

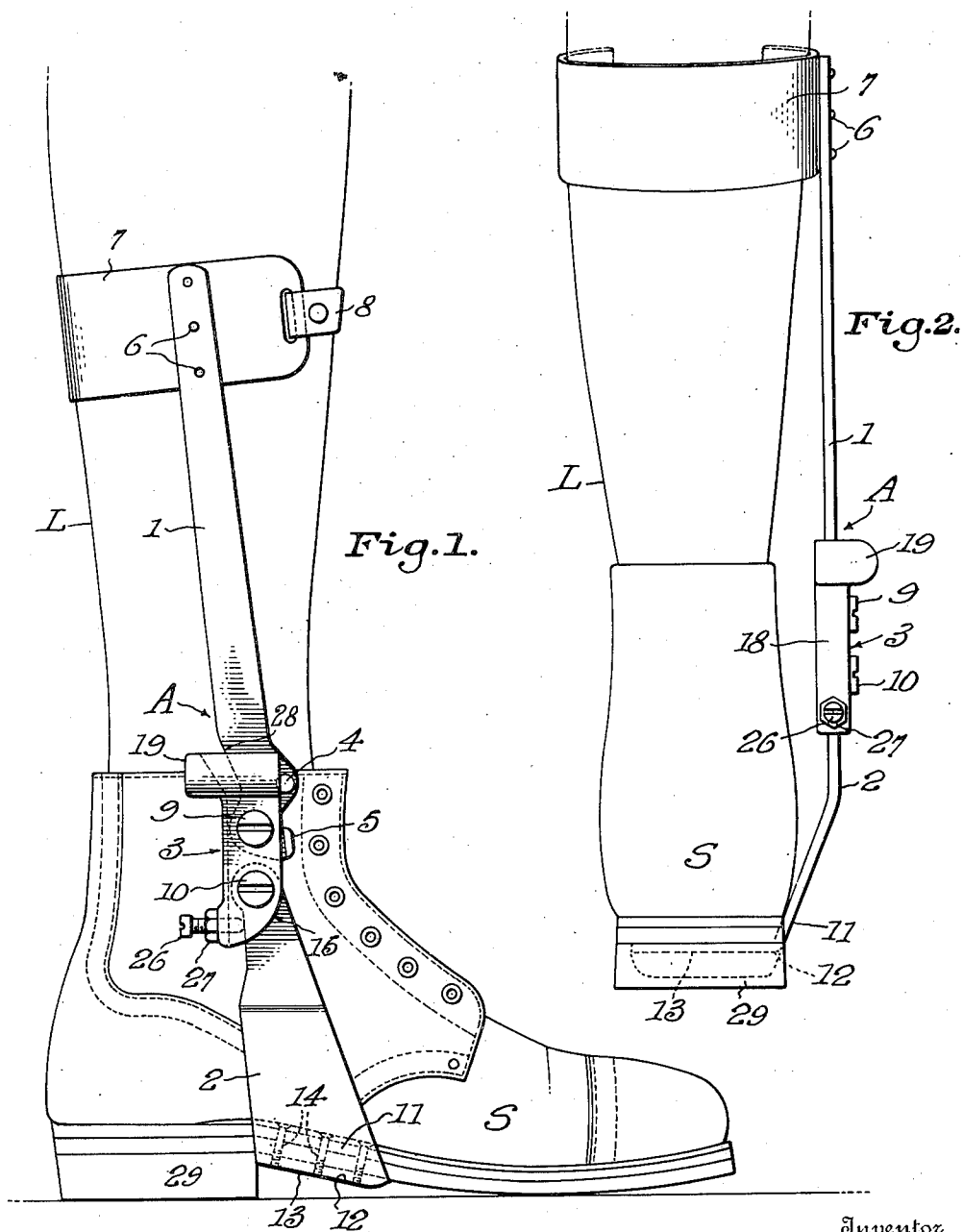
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E. C. FOLLIS
SURGICAL BRACE

2,477,591

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2 Sheets-Sheet 1



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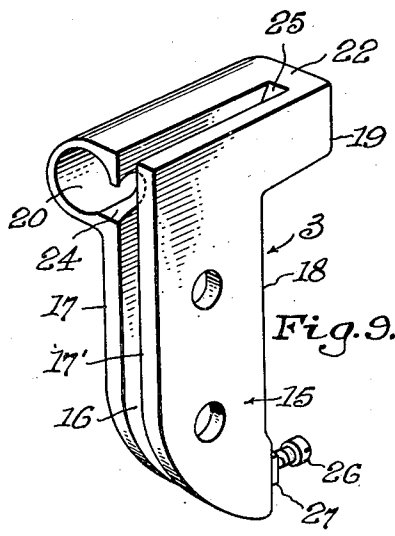
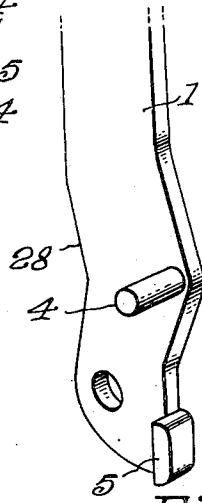
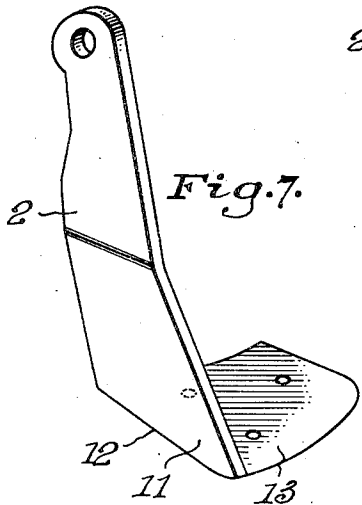
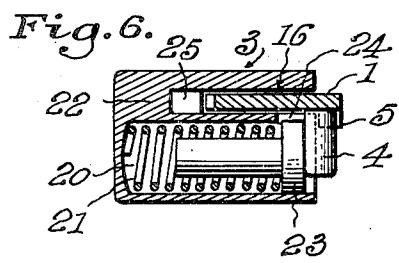
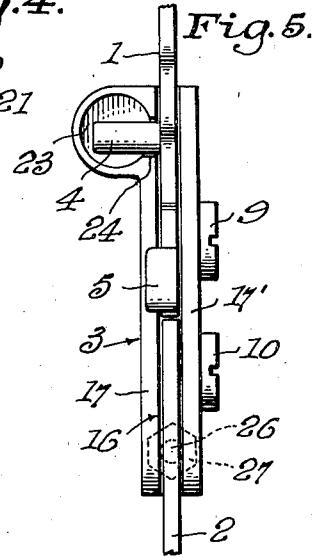
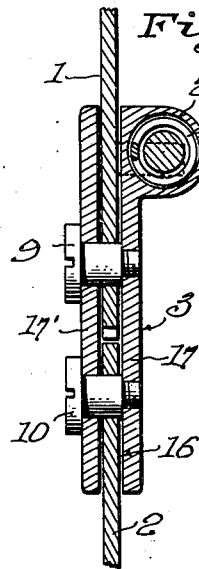
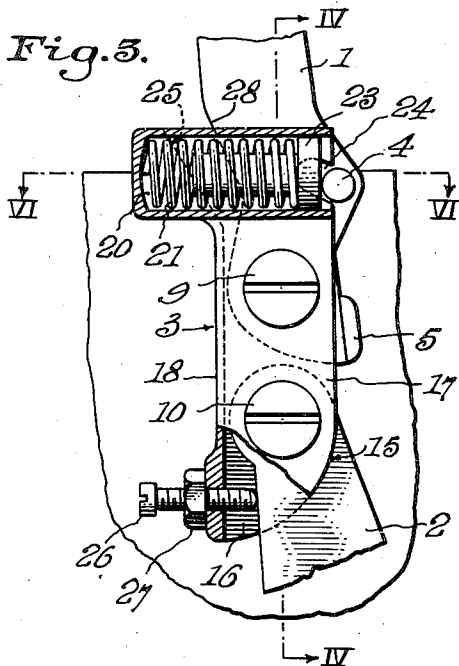
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SURGICAL BRACE

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2 Sheets-Sheet 2



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SURGICAL BRACE

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6 Claims. (Cl. 128—80)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without payment to me of any royalty thereon.

This invention relates to a surgical brace of that class which is used in supporting the foot, so as to facilitate the walking of persons afflicted with lame or weak limbs.

One of the objects of the invention is to provide a foot support adapted to take all strain off the controlling foot muscles and ligaments of persons suffering from foot ailments, whereby they may go about their normal activities, at the same time allowing the foot muscles to heal completely.

Another object of the invention is to provide a foot support which is comparatively simple in construction, conveniently manipulated, strong, durable, highly efficient and reliable in use, compact, light in weight and which may be manufactured at low cost.

When a person is disabled by foot ailments, such as when the foot drops, they lose control of the foot which, in walking, drops down or drags, thus causing the individual to stumble or fall. Rest is the main cure so the individual must stay off his or her feet and possibly be confined to bed.

It is therefore another object of the invention to provide a surgical brace which will support the foot in a manner such that the foot will be prevented from dropping, thus avoiding the danger of the person stumbling or falling and without the necessity of staying off the feet.

With the above and other objects and advantages in view, the invention consists of certain features of construction and operation of parts which will hereinafter be described and shown in the accompanying drawings, in which:

Figure 1 is a side elevation of the improved foot support illustrated as being applied to the inside of the left leg for supporting the left foot;

Figure 2 is a rear elevational view thereof;

Figure 3 is an enlarged fragmentary detail view, partly in section, of an intermediate member or ankle-joint with its connected parts broken away;

Figure 4 is a vertical sectional view taken on line IV—IV of Figure 3 and looking in the direction of the arrows;

Figure 5 is a front elevation of Figure 3;

Figure 6 is a detail longitudinal sectional view taken on line VI—VI of Figure 3;

Figure 7 is a perspective view of the foot member of the support;

Figure 8 is a fragmentary view of the lower end of an upper brace or pivot arm used in carrying out the invention; and

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Figure 9 is a perspective detail of the intermediate member or ankle-joint of the invention.

Referring more specifically to the drawings, A designates generally the improved foot support or surgical brace of the class which is applied to the leg for supporting the foot of persons suffering from foot ailments and facilitating the walking of the persons without strain on the controlling foot muscles and ligaments.

The foot support A comprises an upper brace member or stay 1, a lower brace member or stay 2 and an intermediate link member or ankle-joint 3 between the upper and lower bracing members 1 and 2, respectively. The upper bracing member 1 has a plunger control pin 4 projecting outwardly from one side thereof adjacent to its lowered end and is provided with a stop member 5 extending outwardly from the front edge at the lower end of the upper bracing member 1 for purposes which will hereinafter appear. The upper bracing member 1 is fastened at its upper end by rivets 6 or the like to a leg band 7 adapted to be fastened around the leg L of the user of the device by adjusting strap 8. The brace extends downwardly from the leg band 7 to a point in line with the ankle-joint 3, where it is pivotally secured adjacent to the upper end of the ankle-joint 3 by the pivot screw 9.

The lower bracing member 2 extends upwardly to a point where it is pivotally secured to the ankle-joint 3 adjacent to the lower end thereof by a pivot screw 10. The lower portion 11 of the bracing member 2 is bent inwardly at 12 and is widened as it closely approaches the arch of the shoe S. The lower end of the lower bracing member 2 is bent inwardly at substantially right angles to the lower portion 11 to provide a securing element 13 adapted to engage the bottom of the shoe-sole at the arch of the shoe, where it is secured thereto by screws 14 or the like.

The ankle-joint 3 is in the form of a substantially inverted L-shaped casting having a vertically extending portion 15 at its lower end and provided with a slot 16 which extends vertically upwardly from the lower end of the ankle-joint through the upper end thereof, whereby side walls 17 and 17' and a rear wall 18 are formed on the ankle-joint, with the slot 16 therebetween. The upper end of the ankle-joint 3 is provided with a horizontally extending portion 19 which projects rearwardly from the rear wall 18. A horizontally extending cylindrical bore or spring housing 20 is formed in the upper end and at the outside of the wall 17 of the ankle-joint 3, with the cylindrical bore 20 extending

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from the front edge of the side wall 17 toward the rear wall 18 and into the projecting portion 19 on the upper end of the ankle-joint. The cylindrical bore 20 provides a housing for a compression spring 21, the rear end of which abuts against the rear wall 22 of the projecting portion 19, with the front end of the compression spring 21 being engaged by a plunger 23 extending into the cylindrical bore or spring housing 20. The plunger 23 is actuated by the plunger control pin 4 on the bracing member 1 adjacent to the lower end thereof, with the pin 4 adapted to work in a curved slot 24 formed in the inner side and at the outer end of the spring housing 20 and with the lower end of the upper bracing member 1 engaging in the upper end of the vertical slot 16. The inner edge of the rear wall 22 of the projecting portion 19 on the upper end of the ankle-joint 3 is beveled upwardly and outwardly at 25 from the upper end of the rear wall 18 of the vertically extending portion 15 for a purpose which will hereinafter appear. A horizontally extending spring tension adjusting screw 26 is mounted on the rear wall 18 of the ankle-joint 3 with the inner end thereof contacting with the lower bracing member 2 adjacent to its upper end, which bracing member 2 engages at its upper end in the lower end of the vertical slot 16 in the ankle-joint. A nut 27 is provided on the screw 26 for locking it in adjusted position.

In Figures 1 and 3, the compression spring 21 in the cylindrical bore or spring housing 20 is illustrated as being partially pressed inwardly therein by the plunger 23, which, in turn, is engaged by the plunger control pin 4 on the side and adjacent to the lower end of the upper bracing member 1. By retracting the adjusting screw 26, the compression spring 21 forces the plunger 23 against the pin 4, causing the upper brace member 1 to be actuated forwardly on its pivot screw 9 until the stop member 5 nearly contacts with the front edge of the side wall 17 of the ankle-joint 3, when the individual user of the foot support is standing erect.

In operation, when walking with the foot support applied to a leg for supporting an injured foot the heel 29 of the shoe S hits the surface on which the individual is walking first and then on the ball of the foot. This causes the pin 4 on the upper bracing member to move inwardly in the curved slot 24 and to press in on the plunger 23, which in turn compresses the spring 21 in the housing 20, until the individual's body moves forward on the next step, allowing the upper bracing member 1 to move forward and causing the pin 4 to move outwardly in the slot 24 for allowing the plunger 23 to be actuated outwardly by the spring 21, thus decompressing the spring. The upper bracing member 1 is beveled at 28 on the rear edge thereof closely adjacent to its lower end to permit movement of the upper brace member rearwardly into contact with the beveled inner edge 25 of the projection portion 19 of the ankle-joint.

It will thus be seen that there is herein provided a novel and efficient form of foot support which is well adapted for the purpose intended. Even though the foot support has herein been disclosed as comprising certain features of construction and operation of parts, it is nevertheless to be understood that various changes may be made therein, if the changes do not depart from the spirit or scope of the claims.

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Having thus described my invention, what I claim as new and wish to obtain by Letters Patent is:

1. A foot support, comprising an upper brace member adapted to be attached at its upper end to the leg, a lower brace member having its lower end engaging a shoe, an intermediate ankle-joint member provided with an upper and a lower pivot means by which it is pivotally connected respectively to the lower end of said upper brace member and pivotally connected to the upper end of said lower brace member, and coacting means on said intermediate member and upper brace member for yieldably engaging said intermediate member with said upper brace.

2. A foot support, comprising an upper brace member adapted to be attached at its upper end to the leg, a lower brace member having its lower end engaging a shoe, an intermediate ankle-joint link member provided with an upper and a lower pivot means by which it is connected respectively to the lower end of said upper brace member and pivotally connected to the upper end of said lower brace member, coacting means on said link member and upper brace member for yieldably engaging said upper brace member with said link member, and means mounted on said link member and contacting said lower brace member for locking said link member in yielding relation with said upper brace member, and limiting the pivotal movement of said lower brace member on said link member.

3. A foot support, comprising an upwardly extending upper brace member adapted to be attached at its upper end to the leg, a lower brace member having its lower end secured to a shoe, an intermediate ankle-joint provided with two separated pivot means by which it is pivotally connected to the lower end of said upper brace member and pivotally connected to the upper end of said lower brace member, means including a compression spring mounted on said ankle-joint, and coacting means on said upper brace member for yieldably engaging said upper brace member with said ankle-joint.

4. A foot support, comprising an upper brace member adapted to be attached at its upper end to the leg, a lower brace member having its lower end secured to a shoe, an intermediate ankle-joint pivotally connected to the lower end of said upper brace member and pivotally connected to the upper end of said lower brace member by longitudinally spaced pivot means, coacting means for yieldably engaging said ankle-joint with said upper brace member, said coacting means including a compression spring and a plunger for actuating said spring mounted on said ankle-joint, and a pin mounted on said upper brace member contacting with and adapted to actuate said plunger against the action of said spring.

5. A foot support, comprising an upper brace member adapted to be attached at its upper end to the leg, a lower brace member having its lower end secured to a shoe, an intermediate ankle-joint having upper and lower pivot means and pivotally connected respectively to the lower end of said upper brace member and pivotally connected to the upper end of said lower brace member, coacting means for yieldably engaging said ankle-joint with said upper brace member, said coacting means including a compression spring and a plunger for actuating said spring mounted on said ankle-joint and a pin mounted on said upper brace member contacting with and adapt-

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ed to actuate said plunger against the action of said spring, and an adjusting screw and lock nut mounted on said ankle-joint, said adjusting screw contacting with said lower brace member for locking said ankle-joint in yielding relation with said upper brace member and limiting rearwardly the pivotal movement of said lower brace member on said ankle-joint.

6. A foot support, comprising an upper brace member adapted to be secured at its upper end to the leg, a lower brace member having an inwardly bent lower end adapted to extend underneath and secured to the arch of a shoe, an ankle-joint having a vertically extending slot therein, and a cylindrical bore on its upper end, the lower end of said upper brace member extending into the upper end of said vertical slot and pivotally connected to the upper end of said ankle-joint with the upper end of said lower brace member extending into the lower end of the vertical slot and pivotally connected to the lower end of said ankle-joint, a slot formed in said ankle-joint adjacent to one side of said cylindrical bore, coacting means for yieldably engaging the upper end of said ankle-joint with the upper brace member adjacent to the lower end thereof, said coacting means including a compression spring mounted

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in said cylindrical bore, a plunger mounted in said cylindrical bore and adapted to actuate said spring, a pin mounted on the upper brace member adjacent to the lower end thereof and operable in said slot adjacent to said cylindrical bore for contacting with and actuating said plunger against the action of said spring, and means on the lower end of said upper brace member adapted to contact with said ankle-joint for limiting the yielding movement of said upper brace member on said ankle-joint.

EVAN C. FOLLIS.

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