

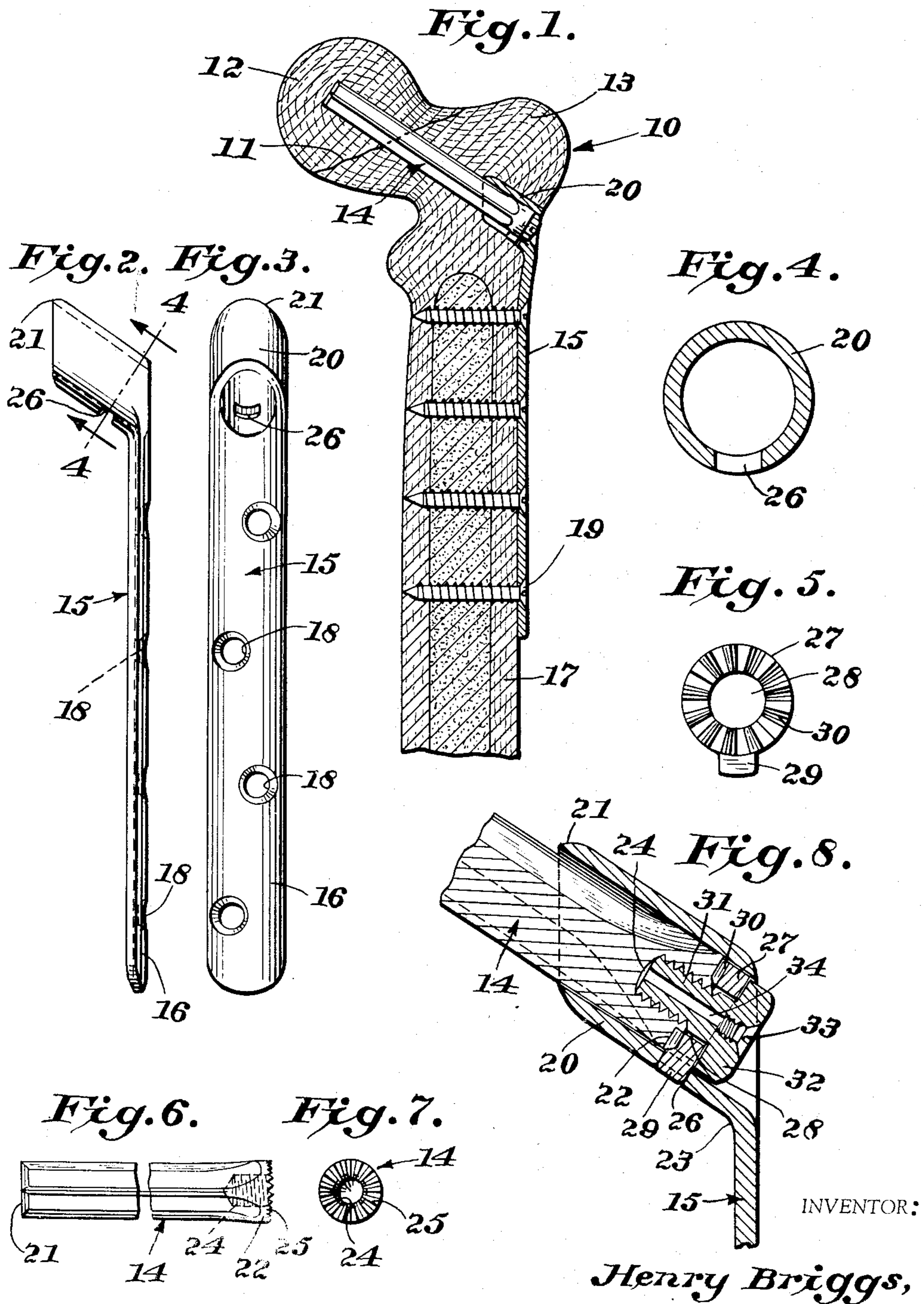
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FRACTURE SECURING DEVICE

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FRACTURE SECURING DEVICE

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3 Claims. (Cl. 128—92)

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This invention relates to surgical instruments, and more particularly to an improved device for treating bone fractures and the like.

An important object consists in associating with a fracture nail or pin, means for maintaining the nail in a fixed position when it is inserted into a fractured femur to hold the proximal fragment of the femur to the distal fragment thereof.

A further object comprehends the provision of a surgical instrument including a fracture nail insertable through a tubular arm of an angulated plate or strap and arranged to be emplaced with the arm into the femur to firmly maintain the fractured fragments in proper healing engagement to facilitate the union or knitting of the fracture.

Other objects and advantages of the invention will become apparent from the following description when taken in conjunction with the accompanying drawings.

Referring to the drawings wherein is shown a preferred embodiment the invention may assume:

Figure 1 is a longitudinal sectional view of a fractured femur immobilized by a "Smith-Petersen" fracture nail and showing my improved surgical device associated therewith.

Figure 2 is a detailed side view of the angulated plate.

Figure 3 is a front view of Figure 2.

Figure 4 is a sectional view taken substantially along the lines 4—4 of Figure 2.

Figure 5 is a detail front view of the removable stop member.

Figure 6 is a detailed side view of a "Smith-Petersen" fracture nail or pin modified in accordance with the present invention.

Figure 7 is an end view of Figure 6, and

Figure 8 is an enlarged detail sectional view showing the fracture pin and its associated parts mounted in the tubular arm or portion of an angulated plate.

For the purpose of illustration, the improved surgical device for internal fixation of a bone fracture is shown associated with a femur 10 which has been fractured at 11 between the head or proximal fragment 12 and the distal fragment 13. The fracture nail or pin 14, such as a "Smith-Petersen" nail, is shown inserted in the femur so as to hold the fractured fragments 12 and 13 in a fixed position to insure proper knitting or union of the bony fragments.

In order to provide simple, efficient and positive means for preventing outward axial displacement and rotatable displacement of the nail 14 when it is emplaced in a fractured bone such as the

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femur 10, there is associated with the nail an angulated plate or strap 15. Preferably the plate 15 has an elongated curved body or shank 16, so as to conform in curvature with the contour of the femoral shaft 17 and may be provided with longitudinally spaced countersunk openings 18 (Fig. 3) for receiving retaining screws 19 that are arranged to be inserted in the shaft 17 to firmly and securely maintain the surgical device in a fixed position relative to the fracture. The plate 15 at one end terminates in a tubular arm or portion 20 which may be provided with a sharp edge 21 and through which the nail 14 extends so as to have its head 22 enclosed within the arm 20 (Fig. 8) when the parts are assembled in operative position. The tubular arm 20 is shown extending laterally and upwardly from the plate 15 so as to form an obtuse angle as at 23 (Fig. 8), but this angle and position may be varied depending upon the particular use to which the surgical device is to be applied. The head or inner end 22 of the nail 14 is formed with a threaded recess or socket 24 (Fig. 6) and a serrated end surface 25. The wall of the tubular member 20 in the bottom thereof and adjacent to the plate 15 is provided with a slot or opening 26. A removable stop member 27, preferably of cylindrical shape and of slightly smaller diameter than the inner diameter of the tubular arm 20, is provided with a central opening 28 (Fig. 5) and a depending lug 29 arranged to fit in the slot 26. When the head 22 of the nail 14 is inserted into the opening 20 so as to extend slightly beyond the slot 26, the annular stop or retaining member 27 may be positioned in the arm 20 and the lug 29 inserted into the slot 26 so as to be maintained in a fixed position therein, and provide means for limiting the axial outward movement or displacement of the nail 14 relative to the plate 15 when the surgical device is used for internal fixation of a bone fracture. The inner face or surface of the stop member 27 is preferably serrated as at 30 to engage and interlock with the serrations 25 on the head 22 of the nail, when the parts are assembled.

The nail 14 and the stop 27 are maintained in a fixed position within the tubular arm 20 by a threaded screw 31 which extends through the opening 28 of the stop 27 so as to engage the threaded wall of the recess 24. The head 32 of the screw 31 may be kerfed or grooved as at 33 for receiving a suitable operating tool, and when applied to the nail forces the serrated surface 30 of the stop member 27 into interlocking engagement with the serrations 25 so as to prevent

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rotary movement of the nail relative to the arm 20. The screw 31 may be provided with an axial bore 34 to enclose a guide wire. Thus, it will be seen that the stop member 27 is so positioned in the tubular arm 20 as to constitute simple, efficient and positive means for preventing outward axial displacement of the nail 14 and also prevents rotation of the nail 14 relative to the arm 20 when the parts are assembled.

Assuming the surgical device is used to maintain the proximal fragment 12 of the femur being held in proper engagement with the distal fragment 13 at the point of fracture 11 (Fig. 1), it will be seen that after the nail 14 is inserted in the femur 10, the tubular arm 20 is emplaced in the side of the distal fragment or greater trochanter 13 and inserted so that the slot 26 is positioned in front of the head 22 of the nail (Fig. 8). The stop plate 27 is then inserted into the arm 20 and the lug 29 drops into the slot 26. The retaining screw 31 is now threaded to the wall of the recess 24 so as to move the serrations 30 into firm interlocking engagement with the serrations 25 to prevent rotative movement of the nail 14 and also to limit the outward axial displacement of the nail relative to the arm 20. Thus, means that can be conveniently and safely manipulated by the surgeon are provided to insure proper fixation in order that the bony fragments at the point of fracture 11 may be properly united or knitted together.

It will be understood that the form of the invention shown is merely illustrative of the preferred embodiment and that such changes may be made as come within the scope of the following claims.

I claim:

1. A surgical device for internal fixation of a fracture including in combination, a fracture nail, a plate having a tubular arm extending laterally therefrom, said tubular arm when the fracture nail is inserted into a fractured bone to hold the fragments together, arranged to be emplaced in the bone and enclose the nail head, said tubular arm having a slot in the wall thereof, a detachable stop member arranged to be posi-

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tioned in said tubular arm and abut the end of the fracture nail, said stop member having a lug insertable in said slot for retaining the same in a fixed position, and means for detachably connecting said stop member to the head of the nail.

2. A surgical device as called for in claim 1 in which the stop member is provided with means coacting with complementary means on the end of the fracture nail for preventing rotation of the latter.

3. A surgical device for internal fixation of a fracture including in combination, a fracture nail having a head provided with an axial threaded recess and a serrated end surface, a plate having an end provided with a tubular arm extending laterally at an angle to the longitudinal axis of the plate and provided with a cutting edge, said tubular arm when the nail has been inserted into a fractured bone arranged to be emplaced in the bone and enclose the head of the nail, said tubular arm having a slot therein, a stop member arranged to be mounted in said tubular arm and having a lug extending into said slot so as to maintain the stop member in a fixed position, said stop member having a serrated surface in abutting engagement with the serrated surface on the end of the nail, a screw extending through said stop member and into said recess so as to maintain the nail in a fixed position, and means for securing said plate to the femoral shaft when the parts are assembled.

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

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