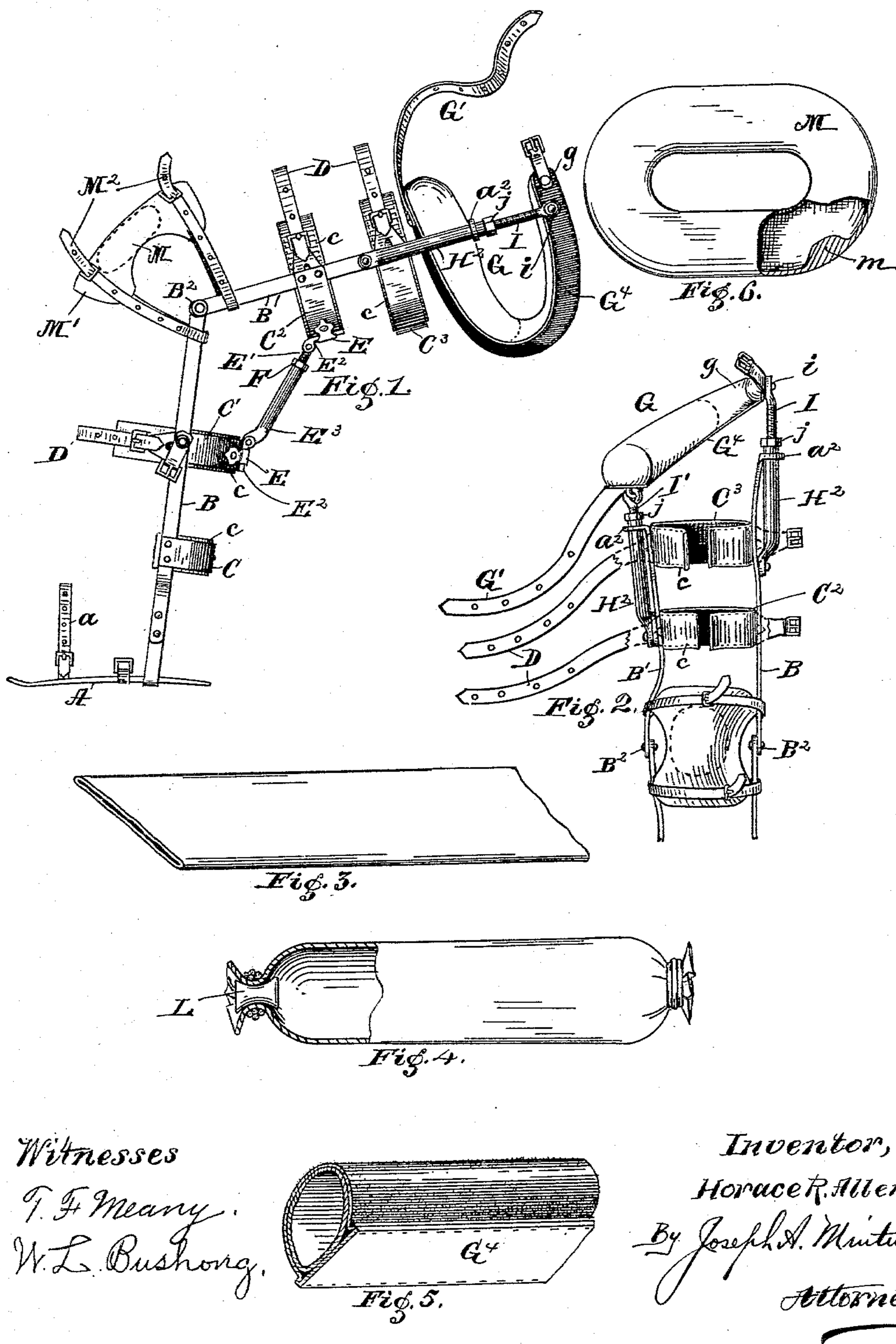


(No Model.)

H. R. ALLEN.
LEG BRACE.

No. 559,835.

Patented May 12, 1896.



Witnesses

T. F. Meany,
W. L. Bushong,

Inventor,

Horace R. Allen,

By Joseph A. Minton
Attorney,

UNITED STATES PATENT OFFICE.

HORACE R. ALLEN, OF INDIANAPOLIS, INDIANA.

LEG-BRACE.

SPECIFICATION forming part of Letters Patent No. 559,835, dated May 12, 1896.

Application filed November 5, 1894. Serial No. 527,865. (No model.)

To all whom it may concern:

Be it known that I, HORACE R. ALLEN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Leg-Braces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in appliances to be used in the practice of orthopedic surgery, and has special reference to improvements in braces for the treatment of patients afflicted with stiffness of the hip, knee, or ankle joints, the objects of the invention being, first, to provide a brace that may be secured in a firm and substantial manner to the afflicted member and may be adjusted to conform to the shape of the leg; second, that may be adjusted by small successive changes to produce gradual extension of the leg, and as extension is produced will retain and hold the parts until they are thoroughly adapted to their changed condition, and, third, to provide self-adjusting pads that will adapt themselves to the uneven surfaces of the body, so as to prevent bruising the parts by giving an even pressure to the whole surface covered and enabling a greater amount of pressure to be endured without chafing or bruising the flesh. The object also is to provide pads that will not become hardened or packed by the perspiration of the body.

I accomplish the objects of this invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation of a complete brace constructed in accordance with this invention and shows same removed from the body of the patient to be treated. Fig. 2 is a front view of a portion of the brace, showing the upper part of the brace from a point below the knee-joint. Fig. 3 is a detail in perspective of the rubber from which the hip-pads are constructed. Fig. 4 shows the tube with its ends tied and the tube inflated to form the pad. One end is shown broken away to show the solid plug inserted, through which the injection will be made. Fig. 5 is a detail in perspective of a portion of the pad

complete and applied to the brace, the figure showing the manner in which the pad is covered and secured by such covering to the brace. Fig. 6 is a top view of the knee-pad and shows a portion broken away and sectioned to expose the lug formed in the wall through which the instrument for inflating the pad is inserted.

Similar letters of reference in the drawings refer to like parts throughout the several views.

A is the plate which underlies the foot or shoe of the person wearing the brace and will correspond in area and size approximately with sole of the foot or shoe.

B and B' are standards which are fastened rigidly to the plate A, one upon each side of said plate, and are projected upwardly upon each side of the patient's leg to points upon or near the hip and are there secured by a hinged connection with a crescent-shaped pad, which will be hereinafter more fully described.

a is a strap fastened to the shoe-plate A and by which the foot is strapped to the plate. The standards B and B' will each be in two sections hinged together at B² opposite the knee of the patient in order that the brace may be bent to conform to the crooked condition of the leg. Metal half-bands C, C', C², and C³, which will be curved to the rear, will connect the standards. These bands will be lined on the inside with cloth or other soft material c. The bands and lining will be fastened to the standards by means of two rivets through each end of the bands and the standards. Opposite each of the bands C', C², and C³ and passing around the front of the leg are the straps D in two parts buckled together, as shown. The ends of the straps are secured to the standards by means of the same rivets which secure the bands C', C², and C³. As shown in the drawings, my practice is to fashion the ends of the straps into Y-shaped patterns and pass the rivets through the ends of the Y's, whereby each end is secured by two rivets, which keep the straps from slipping up or down out of alinement with the band on the other side of the leg.

E are catches riveted to the bands C' and C². E' is a threaded bolt, having a finger E² piv-

otally secured to its upper end, the said finger being adapted to slide under the catch E on the band C².

E³ is a barrel having a like finger pivotally secured to its lower end, which finger is adapted to be removably secured to the catch on the band C'.

F is a threaded nut working on the bolt E'. The bolt will be inserted within the hollow barrel, and the amount of projection within the barrel will be regulated by the position of the nut upon the bolt. This construction enables the angle of the standards at the bend opposite the patient's knee to be lessened gradually and the parts locked in a positive manner.

G is the crescent-shaped pad which terminates the standards at the top. It partially encircles the leg, extending around the back of same, and is provided with the strap G', which passes around the front of the leg. The strap is in two sections, which are buckled together and by which the pressure of the pad against the leg may be regulated. The connection of the pad with the standards is as follows: The upper ends of the standards terminate in the loops a². The barrels H² have their lower ends riveted to the standards, and the upper ends of the barrels are projected through the loops, thereby making a secure attachment of the barrels to the standards. The threaded bolts I and I' have their lower ends inserted into the barrels, and the length of the inserted portion is regulated by means of the nuts j. The upper end of the bolt I is secured by means of the rivet i to the outside end of the pad, forming a hinged connection therewith. The bolt I' terminates in a hook which is projected through an eye depending from the pad, as shown in Fig. 2. By the above construction the length of the standards can be adjusted. The pad G comprises a base-plate G⁴, of plate metal, which is bent to the desired shape. This will be overlaid by the pad proper, which will be secured to the base and held in place thereby. The outer end g will consist of a cloth cover filled with cotton or other suitable material; but the pad upon the inner end and extending to about the point indicated by the dotted lines will consist of an inflated rubber tube filled with air, or preferably with water or glycerin, which will make a very soft and self-adjusting pad. The construction of this pad will be of the following peculiar nature: The rubber will be furnished in lengths of several feet and will be cut off in smaller lengths according to the size of the pad which is to be made. The ends of the sections constituting the pad will be tied together in the manner shown in Fig. 4, and in one of the ends a rubber plug L, of solid material, will be inserted and the tube tied around it. Through this plug the nozzle of the injector may be inserted and the pad filled to the proper capacity. The withdrawal of the nozzle will not leave an outlet for the escape of

the filling of the pad, because of the closing up of the opening by the elasticity of the plug. The pad is then placed in the desired position upon the plate and secured in that position by stitching a covering of cloth over it, as is shown in Fig. 5.

M is a knee-pad which rests upon the kneecap. The pad is shown in a detached view in Fig. 6. This pad will be molded of rubber in the shape shown and will be provided with the solid lug m, through which the nozzle of the injector may be introduced substantially as described in the case of the rubber plug in the other form of pad.

M' represents a leather blanket, to which the pad is fastened by a cloth covering stitched to the blanket. The straps M² pass around the standards B and B'. They are in two sections buckled together and are tightened by means of said buckles. The utility of this construction will be apparent from the following considerations: In the treatment of a patient by means of the leg-brace it is frequently necessary to vary or adjust the degree of inflation of the pads to correspond with the changes in location of the different parts. It is very desirable that this should be done while the brace is being used—evidently a requirement of no small difficulty. For instance, it would be quite impossible to accomplish this merely by tying the end of the rubber tubing, as is shown on the right of Fig. 4, for with such a construction when it was desired to further inflate the pad or to partially collapse the same this could only be done by untying the cincture around the end, which would permit the entire escape of the liquid from the pad. The pad would then have to be refilled with liquid to the desired extent and then again tied up. The manifest inconvenience of such a method of variation I have avoided by my present device, in which the inflation of the pad can be adjusted and water can be added or subtracted in any desired amount without removing the cincture around the compressible elastic plug.

I claim—

1. A pad for braces constructed of thin rubber material forming the walls and having the outlet at one end filled by a plug of rubber or like compressible and elastic material, said plug being pierced to permit the insertion of the nozzle of an injector, and being held under compression as by a suitable cincture, whereby the perforation is closed, said plug being of sufficient thickness and compressibility to permit the insertion of the nozzle of an injector while still held under compression by said cincture, substantially as described.

2. A pad for braces constructed of rubber tubing cut transversely into the desired lengths and closed by constricting the ends by suitable cinctures, in combination with a plug of rubber or like elastic and compressible material inserted in one of said ends, perforated to receive the nozzle of an injector,

and under compression by said cincture whereby said perforation is closed, said plug being of sufficient thickness and compressibility to permit the insertion of the nozzle of an injector while still held under compression by said cincture, substantially as described.

3. In a pad for leg-braces, the combination of the base-plate G^1 , the cloth cover, the cotton or like padding at one end thereof, and the inflated rubber tube occupying the other portion of the cover, substantially as described.

4. In a leg-brace, the combination with the standards B and B' and the bands C' and C² said bands having the catches E, of the threaded bolt having the hinged finger to engage the catch on one of the bands, the nut working upon the bolt, and the barrel having

the pivoted finger adapted to be engaged by the catch on the other band, said parts being arranged substantially as described and for the purposes specified.

5. In a leg-brace, the combination with the standards B and B' of the blanket M' having a pad secured thereto and the straps M² secured to the blanket and passing around the standards, said straps being in two parts each and buckled together, all substantially as described and for the purposes specified.

In testimony whereof I affix my signature in presence of two witnesses.

HORACE R. ALLEN.

Witnesses:

JOSEPH A. MINTURN,
T. F. MEANEY.