July 2, 1935. E. E. LONGFELLOW 2,007,127

SURGICAL REDUCTION AND EXTENSION SPLINT

Filed Oct. 14, 1932 2 Sheets-Sheet 1

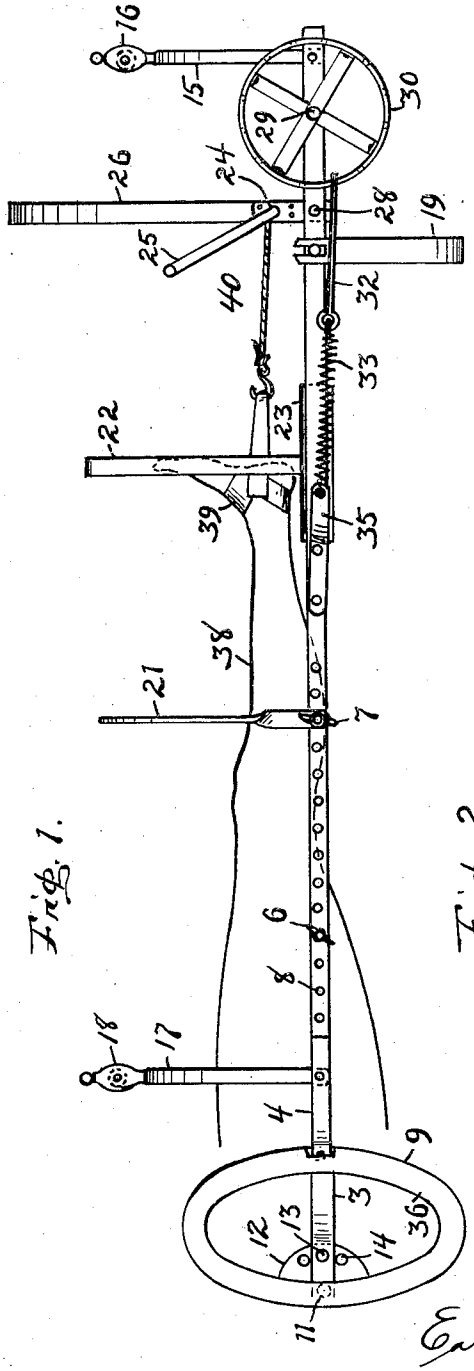

Fig. 1.

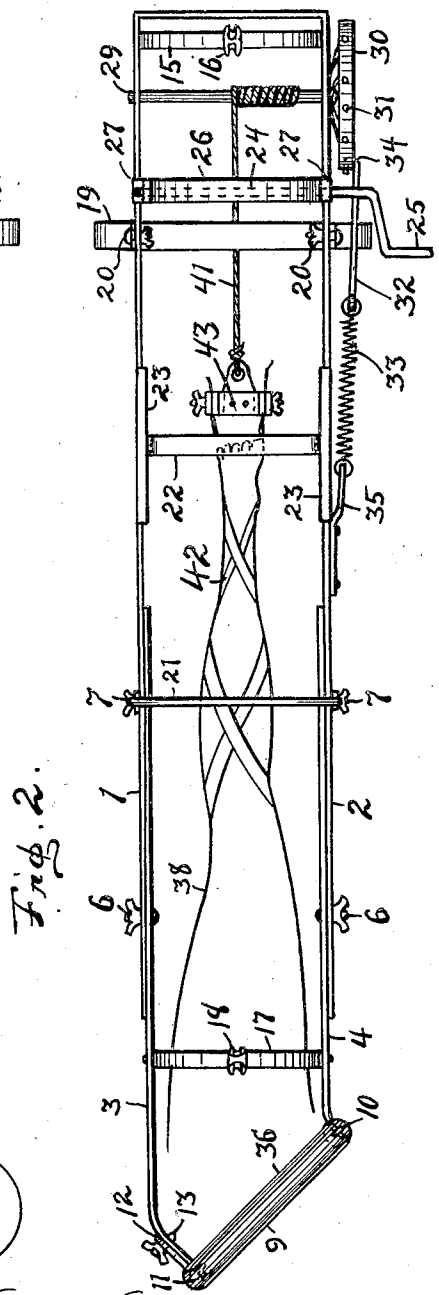

Fig. 2.

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Filed Oct. 14, 1932 2 Sheets-Sheet 2

Fig. 3.

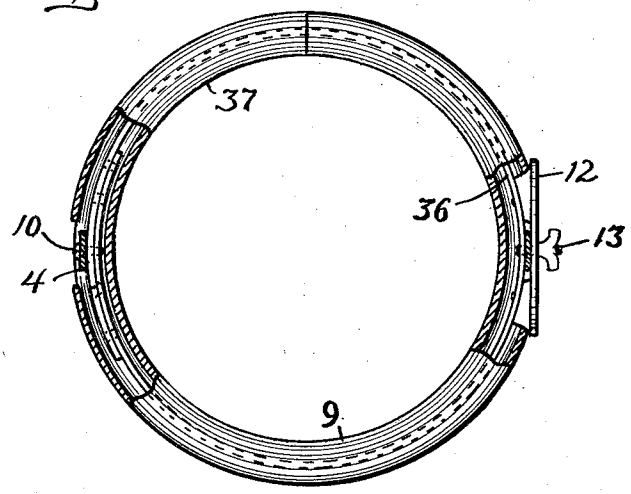


Fig. 4.

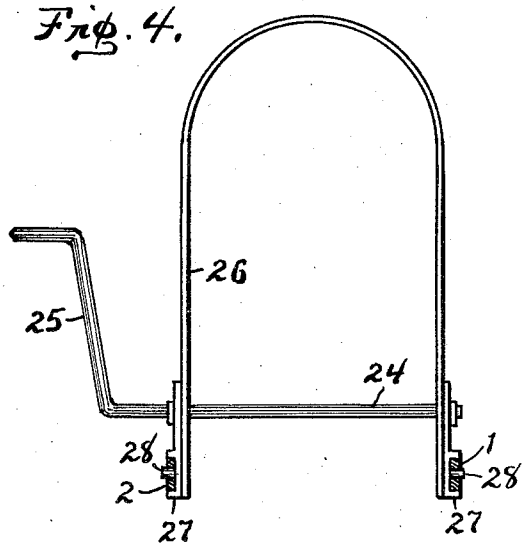
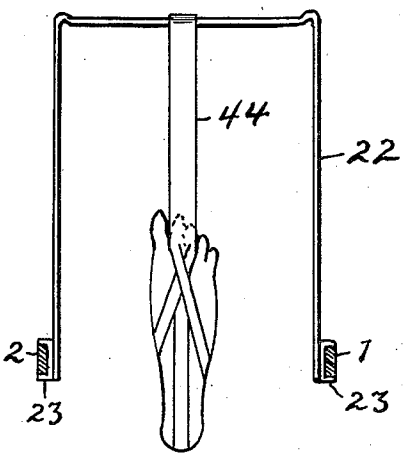


Fig. 5.



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UNITED STATES PATENT OFFICE

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SURGICAL REDUCTION AND EXTENSION SPLINT

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Application October 14, 1932, Serial No. 637,683

7 Claims. (Cl. 128—85)

This invention relates to improvements in surgical reduction and extension splints. One of the objects of the invention is to provide in conjunction with a fracture splint a removable means for reducing a fractured member while positioned in the splint, and also a yielding means for applying tension to the fractured member subsequent to the reduction of the fracture. Other features and advantages of the invention will appear in the following description.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which:—

Fig. 1 is a side elevation of the splint showing the fracture reducing means as applied to the leg of a patient;

Fig. 2 is a plan view of the splint showing the yielding extension means applied;

Fig. 3 is a detail view of an adjustable padded ring that forms the head of the splint, portions being broken away;

Fig. 4 is an elevation of the windlass for the reducing means, the side members of the splint being in transverse section; and

Fig. 5 is a similar view of an adjustable suspensory anchor frame.

The illustrative embodiment of the invention consists of an U-shaped main frame having spaced side members 1 and 2 provided with corresponding adjustable arms 3 and 4. The side members overlap said arms and are secured thereto in adjusted positions by means of bolts 6 and 7, there being made in said side members and arms corresponding series of bolt holes 8 for the reception of said bolts.

The outer ends of the arms 3 and 4 are curved laterally in the same direction and are connected respectively at their extreme outer ends to the corresponding opposite sides of a padded ring 9 by means of pivots 10 and 11. The ring 9 has adjacent its connection with the arm 3 a perforated anchor-plate 12 which is secured to said arm by means of a bolt 13 applied through one of the several openings 14 in said plate. By this means the ring is held selectively in various positions after adjustment thereof by tilting the ring upon the axes of its pivots 10 and 11.

The rear end of the frame has secured thereon a bail 15 provided at its top with a pulley 16, and a similar bail 17 is connected with the arms 3 and 4 and is provided with a pulley 18, so that the frame may be suspended by means of pendent cables (not shown) applied to the pulleys in the usual manner.

A prop 19 is secured pendently and adjustably to the side members 1 and 2 at points suitably spaced from the rear end of the frame and is secured by means of bolts 20 so that the rear end of the frame may be conveniently supported in elevated position upon a bed.

The side members 1 and 2 and the corresponding arms 3 and 4 have secured thereto by means of the bolts 7 an upwardly extending arch 21 which serves the purpose of supporting the covering (not shown) for the patient out of contact with the fractured member. The arch 21 may be adjustably positioned longitudinally on the frame by connecting its bolts 7 selectively through the bolt holes 8, and the frame, if desired, may be flexed vertically by removing the bolts 6 to permit the arms 3 and 4 to adjustably turn upon the bolts 7.

The frame has adjustably mounted thereon an upwardly extending anchor frame consisting of an arch 22 preferably made of spring metal and provided at each of its ends with a horizontally disposed channel bar 23 that embraces the corresponding side member of the frame upon which it has longitudinal sliding movement, whereby the anchor frame may be readily adjusted longitudinally with respect to the frame. The anchor frame is frictionally held in adjusted positions on the frame by outward spring pressure exerted by its arch. When not required for use, the anchor frame may readily be removed by springing the arch inwardly to permit disconnection of the channel bars from the side members.

The fracture reducing means consists of a windlass shaft 24 provided with a crank 25, the shaft being mounted rotatively in a bracket 26 which is detachably mounted on the side members 1 and 2 of the frame. The bracket 26 is in the form of an arch made of spring metal and each end thereof is provided with a slotted lug 27 that embraces the corresponding side member and has a pin 28 that fits in a corresponding opening in the side member whereby the bracket is held from moving longitudinally on the frame. By pressing the sides of the bracket 26 inwardly so as to detach the lugs from the side members the bracket together with the windlass is readily removed.

The yielding extension means consists of a second windlass shaft 29 which is rotatively mounted in the side members 1 and 2 of the frame and is conveniently disposed in the frame at a point located between the rear end of the frame and the bracket 26.

One end of the windlass shaft 29 has secured

thereon a handwheel 30 the rim of which has an annular series of spaced openings 31, and a retractive mechanism is provided for holding the hand-wheel yieldingly in adjusted positions consisting of a rod 32 connected at one end with a tension spring 33 and bent at its opposite end to form a hook 34 adapted to be inserted selectively in the openings 31 in the rim of the hand-wheel. The end of the spring 33 opposite its connection with the hook-rod 32 is secured to a bracket 35 that is mounted on the side member 2 at such point thereon that the spring is stretched when the hook 34 is in operable connection with the rim of the wheel, so that the wheel is thereby yieldingly held from rotation.

Preferably, the ring 9 is made so as to admit of adjustments whereby its diameter is enlarged or decreased to suit the type of patient under treatment. Such ring is formed of a circular spring metal hoop 36, the ends of which are perforated and overlap each other and may conveniently be secured together in adjusted positions by inserting the pivot 10 through the arm 4 and registering perforations in the overlapping ends. The anchor plate 12 is secured to the hoop 36 so as to be supported thereby, and a tubular cushion 37 is arranged so as to substantially encase the hoop.

In using the invention the injured leg 38 is inserted through the ring 9 into position between the side members and arms of the frame. An ankle strap 39 is then applied to the injured member and connected to the windlass shaft 24 by a cable 40 so that by turning the crank 25 the cable is wound upon the windlass shaft and more or less tension is applied to the injured member as required to reduce the fracture. Subsequent to the fracture reducing operation connection is made between the windlass shaft 29 and the injured member by means of a cable 41, bandages 42 and a spreader 43 of any suitable type or by such other expedient as the attending surgeon may elect, so that upon turning of the windlass shaft by manipulation of the hand-wheel 30 the desired amount of traction is applied to the patient's leg. The ankle strap is then removed and the bracket 26 with the windlass 24 is dismounted from the frame.

By connecting the hook rod 32 with the rim of the hand-wheel 30 the windlass shaft 29 is yieldingly restrained from unwinding movement in opposition to the tension of the spring 33.

The foot is suspended from the top of the arch 22 of the anchor frame by applying a suitable bandage 44 or other convenient connection between the foot and arch.

I claim:—

1. A surgical appliance consisting of a splint frame having spaced side members, a windlass and its complemental supporting bracket removably secured on said frame, an extension means consisting of a second windlass mounted in said frame provided with operating means therefor, a retractive mechanism operatively associated with said operating means, and supporting means for said frame.

2. In a fracture splint, a frame, two windlasses mounted in juxtaposition with each other upon said frame, one of which is removable therefrom and the other having a yielding mechanism, means for independently operating and separately connecting said windlasses with an injured member positioned in said frame, and means for supporting said frame.

3. In a fracture splint, a frame, a fracture reducing means consisting of an unyielding windlass provided with a supporting bracket removably mounted on said frame, a traction means consisting of a second windlass mounted in said frame independently operable and arranged in juxtaposition with the first mentioned windlass, said second windlass having an adjustable yielding mechanism, and means for separately connecting said windlasses with an injured member in said frame.

4. In a fracture splint, a frame having a cushioned head member, a fracture reducing means consisting of a windlass and its complemental bracket, said bracket being removably mounted on said frame, means for connecting an injured member positioned in said frame with said windlass, and yielding retractive means in connection with said frame applicable to said injured member and independently operable with respect to said windlass.

5. In a fracture splint, a frame having spaced side members, a windlass having a supporting bracket detachably secured to said members, a second windlass mounted in said frame in juxtaposition with the other windlass and provided with an operating member, and a retractive mechanism in connection with said frame and operatively associated with said operating member.

6. In a fracture splint, a frame, a traction means consisting of a windlass mounted in said frame provided with an operating member, and a retractive mechanism in connection with said frame operably associated with said member.

7. In a fracture splint, a frame having spaced side members, an anchor frame removably positioned upon and having longitudinal adjustment with respect to said members, a traction means in connection with the frame consisting of a windlass and its complemental operating member, a retractive mechanism in connection with said frame operably associated with said operating member, and means separately connecting said anchor frame and said windlass with an injured member positioned in said frame.

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