

No. 618,097.

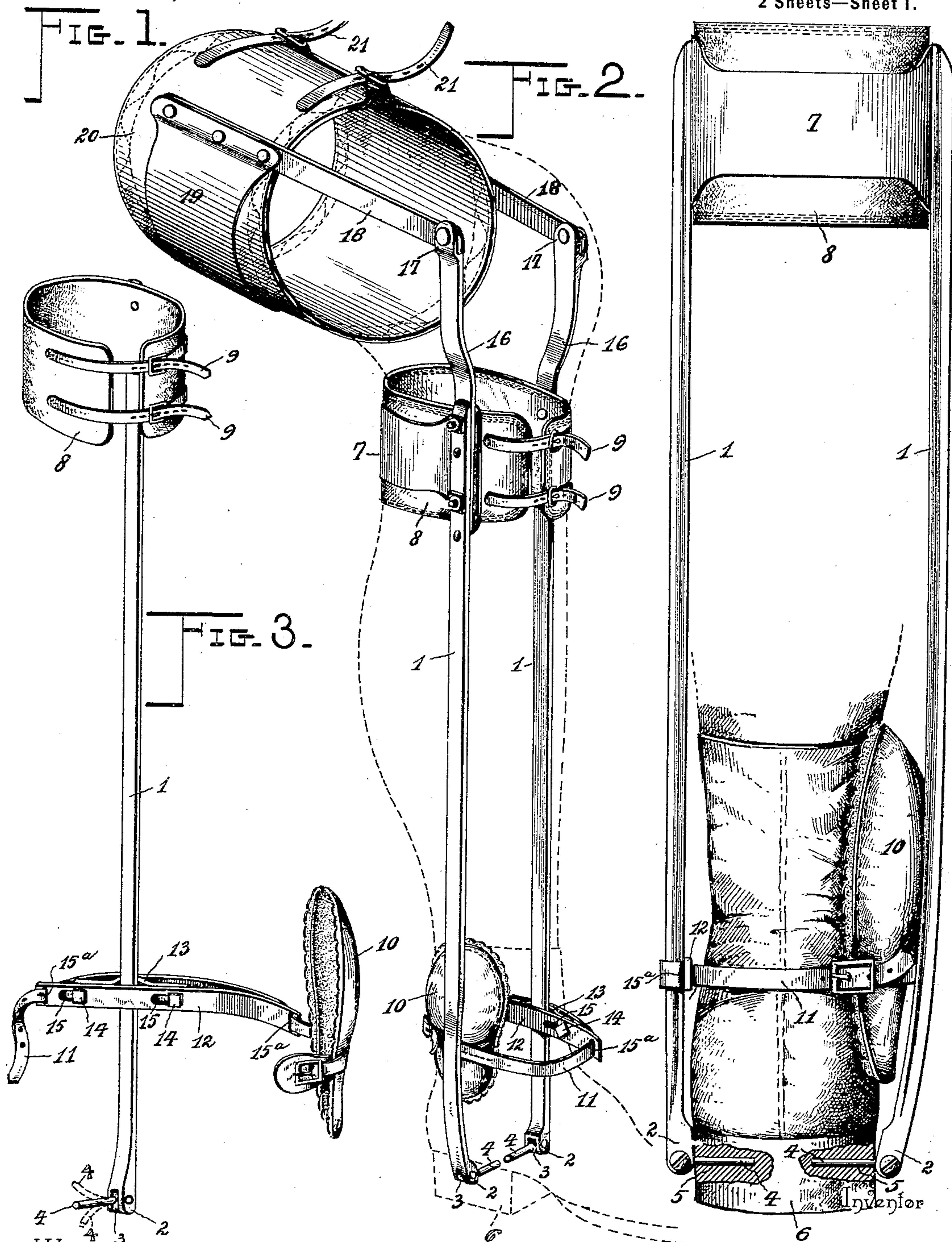
Patented Jan. 24, 1899.

G. P. HILL.
LEG AND ANKLE BRACE.

(Application filed Jan. 21, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

John F. Deufferwiel
Edwin Cruse.

By his Attorneys,

George Powell Hill.

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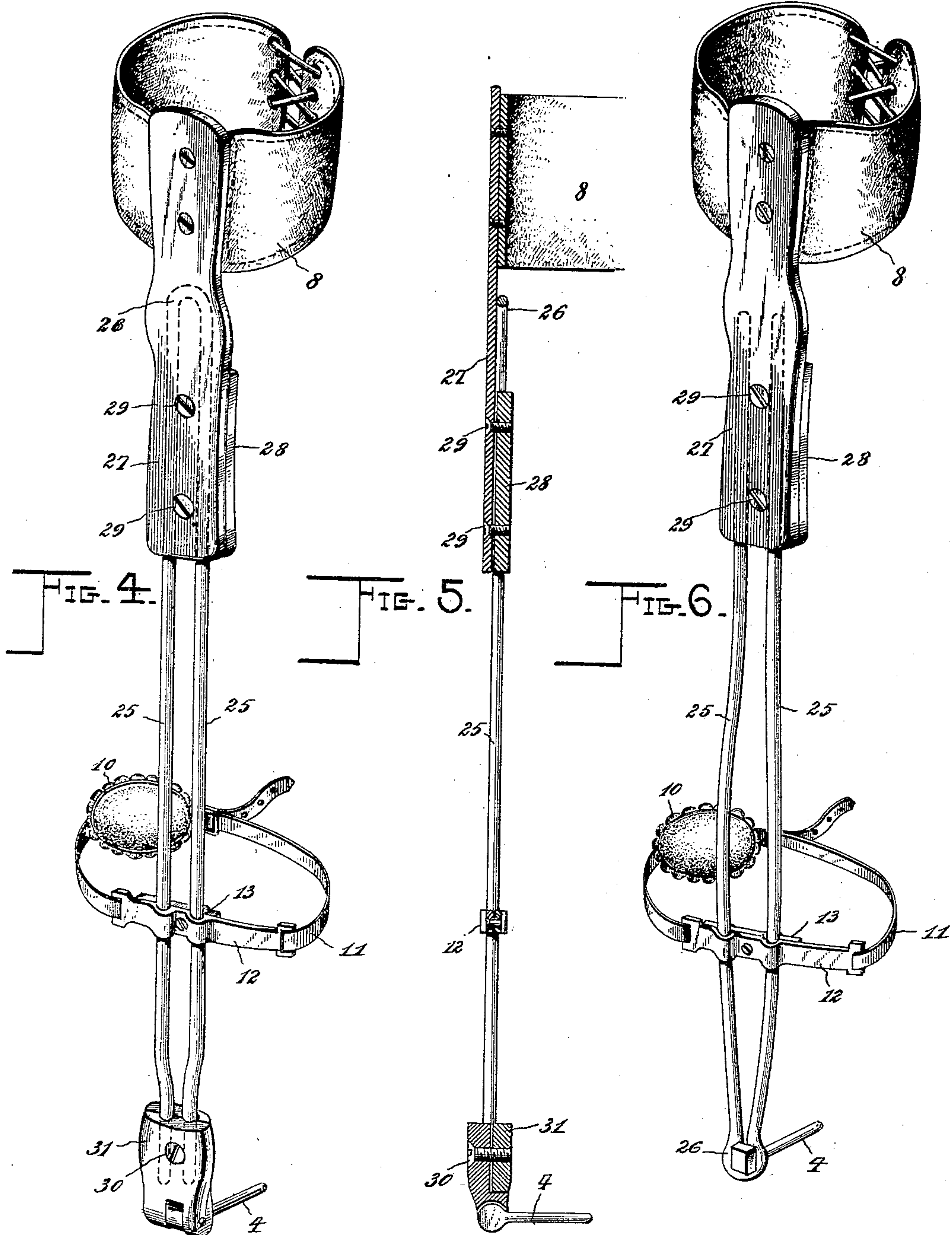
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Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE POWELL HILL, OF RICHMOND, VIRGINIA, ASSIGNOR OF ONE-HALF
TO MALVERN HILL, OF SAME PLACE.

LEG AND ANKLE BRACE.

SPECIFICATION forming part of Letters Patent No. 618,097, dated January 24, 1899.

Application filed January 21, 1898. Serial No. 667,463. (No model.)

To all whom it may concern:

Be it known that I, GEORGE POWELL HILL, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented a new and useful Leg and Ankle Brace, of which the following is a specification.

This invention relates to leg and ankle braces, its objects being to simplify and improve the construction of devices of this character and also the manner of connecting them to the leg and shoe of the wearer, whereby the brace will afford a substantial support for the leg and be wholly out of contact with the foot above the heel of the shoe, to which latter the brace will be detachably and pivotally connected, and the supporting-strap of the ankle-pad will be held away from the leg, and thus prevent uncomfortable pressure or chafing.

With these objects in view the invention consists of the several details of construction and combination of parts, as will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a perspective view of a leg and ankle brace having two supporting-rods made in accordance with my invention and in position on the wearer. Fig. 2 is a rear elevation, the heel of the shoe being in section and the upper portion of the brace removed. Fig. 3 is a perspective view of a brace formed of a single supporting-rod and the ankle-brace connected thereto. Fig. 4 is a perspective view of the brace with a duplex spring bar or rod. Fig. 5 is a longitudinal section through the device shown by Fig. 4. Fig. 6 is a modified construction of the duplex spring bar or rod illustrated by Figs. 4 and 5.

Similar reference-numerals indicate similar parts in the several figures.

1 indicates the side or supporting rods, each of which is curved inwardly at its lower end and provided with spaced perforated ears 2, between which are pivoted the heads 3 of the pins 4, and these pins are designed to fit in horizontally-disposed openings 5 on opposite sides of the shoe-heel 6. The rods are riveted or otherwise secured to the outer face of a metal yoke 7, which is curved to fit around the back portion of the leg below the knee.

A broad band 8, of leather or similar material, is secured to the yoke and provided with straps 9, by means of which the band can be secured in position just below the knee of the wearer. The rods 1 will be of spring metal, preferably steel, and their lower ends can be easily sprung apart for the purpose of inserting the pins 4 or removing them from the openings in the heel of the shoe.

10 indicates an ankle-pad provided with a securing-strap 11, this pad being adapted to engage the ankle on one side of the leg. To the inner face of the rod, on the opposite side of the leg, a bar 12 is adjustably secured by means of a clip-bar 13, which engages the outer face of the rod 1 and is secured to the bar 12 by bolts 14. The openings 15 in the bar 12, through which the bolts 14 pass, are elongated, and the bar 12 can therefore be adjusted transversely of the rod 1, as well as longitudinally thereof, when the bolts are loosened. The bar 12 is provided with a slotted opening 15^a at each end, through which the strap 11 is threaded, and when the ends of the strap are buckled together the strap will lie against the inner face of the bar 12 and be entirely out of contact with the leg of the wearer, and thus prevent chafing and pressure on the leaders or veins of the leg.

In the event it is desired to use a knee-support with the leg-brace the upper ends of the rods 1 will extend above the yoke 7 and be curved outwardly and upwardly, as indicated at 16. Their upper ends will also be bifurcated to form spaced ears 17, between which the lower ends of the bars 18 are pivoted. A metal yoke 19 is secured to the upper ends of the bars 18 and is curved to fit around the back portion of the leg above the knee. A broad band 20, of leather or other suitable material, is secured to the yoke 19 and provided with straps 21, by means of which it may be secured in position on the leg. When the knee-support is not used, the rods 1 will terminate at the yoke 7, as indicated in Fig. 2.

Sometimes the toes of the wearer of my improved brace may be turned inward or outward abnormally, and in order to correct this deformity the pin 4 can be bent close to its head in either direction, according to cir-

cumstances, as indicated in dotted lines in Fig. 3, and inserted in a hole in the heel of the shoe, which extends parallel to its front edge, and in this manner the toe of the shoe will be turned in or out, as desired, and thereby bring the foot of the wearer to a normal position. Instead of bending the pin the same result would be obtained if the hole in the heel for the reception of the pin were bored obliquely to instead of parallel with the front edge of the heel and the pin be straight, as will be readily understood.

By having the pin 4 hinged or pivoted to the supporting-rod on a horizontal axis the foot of the wearer will be enabled to turn slightly sidewise to accommodate itself to uneven or unlevel surfaces in walking without unusual pressure on the supporting-rod, thereby giving a more comfortable support to the ankle-joint while stepping on rough or uneven ground.

In practice it will sometimes be necessary to use two side supporting-rods, as illustrated in Figs. 1 and 2. In other cases it will be necessary to use only one supporting-rod, and the ankle-pad may be used with either form, if necessary, or be omitted if the ankle requires no special support. I do not, therefore, intend to limit my invention to the use of either one or two supporting-rods, as it will depend wholly upon the special conditions in each case as to whether one or two rods will be most desirable.

From the foregoing description it will be seen that the supporting-rod will have a hinge connection with the heel of the shoe, and as its lower end is curved inwardly and its upper end connected to the outer face of the yoke 7 the rod will not be in contact with the foot at any point above the heel and there will be no chafing. As the rod has no joint between its upper and lower end it will form a very rigid and firm support for the leg, and its hinge connection to the heel of the shoe will permit free movement of the ankle. It is also obvious that the ankle-pad will be firmly held in position to support the ankle without any pressure of the securing-strap on the leaders or veins of the leg. The device can be easily removed from the leg of the wearer without taking off the shoe by unbuckling the straps of the ankle-pad and leg-bands and then simply disengaging the pin from the heel of the shoe. It is also obvious that the rod or rods 1 may be adjustably connected to the yoke 7 in order that the brace may be adapted for use on legs of different lengths.

In Figs. 4 to 6, inclusive, I have illustrated other embodiments of my improvement in which duplex springs or elastic rods are employed, which combine strength, flexibility, lightness, and comfort to the wearer. The principle of the brace illustrated in the accompanying Figs. 4 to 6, inclusive, is the same as in Figs. 1 to 3, in that they include the bar or rod for supporting the ankle or leg,

the pins for attachment to the heel, the ankle band or pad, and the leg-band; but the construction of the rod or bar itself is varied to introduce the feature of a duplex spring-rod, which makes the brace lighter and adds to the comfort and convenience of the wearer.

In the construction shown by Figs. 4 and 5 I make the supporting bar or rod of a single length of spring metal and bend or fold the same upon itself to provide two strands 25, which lie practically parallel to each other. The doubled end 26 of the duplex rod is fitted against a plate 27, forming one member of a clamp, the other member 28 of which clamp is fitted against the other side of the strands or lengths of the rod. The two clamp-plates are drawn together by the screws 29, and thus the strands of the rod or bar are held securely between the members of the clamp. The clamp is extensible on the duplex-strand rod, and the plate or member 27 of the clamps extends upwardly a suitable distance to carry the leg band or brace 7. The lower ends of the strands 25 are bent inwardly to be attached by a screw 30 to a lower smaller clamp 31, and this lower clamp carries the heel-attaching pins 4, which are pivotally connected to the clamp 31, as shown. The ankle-band is attached to the strands of the duplex rod in substantially the manner heretofore described.

In the embodiment of the invention illustrated by Fig. 6 I also employ the duplex rod, but arrange it in a different manner. The doubled or looped end of the rod is lowermost to provide for the attachment thereto of the heel-pins 4, while the free ends of the strands forming the duplex rod are received in and confined by the two-part clamp and the screws thereof.

It will be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what I claim is—

1. In a brace of the class described, a supporting-rod carrying at its lower end a pin pivoted or hinged thereto, said pin being adapted to enter an opening in the heel of the shoe.

2. In a leg-brace, a supporting-rod carrying at its upper end a leg-embracing yoke or band, and carrying at its lower end an inwardly-disposed pin adapted to engage an opening in the heel of the shoe, substantially as set forth.

3. In a leg and ankle brace, the combination with a leg-supporting rod, of a transverse bar connected to said rod, an ankle-pad, and a securing-strap connected to the pad and the ends of the transverse bar, substantially as and for the purpose specified.

4. In a brace of the class described, the combination with a supporting-rod, of a horizontally and vertically adjustable transverse bar fitted on the rod, and a securing-strap

carrying an ankle-pad and supported by said bar, substantially as set forth.

5 5. A leg and ankle brace comprising a supporting-rod connected at its upper end to a yoke adapted to be secured to the leg, and having its lower end curved inwardly and provided with means to form a hinged joint with the heel of a shoe, a transverse bar adjustably connected to said rod and having
10 openings in its ends, an ankle-pad to support the ankle on the side remote from the transverse bar, and a securing-strap connected to the pad and threaded through the openings in the transverse bar, substantially as and
15 for the purpose specified.

20 6. A leg-brace comprising a supporting-rod connected at its upper end to a leg-yoke, and a pin hinged to the lower end of the rod and extending into the heel of a shoe on a substantially horizontal plane and in a direction oblique to the front edge of such heel, substantially as described.

7. A leg-brace comprising a spring rod or bar bent from a length of elastic metal to form parallel strands, a heel-pin attached to
25 the lower end of the duplex rod, a clamp fitted to the upper ends of the strands of the duplex rod, and a leg yoke or strap attached to the clamp, substantially as described.

8. A leg-brace comprising a duplex-spring
30 rod or bar, a clamp fitted to the lower end thereof, another clamp fitted to and adjustable on the upper end of the rod or bar, an ankle-band, a heel-pin attached to the lower clamp, and a leg-band attached to the upper
35 clamp, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEO. POWELL HILL.

Witnesses:

P. R. ROSE,
WM. J. HARVIE.