J. E. CAMERON.

ORTHOPEDIC DEVICE OR APPARATUS.

APPLICATION FILED JAN. 10, 1920.

1,418,283. Patented June 6, 1922.

Fig. 1.

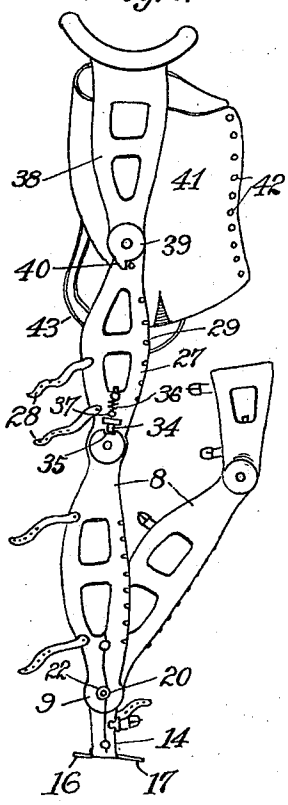


Fig. 2.

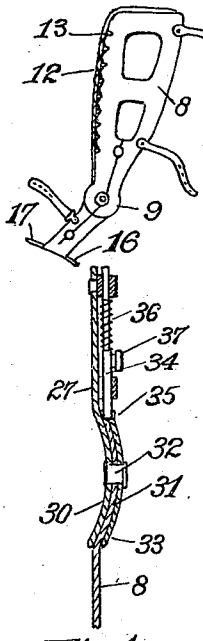


Fig. 4.

Fig. 3.

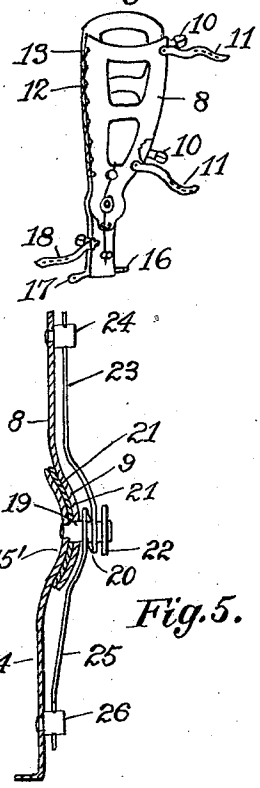


Fig. 5.

Fig. 6.

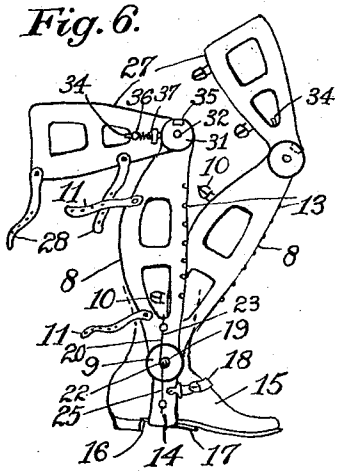
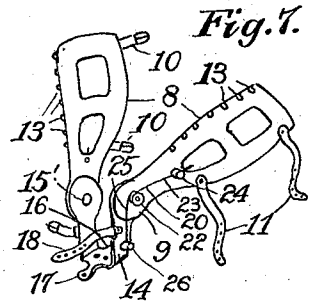


Fig. 7.



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ORTHOPEDIC DEVICE OR APPARATUS.

1,418,283. Specification of Letters Patent. **Patented June 6, 1922.**

Application filed January 10, 1920. Serial No. 350,564.

To all whom it may concern:

Be it known that I, JOHN EDMOND CAMERON, a subject of the King of Great Britain, and resident of Charlottetown, Prince Edward Island, Canada, have invented certain new and useful Improvements in Orthopedic Devices or Apparatus, of which the following is a specification.

This invention relates to orthopedic devices, and it is the object of the invention to provide a brace for the ankle, leg, thigh, hip and spine for the correction and curing of deformities of such members, and which is also applicable as a splint or fracture apparatus for the treatment of broken limbs, sprains and dislocated joints.

It is a further object of the invention to combine a crutch with an orthopedic device of this character whereby to adapt the same for use in connection with the treatment of hip disease, and for instance tuberculosis of the leg and other diseases, or the mending of a fracture, in which the ligaments and muscles are in a weakened condition and not able to perform their proper function and the leg requires to be supported in a fixed position whereby the user is enabled to walk without disturbing the leg or other affected part and without supporting the entire weight of the body upon the leg in walking.

It is another object of the invention to provide in connection with an orthopedic device of this character a stirrup to support the foot and provide means in connection with such stirrup whereby the stirrup and thereby the foot is yieldingly urged forward and upward.

In carrying out the invention I provide a pair of leg sections shaped to conform to and engage at opposite sides of the leg and pivotally connect to the inner sides of the lower ends of said sections a stirrup, the portions of the stirrup and leg sections where they are connected being cupped, and means being provided to yieldingly urge the stirrup in a forward direction. To use the device as a leg and thigh brace sections to engage at opposite sides of the thigh are pivotally connected to the leg sections and releasable means are provided to permit of a limited movement of the thigh and leg sections relative to each other in the normal position of such means, and which means are releasable to permit of an unlimited movement of the thigh and leg sections relative to each other. To use the device as a crutch a crutch section is pivotally connected to one of the thigh sections to have free movement in one direction and a limited movement in reverse direction, and to facilitate the use of the device as a crutch and as a means for the correction of a deformity of the spine a jacket to be worn upon the body of the user is secured to the crutch.

In the drawing accompanying and forming a part of this specification Figure 1 is a side elevation, one of the leg and thigh sections being shown as moved to position out of normal relation to the other section for a clear understanding of the invention.

Figure 2 is a side elevation of the leg sections and stirrup connected thereto together with means to yieldingly urge the stirrup forward and showing the stirrup in its foremost position.

Figure 3 is a view similar to Figure 2 but showing the position the stirrup will assume in walking while supporting the body upon the leg in connection with which the leg sections are used.

Figure 4 is an enlarged sectional view of the connections between the leg and thigh sections and to show the releasable means to permit of only a limited movement between said sections.

Figure 5 is an enlarged sectional view of the pivotal connection of the joints between the stirrup and leg sections and the means to yieldingly urge the stirrup in a forward direction.

Figure 6 is a side elevation of thigh and leg sections with the stirrup connected to the latter, the thigh and leg sections being moved out of their normal relative positions; and

Figure 7 is a perspective view of the leg sections and connected stirrup with the leg sections moved out of normal relation to each other.

Similar characters of reference designate like parts throughout the different views of the drawing.

The embodiment of my invention illustrated in the drawing comprises a pair of leg sections 8, 8 shaped to conform to and adapted to engage at opposite sides of the leg and having at the lower end an outwardly cupped portion 9. The leg sections are secured upon the leg by strap members 10, 11 attached adjacent the rear longitudinal edges of the sections, the one section, as 10, having a buckle and the other mem-

bers 11 perforated for the engagement of the buckle, and by a lacing 12 (Figures 2 and 3) to engage the lacing hooks 13 along the forward edges of the leg sections.

A stirrup 14 to engage around the bottom or sole of a shoe 15 has cupped portions 15′ arranged to embrace opposite sides of the ankle. The stirrup is secured to the sole of the shoe or boot and for this purpose has a rearwardly extending lip 16 to engage between the sole and heel and a forwardly extending lip 17, these lips having perforations for the engagement of the securing means. By the arrangement of these lips a greater bearing is given the stirrup upon the shoe or boot. The stirrup is also provided with an adjustable strap 18 fastened at a point below the cupped portions and adapted to extend over the instep to provide a support to hold the cupped portions firmly and directly over the ankle joints.

The cupped portions of the leg sections 8 engage at the outer side of the cupped portions of the stirrup and pivotally connected thereto by a stud 19 fixed to the cupped portions 15′ of the stirrup, as by brazing or otherwise, to project laterally and engage in openings in the cupped portion of the leg sections. By this arrangement the stirrup is held immovably against the ankle joints and the movement between the stirrup and leg sections is upon the outer surface of the cupped portions of the stirrup thereby preventing any rubbing or chafing of the ankle. The cupped portion of the leg sections may be reinforced with bushings 21 brazed or otherwise fixed thereto to provide a wide bearing upon the studs, which are case-hardened to insure their durability.

Yielding means are provided to throw and urge the forward end or toe portion of the foot forward and upward to prevent dragging of the toe portion of the shoe or boot and comprises springs 20 coiled about the extended ends of the studs 19 and confined between the leg sections and heads or washers 22 fixed to the ends of the studs, the free ends of the springs being extended, the one end 23 slidably engaging in the lug 24 on the leg sections and the other ends 25 slidably engaging in lugs 26 projecting from the stirrup. By this arrangement the springs are adapted to have free action to adjust themselves both as to length and angle.

Thigh sections 27 shaped and arranged to engage at opposite sides of the thigh are adapted to be secured to the thigh by straps 28 connected to the lateral longitudinal edges of the sections and a lacing to engage hooks 29 at the forward longitudinal edges of said sections. Each thigh section has a cupped portion 30 (Figure 4) at the lower end to correspond in shape substantially to the cupped portion 31 at the upper ends of the leg sections and to engage at the inner surface of said cupped portions 31. The thigh and leg sections are pivotally connected by studs or rivets 32 fixedly carried by the thigh sections and loosely engaging openings in the cupped portions of the leg sections, a cupped member 33 preferably engaging at the outer side of and being fastened to the cupped portion of the leg sections. By this arrangement the connection of the thigh and leg sections serves as a brace for the knee, and the thigh sections located adjacent the knee and being immovably secured to the thigh the leg sections are adapted to move on the studs 32 contiguous to the thigh sections and there will be no rubbing and consequent chafing action against the knee, studs being case-hardened.

To permit of the leg and thigh sections having a limited movement relative to each other as in walking, or an unlimited movement between said sections, as when assuming a sitting posture, a detent 34 is slidably mounted on each of the outer thigh sections, and yieldingly urged to engage a notch 35 in the outer leg sections by springs 36, as clearly shown in Figure 4. The notches are slightly wider than the portion of the detents engaging in the notches, whereby the leg sections may have a limited to and fro swinging movement as in walking. To permit of unlimited movement between the leg and thigh sections and permit the assuming of a sitting posture, as shown in Figure 6, the detents 34 are manually releasable from the notches 35, and for this purpose they are provided with a knob or finger piece 37 to readily manipulate the detents to release them from the notches 35. In the released position the ends of the detents will ride along the peripheral edge of the joint of the leg sections, or the plates 33 connected thereto. When a standing or upright position is again assumed the detents will automatically engage the notches 35 to again permit only of a limited movement between the leg and thigh sections.

To adapt the device to serve as a means to relieve the entire support of the body from the leg or foot a crutch section 38 is pivotally connected, as at 39, to the outer side of the outer thigh sections and to engage at the side of the body. To permit of said crutch and thigh section having unlimited movement in one or a forward direction and a limited backward movement each of the joint sections of the crutch and thigh sections is arranged with a stop which are adapted to engage when the members are in the position shown at 40 in Figure 1.

To also adapt the device to correct a deformity in the spine a jacket 41 of suitable fabric or the like and shaped to conform to the body is secured to the crutch member 38, and is secured to the body by a lacing passed through eyelets 42. A strap or band

43 is connected to the lower end of the jacket and crutch member to pass around the body to serve as a brace at the hip.

The leg, thigh and crutch sections are made of suitable sheet material, preferably metal which may be readily shaped to form, and portions of the material are stamped out to provide for ventilation and make the apparatus as light in weight as possible.

Having thus described my invention, I claim:

1. An orthopedic device comprising in combination a stirrup secured to the sole of a shoe and arranged with circular cupped portions to embrace opposite sides of the ankle joint; a pair of sections to embrace the leg, said sections being of circular shape in transverse section and arranged with a circular cupped portion to engage outside the cupped portions of the stirrup adjacent the ankle and pivotally connected thereto; and resilient means mounted upon the pivotal connection of the stirrup and leg sections and movably connected to the stirrup and leg sections to yieldingly urge the stirrup forward to swing on the pivotal connection thereof with the leg members for the purpose specified.

2. An orthopedic device comprising a pair of leg sections adapted to be secured to the leg to engage at the inner and outer sides of the leg and having a circular cupped portion at the lower ends; a stirrup having cupped portions to engage the inner sides of the cupped portions of the leg sections and having laterally projecting studs centrally of said cupped portions to engage openings centrally in the cupped portion of the leg sections to pivotally connect the two together; spring wire coiled about the studs; and studs fixed in the stirrup and leg sections having perforations for the slidable engagement of the free ends of the wires, and said wire operating to urge the stirrup forward for the purpose specified.

3. An orthopedic device comprising a pair of sections shaped to conform to and engage at opposite sides of the leg and arranged to be secured to the leg; a pair of sections shaped to conform to and engage at opposite sides of the thigh and arranged to be secured thereto and pivotally connected at the lower ends with the upper ends of the leg sections; detents carried by one pair of sections; recesses for the engagement of the detents in the other pair of sections arranged to permit of a limited movement of the one pair of sections relative to the other pair of sections, and said detents being releasable to permit of unlimited movement of one pair of sections relative to the other pair of sections; and a stirrup pivotally connected to the lower ends of the leg sections.

4. In an orthopedic device a stirrup; a pair of leg sections pivotally connected to the stirrup; means to yieldingly urge the stirrup forward on its pivotal connection with the leg sections; a pair of thigh sections pivotally connected to the leg sections; said leg and thigh sections being arranged with means to secure them to the leg and thigh; a detent carried by each of the thigh sections to engage a notch in each of the leg sections to permit of a limited movement of said sections relative to each other, said detents being releasable to permit of unlimited movement of the sections relative to each other; and a crutch section pivotally connected to one of the thigh sections, said connection between the thigh and crutch sections being arranged to permit of a limited movement in one direction.

5. In an orthopedic device a stirrup; a pair of leg sections pivotally connected to the stirrup; means to yieldingly urge the stirrup forward on its pivotal connection with the leg sections; a pair of thigh sections pivotally connected to the leg sections; releasable means operative to permit of a limited movement only between the leg and thigh sections or an unlimited movement between said sections; a crutch section pivotally connected to one of the thigh sections to permit of a limited movement in one direction and an unlimited movement in the opposite direction between said sections; and a jacket connected to the crutch sections for the purpose specified.

JOHN E. CAMERON.