches 46, 48 whereby the collar 34 is prevented from further rotation about its longitudinal axis.

The collar 18 is now moved axially of the lower end portion 14 to engage the upper end 36 of the sleeve 34 after which it is rotated causing the cap threads 22 to thread downwardly on the sleeve threads 38 thereby releasably connecting together the cap 18 and the sleeve 34. As this connection is effected, the lower end 30 of the cap 18 engages the upper side of the gasket 70 to clamp and seal the gasket between the end 30 and the adjacent upper end 68 of the collar 62.

With this assembly the planar end 14 terminates inwardly of the end 40 so that that portion of the sleeve 32 which extends between its lower end 40 and the adjacent lower planar end 14 of the ground-engaging end 12 of the cane 10 defines a substantially hollow cylindrical compartment 76 which is adapted to receive a resilient flexible discoidal element 78, and over the lower end 40 of the sleeve 34 is threaded a second cap 80.

The cap 80 is formed of a resilient material, rubber, for example, and includes a substantially cylindrical traction member 82 which extends transversely across the lower end 40 of the sleeve 34 and the adjacent side of the discoidal sponge rubber element 78. The cylindrical traction member 82 is provided with an upwardly extending cylindrical flange 84 at the circumferential marginal edge thereof, and the upper end of the flange 84 is inwardly reverted as at 86 to be seated within the circumferential groove 44. This effects a detachable connection of the second cap 80 on the lower end 40 of the sleeve 34.

Optionally, the traction member 82 may be provided with a plurality of circumferentially spaced transversely extending spike-receiving openings 88 (see FIGURE 3), or the traction member may be installed as an imperforate element at the time the attachment assembly is made and these openings formed thereafter in a manner to be described.

With the attachment mounted on the ground-engaging end 12 of the cane 10 in the manner described above, and assuming all of the component elements thereof are in the full line position as shown in FIGURE 1 of the drawing, the cane or crutch 10 is used in the conventional manner. However, and upon the setting in of inclement weather conditions which result in, for example, accumulations of snow and ice, the user may turn the knurled collar 62 in such a direction as to cause the inserts 54 to move axialy downwardly, reference being made to FIGURE 1, whereby the spike ends 60 of the inserts are forced out of their guide passages 52 and are caused to pass through

the openings **88** formed in the traction member **82** of the second cap **80** to assume their dotted line positions as shown in FIGURE 1.

As has been stated above, it is optional whether or not the traction member **82** is formed with the openings **88** for if this element, in its original installation, constituted an imperforate disc, then the force exerted by the spike ends on the traction member **82** may be made sufficient to cause the spike ends **60** to penetrate the traction member **82** and eventually assume the dotted line extended positions thereof as shown in the last named figure.

When the ground-engaging spikes **60** are being utilized, there will be a tendency of snow and ice to be compacted and retained within that space surrounded by the spikes **60** and which builds up against the cylindrical traction member **82**. This accumulation of snow and ice is resisted by the discoidal element **78** which constantly biases the cylindrical traction member for movement in a direction away from the adjacent end **14** of the cane **10** and this bias on the traction member **82** tends to eject the accumulated snow to maintain the area surrounded by the spikes **60** relatively free of snow and ice which would otherwise tend to lessen the efficiency of the nonskid elements or spikes **60**.

With the component elements of the attachment mounted on the ground-engaging end **12** of the cane or crutch **10**, there is a tendency for the attachment elements to rotate about the axis of the cane **10** and to prevent the same an antirotation means is provided which comprises a lock pin **86** (see FIGURES 1 and 3) which extends through the closure wall **24** with the inner end thereof adapted to be engaged and received within the upper end of one of the ways **50**.

As has been stated above, the inserts **54** are of "uniform" construction and the attachment will perform its functions in a satisfactory manner if the inserts are, in fact, identical with respect to one another. It will be recognized, however, that if the inserts **54** are of equal axial length, the first of those to thread on the leading end of the thread **66** will, of course, move axially of the collar **62** before the leading end of the thread **66** threads with the threaded edge portion **56** of the next succeeding one of the inserts **54**. It would thus be impossible for the outer terminal end of each spike end **60** to terminate in the common plane of the ground surface line G as shown in FIGURE 1 unless some compensation is afforded. Thus, and as is indicated in FIGURES 1 and 2, the axial lengths of the inserts **54** will progressively become shorter reading clockwise from the insert **54** to the insert **54A**, the latter comprising the last of the inserts **54** to be threaded on the collar **62** and having the smallest axial length.

To one skilled in this art it will be appreciated that the progressive shortening of the axial lengths of the inserts **54** from the longest to the next smaller one thereof involves an increment of length difficult to positively identify without measurement or other means of identification. Similarly, since the axial lengths of the inserts **54** differ only minutely from one another, once the same are installed in their respective ways **50** it would almost be impossible to determine if they are placed in their proper sequential order. To avoid this problem and to insure rapid and accurate assembly of the device, unit or attachment, each insert **54** may be marked with a paint dot **55** at the upper end thereof, with the dots varying in color from insert to insert to designate inserts having differing axial lengths. The upper planar portion of the upper end **36** will be marked with paint dots **36A**, also differing in color from one another, the dots **36A** being disposed adjacent each way and will correspond with the color of the dots **55**. Thus, the inserts **54** and ways **50**, through the matching of the color dots, become coded relative to one another and assure the assemblyman that in matching the dots the inserts will appear in their proper sequential order.

A second embodiment of this invention is illustrated in FIGURES 4 and 5 wherein a more simplified nonskid attachment, here generally designated by the reference numeral **100**, is provided. The two embodiments of this invention utilize substantially common components, and insofar as it is practical and feasible, the related elements of the second embodiment which find counterparts in the fist one thereof, have been assigned the same reference numeral but to which a prime mark has been added to effect a differentiation therebetween.

Thus, and referring specifically to the last mentioned figures, reference numeral **10'** designates a conventional cane having its lower end portion **12'** turned down to form a circumferential shoulder **102** which terminates in the planar end **14'**. As before, the lower end **12'** is formed with a diametrically extending transverse bore **15'** which, in this embodiment of the invention, has been moved into closer proximity to the planar terminal end **14'** to lie substantially adjacent thereto.

In this second embodiment, the attachment **100** is designed to be easily assembled as a complete unit when offered at retail. To this end, the unit or attachment **100** includes the same sleeve **34'** having an enlarged upper end **36'** threaded as at **38'**. The circumferential flange **42'**, according to this modification, has been axially elongated to provide sufficient body for a pair of diametrically opposed openings **104**, **106** of which, the former is counterbored at **108** and the latter is internally threaded. The unit **100** includes an elongated screw or bolt **110** having an enlarged head **112** at one end thereof, the head **112** being kerfed as at **114** to receive a conventional screwdriver blade or other suitable tool, not shown. The other end of the bolt or screw **110** is threaded at **116**. As is seen in FIGURE 5 of the drawing, the bolt or screw **110** is received within the openings **104**, **106** with the enlarged head **112** thereof being received within the counterbore **108**, and the other threaded end **116** being threadedly engaged within the opening **106**.

The sleeve **34'** is constructed as before and includes the enlarged upper end **36'** externally threaded as at **38'**. The sleeve **34'** is formed with the customary axially extending ways **50'** which communicate, adjacent each of their respective ends, into the upper ends of guide passages **52'** which as before, open into the lower planar end **40'** of the sleeve **34'**.

With the inserts **54'** mounted within their respective ways **50'** the threads **56'** thereof are engaged by the threads **66'** of the collar **62'**. The cap **18'** is threaded on the threads **38'** of the sleeve **34'**, all as has been heretofore described, and washers **70'** and **74'** are disposed, as before, between the lower end **30'** of the collar **18'** and the adjacent end **68'** of the collar **62'**, and the lower end **72'** of the collar **62'** and the adjacent end of the flange **42'**.

Assuming that the cane end portion **12'** has been turned down as described above to provide the shoulder **102**, the unit or device **100** may now easily be installed thereon. To this end, and assuming that the inserts **54'** are in their retracted positions and the component elements of the device **100** are in their respective positions as shown in FIGURE 5, the operator need but withdraw the screw or bolt **110** and to insert the end portion **12'** through the opening **26'** formed in the end wall **24'** of the cap **18'**. The end **12'** is telescopically received within the sleeve **34'** until the end wall **24'** abuts against the shoulder **102**. The attachment **100** may then be axially turned relative to the end portion **12'** until the openings **104**, **106** become aligned with the transversely extending bore **15'**. Thereafter, the bolt **110** is passed through the opening **104** and is threaded into the opening **106**, the enlarged head **112** thereof becoming seated within the counterbore **108**.

It will be manifest from the above description that the operation of this device is identical to that of the preceding embodiment and, theretore, requires no further explanation.

Having described and illustrated two embodiments of this invention in detail, it will be understood that the same is offered merely by way of example, and that this invention is to be limited only by the scope of the appended claims.

What is claimed is:

1. A nonskid attachment for connection on a cane adjacent the terminus of the ground-engaging end thereof, said attachment comprising

(A) an elongated substantially hollow sleeve having a pair of opposed ends,

(B) a plurality of ground-engaging members mounted on said sleeve for reciprocable axial movement relative thereto, said ground-engaging members each having a pair of opposed ends including a ground-engaging end normally positioned adjacent one end of said sleeve, and

(C) means mounted on said ground-engaging members and operatively connected therewith whereby operation of said means causes said ground-engaging members to move axially of said sleeve and consequently cause said ground-engaging ends thereof to extend from or retract towards said one end of said sleeve,

(D) said sleeve being adapted to receive said ground-engaging end of said cane therein with its said terminus positioned adjacent said one end of said sleeve.

2. An attachment as defined in claim 1 wherein

(A) said ground-engaging members comprise a plurality of elongated inserts mounted on said sleeve.

3. An attachment as defined in claim 1 wherein

(A) said ground-engaging members comprise a plurality of elongated inserts each having a spike at their respective said ground-engaging end and a threaded other end, and

(B) said operable means comprising an internally threaded collar threaded on said threaded ends of said inserts.

4. An attachment as defined in claim 3 including

(A) means to prevent rotation of said sleeve relative to said ground-engaging end of said cane, and

(B) means to prevent axial movement of said collar relative to said sleeve.

5. An attachment as defined in claim 1 wherein

(A) said sleeve includes an outwardly extending cylindrical flange adjacent its said one end and is provided with external threads at its other end, said sleeve being formed with a plurality of axially extending peripherally spaced outwardly opening ways, said flange having a plurality of guide passages extending transversely therethrough and axially relative to said sleeve, said ways and guide passages being in open communication at adjacent ends thereof,

(B) said ground-engaging members comprising elongated inserts each mounted, respectively, for reciprocation in one of said ways, said ground-engaging ends of said inserts comprising spikes normally housed in said guide passages,

(C) said operative means comprising an internally threaded collar rotatably mounted on said threaded other ends of said inserts.

(D) an internally threaded cap adapted to be mounted on said ground-engaging end of said cane to threadedly receive said threaded end of said sleeve therein, and

(E) said collar extending between and engaging said cap and said flange.

6. An attachment as defined in claim 5 and

(A) a pin extending transversely across said sleeve and having its opposed ends connected thereon, said pin being adapted for insertion transversely through said ground-engaging end of said cane and cooperating with said sleeve to prevent rotation of the latter axially relative to said ground-engaging end of said cane.

7. An attachment as defined in claim 6 and

(A) a second cap mounted on said sleeve and extending transversely across said one end thereof, and

(B) means detachably connecting said second cap on said flange.

8. An attachment as defined in claim 7 wherein

(A) said flange is provided with a circumferential groove and said second cap having a flange formed thereon seated within said groove, said last named flange and its associated groove comprising said detachable connecting means.

9. An attachment as defined in claim 8, and resilient means disposed within said sleeve adjacent its one end thereof, said resilient means being normally interposed between said terminus of said cane and said second cap and constantly biasing said second cap for movement in a direction away from said terminus of said ground-engaging end of said cane.

10. An attachment as defined in claim 9 and

(A) means mounted on said first cap and engageable with one of said ways to prevent relative rotation of said first cap and said sleeve with respect to one another.

11. An attachment as defined in claim 2 wherein

(A) said inserts are each of an axial length differing from one another.

12. An attachment as defined in claim 5 wherein

(A) said means to prevent relative rotation between said sleeve and ground-engaging end of said cane comprises forming in said flange a pair of opposed openings adapted for alignment with a transverse bore in said ground-engaging end of said cane, and

(B) rigid means adapted for engagement within said bore and releasably retained within said openings.

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