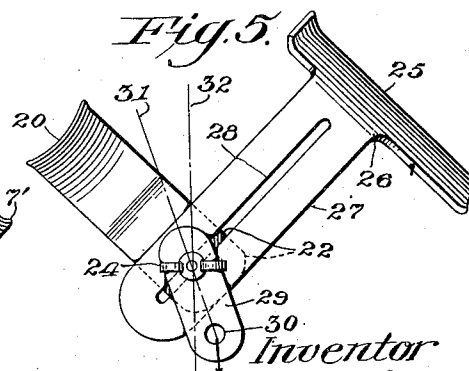
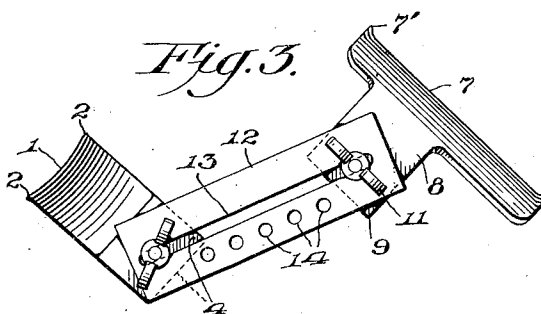
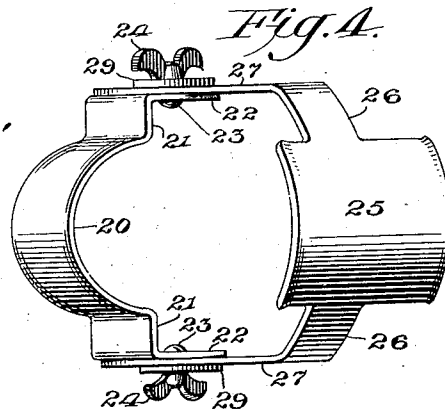
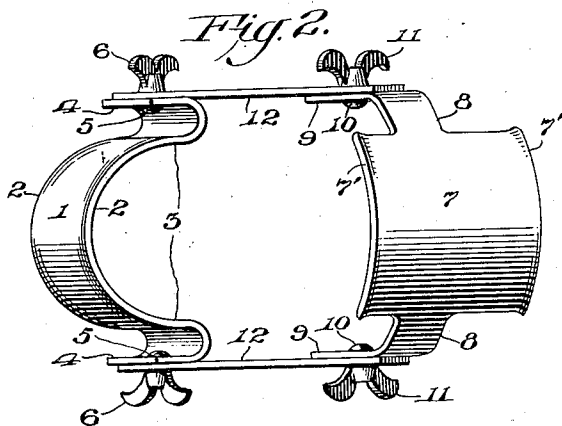
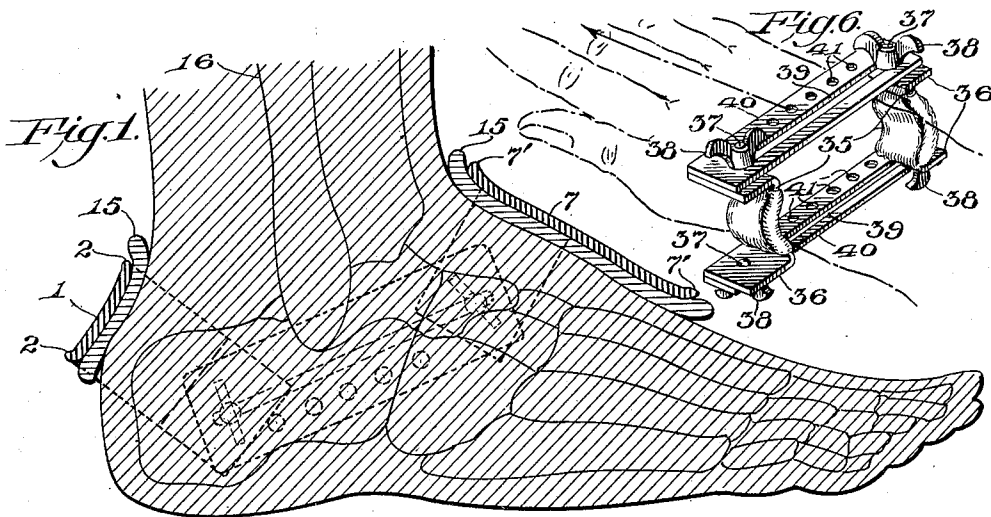


April 12, 1932.

H. C. MASLAND
SURGICAL APPLIANCE
Filed Feb. 1, 1928

1,853,693



Witness:

H. Sample

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SURGICAL APPLIANCE

Application filed February 1, 1928. Serial No. 250,974.

The object of the invention broadly is to provide improvements in surgical appliances, and more particularly in fracture-reducing, limb-tensioning devices.

Another object is to provide a plurality of members shaped so as to approximate the curvature of various portions of the surface of one's hand and foot, such as the back of the heel, the upper surface of the foot forward of the ankle, and the reduced portions of the wrist, together with means for adjustably connecting such members and maintaining them in a fixed predetermined relationship, and with the aid of such last-named means permitting the application of the desired tension to the fractured limb.

A further object is to provide in each such appliance a pair of substantially stirrup-shaped members of the proper curvature throughout their wrist- or foot-engaging portions, the end portions of each of said members being curved so as to extend a generous distance laterally of the wrist or foot, and links or plates extending between and adjustably connecting together the corresponding sides of said members through the medium of suitable fastening means such as thumb screws or bolts and wing-nuts.

Still another object is to provide in such structure plates provided in each case with preferably a single elongated aperture in which the set screws or locking bolts are slidable, in order to adjust the distance between the members to suit ankles, wrists, and the like, of different sizes, while each of said links or plates is furthermore provided with longitudinally spaced apertures adapted to receive any suitable form of tensioning means or mechanism, for the purpose of maintaining a predetermined length of the fractured bone while knitting.

A still further object is to provide in a modified form of the device the combination of a pair of members, designed to engage the ankle, wrists, or other part of the body, at least one of said members being provided with preferably integral parallel extensions having elongated slots, while the other of said members is provided with set screws or locking bolts extending through said slots, to

permit angular adjustment, and slidable in said slots to permit alteration in the distance between, said members.

And a still further object is to combine in combination with the form of the device last described a pair of arms, normally fixed by the securing means as to their angular relation to said members, and provided with an aperture, shoulder, or other suitable means, for connecting thereto a suitable form of tensioning device, said tensioning device, when said arms are adjusted to extend angularly with respect to the axis of the leg or arm to which the device is attached, operating to impart a turning moment to the device primarily, and thereby to the ankle, wrist, or the like, during the knitting of the particular bone.

With these and other objects in mind, the present invention comprises further details of construction and operation which are fully brought out in the following description when read in conjunction with the accompanying drawings, in which Fig. 1 is a vertical longitudinal section through a human foot and ankle to which has been operatively attached one embodiment of the invention; Fig. 2 is a top plan view of the device as illustrated in Fig. 1; Fig. 3 is a side elevation of the same; Fig. 4 is a top plan view of a modified form of the device in the general position illustrated by Fig. 2; Fig. 5 is a side elevation of the modification of Fig. 4; and Fig. 6 is a perspective view of a still further modification of the device particularly designed for use in conjunction with the wrist or hand of a patient when reducing the fracture of one's arm.

Referring to Figs. 1, 2 and 3, preferably two members are provided for directly engaging the foot. A stirrup-shaped member 1 is substantially U-shape and has its laterally opposite edges 2 curved outwardly, while its opposite sides 3 are approximately parallel and respectively terminate in laterally outwardly and reversely curved portions 4, to which are connected locking bolts 5, upon the oppositely extending free ends of which latter are adjustably positioned suitable wing-nuts or the like 6.

A second stirrup-shaped member is provided, the same comprising a central longitudinally elongated curved portion 7, having curved edge portions 7', and from which integral arms 8 extend in laterally opposite directions and terminate in substantially parallel portions 9, to which other locking bolts 10 are connected, said bolts being provided upon their oppositely extending free end portions with wing-nuts 11 or other suitable means for tensioning the same.

A pair of normally parallel links or plates 12 are provided, each comprising a longitudinally extending aperture 13, through which the central portions of the respective bolts 5 and 10 pass and in which said bolts are adapted to slide longitudinally for the purpose of permitting wide angular and other adjustments between the respective stirrup-shaped members 1 and 7. Each of said plates is further provided with longitudinal spaced apertures 14 laterally disposed upon one side of the corresponding longitudinal apertures 13, said spaced apertures being adapted to receive cord, wire, or in fact any other suitable means or connecting elements extending from suitable tensioning devices or apparatus.

In the operation of this device, the stirrup members 1 and 7 are placed upon the respective rear and upper front portions of a foot as shown in Fig. 1, but separated therefrom by suitable padding 15 to prevent injury to the skin or flesh of the foot or ankle. After said members are positioned so as to bear properly against the foot, and after their angular relationship with each other has been determined, the wing-nuts 6 and 11 are tightened so as to maintain the stirrups 1 and 7 and oppositely positioned plates 12 in fixed relative positions.

If it is desired to place a tension upon the leg in alignment with the bone 16, such tensioning device or mechanism is connected with the respective plates 12 through that one of the apertures 14 which is in alignment with the bone 16. However, if for instance a turning moment were to be placed upon the leg and particularly upon the bone 16 through the medium of the foot and ankle, the tension device or mechanism is connected with the respective plates through the medium of the apertures 14, either to the front or rear of said first-mentioned aperture, as the case may be.

Referring now to Figs. 4 and 5, a form of the device is here shown as comprising what might be called a heel stirrup, having a central curved portion 20 terminating laterally in oppositely directed sections 21, which in turn merge into parallel sections 22, to which are connected bolts 23 carrying wing-nuts or the like 24. A second member which might be referred to as a foot stirrup comprises a

central portion 25, from which arms 26 project in opposite directions and merge into elongated parallel sections 27, each of which is provided with an elongated aperture 28 through which extend the central portions of the bolts 23.

In the operation of this form of the device, the stirrup members 20 and 25 are positioned upon the rear of the heel and the upper portion of the foot in front of the rise of the leg as shown in Fig. 1, but the angular adjustment and longitudinal distance between the stirrup sections 20 and 25 are obtained by the adjustment given to the bolts 23 in the slots 28. When the proper adjustment has been obtained, the wing-nuts 24 are tightened, at the same time tightening against the outer surface of the members 27 the angularly disposed arms 29 which extend freely from the device and in their free end portions are provided with suitable apertures 30 or other means for connecting a tensioning device or mechanism thereto.

In the use of this form of the device, when necessary to impart a turning moment to the fractured bone, the longitudinal axis 31 of the arm 29 is adjusted angularly with respect to the axis 32 of the leg in which the fractured bone is located, with the result that a tension applied in the direction of the arrow obviously will impart a turning moment to the device as a unit since its parts are fixed with respect to each other upon tightening the wing-nuts 24.

Referring finally to Fig. 6, there is shown a form of the device which has been designed especially with regard to fractures of the arm, and comprises a pair of preferably similar members, each of which has a central outwardly curved portion 35 which may be padded to protect the wrist of the wearer, said central portions terminating in opposite directions in parallel extensions 36, to which are connected bolts 37 carrying wing-nuts or the like 38. Said bolts pass through elongated apertures 39 in parallel links or plates 40, said plates also being provided with longitudinally spaced apertures 41, disposed laterally with respect to the elongated apertures 39, each of said members being designed for and operated in the same general manner as the members 1 and 7 in Fig. 2 and the members 20 and 25 in Fig. 4, and the desired angular relation and distance between the members 35 being maintained by tightening the wing-nuts 38 after the bolts 37 have been properly adjusted in the respective elongated apertures 39. Additionally, then, the proper tension can be applied to the device by connecting the particular tensioning means therewith through the proper apertures 41 to impart such tension in a direction either in line with the longitudinal axis of the arm, or with a turning moment applied thereto.

Having thus described my invention, what

I claim and desire to protect by Letters Patent of the United States is:—

1. A clamp adapted for use as a part of fracture-reducing, limb-tensioning surgical apparatus, and comprising a pair of rigid stirrup-like members, means adapted to adjustably connect said members in predetermined fixed shape, separation and angular relation in their common plane of relative transverse movement, and means to place an extraneous tension upon said clamp as a unit.

2. A clamp adapted for use as a part of fracture-reducing, limb-tensioning surgical apparatus, and comprising a pair of stirrup-like members, a pair of links loosely and adjustably connecting corresponding portions of said members together in any angular or distant interrelation, and means to normally maintain said links and members in a fixed relative angular position after adjustment.

3. A clamp adapted for use as a part of fracture-reducing, limb-tensioning surgical apparatus, and comprising a pair of stirrup-like members, a pair of links having elongated slots, and locking means carried by the respective members and slidable in said slots to adjust and normally maintain the proper distance between and angular relation of said members, and each of said links having longitudinally spaced apertures adapted to selectively receive tensioning means to vary the resultant effective force applied to that part of the body to which the device is attached.

4. A retention or holding grip or splint device for the treatment of bone injuries, comprising a pair of rigid stirrup-shaped members, and separate connecting members adjustably and rigidly attachable to said stirrup-shaped members, said stirrup-shaped members being adjustable to any angle toward or away from each other and being rigidly attachable in such preadjusted angular relation to the said separate connecting members.

5. A retention or holding grip or splint device for the treatment of bone injuries, comprising a pair of rigid stirrup-shaped members, and separate connecting members adjustably and rigidly attachable to said stirrup-shaped members, said stirrup-shaped members being adjustable to any angle toward or away from each other and being rigidly attachable in such preadjusted angular relation to the said separate connecting members, and said grip providing means to apply traction either vertically or at varying angles to the said connecting members.

6. A retention or holding grip or splint device for the treatment of bone injuries, comprising a pair of rigid stirrup-shaped members, and separate connecting members adjustably and rigidly attachable to said stirrup-shaped members, said stirrup-shaped

members being adjustable to any angle toward or away from each other and being rigidly attachable in such preadjusted angular relation to the said separate connecting members, and said grip providing means to apply traction either vertically or at varying angles to the said connecting members, said stirrup-shaped members being adjustable and rigidly fixed to said connecting members in variable spaced relation with each other.

In testimony whereof I have affixed my signature.

HARVEY C. MASLAND.

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