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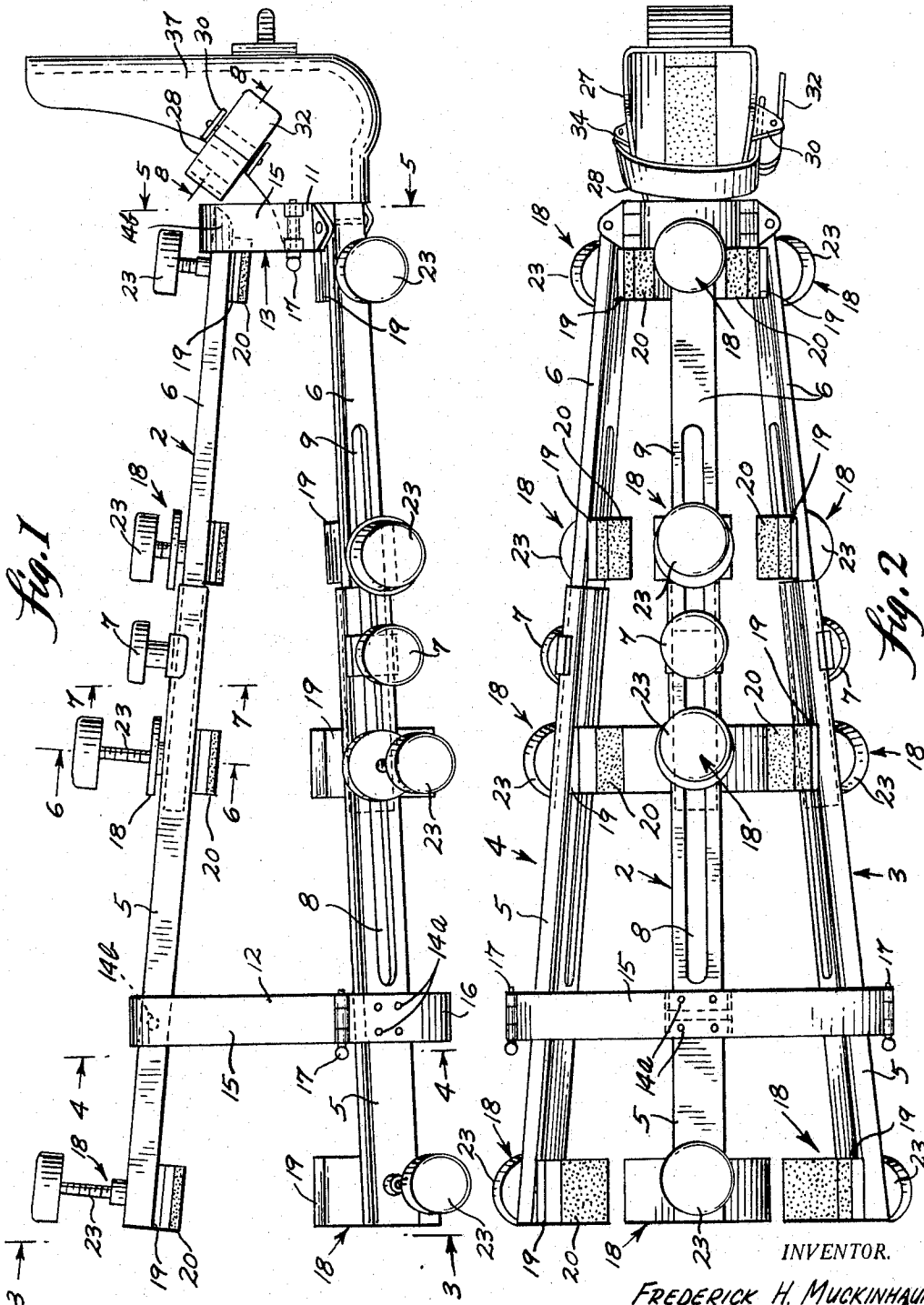
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FRACTURE SETTING DEVICE

Filed Oct. 18, 1965

2 Sheets-Sheet 1



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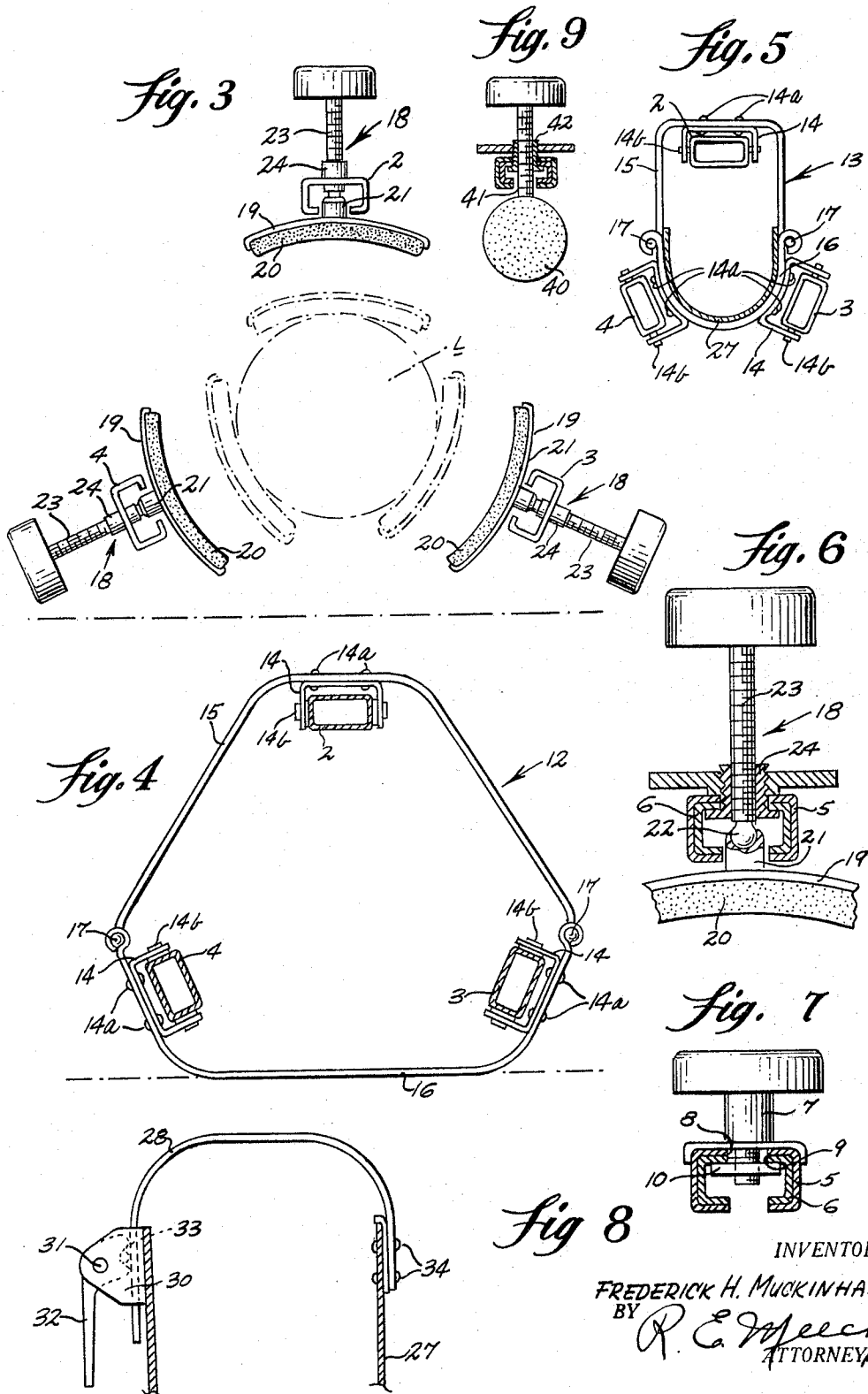
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3,299,888
FRACTURE SETTING DEVICE
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This application is a continuation-in-part of my application bearing Serial Number 219,646, filed August 27, 1962, now abandoned.

This invention relates to a fracture setting device, and more particularly, to an improved adjustable surgical splint or bone setting device especially adaptable for use in the treatment of fractures of the leg and thigh.

It is the general object of the present invention to provide a splint device especially adapted for use upon the lower limbs but which may also be employed in treating fractures with slight modifications of the upper limbs, and which is so constructed that it may easily and readily be applied to the patient, and when in use will permit easy inspection at any time of a wound or laceration of the limb without disturbing the union of the fractured parts or interfere in any way with the healing operation.

It is another object of the invention to provide an improved splint device which can be quickly applied with precision and adjusted in a manner to secure perfect extension and fixation without pressure in the process on any part of the limb.

It is a further object of this invention to provide a device of this character which is susceptible of innumerable adjustments so as to function as a splint or a bone setting medium and which is conveniently adaptable for first-aid use, emergency and ambulance work or field service which will avoid shortening of the limb or limbs and other damage thereto.

It is still another object of the present invention to provide an improved splint device which is relatively simple in its construction when compared with other such suggested devices, thoroughly reliable and efficient in its operation and use, readily and easily adjusted for setting of bone fractures, capable of application and removal with dispatch and relatively inexpensive in its construction.

Various other objects and advantages of this invention will be more apparent in the course of the following specification, and will be particularly pointed out in the appended claims.

In the accompanying drawings, there is shown for the purpose of illustration, an embodiment which my invention may assume in practice.

In these drawings:

FIG. 1 is a side elevational view of the improved device in accordance with my invention,

FIG. 2 is a plan view thereof,

FIG. 3 is a sectional view taken on line 3—3 of FIG. 1,

FIG. 4 is a sectional view taken on line 4—4 of FIG. 1,

FIG. 5 is a sectional view taken on line 5—5 of FIG. 1,

FIG. 6 is a sectional view taken on line 6—6 of FIG. 1,

FIG. 7 is a sectional view taken on line 7—7 of FIG. 1,

FIG. 8 is a sectional view taken on line 8—8 of FIG. 1,

and

FIG. 9 is a modified form of a leg clamping member adapted for use in connection with the fracture setting device of the present invention.

Referring more particularly to the drawings, the improved device in accordance with the present invention consists of a plurality of elongated spaced-apart rigid members 2, 3 and 4 (three as illustrated herein) arranged in substantially a circular configuration. Each of these rigid members consists of two tubular members

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5 and 6 preferably substantially rectangular-shaped in cross section with one telescopically arranged within the other so that the length of each may be adjusted according to the length of the leg of the patient and the location of the fracture or fractures as the case may be.

There is arranged with each of the rigid members 2, 3 and 4, an outwardly extending adjustable screw 7 disposed in slots 8 and 9 in the tubular members 5 and 6, respectively, having a nut 10 arranged on threaded portion thereof positioned within the tubular members which functions to clamp securely together the two tubular members of the respective rigid members in their adjusted positions, as more clearly shown in FIGS. 1 and 7 of the drawings.

As more clearly shown in FIGS. 1, 2, 4 and 5, there is provided a pair of spaced-apart strap-like annular members 12 and 13 with one arranged adjacent each end of the rigid members 2, 3 and 4. On each of these annular members, there is arranged a plurality of substantially U-shaped bracket members 14 which are secured thereto by means of rivets or screws 14a for holding the rigid members in spaced relation. Each of these annular members consists preferably of two parts 15 and 16 hingedly and releasably secured together by means of pins 17 at each side thereof. With each of these bracket members, there is arranged a transverse pin or shaft 14b which extends into the side walls of the respective rigid members 2, 3 and 4 positioned therein whereby the rigid members are hingedly attached to the respective annular members.

With each of the rigid members 2, 3 and 4, there is arranged a plurality of spaced-apart clamping members 18 which are adjustable relative to the rigid members and the leg of the patient and for the purpose of positioning and holding the leg securely between the rigid members. Each of these clamping members 18 consists preferably of an arcuate plate-like member 19 arranged on the inner side of the rigid members preferably having a sponge-like lining 20 which is adapted to contact the skin of the patient's leg, as more clearly shown in FIG. 3 of the drawings. As more clearly shown in FIGS. 1, 3 and 6, on the outer side of each of these plate-like members 19 there is secured thereto a socket member 21 in which there is movably disposed a ball or peen 22 arranged on the inner end of an adjustable hand screw 23 so as to provide a universal connection therebetween. There is arranged on the inner end of each of these screws 23 in the wall of the rigid members, a flanged threaded bushing 24 for holding securely the respective clamping members in their adjusted positions.

At the outer end of the rigid members 2, 3 and 4, there is arranged a hollow foot receiving member 27 substantially in the shape of a foot and in which the foot of the patient is adapted to be positioned so as to substantially envelop the same. This member 27 extends into and is suitably attached, preferably by means of welding, to the strap-like annular member 13, as more clearly shown in FIGS. 1 and 5 of the drawings.

As more clearly shown in FIGS. 1, 2 and 8, there is arranged with this foot receiving member 27, an adjustable strap-like or band member 28 the free end of which extends through a substantially U-shaped bracket member 30 secured to the side of this member 27 as at 34. There is pivotally arranged as at 31 with this bracket 30, a lever-like member 32 having an inner ribbed locking portion 33 which cooperates with the free end portion of the strap-like member 28 so as to adjust selectively this strap-like member relative to the foot or arch of the patient.

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It will be understood that the rigid members 2, 3 and 4 may be made of any suitable material preferably extruded aluminum or any other light weight metallic material so that the device will not be too heavy to handle and to position and manipulate on the leg of the patient and so that it will not be too uncomfortable to the patient.

While the device of my invention, as illustrated, is primarily applicable to all cases of fractures and luxations of the leg, it will be understood that it may be slightly revised for use on the arm by deleting the foot receiving member and substituting therefor a suitable members to receive the hand of the patient.

Having described the construction of my improved device it is used in the following manner. It will be assumed that the pins 17 have been removed from the annular members 12 and 13 so as to permit separation one from the other of the two parts 15 and 16 thereof and to permit removal of the upper rigid member 2. The patient's leg or arm L, as the case may be, is positioned in the device so that the foot of the patient is disposed in the foot receiving member 27 and the leg lies on sponge-like pads or members 20 of the clamping members 18 of the lower rigid members 3 and 4, as shown in FIGS. 1 and 3 of the drawings.

After the leg of the patient has been comfortably placed and supported therein, the strap-like member 28 is positioned over the arch of the patient's foot and the foot locked therein by means of the locking lever 32. The length of each of the rigid members 2, 3 and 4 is then adjusted to the desired length in respect to the condition of the patient and the location of the dislocation or fracture, by moving the members 5 and 6 telescopically relative to one another and locking them in their adjusted positions by means of the screws 7. The upper rigid member 2 is then positioned on the upper side of the leg with the sponge-like pads or members 20 in contact with the leg of the patient. The two parts 15 and 16 of the annular members 12 and 13 are then joined together by replacing the pins 17. All of the clamping members 18 are then adjusted by means of the respective hand screws 23 with respect to the leg or arm of the patient. This completes the assembly of the device on the patient and naturally the various parts may be adjusted from time to time in accordance with the treatment desired.

In FIG. 9 there is shown a modified form of clamping member 18 as more clearly shown in FIG. 6. While a plurality of clamping members are employed, as shown in FIG. 3, merely one will be shown and described. This modified form consists of a spherical member 40 arranged on the inner side of the rigid member which is adapted to contact directly the skin of the leg of the patient. This spherical member is suitably arranged on the end of a head screw 41 which extends through a threaded bushing 42 arranged in the rigid member.

As a result of my invention it will be seen that there is provided a splint device or leg brace which can be conveniently and quickly adjusted to fit the limb of the patient and in using this device it is possible to move the patient without discomfort and without the danger of causing any displacement of the fracture reduction. Such a device, if desired, may be varied somewhat in size but it is intended that the adjustability of the leg mechanism and parts associated therewith be such that one size will be applicable to various sized limbs.

It will also be seen that due to the telescopic arrangement of the rigid tubular members 5, the device may be folded into a relatively compact unit so that it can be stored or packed in a small space and can be easily carried from one place to another and, at the same time, may be easily and quickly adjusted ready for use.

While I have shown and described an embodiment which my invention may assume in practice, it will be understood that this embodiment is merely for the purpose of illustration and description, and that other forms

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may be devised within the scope of my invention as defined in the appended claims.

What I claim as my invention is:

1. A device of the class described comprising:

a plurality of elongated spaced-apart rigid members, each of said rigid members consisting of at least two tubular members telescopically interengaged relative to one another so that the length thereof may be adjusted,

adjustable screw means carried by the opposed interengaged ends of said tubular members for holding the same in their adjusted position,

an annular member consisting of at least two parts arranged at least adjacent each end of said rigid members which is adapted to encircle the limb of a patient and to which said rigid members are attached for holding the same in spaced-apart relation, means releasably attaching said two parts one to the other so that the tubular members may be moved relative to one another whereby the device may assume an open position,

means carried by each of said annular members to which each of the respective rigid members is hingedly attached,

a substantially foot-shaped housing member attached to the end of at least one of said rigid members which is adapted to receive the foot of a patient, an adjustable strap-like member carried by said last member for holding the foot in position therein, and a plurality of spaced-apart adjustable leg clamping members carried by each of said rigid members on the inner side thereof.

2. A device as defined in claim 1, wherein each of the clamping members includes a spherical member arranged on inner end of the hand screw.

3. A device of the class described comprising:

a plurality of elongated spaced-apart rigid members, each of said rigid members consisting of at least two tubular members substantially rectangular-shaped in cross section telescopically interengaged relative to one another so that the length thereof may be adjusted,

adjustable screw means carried by the opposed interengaged ends of said tubular members for holding the same in their adjusted position,

an annular member arranged at least adjacent each end of said rigid members which is adapted to encircle the limb of the patient and to which said rigid members are attached for holding the same in spaced-apart relation,

each of said annular members consisting of at least two parts having means arranged therewith for attaching one to the other,

a substantially foot-shaped housing member attached to one end of at least one of said rigid members in which the foot of the patient is adapted to be positioned,

an adjustable strap-like member carried by said last member for holding the foot in position therein,

a plurality of spaced-apart adjustable leg clamping members carried by each of said rigid members on the inner side thereof,

a socket member arranged on the outer side of each of said clamping members,

an outwardly extending adjustable hand screw arranged in each of a plurality of threaded members carried by said rigid members, and

a peen arranged on the inner end of each of said screws which is movably disposed in the respective members so as to provide a universal connection therebetween.

4. A device as defined in claim 3, wherein each of the clamping members includes a spherical member arranged on inner end of the hand screw.

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5. A device of the class described comprising:
- a plurality of elongated spaced-apart rigid members, each of said rigid members consisting of at least two tubular members substantially rectangular-shaped in cross section telescopically interengaged relative to one another so that the length thereof may be adjusted, 5
 - adjustable screw means carried by the opposed interengaged ends of said tubular members for holding the same in their adjusted positions, 10
 - an annular member arranged at least adjacent each end of said rigid members which is adapted to encircle the limb of the patient and to which said rigid members are attached for holding the same in spaced-apart relation, 15
 - each of said annular members consisting of at least two parts having means arranged therewith for releasably attaching one to the other,
 - a substantially foot-shaped housing member attached to one end of at least one of said rigid members in which the foot of the patient is adapted to be positioned, 20
 - an adjustable strap-like member carried by said last member for holding the foot in position therein,
 - a plurality of spaced-apart adjustable leg clamping members carried by each of said rigid members on the inner side thereof, 25
 - each of said clamping members consisting of an arcuate plate-like member having a sponge-like lining arranged on the inner side thereof, 30
 - a socket member arranged on the outer side of said plate-like member centrally thereof,
 - an outwardly extending adjustable hand screw arranged in threaded means carried by said rigid members,
 - a peen arranged on the inner end of said screw which is movably disposed in said socket member so as to provide a universal connection therebetween, and 35
 - a lock nut arranged with said screw for locking the clamping member in its adjusted position.
6. A device as defined in claim 5, including a plurality of spaced-apart bracket members carried by each of said annular members to which each of the respective rigid members are hingedly attached. 40
7. A device of the class described comprising:
- a plurality of elongated spaced-apart rigid members, each of said rigid members consisting of at least two tubular members telescopically interengaged 45

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- relative to one another so that the length thereof may be adjusted,
- adjustable screw means carried by the opposed interengaged ends of said tubular members for holding the same in their adjusted position,
- an annular member consisting of at least two parts arranged at least adjacent each end of said rigid members which is adapted to encircle the limb of a patient and to which said rigid members are attached for holding the same in spaced-apart relation,
- means releasably attaching said two parts one to the other so that the tubular members may be moved relative to one another whereby the device may assume an open position,
- means carried by each of said annular members to which each of the respective rigid members is hingedly attached,
- a substantially foot-shaped housing member attached to the end of at least one of said rigid members which is adapted to receive the foot of a patient,
- an adjustable strap-like member carried by said last member for holding the foot in position therein, and
- a plurality of spaced-apart adjustable leg clamping members carried by each of said rigid members on the inner side thereof,
- each of said clamping members consisting of an arcuate plate-like member having a sponge-like lining arranged on the inner side thereof.

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