

April 25, 1939.

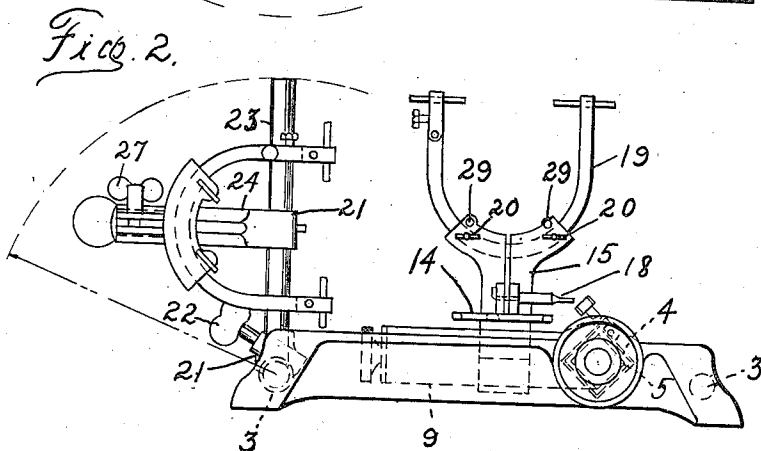
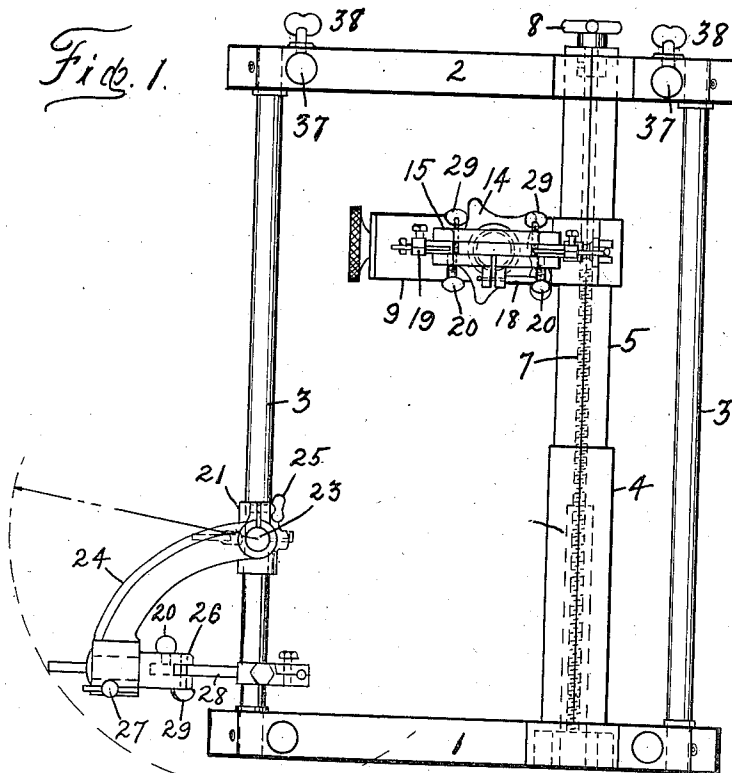
E. E. LONGFELLOW

2,155,866

SURGICAL REDUCING FRAME

Filed Nov. 14, 1936.

2 Sheets-Sheet 1



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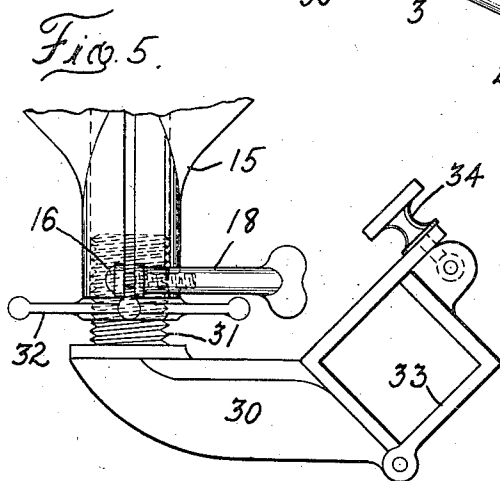
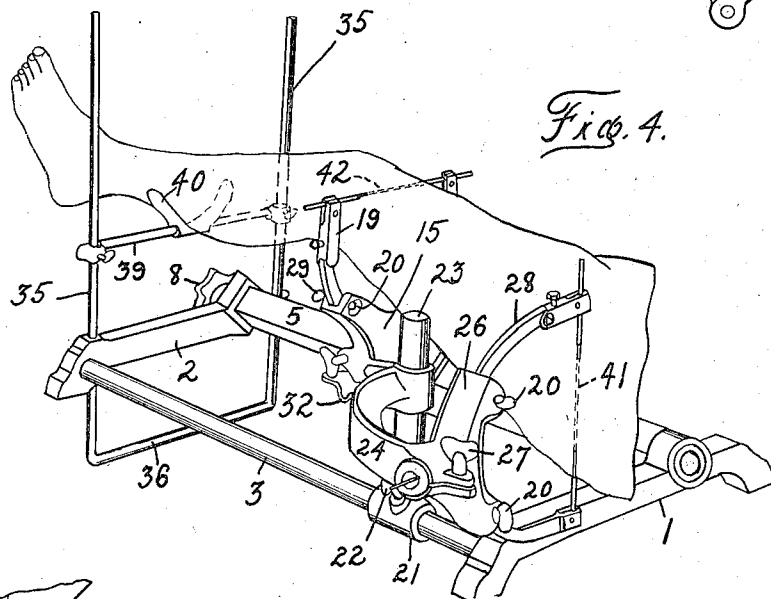
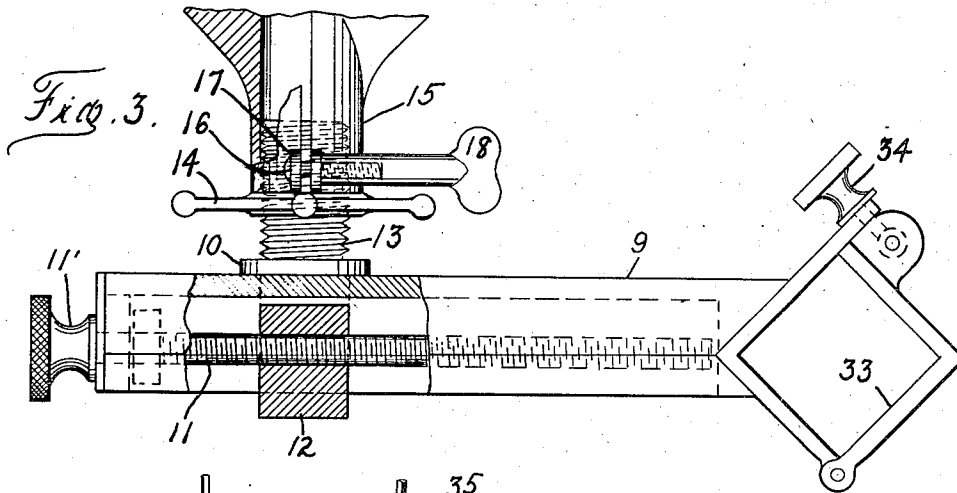
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UNITED STATES PATENT OFFICE

2,155,866

SURGICAL REDUCING FRAME

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Harry Herschel Leiter, Warsaw, Ind.

Application November 14, 1936, Serial No. 110,895

5 Claims. (Cl. 128-84)

This invention relates to improvements in surgical reducing frames particularly for skeletal treatment such as femur fractures.

One of the objects of the invention is to provide an equipment for securely establishing fragments of a fractured bone definitely in proper articulation.

Another object is to provide means for firmly holding skeletal wires or pins that are inserted through bone fragments in definite relative positions.

Further objects 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 plan view of apparatus in which the invention is embodied;

Fig. 2 is an end elevation projected from Fig. 1;

Fig. 3 is an elevation showing part of the apparatus shown in Fig. 1, parts being in section;

Fig. 4 is a perspective view showing one form of the apparatus including the representation of an injured leg disposed thereon; and

Fig. 5 is a fragmentary elevation of a part of the apparatus in modified form.

The illustrative embodiment of the invention is similar in some respects and of the character of that disclosed in my previous patent, No. 2,020,262, issued November 5, 1935, and is characterized by the particular arrangement of the various parts and additional fixtures whereby the appliance is adapted for use in skeletal treatment of fractures of the femur.

The present structure has a base frame consisting of end pieces 1 and 2 spaced apart and connected together by side rods 3. A traction mechanism is mounted in connection with said end pieces consisting of a beam formed by telescopic members 4 and 5 which are preferably rectangular in cross section. In the member 4 is secured a threaded tube 6 into which extends a threaded operating rod 7 that extends longitudinally through the member 5 and is provided at its outer end with a knob 8 by which the rod 7 is manipulated. Upon actuating the rod the member 5 is adjustably moved longitudinally relative to the end piece 2 and the member 4.

Upon the member 5 is removably secured a horizontally disposed bracket 9 having thereon a carriage 10 that is movable longitudinally on said bracket. The bracket 9 has located therein an operating rod 11 provided with a knob 11' that has threaded relation with a lug 12 that

is integral with said carriage and extends up into the bracket through the bottom thereof which is open. The carriage has an upwardly extending threaded post 13 provided with an adjusting member 14 having threaded relation therewith.

Upon the top of the post is loosely mounted a slotted swivel-head 15 adapted to have axial and angular adjustment thereon. A bolt 16 extends through a pair of ears 17 on the swivel-head and is provided with a clamp member 18 threaded on the bolt by means of which the swivel head 15 is secured in adjusted positions on the post. By turning the adjusting member 14 upon the post the swivel-head is raised or lowered relative to the post as desired. The upper end of the swivel-head 15 is slotted for the reception of a pin or wire securing bow 19 preferably U-shaped and which is adjustably and removably secured in position in the swivel-head by means of set-screws 20.

Upon one of the side rods 3 is mounted a clamp member 21 having axial and angular adjustment thereon, and provided with a clamp screw 22 for securing it in adjusted positions. The clamp member has secured thereon a post 23 upon which is mounted a bracket 24 adapted to have axial and angular adjustment thereon, there being provided a thumb-screw 25 for securing the bracket in adjusted position on said post.

In the free end of the bracket is mounted a swivel-head 26 disposed to be adjustably turned upon a horizontal axis, there being provided a thumb-screw 27 for securing said swivel-head in adjusted positions relative to said bracket.

The swivel-head 26 is slotted for the reception of a pin or wire securing bow 28, similar to the bow 19, and is also provided with set-screws 20 by which said bow is secured in adjusted positions in the swivel-head.

Each of the swivel-heads 15 and 26 have thumb-screws 29 that extend through the corresponding swivel-heads adjacent the curved inner perimeter of the bows located in the grooved ends of said swivel-heads, permitting adjustable movements of the bows and preventing removal thereof while said thumb-screws are in place. However, upon removal of the thumb-screws and loosening of the set-screws 20 the bows may be readily detached from their swivel-heads.

In Fig. 5 is illustrated a modified form of a bracket 30 for support of the swivel-head 15 instead of the bracket 9, previously referred to,

especially when an adjustable carriage on the bracket is not required. In this instance the bracket 30 is provided with a threaded post 31 having thereon an adjusting member 32. The swivel-head 15 is positioned on the upper end of the post 31 and is raised or lowered thereon to the desired elevation by manipulating the adjusting member 32, and the swivel-head is turned angularly upon the axis of the post to the desired position and is there secured by tightening the clamping member 18.

Each of the brackets 9 and 30 are provided at one end thereof with a hinged clamp 33 having a securing member 34 for holding the same in closed position relative to the bracket. By this means said brackets are readily attachable to and removable from the telescopic member 5.

As a means for sustaining one end of the base frame in elevated positions and for supporting a distal portion of an injured leg of a patient, there is provided an appliance preferably consisting of a U-shaped drop having side uprights 35 that are contiguous with a connecting base portion 36. The uprights extend through openings 37 in the end piece 2 and are secured in adjusted positions in said end piece by means of set-screws 38. A cross-piece 39 is adjustably mounted upon said uprights and is provided in its middle portion with a cradle 40 to provide a rest for the injured member. By this arrangement when the appliance is positioned on a bed or table the base frame is arranged in the best position selected by the surgeon, and also, the distal part of the injured leg is supported in the most comfortable position.

Operation

In using the appliance, for example, in skeletal treatment for fractures of the femur, the injured leg is positioned over the base frame with its distal part resting in the cradle 40. The clamp member 21 is then adjusted upon its supporting side rod 3; the bracket 24 is adjusted upon the post 23 that projects from said clamp member; the swivel-head 26 is adjustably turned upon its axis to a desired position; and the bow 28 is adjusted in said swivel-head so that its outer ends are positioned respectively above and beneath the greater trochanter of the femur. A pin or wire 41, preferably of the Steinmann or Kirschner type, is then introduced through the flesh about the proximal end of the femur and through the greater trochanter thereof by the usual method employed by surgeons, the end portions of the pin or wire being then secured in the ends of the bow 28. A similar pin or wire 42 is then introduced through the flesh surrounding the distal portion of the femur and through the portion thereof adjacent its condyles, the ends of the pin or wire being then secured in the outer ends of the bow 19. The pins or wires thus introduced and secured in their respective bows are adjustably positioned relative to each other to obtain proper apposition of the bone fragments by manipulating the knob 8 to obtain sufficient extension to permit alinement of the bone fragments and then adjusting the bows respectively, or one of them, in their swivel-heads in which they are supported to effect proper relative rotation of the bone fragments so that upon further manipulation of the knob the opposing ends of the bone fragments are brought into proper alinement where they are definitely held for a recovery period.

The operation is completed by applying a plaster cast (not shown) encompassing the injured

member and adjacent exposed portions of the pins 41 and 42 after which the appliance is removed except said pins or wires which remain imbedded in the cast.

I claim:

1. In a surgical appliance for the treatment of bone fractures, a base frame having a beam provided with a longitudinally adjustable member and operating knob therefor, a bracket removably secured on said member extending laterally with respect thereto and provided with an adjustable carriage thereon having a vertical post, means for adjustably moving said carriage on said bracket, an adjusting member threaded on said post, a swivel-head having clamping means mounted on said post adjustably movable thereon by said adjusting member, a clamping member adjustably mounted on said base frame having a post extending therefrom, a second bracket mounted on said post having means for securing same in adjusted positions thereon, a second swivel-head mounted in the last-mentioned bracket, a pin or wire securing bow adjustably and removably mounted in each of said swivel-heads, a skeletal pin or wire secured in the outer ends of each of said bows, and a prop adjustably connected with one end of said base frame having adjustably secured thereon a leg-supporting member.

2. In a surgical appliance for the treatment of bone fractures, a base frame having a beam provided with a longitudinally adjustable member and operating knob therefor, a bracket removably secured on said member extending laterally with respect thereto and provided with an adjustable carriage thereon having a vertical post, means for adjustably moving said carriage on said bracket, an adjusting member threaded on said post, a swivel-head having clamping means mounted on said post adjustably movable thereon by said adjusting member, a clamping member adjustably mounted on said base frame having a post extending therefrom, a second bracket mounted on said post having means for securing same in adjusted positions thereon, a second swivel-head mounted in the last-mentioned bracket, a pin or wire securing bow adjustably and removably mounted in each of said swivel-heads, and a skeletal pin or wire secured in the outer ends of each of said bows.

3. In surgery, a splint for bone fractures having a base frame provided with a longitudinally adjustable beam and adjusting means therefor, a lateral bracket on said beam, a carriage on said bracket longitudinally movable thereon provided with a post the axis of which extends at right angles to that of said beam, a swivel head axially and angularly adjustable on said post provided with means for adjusting and securing said swivel head in adjusted position thereon, a skeletal pin or wire securing bow adjustably and removably secured in said swivel head, and a second skeletal pin or wire securing bow provided with a mount therefor adjustably supported upon the base frame structure.

4. In surgery, a splint for bone fractures having a base frame provided with a longitudinally adjustable beam and adjusting means therefor, having also a side rod, a skeletal pin or wire securing bow provided with a mount therefor that is adjustably supported in connection with said base, said bow being adjustable in said mount and removable therefrom, said mount consisting of a post adjustably mounted on said side rod to have angular and axial adjustment thereon, a bracket on said post having axial and angular adjustment

thereon, a skeletal pin or wire securing bow adjustably and removably secured in said bracket, and a second skeletal pin or wire securing bow provided with a mount therefor adjustably supported in connection with said beam.

5 5. In surgery, a splint for bone fractures having a base frame provided with a longitudinally

adjustable beam and adjusting means therefor, having also a side rod, and skeletal pin or wire securing bows provided each with a mount therefor that are adjustably supported respectively in connection with said beam and said side rod.

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