March 3, 1953 W. LEATHERS 2,630,116

LEG STRAIGHTENER APPLIANCE

Filed June 8, 1950

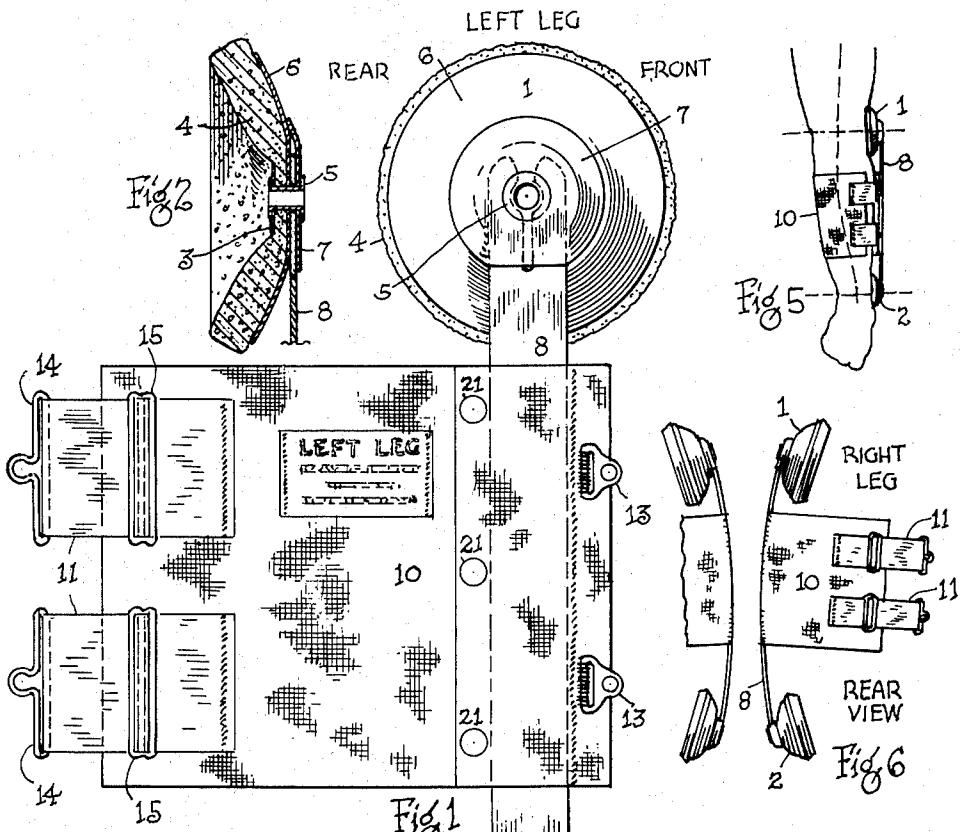


Fig 1

Fig 2

Fig 5

Fig 6

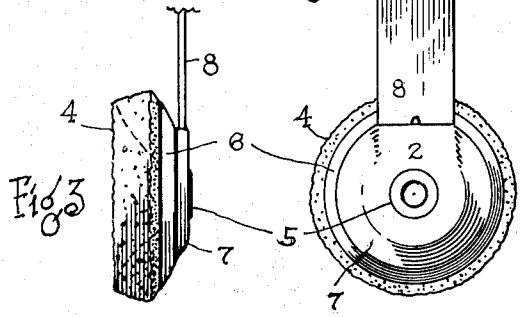


Fig 3

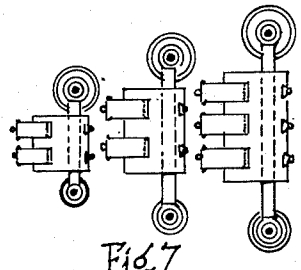


Fig 7

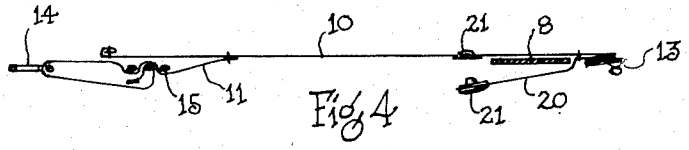


Fig 4

WARD LEATHERS
INVENTOR.

BY Shemke & Mattare

Attorneys.

Patented Mar. 3, 1953

2,630,116

UNITED STATES PATENT OFFICE

2,630,116

LEG STRAIGHTENER APPLIANCE

Ward Leathers, Brooklyn, N. Y.

Application June 8, 1950, Serial No. 166,946

4 Claims. (Cl. 128—89)

1

This invention relates to an improved leg corrector or straightener appliance.

The specific object of my invention is to provide simple means whereby any caretaker, such as a nurse or mother, can easily straighten a child's crooked legs.

Crooked legs in adults, as well as in pre-adults, are due in most cases to the shank or lower leg bones being curved in a plane lateral to the body. They are almost never curved fore and aft. Many shanks are so curved. Beautiful, straight legs are the exception. Most adults, when standing erect, cannot touch both ankles and knees. For this reason many women are not proud of their legs and many men find their trousers hanging badly. These faults are readily corrected in childhood by means of my invention.

Doctors, particularly bone specialists, are aware of the fact that all bones—especially growing bones—are readily bent or deflected by continuously applied pressure. Orthodontists move teeth about by means of springs.

Shanks have heretofore been straightened, but only at great expense and difficulty. The means have been brutally clumsy and hard to wear at night. My invention simplifies the means and method. My leg correctors are featherweight, easily and comfortably worn by children under sleepwear. They are snapped on or off in a moment as easily as garters. The spring tension is readily altered. Soft cups contain knee and ankle bulges. Neoprene sponge or foam yields comfort and precludes slipping. The cups are hinged exactly at the axis of knee and ankle joints. Springs of varying length may readily be inserted as the child grows. These and other advantages, such as smoothly hugging the leg and presenting a smoother external aspect, are hereinafter elucidated.

The invention, with other objects and advantages thereof, and the particular construction, combination and arrangement of parts comprising the same, will be understood from the following detailed description when considered in connection with the accompanying drawing, forming part hereof and illustrating one embodiment of the invention.

In the drawing:

Fig. 1 is a side elevation of a leg straightener appliance constructed in accordance with the invention, the leg wrap being shown opened flatwise;

Fig. 2 is a detail vertical section of the upper knee-cup or cushion;

2

Fig. 3 is a detail side view of the lower ankle-cup or cushion;

Fig. 4 shows schematically the fabric leg wrap and adjusting and connecting means therefor;

Fig. 5 shows in front elevation a child's right leg with my corrector attached thereto;

Fig. 6 illustrates a pair of the leg correctors and shows the tension-curve of the springs;

Fig. 7 diagrammatically illustrates how a multiplicity of graduated sizes of knee-cups, ankle-cups, springs, leg bands and adjustable tapes make these correctors applicable to all sizes of children's legs.

While a preferred embodiment of the invention is illustrated in the drawings, it will be understood that minor changes and modifications may be made in the particular construction shown and the invention may be embodied in other forms as will appeal to those skilled in the art and falling within the scope of the appended claims without departing from the spirit of the invention.

Referring to a detail description of the particular embodiment of the invention illustrated in the drawing, in Figs. 1, 2 and 3 a knee-cup 1 and an ankle-cup 2 are shown, each of the same comprising an internal washer 3, a compressed (and thus deformed) neoprene pad 4 cut from a sheet of sponge or foam rubber, a grommet 5 with a broad outside face, a dural cup 6, and an aluminum spring cover or shield 7. Under the spring shield 7 is an elongated flat spring member 8 provided at each end with a slotted portion which snaps around the grommet 5, as shown in dotted lines in Fig. 1 of the drawing. The above construction provides a soft, yielding, cuplike cushion for knee-bulge and ankle-bulge. I have found such construction invaluable for the following reasons:

(1) It provides a sizable area for distributing and resisting the thrust of the spring member 8 at knee and ankle joints—relieving any discomfort when worn all night—every night.

(2) It prevents the possible slipping of these spring supports from their proper position on the legs of restless children, the sponge or foam rubber serving as a myriad of suction cups.

(3) It incorporates a free-turning hinge exactly at the point of knee or ankle joint rotation.

(4) It permits of close-up construction, that is, the spring being disposed as close as possible to knee and ankle in order to avoid discomfort yet, it should be noted, the skin of the wearer does not touch the washer 3.

(5) It gives a yielding element between the washer 3 and the spring-shield 7 so that the cups cannot readily be damaged by a child trying to wrench or twist the cup from the spring. Actually this construction makes the cup slightly deflectable angularly with respect to the spring 8 which makes the cups settle more comfortably into position when being put on or taken off.

A leg wrap 10 is used for drawing the spring toward the leg, and the leg bones toward the spring. The leg wrap 10 is a flexible member, preferably of washable, rubberized fabric or of flexible sheet plastic broad enough to distribute the spring load over a sizable area of the calf of the leg. Tapes 11, adjustable for length, hook the flexible member around the leg by means of garter hardware, hook 13, loop 14 and clasp 15, or other suitable attaching means. The flexible member 10 and the tapes are substantially nonelastic, the member 10 being sufficiently adhesive to hold to the skin without slipping.

The spring 8 passes through a slot in the member 10 (see Fig. 4), the slot being provided by an elongated strip of material secured by stitching or otherwise along its side marginal edges to the member 10, or the slot or casing for the spring may be provided, as shown in Fig. 1, by a flap 20 secured by stitching along one side marginal portion and detachably connected to the member 10 along its other side marginal portion by small snap fasteners 21. These fasteners 21 are for the purpose of easily removing the leg wrap 10 from the spring strip 8, as for laundering.

There are, of course, many kinds and types of leg wraps that may be used for the purpose set forth without departing from the spirit of my invention.

The spring 8 (see Figs. 5 and 6) is normally of such cross section to length, and is bent or set to such a curve that when drawn substantially straight by the leg wrap 10 connected around the leg of the wearer, it will maintain the required stress for correcting the leg bones without discomfort. The stress may be gradually increased to a reasonable optimum as the wearer becomes more accustomed to its use. The change in tension is accomplished by adding more set-bend to the spring. The spring may be pulled out of the knee and ankle cups only with considerable effort, but such construction makes spring replacement possible, and springs may require replacement as children grow.

Fig. 1 shows my leg corrector at substantially actual size for a two-year old child (6.5 inches between knee and ankle hinge centers). A diagram, Fig. 7, illustrates a relative range of sizes from approximately two to ten years of age (6.5 to 12.5 inches). It will be noted that the spring member 8 may remain the same width for all sizes, since the tension range is more readily accomplished by a change in thickness of the spring member 8. The width and number of tapes may vary with the size of the device and the child. Other persons may, of course, use these correctors, but the fast-growing bones correct faster.

What I claim is:

1. An appliance for correcting deformities in legs including a flat elongated spring member having a set lengthwise curvature, a cushion of cuplike formation at one end of the spring member at the concave side thereof to receive therein a knee-bulge, a cushion of cuplike form on the other end of the spring member at the concave side thereof to receive therein an ankle-bulge, each of said cushions comprising a disk of sponge rubber or like material, a substantially rigid dished disk disposed with its concave side against the rear side of said rubber disk and forming a backing therefor, a concave cover member at the rear side of said backing disk, a grommet extending axially through the rubber disk, backing disk, and cover member and securing the same together with the rubber disk compressed at its central part, said spring member having a longitudinal slot extending inwardly from each end therof with a partly circular bearing intermediate the length of the slot, each slotted end portion of the flat spring member being adapted to snap about the grommet of one of the cushions between the backing disk and said cover member, a flexible leg wrap, means connecting the leg wrap to said spring member intermediate the ends of the latter, and means detachably connecting end portions of the leg wrap one to the other, said leg wrap being adapted to be arranged about the leg between knee and ankle to draw the leg bones toward the spring member and the latter toward the leg bones to straighten the spring member against its set curvature and cause straightening pressure to be applied to one side of the leg laterally thereof between the knee and ankle.

2. In an appliance for correcting deformities in legs, an elongated spring strip having a lengthwise curvature, cushions at opposite ends of said strip projecting from the concave side thereof, a leg wrap consisting of a wide sheet of pliable material of a length adapting it to extend about a person's leg and having means for securing it about the leg, said spring strip extending along the outer surface of said sheet with portions projecting from upper and lower edges thereof, a flexible flap extending along said sheet between upper and lower edges thereof and permanently secured along one side edge to the sheet, said flap extending across said strip transversely thereof and detachably secured along its other side edge to the sheet and forming a casing for the strip open at upper and lower ends and detachably mounting the leg wrap upon the strip for sliding movement along the strip to adjusted positions thereon.

3. A pad for a leg straightening device comprising a disk of soft rubber, a substantially rigid dished disk disposed with its concave side against the rear side of said rubber disk and constituting a backing for the rubber disk, and a fastener passing axially through the rubber disk and the backing disk and securing the rubber disk permanently compressed and secured at its central portion to the backing disk and forming the rubber disk with a concaved front surface of a depth disposing the fastener rearwardly of the plane of the marginal edge of the rubber disk and thereby preventing contact of the fastener with a person's leg against which the rubber disk bears when the pad is in use.

4. In an appliance for correcting deformities in legs, a pad comprising a stiff backing disk of concavo-convex formation having its concaved surface presented forwardly, a cushion of sponge rubber disposed against the concaved surface of said backing disk and compressed to a permanent cup-like formation and having its concaved surface presented forwardly, said disk and said cushion being formed with centrally located aligned openings, a washer disposed against the central portion of the front surface of said cushion about the opening in the cushion, and a fas-

tener passing loosely through the washer and the aligned openings in the cushion and the backing disk and having an outstanding flange about its front end overlapping said washer and an outstanding flange about its rear end overlapping the central portion of the rear surface of the backing disk and free therefrom, said fastener serving to hold the disk and the cushion and the washer assembled and being shiftable longitudinally through the aligned openings into and out of position for gripping a slotted end portion of a strip and detachably mounting the pad upon the strip.

WARD LEATHERS.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,160,709	Peckham	May 30, 1939
2,308,776	Peckham	Jan. 19, 1943

FOREIGN PATENTS

Number	Country	Date
578,241	Germany	June 12, 1933

OTHER REFERENCES

1899 Catalog of George Tiemann and Co., New York, N. Y., page 720.

"Braces Today," Newsletter of The Pope Foundation, Inc., Kankakee, Ill., for March 1948, p. 3, and February 1950, p. 3.

Copies of the above publications in Division 55.