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C. V. FISHER

1,934,346

SPLINT

Filed Aug. 5, 1931

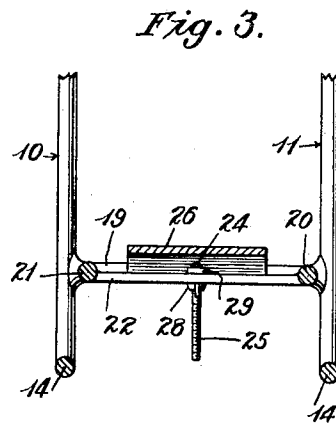
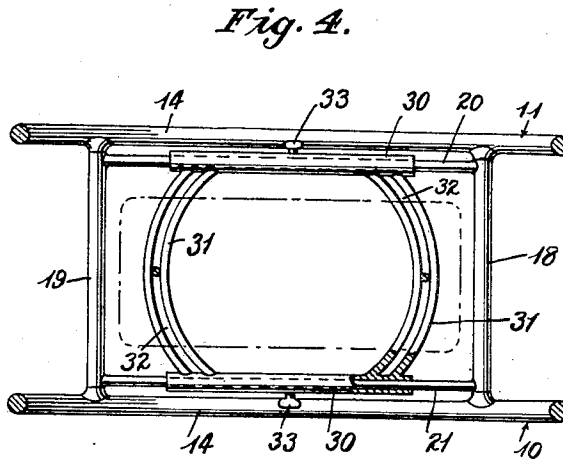
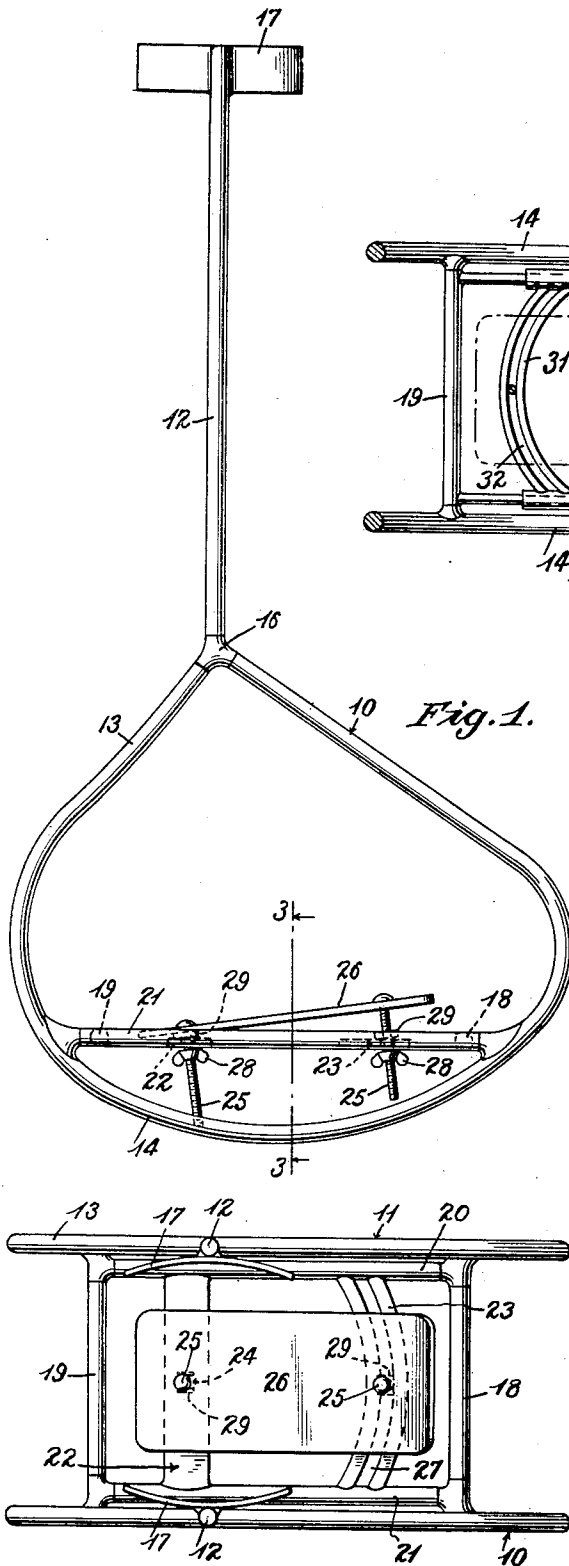
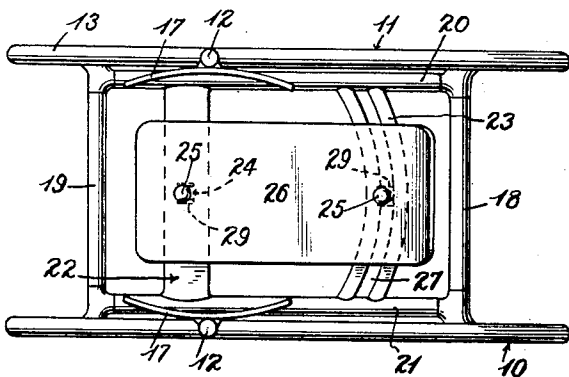


Fig. 2.



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UNITED STATES PATENT OFFICE

1,934,346

SPLINT

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6 Claims. (Cl. 128—85)

My invention relates to splints and particularly to splints for reducing fracture of the lower extremities, and has for one of its objects the provision of a splint which will enable a surgeon to easily extend a fracture of both the tibia and fibula, and which will securely maintain the fragments in extended position.

Another object of the invention is to provide a splint which will allow the surgeon to more completely immobilize the adjacent joint of the fractured limb in plaster of Paris casts.

Another object of the invention is to provide means for dressing the foot in any desired position relative to the portion of the limb above the fracture whereby a more perfect junction of the fragments may be obtained.

A further object of the invention is to provide a splint which will not interfere with the dressing of the wound in the case of a compound fracture and which will allow the surgeon to conveniently inspect the wound and to change the dressing.

A still further object of the invention is to provide a splint which will serve as an excellent ambulatory dressing when the patient is convalescing.

Other objects and advantages will appear in the following description of the preferred embodiment of the invention shown in the attached drawing, of which:

Fig. 1 is a side elevation of the splint;

Fig. 2 is a plan view;

Fig. 3 is a partial section taken on the line 3—3 of Fig. 1; and

Fig. 4 is a horizontal sectional view showing a modification of the device.

Referring more particularly to the drawing, the numerals 10 and 11 designate the two side frame members of the device, each of which is formed of a single piece of round bar stock preferably steel. As shown in Fig. 1, each side member comprises an upper straight portion 12, a second substantially straight portion 13 extending at an angle to the portion 12, a lower curved or rocker portion 14, and a third substantially straight portion which terminates adjacent the junction 16 of the straight portions 12 and 13 and is secured thereto preferably by a welding operation, so as to form an enlarged closed loop. The upper ends of the straight portions 12 are provided with arcuate cross pieces 17 welded thereto, the purpose of which will hereinafter appear.

The two side frame members 10 and 11 are rigidly connected at two opposed points on the

lower curved portions 14 by a front cross member 18 and a rear cross member 19 which are preferably welded to the side frame members. Rods 20 and 21 extend between the cross members 18 and 19 and are connected thereto adjacent the side members 10 preferably by welding. It will be seen that the members 18, 19, 20 and 21, which are also formed of round bar stock, are disposed in a plane substantially perpendicular to the straight portions 12 of the side members 10.

In the modification shown in Figs. 1 to 3 inclusive, a flat cross member 22 is disposed between the rods 20 and 21 parallel to and spaced from the rear cross member 19 and an arcuate cross member 23 is also disposed between said rods, spaced from the front cross member 18. The cross members 22 and 23 are rigidly connected to said rods, preferably by welding.

The cross member 22 is provided with an aperture 24, slightly largely in diameter than a threaded member 25 which is adapted to be received in the aperture. The threaded member is rigidly secured at one end to a plate 26 adjacent one end of the plate and forms a support therefor. Another threaded member 25 is similarly secured to the other end of the plate and is adapted to project through an arcuate slot 27 in the arcuate cross member 23. The threaded members are provided with wing nuts 28 below the respective cross members and lock nuts 29 above said cross members. The aperture 24 and slot 27 are made sufficiently large so that the plate may be tipped at an angle to the plane of the rods 20 and 21 as shown by Fig. 1.

In the modification shown in Fig. 4 tubes 30 surround the rods 20 and 21. Arcuate cross pieces 31 rigidly connect the tubes 30 adjacent their ends and are provided with arcuate slots 32, adapted to receive the threaded members 25 which support a plate 26 exactly similar to the plate and threaded members shown in Figs. 1 to 3 inclusive. The tubes 30 are made shorter than the rods 20 and 21 and are adapted to slide thereon to provide an adjustment longitudinally of the rods. The tubes 30 are provided with set screws 33, threaded into apertures in the walls thereof, intermediate the end of the tubes, and are adapted to engage the rods to hold the tubes and members carried thereby in adjusted position.

The above described splint is adapted to be used in connection with plaster casts for immobilizing the joints adjacent the fracture and is particularly useful in the case of a fracture of both the tibia and fibula. In the case of the fracture

of both of these bones, it is well known that the muscles of the lower limb immediately contract causing an overlapping or overriding of the fragments. In order to properly set or reduce the fracture, it is necessary to extend the limb. It is also well known that the most satisfactory method of effecting the necessary immobilization of the joints adjacent the fracture is to encase them in plaster casts.

In the use of the splint herein described, the angle and foot are first encased in a plaster boot, during which process the plate 26 is embedded therein adjacent the bottom of the foot with the threaded members projecting therefrom substantially perpendicular to the bottom of the foot. The knee is then encased in a cast during which process the arcuate cross pieces 17 at the upper ends of the side frames 10 are embedded in the cast. The cross pieces 17 may be positioned either above or below the knee depending upon the length of splint used, but it is preferred to position them below the knee. It is noted that the surgeon may use his own technique in forming the casts, so long as they are made strong enough to take the stress put upon them by the extension of the limb. Before the cross pieces 17 are positioned in the knee cast, the respective apertures and slots in the plate supporting cross pieces are slipped over the threaded members 25 of the plate. As soon as the casts have hardened, the thumb nuts may be screwed up to extend the limb and reduce the fracture. By drawing the rear threaded member 28 farther down than the front threaded member the foot may be positioned in dorsal flexion if the particular case requires that position to produce a proper registration of the fragments. Conversely by drawing the front threaded member down farther, the foot may be placed in planar flexion.

In the modification shown in Figs. 1, 2 and 3 the plate may be swung about the rear threaded member as a pivot so that the foot may be set in either eversion or inversion. The plate may then be locked in the desired position by means of the locknuts 29. To effect the same result the locknuts 29 may be turned on the threaded members to a predetermined position and the thumb nuts then tightened to lock the plate in the desired position. It will thus be seen that the splint provides means enabling a surgeon to easily effect a proper registration of the fragments in any case.

In the modification shown in Fig. 4 the plate may be swung about the center of curvature of the arcuate slots 32 to set the foot in either eversion or inversion and in addition the entire plate and plate supporting assembly, comprising the arcuate cross pieces 31 and tubes 30, may be moved longitudinally of the rods 20, so that the foot is moved forwardly or rearwardly with respect to the side frames 10 which are held rigidly in position by the knee immobilizing cast, as an aid to properly setting the fragments in certain cases.

Also the splint forms an excellent ambulatory dressing, since the curved or rocker portion 14 is adapted to take the patient's weight when walking or if it is inadvertently placed thereon when using crutches and to transmit the stress to the knee of the patient by means of the side frames 10 and the knee cast so that none of the patient's weight is placed upon the fracture.

While I have shown and described a preferred embodiment of my invention, it is understood that the same is not to be limited to all the details shown but is capable of modification and varia-

tion within the spirit of the invention and the scope of the appended claims.

What I claim is:

1. In a splint for setting fractures of the lower limb, brace members adapted to be positioned at opposite sides of the fractured limb and having rocker portions extending below the foot thereof to form a support whereby the splint forms an ambulatory dressing, said brace members having upper cross members adapted to be embedded in a plaster cast immobilizing the knee, lower cross members rigidly connecting said rocker members below the foot, spaced supporting members rigidly connecting said lower cross members and extending longitudinally of the foot, an elongated plate adapted to be embedded adjacent the bottom of the foot in a plaster boot encasing the foot and ankle, adjustable tension members extending from said plate adjacent the ends thereof and perpendicular thereto, a member connecting said supporting members spaced from one end thereof and having an aperture therein adapted to receive one of said tension members, a member connecting said supporting members adjacent the other end thereof and having an arcuate slot therein adapted to receive the other tension member whereby the plate may be adjusted to set the foot in either inversion or eversion, and means to lock said plate in adjusted position.

2. In a splint for setting fractures of the lower limb, brace members adapted to be positioned at opposite sides of the fractured limb and having rocker portions extending below the foot thereof to form a support whereby the splint forms an ambulatory dressing, said brace members having upper cross members adapted to be embedded in a plaster cast immobilizing the knee, lower cross member rigidly connecting said rocker members below the foot, spaced supporting members rigidly connecting said lower cross members and extending longitudinally of the foot, an elongated plate adapted to be embedded adjacent the bottom of the foot in a plaster boot encasing the foot and ankle, adjustable tension members extending from said plate adjacent the ends thereof and perpendicular thereto, members connecting said supporting members spaced from the ends thereof and having arcuate slots therein to receive said tension members whereby said plate may be adjusted to set the foot in either inversion or eversion, and means on said tension members to extend the limb, said slots being of sufficient width to permit the plate to be tilted whereby the foot may be set in either dorsal or planar flexion, and means to lock the plate in adjusted position.

3. In a splint for setting fractures of the lower limb, brace members adapted to be positioned at opposite sides of the fractured limb and having rocker portions extending below the foot thereof to form a support whereby the splint forms an ambulatory dressing, said brace members having upper cross members adapted to be embedded in a plaster cast immobilizing the knee, lower cross members rigidly connecting said rocker members below the foot, spaced supporting members rigidly connecting said lower cross members and extending longitudinally of the foot, an elongated plate adapted to be embedded adjacent the bottom of the foot in a plaster boot encasing the foot and ankle, adjustable tension members extending from said plate adjacent the ends thereof and perpendicular thereto, members slidable longitudinally of said supporting members, means to lock said slidable members in adjusted position, members rigidly connecting said slidable mem-

bers, and means on said tension members to draw said plate toward the members connecting said slidable members to extend the limb.

4. In a splint for setting fractures of the lower limb, brace members adapted to be positioned on opposite sides of the fractured limb, said brace members having enlarged upper portions adapted to be embedded in a plaster cast encircling the limb, said brace members terminating at their lower ends in enlarged loops adapted to be positioned adjacent the sides of the foot of said limb, said loops having portions adjacent the toe and heel of the foot and rocker portions adapted to extend below the foot to form an ambulatory dressing, means rigidly connecting said loops, a member adapted to be embedded in a cast encasing the foot, and adjustable means associated with said connecting means for forcing said plate downwardly to extend the fracture.
5. In a splint for use in setting fractures of the lower limbs, the combination of a pair of upper members adapted to be embedded in a cast encasing the knee, brace members connected to said upper members and adapted to be positioned adjacent the sides of the lower limb, said brace members terminating at their lower ends in enlarged loops extending forwardly and rearwardly and adapted to be positioned adjacent the sides

of the foot of said lower limb, said loops having portions positioned adjacent the toe and heel of said foot and extending below the foot when said splint is in position, cross members to rigidly connect said loops below the foot, a lower member above the cross members adapted to be encased in a cast encasing said foot and means between said cross members and said lower member for drawing the lower member away from said upper members to reduce the fracture.

6. In a splint for setting fractures of the lower limb, in combination, brace members adapted to have their upper ends attached to said limb adjacent the knee and to be positioned at opposite sides of the fractured limb, said brace members terminating at their lower ends in enlarged loops extending forwardly and rearwardly and having portions adjacent the toe and heel of the foot of said limb when the splint is in position and a curved portion extending below the foot to form a rocker portion for using the splint as an ambulatory dressing, cross members rigidly connecting said loops, an attaching member adapted to be secured to the lower portion of the limb, and adjustable connections between said cross members and said attaching member.

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