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G. C. MARTIN

1,982,140

ORTHOPEDIC OR SURGICAL DEVICE

Filed Jan. 19, 1931

Fig. 1

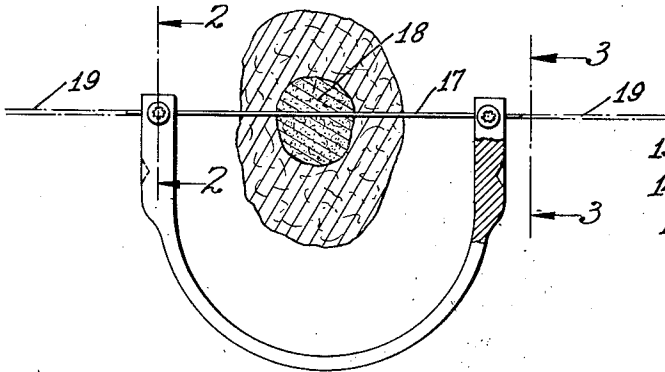


Fig. 2

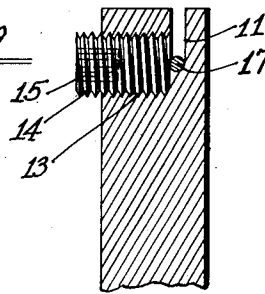


Fig. 4

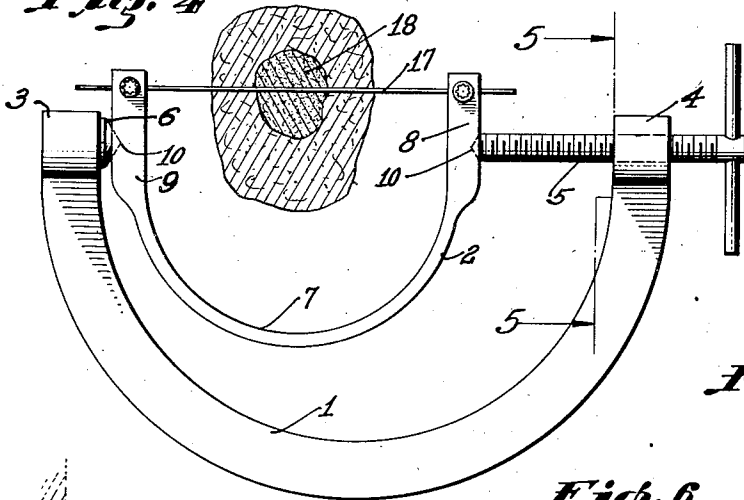


Fig. 3

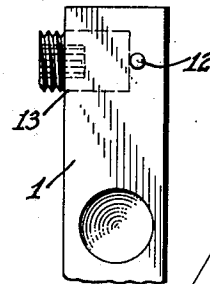


Fig. 5

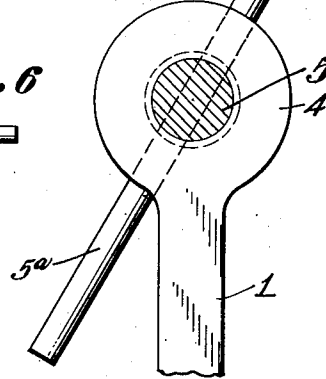


Fig. 6

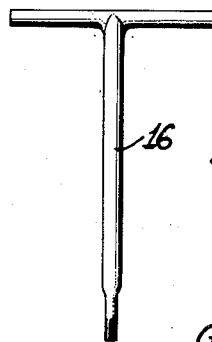
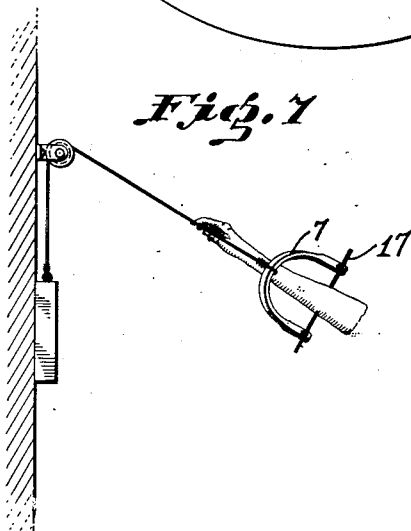


Fig. 7



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UNITED STATES PATENT OFFICE

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ORTHOPEDIC OR SURGICAL DEVICE

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4 Claims. (Cl. 128—84)

This invention relates to orthopedic or surgical devices.

The invention has for an object the provision of novel means whereby fractured bones may be reset. At the present time, it is customary to reset an over-riding fracture by taping the skin in such a manner as to allow a firm grip to be secured on the skin. The tape as a rule is run over a stick or through a loop on some sort of traction mechanism and the over-riding fracture of the bone pulled into place by pulling on the adhesive tape. Thus, in adjusting an over-riding fracture or for that matter a spiral fracture, the pull is first made on the skin, then from the skin through the flesh comprising muscles, blood vessels, tendons, nerves, etc., which in turn are attached in part at least to the bone, with the result that a strain occurs in every part of the body near the zone of the fracture, and this strain is sometimes very considerable before the actual fractured bone is pulled upon at all. Thus, after a bone has been set in accordance with this method, the muscles which have been severely strained must perform the further function of holding the bone during a healing operation. This imposes such a vast amount of work upon the muscles as to require a considerable period for the fracture to heal.

The present invention has for an object the provision of means as well as therapy whereby a bone may be quickly set with minimum of effort on the part of the surgeon and without relying upon the muscles to hold the bone after setting.

The invention likewise contemplates among its objects a therapy whereby the blood vessels, nerves, tendons, and the like, are not subjected to strain, no particular discomfiture to the patient, and barring complications a rapid recovery may be expected.

Other objects of the invention will appear as the specification proceeds, including a device which is simple in operation, cheaply manufactured and will afford superior results.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, construction, association, and relative arrangement of parts, members and features, as well as a method of use, all as shown in a certain embodiment in the accompanying drawing, described generally, and more particularly pointed out in the claims.

In the drawing:

Figure 1 is an elevation, partly in section, of a portion of the invention shown in conjunction with a wire which has been passed through a bone,

Figure 2 is a sectional view on the line 2—2 of Figure 1,

Figure 3 is a detail looking in the direction of the arrows 3—3 of Figure 1,

Figure 4 is an elevation, partly in section, illustrating the invention,

Figure 5 is a view on the line 5—5 of Figure 4,

Figure 6 is an element which may be used in practicing the invention, and,

Figure 7 illustrates a method of use of the invention.

Referring to the drawing, I shall first describe the invention in one of its simplest embodiments. Figure 4 illustrates the invention and the same in the embodiment shown includes a compressor 1 and a harp 2. The compressor is formed of relatively stiff material, that is to say, rigid and not subject to bending, and this material is semi-circular or U-shaped in form. Both ends of the said member are enlarged as shown at 3 and 4, 4 being transversely bored and tapped to receive a compressor screw 5 provided with a handle 5^a, while the opposite enlargement 3 carries an inwardly projecting tapered pin 6.

The harp 2 may be semi-circular in form, an intermediate body portion 7 of which is relatively thin in comparison with enlarged end or leg portions 8 and 9. The enlarged portions 8 and 9 are both provided with socket portions 10. The enlarged portion 9 is formed with a transverse slot 11, while the opposite enlarged portion 8 is formed with a transverse bore 12. Both enlargements are transversely bored and screwthreaded as shown at 13, and screw members 14 are received within said tapped bores, as illustrated in Figures 2 and 3. These screw-members are centrally bored and fluted, as shown at 15, so that the end of a wrench 16 may be fitted therein to turn the said screws.

The operation, uses and advantages of the invention are as follows:

As stated, this is a therapeutic device, and is useful in resetting of bones after a bone has been fractured. As stated in my Patent No. 1,911,764, issued May 30, 1933, for Orthopedic devices, I use a wire drill of considerable length and which drill is passed completely through the flesh and the bone. This drill is illustrated in Figures 1 and 4 at 17, and the bone through which the same has been passed at 18. After the drill has been passed through the bone and the flesh, with the same projecting outwardly as, for instance indicated by the dotted lines in Figure 1 at 19, the harp is brought into position by passing one end of said drill through the opening 12 of said harp whereupon an opposite por-

tion of the drill is dropped within the transverse slot 11. The screws have not been tightened and the said harp is now placed within the confines of the compressor 1, the tapered pin 6 being received within the socket 10 of the part 9 and the compressor screw 5 received within the socket 10 of the part 8. The compressor screw is then turned so as to compress the harp, the harp being yieldable for this purpose, being spring steel. The said screws are then tightened against the drill through the medium of the wrench 16, and the compressor screw is then released from the harp so that the compressor may be entirely removed. This will leave the drill 17 under tension. Practically any degree of tension desired within a given range may be obtained by the manner just stated. It has been found in practice that about 200 pounds pull on the wire will hold the wire stiff and unbendable under a 50 pound pull applied to the center of the wire. The harp is now ready for use to correct either a spiral or over-riding fracture. Obviously, in a spiral fracture, the surgeon would turn the harp which would as a consequence turn the bone. In the case of an overriding fracture, a direct pull in the proper direction will move the bone.

If we assume that a bone of the arm has been fractured, after the bone has been set, the arm may be placed within a cast, and after a few days the wire drill may be removed by simply pulling upon one end of the same. It is elementary that the flesh will not tend to adhere to the drill and the bone surrounding the drill tends to slough away so that the drill is easily removed.

In Figure 7, I have illustrated the harp with a weight pulling upon the same. Thus, instead of relying upon the muscles to hold the bone together after a fracture has been adjusted, I may rely upon the weight to hold the bone in position. This weight may be left in position for several days. The mechanical application of force to the bone itself, of course, gives a much better control over the bone either in the adjusting of the fracture or in holding the bone in a given position after adjustment than the taped method.

In the first part of the specification, I described the general method now used for adjusting fractures, to-wit: taping the skin. It will be seen that the present method is far simpler and more positive because by drilling through the bone with the wire and pulling directly on the wire itself, the necessary pull to adjust a given fracture is about or less than one-third of the pull required when the pull is through the skin and the flesh. The final result of this is that after the fracture has been adjusted and held, the flesh, vessels, nerves, etc., are not left in a strained condition. Of course, the fracture can be adjusted more quickly and exactly by the method described than through the taped skin method.

In the specification, I have referred particularly to a fractured bone, although it is obvious that the bone need not be fractured in order to use the present invention. It has become practice where a leg bone is shorter than the other leg bone, to saw the bone, the cut made resembling a mortise and a tenon. The bone is then stretched so that the tenon does not entirely leave the mortise and time is given for the bone to fill. In this

way, bones have been lengthened as much as an inch and a half. My invention is particularly adapted for this purpose. At the present time, bones have been lengthened after being sawed, by passing very stiff rods through the bones, these said rods resembling spikes. This system is used by German surgeons. However, a stiff rod the size of a spike could not be used for small bones, as the wound would be unduly large and healing resultantly slow.

It will be apparent that my invention provides a thin or small diameter wire which does not cause undue harm to the bone through which it is passed, with the result that when the wire is withdrawn, the bone rapidly heals. It will be seen also that this relatively thin wire has all the advantages of the spike so far as stiffness is concerned, for the reason that the wire is tensioned to any degree desired. Hence, the bone is as easily manipulated with the wire as it would be by the spike.

I do not wish to be confined to any precise details of the invention because it is obvious that different forms of set screws other than that illustrated at 14 may be utilized and different forms of compressors may be employed for the harp, the principle of the invention being to provide a yieldable member which will tend to hold a wire passed through the flesh and bone under a selected degree of tension to the end that the said wire will not bend after being tensioned but will permit a bone to be readily adjusted by either a twist or a pull upon the wire.

It is obvious that various changes and modifications and variations may be made in practicing the invention in departure from the particular showing of the drawing without departing, however, from the true spirit of the invention.

I claim:

1. An orthopedic or surgical device for setting bone through which a wire has been passed, including a resilient harp adapted to be secured to said wire at opposite sides of said bone, and means for compressing said harp to in turn axially tension the said wire when the means for compressing the harp is released from said harp.

2. An orthopedic or surgical device adapted to set bone through which a wire has been passed, including a yieldable harp adapted to straddle said bone and for engagement with said wire on opposite sides of said bone, means for compressing said harp, and means for locking said wire to said harp to in turn axially tension the wire when the first named means is released from the harp.

3. An orthopedic or surgical device including a yieldable harp, bone traction means carried thereby and an adjustable compressor harp for engagement with said first harp to place the same in compression, the bone traction means being in tension when the compressor harp is released from the yieldable harp.

4. An orthopedic or surgical device including a yieldable harp having spaced end portions between which a wire is adapted to be placed, a compressor for compressing said harp, and means for locking the wire between ends of the harp after such compression, to place the wire under axial tension when the compressor is released from the harp.

GEORGE C. MARTIN.