

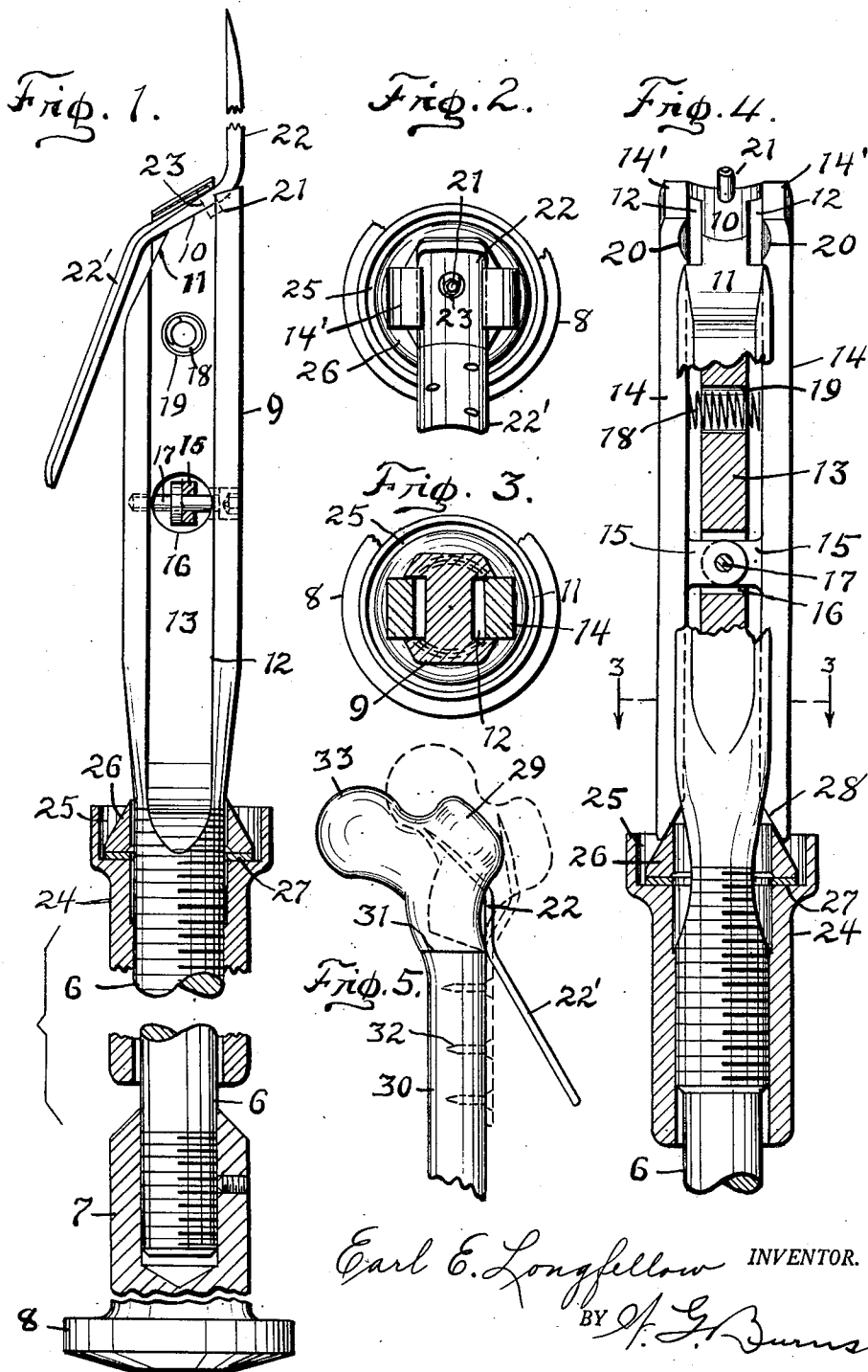
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SURGICAL BLADE PLATE DRIVER AND EXTRACTOR

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SURGICAL BLADE-PLATE DRIVER AND EXTRACTOR

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This invention relates to improvements in a surgical blade-plate driver and extractor for use in readjustment and fixation of the fragments of a femur bone as in "Blade-Plate Internal Fixation for High Femoral Osteotomies" (The Journal of Bone and Joint Surgery, April, 1943, page 319 etc.). The instant application is sequential to a previous application, filed by applicant February 21, 1947, Ser. No. 729,917, for Surgical Appliance for Placing Blade Plates, abandoned.

Where operations of this character are undertaken it is essential that the blade-plate to be driven into the trochanter is held rigidly in connection with an instrument by which the blade is driven into the bone in a definite direction, after which the instrument is detached from the blade-plate without disturbing its position.

An object of the instant invention is to provide an instrument so constructed that a blade-plate of the required size and shape is grasped firmly in connection with the instrument during the driving operation so as to be held in a definite position thereon by simple operation of its parts.

Another object of the invention is to construct the instrument so as to be operable as a driver for a blade-plate or as an extractor therefor by use of a mallet applied selectively in opposite directions.

And a further object of the invention is to construct the instrument for use with single as well as double angle blade-plates.

Other objects and advantages of the invention appear in the following description.

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

Fig. 1 is a fragmentary side elevational view of an instrument in which the invention is incorporated, a part thereof being omitted and other parts being shown in section;

Fig. 2 is a top plan view of the structure shown in Fig. 1, partially broken away;

Fig. 3 is a transverse section of Fig. 4 on the line 3—3 thereof partially broken away;

Fig. 4 is a fragmentary rear elevational view of Fig. 1, parts being broken away and other parts being shown in section; and

Fig. 5 is a fragmentary elevational view of a femur bone into which a blade-plate is initially driven, and subsequently fixated as indicated by dotted lines.

The illustrative embodiment of the invention consists of a drive-shaft 6 the lower end of which has threaded thereon a concentric handle 7 provided with an outwardly extending radial flange 8 located preferably at its lower end. The upper end portion of the drive-shaft is shaped to form a

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head 9 the top of which has an inclined seat 10 and a contiguous rearwardly extending receding offset 11 for the purpose hereinafter referred to.

In the sides of the head 9 are longitudinally extending channels 12, between which extends a web 13, and in said channels are oppositely disposed tong members 14 provided with lugs 15 that extend inwardly from their midportions into an opening 16 in the web, and are supported upon a pin 17 on which the tong members have pivotal movement. The pin 17 is anchored in the head 9 and extends transversely through the opening 16 in the web. An expansion spring 18 extends loosely through an opening 19 in the web and bears against the inner faces of the upper portions of the tong members, the tendency of the spring being to move the upper ends of the tong members outwardly toward their open positions.

The tops of the tong members 14 constitute jaws 14' that have inclination parallel with the plane of the seat 10, and their inner faces are provided with inclined grooves 20 that extend parallel with the tops of the tong members and opposite the corresponding sides of the seat.

The top of the head 9 has secured thereto an anchor stud 21 that projects upwardly from the seat 10 adjacent the forward end thereof for the reception of a blade-plate 22 when disposed on said seat, there being an opening 23 in the blade-plate for reception of the anchor-stud. The arrangement is such that when the blade-plate is disposed on the seat 10, engaged with the anchor-stud, and the jaws are moved into closed position, the blade-plate is clasped and held in a definite position on the instrument in readiness to be driven initially into the trochanter from any selected angle where it is left undisturbed when released from the instrument upon movement of the jaws to their open positions.

As a means for operating the tong members there is provided an adjusting sleeve 24 threaded on the midportion of the drive-shaft having an annular recess 25 in its upper end in which is disposed a cone-shaped annulus 26 that loosely encompasses the drive-shaft, there being disposed between the annulus and the bottom of the recess a loose washer 27. The lower ends of the tong members 14 extend astride the annulus and have opposing slanting faces 28, the arrangement being such that, when the adjusting sleeve is moved upwardly on the drive-shaft, the lower ends of the tong members are moved outwardly through the medium of the annulus, or allowed to move inwardly when the adjusting sleeve is lowered. In this manner the jaws 14' are moved toward

each other in opposition to the action of the spring 18, or away from each other by urge of the spring, accordingly as the adjusting sleeve is raised or lowered. Thus, when the blade-plate is positioned on the seat 19 and the anchor-stud 21 projects through the opening 23 therein while the jaws are in open position, upon closing of said jaws the blade-plate becomes clasped firmly therebetween and is held rigidly in position on the instrument in readiness to be driven into the femur bone structure.

An important feature of the instant invention is the offset 11 that provides clearance for distal ends 22' of blade-plates of the double angle type, so that cocking of the blade-plates on the seat 19 of the drive-head and in the grooves 20 in the jaws 14', is circumvented. The sharp end of the blade-plate is driven into the femur bone structure while the instrument is held by the surgeon in a selected position by striking the lower end of the handle with a mallet.

Should it be desired to extract the blade after having been partially or fully placed, removal of the blade is readily accomplished by striking the top of the flange 8 downwardly with the mallet to effect withdrawal of the blade.

In the diagram (Fig. 5) is shown a blade-plate 22, of the double angle type driven into the greater trochanter 29 with the distal end 22' of the blade-plate extending outwardly from the femur shaft 30. After the blade-plate has thus been positioned the femur shaft is severed by the surgeon approximately where indicated by the line 31, after which the distal end 22' of the blade-plate is moved into contact with the femur shaft and secured thereto by screws 32, thus causing a change of the position of the femur head 33 relative to the femur shaft, which is the object sought when using a blade-plate of the double angle type.

The instrument is also useful in applying blade-plates of the single angle type where fracture of the femur has occurred. In either instance after the blade-plate shall have been initially driven into the bone structure and secured to the femur shaft, fixation of the bone fragments is established in definite relative positions.

After the blade-plate has been installed and secured to the femur structure, the incision made in the flesh is closed by use of sutures in the usual manner.

Variations from the particular construction above disclosed may be resorted to by the exercise of skill in the art, without departure from the spirit or scope of the invention.

What I claim is:

1. A surgical instrument for applying blade-plates to bone structures by which to establish fixation between the fragments of a severed or fractured bone, said instrument consisting of a drive-shaft having a head provided with opposite longitudinal channels therein and an inclined seat on its top and a receding offset contiguous thereto, there being a web between said channels, opposing tong members having inwardly extending lugs supported commonly on a pin located in said web and upon which the tong members have pivotal movement, the upper ends of the tong members, constituting jaws, being provided with grooves in their inner faces extending in the plane of said seat, said jaws being adapted to clasp therebetween a blade-plate when posi-

tioned on the seat, an anchor-stud projecting from said seat and extending through an opening in said blade-plate, an adjusting sleeve threaded on the midportion of said drive-shaft provided with a recess in its top, a conical annulus loosely disposed in said recess and on the drive-shaft, having engagement with the lower ends of said tong members to activate same outwardly, a spring extending through an opening in said web to urge the upper end portions of the tong members apart, and a handle on the lower end of the drive-shaft provided with an annular external radial flange.

2. A surgical instrument for applying blade-plates to bone structures consisting of a drive-shaft having a longitudinally channelled head and a seat on its upper end, an anchor-stud extending upwardly from said seat, tong members pivotally mounted in connection with said head, a spring disposed loosely through an opening in the head to urge the upper portions of said tong members apart, the upper end of said head having an offset for accommodation of the distal end of a double angle blade-plate when said blade-plate is disposed on said seat and secured by said anchor-stud, and adjusting means on the drive-shaft related with said tong members to activate same.

3. A surgical instrument for applying blade-plates to injured or deformed bones, said instrument consisting of a drive-shaft having a head at one end and handle at its opposite end, the top of said head having a seat and an anchor-stud projecting upwardly therefrom and having opposite longitudinal channels and a web intervening therebetween, tong members disposed in said channels respectively, mounted commonly upon a pin supported in said web, upon which said members have pivotal movement, the upper ends of said tong members being shaped to form opposing jaws by which to clasp therebetween a blade-plate disposed upon said seat and engaged by said anchor-stud, a spring acting oppositely against the upper portions of said tong members to spread said jaws apart, and adjusting means on said drive-shaft having engagement with the lower ends of said tong members to activate same in opposition to the action of said spring.

4. A surgical instrument for applying to or extracting a blade-plate from a bone structure, said instrument having a drive-shaft provided with an inclined seat, a clamping means mounted on the head of the shaft adapted to secure a blade-plate on said seat, an outwardly projecting flange member secured on the lower end of the shaft adapted to be struck downwardly by a mallet applied thereto whereby to effect extraction of the blade-plate from said bone structure, and an adjustable means on the midportion of said shaft having engagement with said clamping means for activating same.

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REFERENCES CITED

The following references are of record in the file of this patent:

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