March 23, 1926. 1,577,782

J. R. ATKINSON

SURGICAL SPLINT

Filed Feb. 14, 1923

Fig. 1.

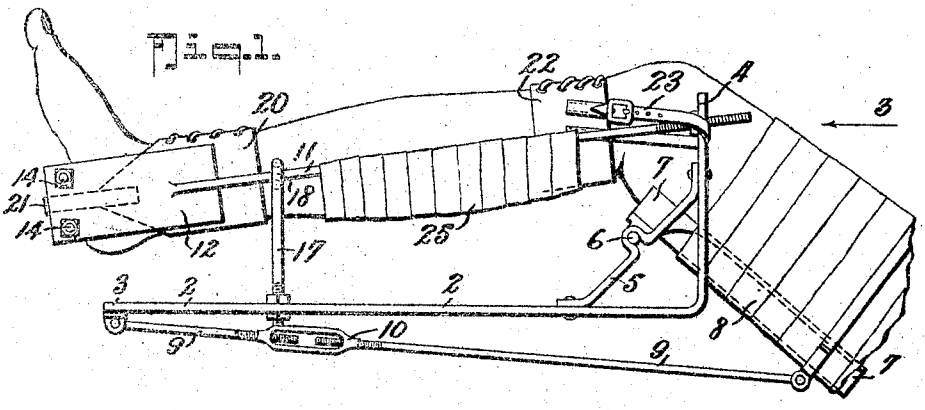
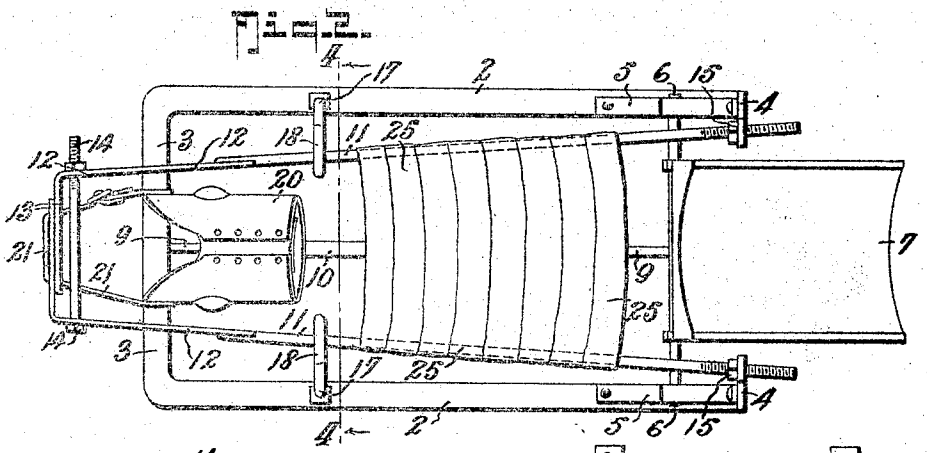


Fig. 2.



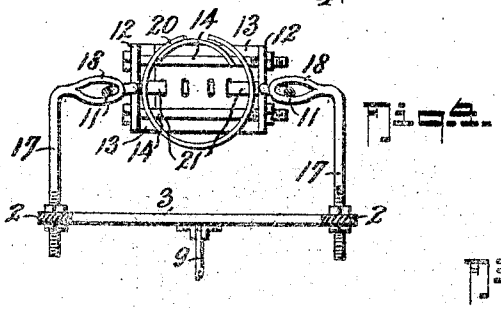


Fig. 4.

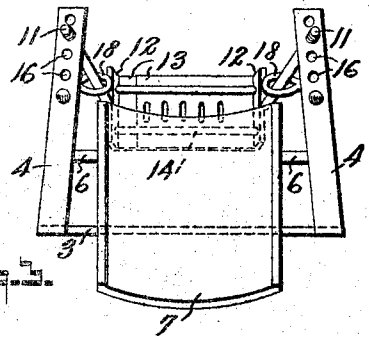


Fig. 3.

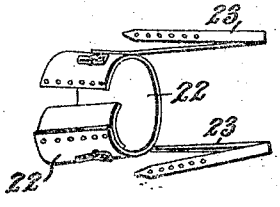


Fig. 5.

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UNITED STATES PATENT OFFICE.

JAMES R. ATKINSON, OF VANCOUVER, BRITISH COLUMBIA, CANADA.

SURGICAL SPLINT.

Application filed February 14, 1923. Serial No. 618,981.

To all whom it may concern:

Be it known that I, JAMES R. ATKINSON, citizen of the Dominion of Canada, residing at Vancouver, in the Province of British Columbia, Canada, have invented certain new and useful Improvements in Surgical Splints, of which the following is a specification.

This invention relates to a splint for a fractured lower limb and is designed to provide such support for the limb that the fractured ends may be drawn apart and readily adjusted, during which adjustment free access is afforded to the location of the fracture.

When both bones of the lower leg are fractured and possibly obliquely, the broken ends will, under the tension of the muscles, tend to overlap one another, and difficulty is experienced in applying the required tension to bring the fractured ends into their correct relative position without imposing an undesired and objectionable tension on the knee joint, or, when support is afforded from the crotch, without an exceedingly uncomfortable and painful pressure applied on this part, which is not adapted to receive such. There is the further disadvantage in both cases that the leg must be maintained straight at the knee joint.

In the device, which is the subject of this application, the required resistance for the tension applied to draw the fractured ends of a broken leg to their proper position in relation to one another is imposed on the underside or back of the thigh adjacent the knee joint, the axis of the thigh being angled to that of the leg to provide a suitable resistance.

The splint frame by which the tension is imposed on the leg and the resistance of that tension distributed, is so designed as to afford free access to the leg at the location of the fracture for an X-ray inspection of it, and for manipulation and bandaging the fracture or for attending to any flesh wound on the leg in the vicinity of the fracture.

The invention is particularly described in the following specification, reference being made to the drawings by which it is accompanied, in which:

Fig. 1 is a side elevation of the splint showing its application to the leg of a patient.

Fig. 2 is a plan of the splint.

Fig. 3, an end elevation looking in the direction of the narrow 3 in Fig. 1.

Fig. 4, a sectional elevation on the line 4—4 in Fig. 2, and

Fig. 5 is a perspective view of the below-the-knee leg band.

In these drawings 2, 3, 4 represent an open rectangular frame composed of longitudinals 2 connected by a cross member 3, and having upwardly turned ends 4. Each upwardly turned end 4 is strengthened by a corner brace 5 and between these corner braces one end of the thigh attaching member 7 is pivotally mounted at 6. The member 7 is shaped to fit against the underside or back of the thigh adjacent the knee, where it is secured by a bandage 8 or other suitable means. From the other end of this member 7 a stay rod 9 extends to the cross portion 3 at the outer end of the rectangular frame. The rod 9 is pin-connected to 7 and 3 and is provided with a turn-buckle 10 by which it may be lengthened and shortened to vary the inclination of the member 7 in relation to the longitudinals 2 of the rectangular frame.

The provision, through which tension is directly applied to the leg to draw the fractured ends into position, is carried from this frame 2, 3, 4, 7, 9. It consists of two side rods 11, to one end of each of which is welded or otherwise secured a flattened portion 12 which is inwardly bent at right angles as at 13 to overlap one another.

These overlapping portions 13 are secured together and adjusted in their distance apart by bolts 14 extending across between them. The other end of each rod 11 is threaded and provided with nuts 15 by which they are secured in one of a series of apertures 16 in the upwardly turned ends 4 of the rectangular frame.

The outer ends of these side rods are supported substantially parallel to the sides 2 of the rectangular frame by uprights 17 adjustably secured to the members 2 and having at the upper ends inwardly turned loops 18, in which the rods 11 freely rest.

Between the stirrup-like connected ends 12, 13 of the side rods 11, a laced ankle band 20 is connected by a buckled strap 21, which passes through apertures provided for it in the inwardly bent ends 13. Between the other ends of the rods 11 which are connected to the upwardly turned ends 4, a

laced leg band 22, adapted to fit the fractured leg immediately below the knee, is connected to each upwardly turned end 4 by a buckled strap 23 on each side.

Between the side rods 11 intermediate the leg band 22 and ankle band 20, a web 25 of bandage or other suitable fabric is passed, which fabric is adapted to support the leg during and after setting.

In use, the member 7 is, as shown in Fig. 1, firmly bandaged to the lower part of the thigh with the frame 2, 3, 4, 9 and uprights 17 connected to it. The ankle band 20 and leg band 22 are laced upon the limb, and the side rods 11 connected together at their inwardly turned ends 13 are passed through the loops 18 of the uprights 17, and while the leg band 22 is connected by the straps 23 to the upwardly turned ends 4, the ankle band is connected by the strap 21 to the inwardly bent ends 13 of the side rods. While the intermediate portion of the leg, in which is the fracture, is resting in the web 25, the nuts 15 are tightend to lengthen the side rods 11 and extend the fractured limb to bring the broken ends into the required relationship, during which adjustment the position of the fracture is fully exposed and accessible for inspection and manipulation.

After setting the splintered leg may be comfortably supported from the bed or suspended from a bed crane.

It will be noted that the angle at which the axis of the leg is held in relation to that of the thigh, may be adjusted by the turnbuckle 10 to enable the thigh to afford the required resistance to the tension of the splint.

Attention is also drawn to the fact that although the frame 2, 3, 4 is pivotally connected at 6 to the thigh member 7, that pivotal connection is only during angular adjustment between the frame and thigh member. After such adjustment is made the frame and thigh member are relatively permanently fixed as one piece.

Also that the leg band 22 is only designed to relieve the knee joint of the tensile strain that would otherwise be imposed on it and to transmit that strain through the straps 23 to the inwardly turned ends 4 of the frame through which it is transmitted to the thigh member 7.

The splint is not only an exceedingly convenient one for the operating surgeon, as it offers ample facilities for inspection and manipulation of the fractured limb; but it is also an exceedingly comfortable one for the patient. As the splint firmly attaches the injured leg to the thigh, and to no other part, the patient has freedom of movement and can assume the position that is most comfortable.

Such parts of the splint as are directly connected to the limb are adjustable that it may be adaptable to variation in the size of the limb it may be required to be used on.

Having now particularly described my invention, I hereby declare that what I claim as new and desire to be protected in by Letters Patent, is:

1. A leg splint comprising a rod extending along each side of the leg from adjacent the knee joint to beyond the foot, each rod being inwardly turned beyond the foot and connected to the other, a frame, said frame including a portion projecting from it on each side of the knee joint to receive the ends of the side rods, means for effecting separate adjustment of the length of each side rod, means pivotally mounting said frame removably to the lower part of the thigh adjacent the knee, means on said frame for supporting said rods adjacent the foot and means for holding said frame adjustably in position.

2. A leg splint comprising a frame having up-standing portions adapted to project to each side of the knee joint, rods adjustably secured in said projecting portions to lie along each side of the leg from adjacent the knee joint to beyond the foot, means securing the ends of said rods to the limb adjacent the foot, means for sustaining said rods above said frame adjacent the foot, a thigh attaching member adapted to be secured on the thigh part of the limb adjacent the knee, means pivotally mounting said frame on said thigh attaching member and an adjustable stay rod secured to said thigh member and to said frame for varying its position with relation to said thigh attaching member, substantially as shown and described.

3. A leg splint, comprising a rod extending along each side of the leg from adjacent the knee joint to beyond the foot, each rod being inwardly turned beyond the foot and connected to the other, a member adapted for attachment to the lower part of the thigh adjacent the knee, said member having attachments to it which project one on each side of the knee joint to which projections the side rods are adjustably connected, means for varying the angle of the projections from the thigh member, means for connecting the lower part of the leg to the inwardly turned ends of the side rods, and means for varying the length of the side rods from the projecting attachment from the thigh member to the inwardly turned ends of the side rods.

4. A leg splint, comprising a rod extending along each side of the leg from adjacent the knee joint to beyond the foot, each rod being inwardly turned beyond the foot and connected to the other, a member adapted to be applied and secured to the inner side or back of the lower part of the thigh adjacent the knee, a member pivotally connected to

one end of this thigh attachment and projecting angularly therefrom on each side of the knee joint, said projecting members being apertured to receive the ends of the side rods, means for varying the angle of the projecting members in relation to the thigh attachment, means for connecting the lower part of the leg to the inwardly turned ends of the side rods, and means for extending the side rods from the connection to the projections from the thigh attachment.

5. A leg splint, comprising a member adapted for attachment to the lower part of the back of the thigh, a member pivotally connected to the end of this thigh attachment, which member extends angularly upward on each side of the knee joint and lengthwise to approximately the length of the leg, a tie rod pin-connected to the other end of the thigh member and pin-connected to the outer end of the angular projection therefrom, side rods extending from the upward projections on each side of the knee joint to beyond the foot where their ends are inwardly turned and connected to one another, an ankle band connected to the inwardly turned ends of the side rods, and means for varying the length of the side rods from the upwardly turned ends of the knee projection to the inwardly turned ends of the side rods.

6. A leg splint, comprising in combination a member adapted for attachment to the thigh adjacent the knee, a light base frame projecting angularly therefrom to approximately the length of the leg and upwardly on each side of the knee, means for varying the angle of projection, a side rod connected to each knee projection, the ends of which rods are secured together beyond the foot, means for securing the foot to the connected ends of the side rods, means for separately adjusting the effective length of each rod, and means for varying the height of the lower end of each side rod in its distance from the base frame.

7. A leg splint, comprising a frame extending along each side of the leg from adjacent the knee joint to adjacent the foot, means for adjustably connecting one end of this frame to the thigh, means for retaining the thigh connection at any desired angle in relation to the portions which extend along the leg, a rod extending along each side of the leg from the end of said frame adjacent the knee to adjacent the foot, means for connecting one end of each rod to the foot, means for independently adjusting the length of each rod, means for supporting the side rods adjacent the foot to the frame, and means for supporting the leg from the side rods.

In testimony whereof I affix my signature.

JAMES R. ATKINSON.