Oct. 17, 1967 H. J. WILHOYTE 3,346,882

LEG EXTENSION DEVICE

Filed Oct. 19, 1964

2 Sheets-Sheet 1

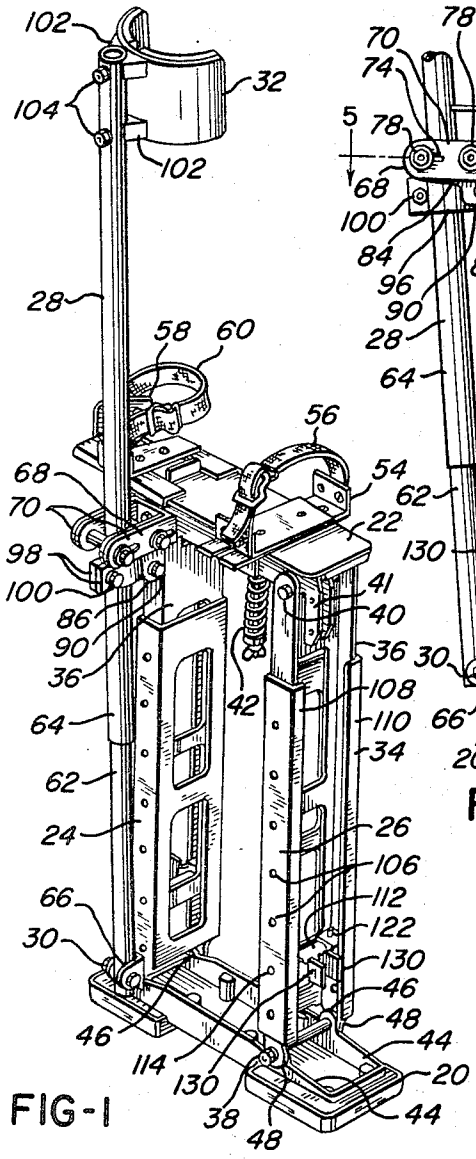


FIG-1

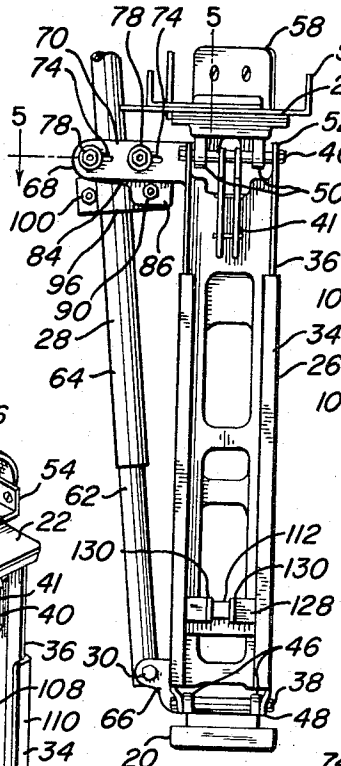


FIG-2

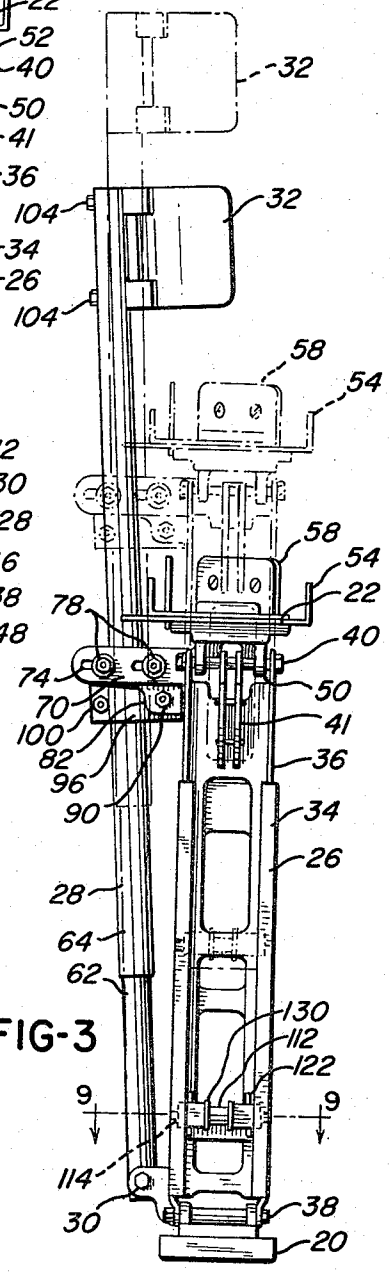


FIG-3

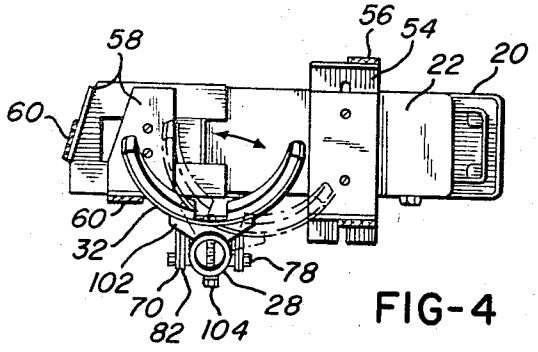


FIG-4

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LEG EXTENSION DEVICE

Filed Oct. 19, 1964 2 Sheets-Sheet 2

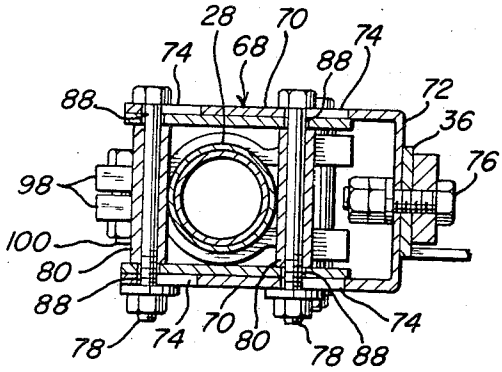


FIG-5

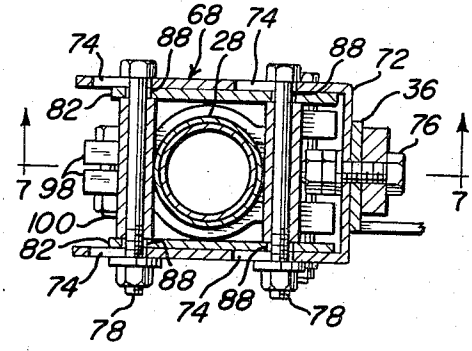


FIG-6

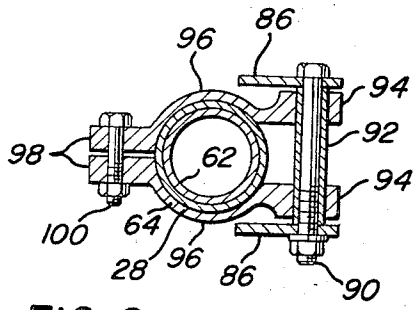


FIG-8

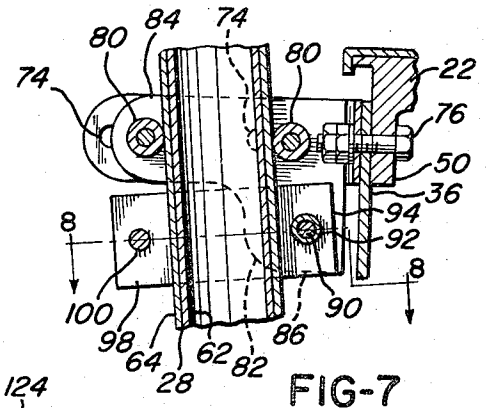


FIG-7

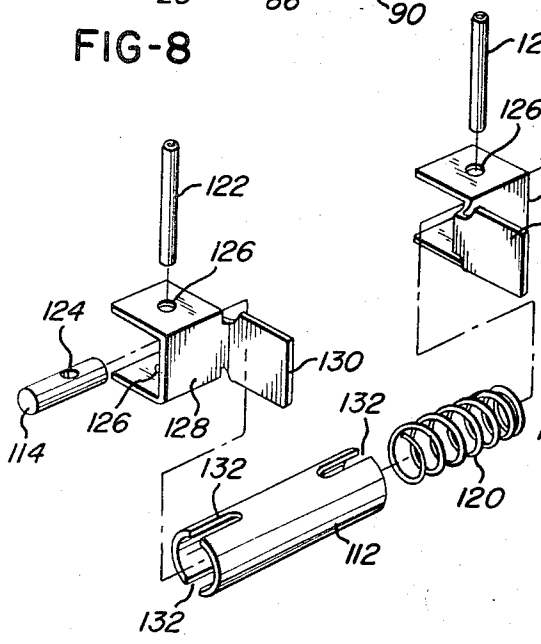


FIG-10

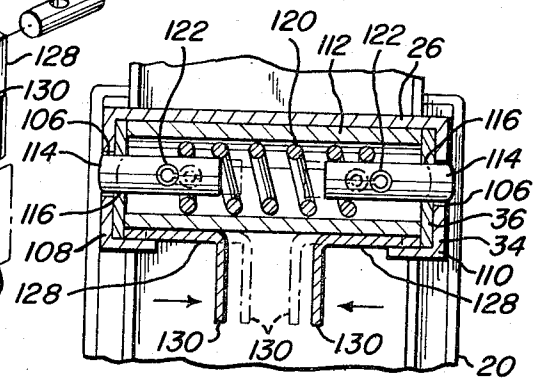


FIG-9

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LEG EXTENSION DEVICE

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Filed Oct. 19, 1964, Ser. No. 404,710
6 Claims. (Cl. 3—4)

ABSTRACT OF THE DISCLOSURE

The leg extension device performs as an extendable stilt, and incorporates a longitudinally and rotationally adjustable telescopic leg post carrying a leg band adjustable to the leg of the user. The leg band is adjustable as to height above a shoe pad, and may be adjusted both longitudinally and laterally of the major axis of the shoe pad, for maximum comfort. The parallelogrammic form of the framework is distortable at its included angles, under the control of a spring adjustment, to achieve a knee-action movement simulating walking. The disposition and adjustability of parts promotes a natural step in walking, thereby to minimize fatigue.

The present invention relates to a leg extension device, or stilt, to be worn in pairs by persons such as workmen, whose duties advantageously may be performed with the body supported at an elevation higher than normal elevation above a floor or other walking surface.

The device of this invention is an improvement over the device disclosed in my issued United States Patent No. 2,802,217, dated Aug. 13, 1957.

The objects of the present invention include those specified in the aforesaid issued patent, and in addition, it is an object of the present invention to enhance the comfort of wearing the leg extension devices.

More specifically, an object of the present invention is to provide means in a leg extension device or stilt, for obtaining critical adjustment to the legs of individual users, in the interests of increased comfort and safety.

Another object is to achieve lateral leg adjustments and height adjustments with unusual ease and despatch, and with due regard to durability and safety in use of the device.

The foregoing and other objects are attained by the means described herein and illustrated by the accompanying drawings, in which:

FIG. 1 is a perspective view of the improved leg extension device, embodying the present invention.

FIG. 2 is a front elevation of the same, showing the leg post thereof in one position of adjustment.

FIG. 3 is a view similar to FIG. 2, showing the leg post in an alternative position of adjustment, and indicating a height adjustment for the shoe pad.

FIG. 4 is a top plan view of the device, with retaining straps broken away.

FIG. 5 is a fragmental cross-section taken on line 5—5 of FIG. 2, showing the leg post adjusted to one position.

FIG. 6 is a view similar to FIG. 5, showing the leg post adjusted to an alternative position.

FIG. 7 is a cross-section taken on line 7—7 of FIG. 6.

FIG. 8 is a cross-section taken on line 8—8 of FIG. 7.

FIG. 9 is an enlarged cross-section taken on line 9—9 of FIG. 3, omitting the leg post, and detailing a latch.

FIG. 10 is an exploded perspective view of the latch illustrated by FIG. 9.

The device as disclosed in the drawings includes an elongate horizontal foot member 20, a shoe pad 22 upon which the shoe of the user may be strapped or otherwise secured, and a pair of upright struts 24 and 26 which maintain the parts 20 and 22 in spaced substantial parallelism at different elevations above floor level. Alongside the shoe pad 22 is disposed a leg post 28 pivoted relative to foot member 20, at 30, for movement to adjusted positions toward and from the major axis of shoe pad 22. The leg post is telescopic, and may therefore be adjusted longitudinally for disposing at desired elevations, the leg band or cradle member 32 that embraces the user's leg in the region of the calf, or elsewhere adjacent to the knee. The leg band or cradle is adjustable laterally also, as will be explained in describing FIG. 4.

The upright strut 26 may comprise an outer frame member 34 channeled longitudinally at opposite sides to slidably embrace an inner frame member 36. Member 36 may be slid longitudinally relative to member 34, and latched in one of several positions, to establish a desired effective height of the strut. The lower end of frame member 34 is pivoted at 38 upon foot member 20, and the upper end of frame member 36 is pivoted at 40 to shoe pad 22. Similarly, the corresponding relatively slidable parts of rear strut 24 are pivoted in like manner to foot member 20 and shoe pad 22. This forms a jointed parallelogrammic structure which may be distorted angularly in a vertical plane about the several pivots mentioned, to afford a flexible knee action of the structure while the device is used in walking.

By means of a yieldable arrangement including bell cranks 41 and an adjustable spring 42, as fully described in my issued patent aforesaid, the pivoted structure may be yieldingly urged at all times to right-parallelogrammic formation as illustrated by FIG. 1. In use, however, forces applied incident to walking may cause the struts 24 and 26 to lean slightly forwardly or rearwardly at the upper ends thereof, so as to facilitate walking with a natural step and thereby afford maximum comfort to the user of the device.

The upper face of foot member 20 may carry integral parallel spaced ribs 44 provided with perforate lugs 46 receptive of pivot bolts 38, which bolts pass through perforate lugs 48 projecting from the lower ends of the upright strut members 26 and 24. The lower face of shoe pad 22 may carry depending perforate lugs 50, to support the pivot bolts 40 which pass through perforate lugs 52 projecting upwardly from adjustable member 36.

Upon the upper face of shoe pad 22 may be mounted a laterally adjustable sole clamp 54 including a retaining strap 56, for detachably securing to the pad the sole of a shoe worn by the user. The heel of the user's shoe may be similarly held upon the pad by means of a clamp 58 and retainer strap 60, or equivalent means.

Leg post 28 may comprise an elongate tube 62 telescopically received within the lower end of a second tube 64, so that tube 64 may be adjusted both longitudinally and rotationally relative to tube 62. A bracket 66 which is fixed with relation to one side of strut 24 adjacent to shoe member 20, carries the pivot bolt 30, and said bolt passes through a transverse opening near the lower end of tube 62 for pivotally mounting said tube upon the bracket. Since pivot bolt 30 is parallel to the major axis of foot member 20, the tube may be rocked inwardly and outwardly toward and from rear strut 24, thereby rendering post 28 and leg band 32 adjustable toward and from a perpendicular line upstanding upon the major axis of shoe member 22.

As upper tube 64 is both rotatable and longitudinally slidable upon lower tube 62, the leg band or cradle 32 may be adjusted rotationally about the common axis of the tubes, and may also be adjusted as to elevation above shoe member 22. These adjustments are additional to the lateral adjustment mentioned in the preceding paragraph.

From the foregoing, it will be understood that the leg band or cradle 32 may be fitted precisely to the leg of a user so as to ensure maximum comfort, regardless of the

shape, size, or length of the limb. Since the band or cradle is offset from the axis of post 28, rotational adjustment of post member 64 has the effect of adjusting the band or cradle forwardly or rearwardly lengthwise of shoe member 22.

Means are provided for clamping the leg post and disposing the leg band in any of the positions of adjustment mentioned above. Such means may comprise a U-shaped bracket or guide member 68, having a pair of outwardly extended arms 70, 70, which arms are extended outwardly in spaced parallelism from a mounting base 72. Each arm 70 may be provided with a pair of elongate slots 74, 74, the slots of each pair being aligned one with the other, and extending lengthwise of an arm.

Base 72 of guide member 68 may be bolted as at 76, and thereby fixed, to the upper frame member 36 of rear strut 24. Post 28 extends between the arms 70, 70, and shifting of the post toward and from base 72 is limited by two clamp bolts 78, 78, passing through slots 74, 74, at opposite sides of the post. Spacer sleeves 80 may be applied to each clamp bolt.

Between the outer ends of sleeves 80 and the inner faces of arms 70, are disposed a pair of L-shaped links 82, 82, each of which includes a horizontal leg 84 and a depending leg 86. The horizontal leg of each link is drilled at two locations 88 to receive clamp bolts 78, the drilled holes of each leg 84 being spaced apart a distance such that sleeves 80 substantially abut opposite sides of post 28. Thus, if clamp bolts 78 are loosened, links 82 may be shifted from left to right (FIGS. 5 and 6), as permitted by the length of slots 74, thereby to alter the inclination of post 28 and adjust the position of leg band 32 transversely of shoe member 22. Tightening of clamp bolts 78 will secure the post in either of the adjusted positions of FIGS. 5 and 6, or in any intermediate position.

The depending leg 86 of each link 82 is drilled to receive a pivot bolt 90 surrounded by a sleeve 92, FIG. 8, and upon opposite end portions of the sleeve are supported the ears 94 of a bi-part clamp 96, 96 which embraces post 28. At an end of the clamp opposite the ears 94, is a second pair of ears 98 which may be forced together by means of a clamp bolt 100, to affix the clamp parts 96—96 securely about post 28. Thus, clamp 96—96 maintains a preselected elevation of the post and the leg band or cradle 32 attached thereto, and at the same time fixes the upper post element 64 against rotation, so as to preserve adjusted positions of leg band 32.

Leg band 32 may consist of a part-cylindrical cradle-like element furnished with mounting blocks 102, which blocks are fixed to the upper end portion of post part 64 in any suitable manner, as by means of screws 104. The mounting offsets the leg band from the axis of the post, wherefore rotation of the post to various positions after loosening clamp bolt 100, provides for fitting of the leg band to the limb of the user forwardly and rearwardly relative to the length of shoe member 22. As was previously pointed out, adjustment of the leg band transversely of the shoe member, is obtained by loosening the bolts 78—78, and shifting the post including links 82—82 toward and from the shoe member to the desired position of adjustment.

By referring to FIG. 1, it is noted that the outer frame member 34 of strut 26 is provided with a line of perforations 106, such perforations being duplicated in each of the channels 108 and 110. The inner frame member 36 carries, near its lower end, a latch subject to manipulation whereby the frame member 36 may be locked in selected position of longitudinal extension, to maintain a desired elevation of shoe member 22. The parts of the other strut 24 are similarly equipped for vertical adjustment.

Referring to FIGS. 9 and 10, a latch housing 112 in the form of an open-ended sleeve or tube spans the inner frame member 36. Within the housing is supported a pair of aligned latch pins 114, each having an outer end that projects through aligned openings 116 provided in frame

member 36. The latch pins are urged outwardly by means of a compression spring 120 within housing 112, the ends of which spring bear against transverse pintles 122 anchored in openings 124 of the latch pins. Spring 120 acts constantly to yieldingly project the latch pins through the openings 116 of frame member 36 and into selected pairs of the perforations 106 of outer frame member 34.

Pintles 122 which pass through latch pins 114, have bearing also in openings 126 of a pair of latch release members 128, each of which members includes a finger piece 130. Members 128 are adapted to slidably embrace the opposite end portions of tubular housing 112, where slots 132 are provided to accommodate the pintles. The inner ends of slots 132 constitute stops for determining the extent to which the finger pieces may be squeezed together (FIG. 9), for retracting the latch pins 114 and disengaging them from the openings 106 of strut parts. Pintles 122 stop against the inner ends of slots 132, to preclude extreme retraction of the latch pins such as would disassociate the latch pins from the openings 116 of the frame member 36.

From the foregoing explanation, it is evident that the effective length of strut 26 may be altered, by moving the frame parts 34 and 36 relatively, while holding the latch release members depressed as indicated by broken lines 130—130 in FIG. 9. When a desired extension of the strut is established, release of the finger pieces 130 permits spring 120 to project the latch pins into selected pairs of openings 106 of frame part 34, thereby to lock frame part 36 thereto.

The improvements herein disclosed enhance greatly the effectiveness of the stilt or leg extension device. Adjustments are easily and quickly made for fitting the device to various users, and in addition, the various adjustments ensure maximum comfort for the user, thereby enabling him to make use of the device for extended periods of time without fatigue. From the standpoint of construction, the device assures maximum safety and durability in use.

It is to be understood that various modifications and changes may be made in the structural details of the device, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. A leg extension device comprising in combination: a horizontal elongate foot member; a horizontal elongate foot pad; and upright strut means hinged to the foot member and the foot pad for supporting the foot pad at an elevation above the foot member; an elongate upright leg post including upper and lower telescopic parts, the upper part having an upper end portion, and the lower part having a lower end portion; a leg cradle; means mounting said cradle upon the upper end portion of the upper telescopic part, in overhanging relationship to the foot pad; means hinging the lower end portion of the lower telescopic part relative to the foot member for lateral angular movement of said lower telescopic part about the hinge means thereof in a direction transverse to the major axis of the foot pad; and means for fixing the upper telescopic part of the leg post at selected elevations and at selected rotated positions of said upper telescopic part and the leg cradle attached thereto.

2. A leg extension device comprising in combination a horizontal elongate foot member; a horizontal elongate shoe pad; and front and rear substantially vertical struts having upper and lower ends; means hingedly mounting the upper ends of both struts upon the shoe pad; and means hingedly mounting the lower ends of both struts upon the foot member; means yieldingly resisting hinge movement of the struts relative to the shoe pad and the foot member; an elongate leg post having an upper and a lower end portion; a leg cradle; and means mounting said cradle upon said upper end portion; means adjustably supporting the lower end portion of the leg post lengthwise upon one strut, with the post extending above

the shoe pad and the leg cradle overhanging the shoe pad; said last mentioned means including a hinge at the lower end portion of said post hinging said post for angular movement laterally of the major axis of the shoe pad; and means for varying the elevation of the leg cradle above the shoe pad, and for adjusting the cradle toward and from a perpendicular line which is upstanding upon one end of the major axis of the elongate shoe pad.

3. A leg extension device comprising in combination: a horizontal elongate foot member; a horizontal elongate shoe pad; and front and rear substantially vertical struts having upper and lower ends; means mounting the upper ends of both struts upon the shoe pad; and means mounting the lower ends of both struts upon the foot member; an elongate leg post having a lower and an upper end portion; an arcuate part-cylindrical leg cradle formed about an axis which intersects the shoe pad approximately at right angles; means mounting said cradle upon said upper end portion of the leg post, with the cradle extending laterally from the post axis and in overlying relationship to the shoe pad; means anchoring the lower end of the leg post upon one of said struts; and means for adjusting the cradle rotationally to dispose the cradle axis at selected distances from a perpendicular line upstanding upon one end of the shoe pad; the aforesaid anchoring means comprising a hinge about which the post has lateral angular movement in a direction transverse to the major axis of the shoe pad; the combination including clamp means adjacent to the shoe pad and operative upon the leg post intermediate the ends of the latter, for fixing said post in selected positions of its lateral angular movement.

4. The device as set forth in claim 3, wherein the leg post is telescopic, and extendable to selected elevations of its upper end portion above the shoe pad.

5. A leg extension device comprising in combination: a horizontal elongate foot member; a horizontal elongate shoe pad; and front and rear substantially vertical telescopic struts each having an upper end and a lower end; means hingedly mounting the upper ends of both struts upon the shoe pad; means hingedly mounting the lower ends of both struts upon the foot member; both of said hinging means being arranged transversely of the shoe pad and the foot member, whereby the struts may be inclined forwardly and rearwardly from the vertical in the direction of the major axis of the foot member; yielding means operative upon at least one of the struts opposing inclination of the struts from the substantially vertical position; a leg post comprising telescopic upper and lower parts extendable axially for varying the effective length of the leg post, the upper post part having an upper end, and the lower post part having a lower end; means hingedly mounting the lower end of said lower post part upon the lower end of the rear strut, for movement of the leg post about the hinge means thereof angularly toward and from the major axis of the elongate shoe pad; a leg cradle mounted upon the upper end of the upper post part, to overhang the shoe pad; and means fixed relative to the shoe pad, for securing the upper post part at selected distances laterally from the major axis of the elongate shoe pad.

6. The device as set forth in claim 5, wherein the telescopic parts of the leg post are tubular and rotatable axially one within the other; the combination including means for selectively adjustably clamping the telescopic parts against relative rotation, to maintain the leg cradle in selected positions of adjustment in the general direction of extension of the major axis of the shoe pad.

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