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FRACTURE NAIL GUIDE

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2 Sheets-Sheet 1

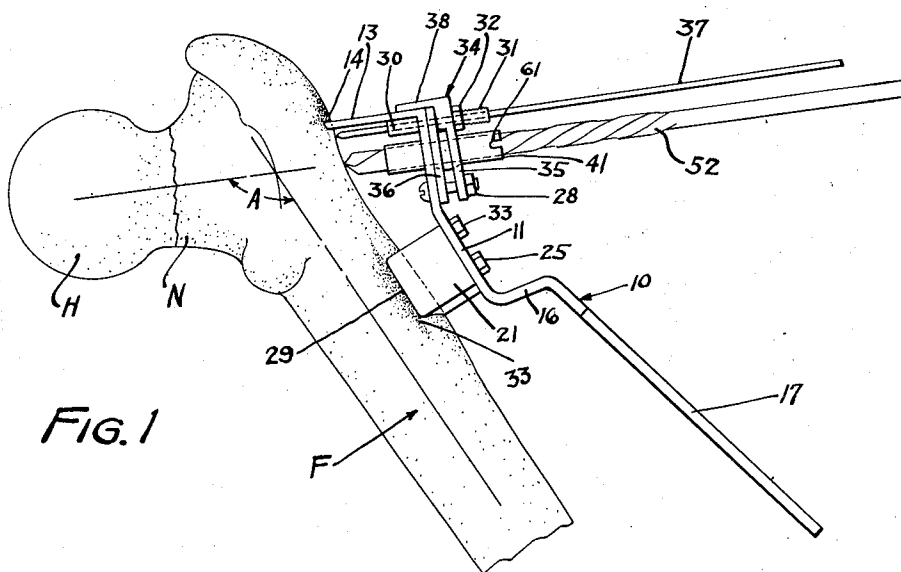


FIG. 1

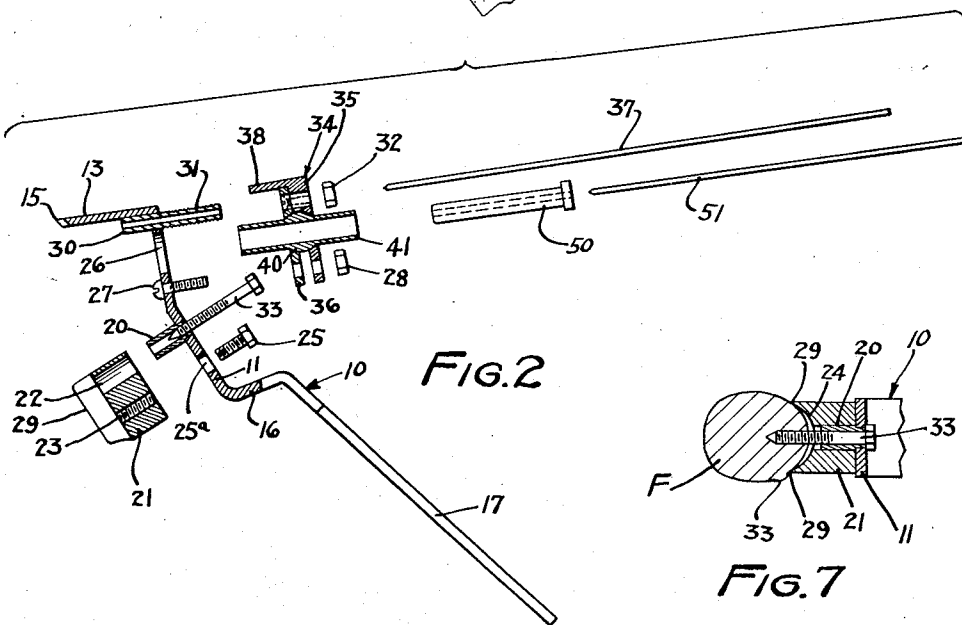


FIG. 2

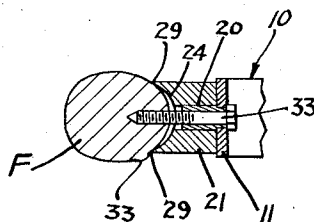


FIG. 7

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FRACTURE NAIL GUIDE

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14 Claims. (Cl. 128—83)

The present invention relates to an improved method and apparatus for fixation of fractures through the neck of the femur.

Heretofore there have been devised various methods of fixation of fractures of the neck of the femur in which the fixation is accomplished by wires, bolts, or nails, inserted through the neck of the femur so as to locate and affix the fractured portions. One of the commonest procedures at the present time comprises the steps of first aligning the fractured portions of the neck of the femur by moderate traction with abduction to the well leg, followed by a reduction of the fracture by the Ledbetter manipulation as described by Key and Conwell in their book entitled *Fractures, Dislocations and Sprains*, page 826, which was published in 1934 by C. B. Mosby Company, St. Louis, Missouri. The fractured portions are then pinned together by 10
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Kirchner wires, the plane and angle of each wire being determined largely by guess, and checked after it is placed by anterior and lateral X-ray pictures.

In a modification of this procedure the Kirchner wires are placed one after the other, the plane and angle of each wire being determined by hand, and checked after being placed by anterior and lateral X-ray pictures, until a Kirchner wire is finally positioned along the axis of the neck of the femur. A hollow drill is then lowered over the protruding end of the Kirchner wire and an enlarged hole drilled for the insertion of a Morrison bolt or Smith-Peterson nail is driven through the bone. The bolt or nail serves as the load-carrying fixation member during the union of the bones.

While these procedures have yielded remarkable results, and a relatively high recovery, as compared with earlier procedures in which no fixation and retaining devices were used, they are objectionable for several reasons:

First. The plane and angle of the first Kirchner test wire in either procedure is determined by the operator, and this wire is therefore entirely explanatory. In some instances it accordingly happened that this exploratory wire was misdirected so that it left the neck of the femur, or was driven through the joint.

Second. According to either of these procedures lateral X-ray pictures are taken after the first and each succeeding Kirchner wire is set, so as to check the position of the wire as an aid to setting the next succeeding wire. The development of each X-ray picture consumes from five to ten minutes, during which the surgeon can

do nothing, and operating time is thus wasted and the patient exhausted. A total of from two to four Kirchner wires is sometimes necessary in either procedure, and the total time consumed for the operation, therefore, frequently amounts to several hours. This long operating time and consequent exhaustion contributes to fatality, especially as patients are usually aged persons.

Third. Where the fixation agent is a Morrison bolt or Smith-Peterson nail, the placement of four or five exploratory Kirchner wires as a means of locating the position of the major bore is an undesirable weakening of the neck of the femur, which is already weakened by the fracture.

Fourth. The determination of the plane and angle of the initial and subsequent Kirchner test wires is done manually and is therefore, within the skill of the operator. The number of operations of this character is relatively small and there are but relatively few operators in the large centers of population who have had sufficient experience to perform this operation without placing an excessive number of test wires and consuming an excessive amount of time in the operation.

It is an object of the present invention to provide a method and an apparatus for overcoming these deficiencies of earlier procedures. Specifically, it is an object of the present invention to provide a method and apparatus for guiding the placement of the first Kirchner test wire, with reference to certain landmarks of the femur, whereby the possibility of misdirecting the initial wire is obviated.

It is also an object to provide a method and apparatus for locating the plane and angles of a subsequent Kirchner wire or a large caliber drill with respect to the femur landmarks and with respect to the initially guided Kirchner test wire whereby the use of subsequent exploratory wires is obviated, or reduced to at a maximum one wire and whereby the total operating time may be sharply reduced from several hours to less than one hour.

It is a further object of the invention to provide a method of femur surgery and an apparatus by which the use of exploratory test wires may be obviated entirely if desired and by which the major boring device may be guided by an instrument definitely located with reference to the femur.

It is also an object to provide an adjustable guide for a boring instrument, which may be located temporarily in fixed position relative to the femur and then adjusted to a position such

that a boring instrument guided thereby will be in alignment with the axis of the neck of the femur.

It is also an object to provide a guide apparatus by which surgeons of relatively little experience may accurately place fixation devices in the neck of the femur, in a minimum time, and by which the angular and lateral adjustments of the drill guide may be made accurately in precise amounts.

It is a further object to provide an instrument and a protractor device by which the adjustment of the instrument may be accurately gauged.

Other objects of the invention are those suggested and implied by the specification, claims and drawings and those inherent in the method described and claimed and in the apparatus illustrated, in which

Figure 1 shows a side elevation view of an apparatus of the present invention as it is applied to a dry specimen femur.

Figure 2 is a side elevational view partly in section, showing the various elements separated from each other.

Figure 3 is an elevation view of the front of the instrument.

Figure 4 is an elevational view of a femur, with the instrument in place and with a protractor guide mounted for adjustment of the instrument.

Figure 5 is a top view of a femur with the instrument in place and with the protractor mounted for adjustment of the instrument.

Figure 6 is an elevational view partly in section of the femur and instrument, showing a Morrison bolt fixation device partly placed, and the instrument ready to be removed.

Figure 7 is a sectional view of the femur and instrument along the lines 7-7 of Figure 4.

The apparatus of the present invention is an instrument which is temporarily attached in fixed position relative to the femur during the fixation procedure. In the figures the femur shaft is designated by the letter F, the head of the femur by the letter H, and the neck of the femur by the letter N. A fracture of the neck of the femur is illustrated by the irregular line extending across the neck N. The apparatus is shown assembled on a femur in Figures 1, 4, 5 and 6 of the drawings and comprises an angularly shaped frame generally designated 10, which is preferably made of a single piece of corrosion-resistant steel. The frame 10 has a central portion 11 which is generally parallel to the axis of the femur F when the instrument is in place thereon, and another integral slide section 12 which is oriented at an angle of about thirty degrees to the portion 10. The upper end of the slide section 12 is bent over at right angles to form the positioning leg 13, the free end 15 of which is shaped to correspond to the shape of the femur just below the trochantric ridge 14. The leg portion 13 of the frame serves with spacer block 21 which is attached to portion 11, to position the slide section 12 in a definite relation to the femur.

The opposite end of the frame 10 is provided with an outwardly extending section 16 and a handle portion 17 by which the instrument may be grasped and held in place in the preliminary operation of affixing it to the femur, as will be described.

The central portion 11 of frame 10 is provided with a fixed drill guide and bushing 20 which protrudes from the frame so as to form a pivot for locating block 21. The locating block 21 is

apertured at 22 to receive the bushing 20 (see Figure 2) and is provided with a threaded opening 23 which receives a fastening stud 25. It will be noted that the hole 25a in frame portion 11 is slightly larger than stud 25. When block 21 is in place and the stud loosened, the block can be pivoted slightly about the bushing 20 as a center within the limits of movement of stud 25 in hole 25a. This slight movement provides the necessary displacement of the edge 15 of leg 13 with respect to the edges 29-29 of block 21, so that the instrument may be used with equal facility on right and left femurs.

The slide section 12 of the frame has a central transversely elongated aperture 26, as shown in Figure 3, below which there is mounted a fastening screw 27 which receives the fastening and lock nut 28. Above aperture 26 on the slide section there is located a tube 30 which passes through the frame, and which is permanently affixed to the slide section and to the right angular portion 13. The protruding end of the tube 30 is threaded at 31 so as to receive the fastening nut 32.

Overlying the slide section there is positioned a transversely movable assembly generally designated 34, which is composed of an outer plate 35 and an inner plate 36. The outer plate is thickened at its upper end, as shown in Figures 1, 2, 4 and 6 so as to space the inner plate 36 from it. The two plates 35 and 36 are fastened together by screws or rivets, not shown. The outer plate 35 also has an overhanging lip 38 which serves to prevent the plate from turning with reference to the leg portion 13 of frame 10.

Plates 35 and 36 of assembly 34 are centrally apertured to receive the spherical portion 40 of the drill guide 41, as shown especially in Figures 2 and 6. When the assembly 34 is separated from the frame, as shown in Figure 2, the drill guide 41 is freely movable in its ball and socket support and may thus be oriented at an angle either horizontally or vertically with respect to the slide section 12 of the frame. When the assembly 34 is in place on the frame 10, as shown in Figures 1 and 4 and nut 32 is tightened, the drill guide 41 may still be moved although the movement is somewhat restricted. When nut 28 is tightened on screw 27, outer plate 35 is drawn toward plate 36 and the ball joint 40 is clamped tightly and all movement of drill guide 41 is prevented.

Referring to Figure 3 it will be noted that the inner and outer plates of assembly 34 have elongated transverse apertures 42 and 43 which permit the assembly to be moved from the left-hand position 44, shown in heavy lines in Figure 3, to the right-hand position shown in the dotted lines in the same figure. The purpose of this movement from one position to the other is to permit the plane of the drill guide to be shifted when this is necessary, as hereinafter explained. The tightening of nut 32 serves to clamp assembly 34 against movement.

By referring to Figure 7 it will be noted that the locating block 21 has an inner curved surface 24 and locating edges 29-29, one of which edges contacts the gluteal ridge 33 of femur F when the instrument is in place thereon. When the instrument is in place on a right femur, the lower edge 29, as shown in Figure 7, contacts the gluteal ridge 33; when on a left femur, the upper edge 29 serves this locating function.

In the separated view, Figure 2, the instrument is shown as provided with a removable drill collet

50 which fits the bore of drill guide 41 and which may be used for centering and guiding a small drill wire 51 of the same diameter as wire 37 which is used when drilling through tube 30. It is understood that this collet may be used at one stage of the operation, and subsequently removed for the insertion of the drill 52 shown in Figure 1. The small drills 37 and 51 are known in the art as "Kirchner wires" and are used for exploratory and for fastening purposes.

For use the instrument is assembled as shown in Figure 1, with the assembly 34 in a central position with reference to slide section 12, and the block 21 pivoted to the right or left position so as to accommodate the instrument to the right or left femurs, whichever may be under treatment. It is noted that Figure 1 shows a Kirchner wire 37 and also a large caliber drill 52, in place on the instrument. These are not on the instrument when it is originally positioned on the femur but are inserted at certain stages of the operative procedure which will be described.

The edge 15 of the angularly shaped portion 13, as previously stated, is shaped to conform with the lower border of the trochantric ridge of the femur and the locating block 21 which has edges 29—29, is shaped and positioned on the instrument with reference to the edge 15 so that an edge 29 will lie along the gluteal ridge 33 of the femur when the instrument is in place, the necessary shifting of block 21 being made as explained above, to accommodate the instrument to right and left femurs.

The instrument is also supplied with a detachable protractor gauge, which is illustrated in Figures 4 and 5. The gauge consists of a staff 60 of a size such that it has a snug slip fit in drill guide 41. The drill guide is preferably notched at 61 to receive a pin 62 which is mounted on staff 60 to steady the gauge and prevent it from turning with reference to the guide. Mounted on the staff 60 are a pair of protractor segments 63 and 64, which are shaped to clear the end 65 of Kirchner wire 37. Each of the segments is calibrated in degrees or other units as desired. Kirchner wire 37 is clearly discernable in an X-ray picture and is a datum line for the measurement of corrections in the photograph. The end 65 of the wire 37 acts as an index pointer in conjunction with the protractor scales 63 and 64 for applying such corrections in using the instrument. The scale 63 is preferably calibrated with line 66 as the zero line, for when the end 65 is opposite the line 66 the axis of drill guide 41 is parallel with the axis of wire 37. The graduations of the protractor segments 63 and 64 which are shown in Figures 4 and 5, are suggestive of any scale of angularity which may obviously be used.

The protractor scale 63 is positioned radially at the zero of the scale of protractor 64 and Figure 5 shows the drill guide 41 and protractor displaced to supply a necessary angular correction, as hereinafter explained.

I have discovered by measuring a large number of specimen femurs that the angle A of Figure 1 between the axis of the femur and the axis of the neck of the femur, is approximately 125 degrees and that the lower border of the trochantric ridge 14 and the gluteal ridge 33 are anatomical landmarks on the femur with reference to which the instrument may be readily located in use. The muscles over the femur are readily detached up to the lower border of the trochantric ridge 14 and laterally as far as the gluteal ridge. Dis-

section of the muscular attachment is resisted at the lower border of the trochantric ridge and posteriorly at the gluteal ridge by the dense fibromuscular attachment of the muscles in these places, respectively.

In the present invention I propose to make use of these anatomical landmarks as locating points for affixing the instrument to the femur during the operative procedure now to be described.

A preferred method of using the present apparatus in an operative procedure comprises the following steps:

1. An anesthetic is administered to the patient. This may be a spinal anesthetic or any other anesthetic, according to the choice of the operator.

2. The patient is then placed on a fracture table and both feet and ankles are padded and traction loops are applied.

3. The patient is then placed upon the saddle of the fracture table against the perineal post thereof which serves to restrain movement of the patient, and traction with abduction of the well leg is applied.

4. The fracture is then reduced, that is to say, the fractured portion of the bone is aligned by use of the Ledbetter manipulation, and then the Letbetter heel and palm test is applied to determine whether reduction is complete. This procedure is described in the book by Key and Conwell entitled Fracture, Dislocations and Sprains, previously mentioned herein.

5. Fixation of the fractured portions of the neck of the femur with moderate traction and proper rotation and abduction is then applied and X-ray photographs from the anterior, posterior and lateral positions are taken and developed. Additional manipulation may then be applied, if necessary.

6. The skin is then prepared by proper antiseptic procedures and a four inch incision is made extending downwardly along the lateral surface of the thigh from the middle of the great trochanter and the femur is freed of its muscular attachment by the use of a blunt dissector or periosteal elevator. This is comparatively easy in the antero-lateral surface but as dissection is carried upward and posteriorly, two points of firm resistance are met with, which as previously described, are defined by the dense fibromuscular attachment on the lower border of the trochanter and the gluteal ridges respectively. The upper curved end 15 of the angularly positioned plate 13 is then pushed upward against the lower border of the trochanter and the edge 29 of spacing block 21 is rotated sidewise against the gluteal ridge.

The instrument is held in position against the trochantric and gluteal ridges by means of handle 17, and a hole is drilled through bushing 20 into the sound portion of the femur. A self-tapping screw 33 is then inserted through the bushing and the locating block and instrument proper are drawn into a temporarily fixed position on the femur, as shown in Figures 1 and 4.

7. A properly engaged Kirchner drill wire 37 is then inserted through tube 30 and is drilled into the neck N of the femur to a depth determined by the surgeon as locating the point of the drill in the head H of the femur.

8. Lateral, anterior and posterior X-ray photographs are then taken and disclose the plane and angle of the Kirchner wire within the neck of the femur (Figures 4 and 5) and enable the operator to gauge the correction of direction

necessary for drill guide 41. As soon as the X-ray pictures are developed the exact angularity correction may be measured with a protractor, on the X-ray picture.

Little difficulty is experienced in finding and locating the edge 15 of member 13 against the lower border of the trochanter but more care is usually required in positioning the locating edge 29 of block 21 against the gluteal ridge. There is seldom any vertical misalignment when using the present instrument, and as a consequence, the initially placed Kirchner wire 37 is invariably at the proper angle of substantially 125 degrees with respect to the shaft of the femur, as shown in Figure 4.

Misalignment of the block 21 with reference to the gluteal ridge has the effect, as shown in Figure 5, of slightly misdirecting the angle of the initial Kirchner wire test drill 37 but no difficulty is experienced due to any reasonable misalignment here, since there is considerable leeway in the head H and neck N of the femur. If care is taken, the possibility of failure of alignment with reference to the gluteal ridge is relatively small.

However, for the purposes of this description, a misalignment is assumed, and the angle between the Kirchner wire and the axis of the femur will appear as angle B in the X-ray picture (Figure 5).

It is also noted that in some cases a shifting of the plane of drill guide 41 may be necessary without a change in angularity of the drill guide, or in addition to the change in angularity of the drill guide. When such adjustment is necessary it is accomplished by loosening nuts 28 and 32 and shifting the whole assembly 34 laterally. Thus, if the X-ray photograph should disclose a configuration of the neck and head of the femur, such as that shown by the dotted line C in Figure 5, shift of assembly 34 to the dotted line position would be necessary in order to bring the axis of drill guide 41 in line with the proper axis, which is illustrated by the line C'.

Due to the configuration of the instrument and the method of locating it with reference to the trochantric and gluteal ridges, the first Kirchner wire 37 which is drilled through guide 30 will go through the upper portion of the neck of the femur, i. e., above the axis of the femur as shown in Figure 4.

9. The corrections which are ascertained to be necessary by a study of the X-ray photographs, may be applied to the drill guide by "eye" or by the use of the protractor gauge shown in Figures 4 and 5. In the assumed case, a correction of angle B in Figure 5 is required to bring the drill guide into proper alignment, which is represented by line L, and the protractor is accordingly moved until the end 65 of wire 37 is opposite scale line 67 which signifies this angularity on protractor 64. In the assumed case no correction of angularity is necessary in the view shown in Figure 4, but if such should be required it would be applied by moving the protractor and drill guide 41 until the appropriate scale mark on scale 63 is in line with end 65 of wire 37. It was also assumed that no change in plane of the drill guide is necessary and hence assembly 34 is not shifted. However, if such correction should be necessary it is applied. After all of the corrections are made, the drill guide is locked in fixed position by tightening nuts 28 and 32.

10. The drill collet 50 is then inserted in drill guide 40 and a second Kirchner wire 51 is then

inserted through the collet and is drilled into the neck of the femur. Lateral, anterior and posterior X-rays are then taken and developed and serve as a means of checking the position of the second wire.

11. If the second wire is in a proper position the drill collet 50 is removed and a large drill 52 of slightly less diameter than the drill guide 41 is inserted and drilled into the neck of the femur in an amount determined by the surgeon as sufficient to locate the end of the drill in the ball portion H of the femur. If it should be found that further corrections of angularity are necessary, these may be applied as described in paragraph 9 above, before the large size drill 52 is used.

12. Drill 52 is then removed and a Morrison bolt, or any other suitable type of fixation instrument is then inserted through the drill guide and into the hole produced by the large drill. Figure 6 shows a Morrison bolt 68 in place after having been inserted through the instrument. Screw 33 is then removed and the entire instrument detached.

13. The Morrison bolt which is the preferred form of attachment device, is then driven into the bone throughout the entire length of the hole and an impactor (not illustrated) is then placed over the bolt and struck several times. This procedure permits increased protrusion of the bolt. The expanding ends 69 of the bolt are then forced into the head of the femur by an expanding plunger and a fixation nut is screwed down so that the bolt maintains the fractured ends of the femur in impacted relation. The expanding plunger and fixation nut have not been illustrated since these are well known in the art as components of the Morrison bolt.

14. The original Kirchner guide wire 37 may then be removed, but it is preferably left in situ as it aids fixation of the bone. If it is permitted to stay it is clipped off evenly with the end of the Morrison bolt. The muscles are then brought together over the bolt and are closed by deep interrupted dermal sutures.

The wire and the bolt are normally permitted to remain in place from about six months to one year. The patient is usually required to remain prone for about three weeks, and it is preferable not to place any appreciable weight upon the joint for about six months. When these precautions are maintained complete recovery is obtained in about ninety per cent of the treated cases.

Many variations may be made in the foregoing preferred method without departing from the spirit of the invention. Thus, the placing of the initial test wire may be omitted and the alignment made by study of an X-ray of the instrument on the femur, the necessary corrections being made from this photograph, using an edge or line on the instrument as datum. However, I prefer to place a Kirchner wire through tube 30 since this serves to hold the fractured portions of the femur in alignment during the drilling of the larger opening and placing of the Morrison bolt or other fixation instrument.

The procedure may also be varied by omitting the placing of a second Kirchner wire through collet 50, since this is in most cases merely a proof drill. After some experience with the instrument the placing of this wire is often found to be unnecessary.

Concerning variations in the apparatus: It is obviously possible to shape the frame 10 differ-

ently. Thus as one modification of the instrument, I propose to make both guides 38 and 41 adjustable, the locating edges adjacent the trochantric and gluteal ridges being dispensed with.

5 In using this modification of the instrument it is initially located generally with reference to the femur and attached. Anterior and lateral X-ray pictures then disclose the position of the instrument on the femur. The initial test wire guide 10 is then adjusted in an amount and direction as indicated by the photographs. However, I prefer to use the locating edges, since experience has shown that by utilizing the trochantric and gluteal landmarks, the instrument is locatable with 15 sufficient accuracy that there is no danger that the initially placed Kirchner wire will be misplaced. The advantage of this located procedure is that it saves about fifteen to twenty minutes operating time.

20 Having thus described my invention, what I claim is:

1. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame means, means for temporarily affixing said frame means to the femur, 25 said frame being formed with a fixed drill guide, and a universally adjustable drill guide mounted on said drill frame means.

2. A surgical instrument for use in the fixation 30 of fractures of the neck of the femur comprising a drill frame means, means for temporarily affixing said frame means to the femur, said frame being formed with a fixed drill guide, a universally adjustable drill guide mounted on said drill 35 frame means, and protractor means for gauging the angularity of said adjustable drill guide with respect to said frame means.

3. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame having a drill guide means having locating edges oriented for simultaneous contact with the femur substantially at the trochantric and gluteal ridges respectively said drill guide 40 being oriented with respect to the locating edges so as to guide the drill through the femur neck. 45

4. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame having a drill guide means having locating edges oriented for simultaneous 50 contact with the femur substantially at the trochantric and gluteal ridges respectively, said drill guide being oriented with respect to said locating edges so as to guide the drill through the femur neck, and handle means for said drill frame 55 means.

5. A surgical instrument for use in the fixation of fractures of the neck of right and left femurs comprising a drill frame, said frame being formed with an edge shaped for contact with the lower 60 border of the trochantric ridge of either the right or left femur, and a means on said frame, said means having a pair of edges thereon located for contact one at a time with the gluteal ridge of the right or left femur with which the instrument 65 is used, when the frame is in contact with the trochantric ridge.

6. A surgical instrument for use in the fixation of fractures of the neck of right and left femurs comprising a drill frame, said frame being formed 70 with an edge shaped for contact with the lower border of the trochantric ridge of either the right or left femur, a locating means on said frame, said locating means having a pair of edges thereon, and an adjustable mounting for said locating 75 means formed to permit limited movement of said

locating means to two positions, in one of which positions one of said pair of edges will be oriented with respect to the frame for contact with the gluteal ridge of a right femur when the frame is in contact with the trochantric ridge of said right femur, and in the other of said positions the other of said pair of edges will be oriented with respect to the frame for contact with the gluteal ridge of a left femur when the frame is in contact with the trochantric ridge of said left 10 femur.

7. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame means having locating edges oriented for contact with the femur adjacent 15 the trochantric and gluteal ridges respectively, handle means on drill frame means, and a drill guide mounted for movement universally with respect to said drill frame.

8. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame means having locating edges oriented for contact with the femur adjacent the trochantric and gluteal ridges respectively, handle 20 means on drill frame means, a drill guide mounted for movement universally with respect to said drill frame, and a second drill guide formed on said frame. 25

9. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame means having locating edges oriented for contact with the femur adjacent the trochantric and gluteal ridges respectively, handle means on drill frame means, a drill guide mounted for movement universally with respect to said drill 35 frame means, and a second guide formed on said frame means, the axis of said second guide being oriented so as to be at an angle of approximately 125 degrees to the major axis of the femur when the locating edges are in contact with the trochantric and gluteal ridges, respectively. 40

10. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame means, means for temporarily affixing said frame means to the femur, said 45 frame being formed with a fixed drill guide, a universally adjustable drill guide mounted on said drill frame means and a removable collet for said universally adjustable drill guide.

11. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame means, a curved supporting edge on said frame means shaped for engagement with the lower trochantric border of a femur, additional supporting means including a 55 supporting edge positioned with respect to said curved supporting edge so as to be engageable with the gluteal ridge of said femur when the curved edge is in engagement with the lower trochantric border, means for temporarily attaching said 60 frame means to said femur, and a drill guide formed on said frame means.

12. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame means, a curved supporting edge on said frame shaped for engagement with the lower trochantric border of a femur, additional supporting means including a supporting 70 edge positioned with respect to said curved supporting edge so to be engageable with the gluteal ridge of said femur when the curved edge is in engagement with the lower trochantric border, means for temporarily attaching said frame 75 means to said femur, a drill guide formed on said frame means, a second drill guide supported on

said frame, said support comprising a ball joint with said frame means, and means for locking said ball joint support to prevent movement of said second drill guide.

- 5 13. A surgical instrument for use in the fixation of fractures of the neck of the femur comprising a drill frame means, a curved supporting edge on said frame means shaped for engagement with the lower trochantric border of a femur, additional supporting means including a supporting edge positioned with respect to said curved supporting edge so as to be engageable with the gluteal ridge of said femur when the curved edge is in engagement with the lower trochantric border, and a drill guide formed on said frame means.
- 10 14. A surgical instrument for use in the fixation of fractures of the neck of the femur com-

prising a drill frame means, a curved supporting edge on said frame means shaped for engagement with the lower trochantric border of a femur, additional supporting means including a supporting edge positioned with respect to said curved supporting edge so as to be engageable with the gluteal ridge of said femur when the curved edge is in engagement with the lower trochantric border, said frame being formed with a handle for easy location of the frame with respect to the lower border of the trochanter and gluteal ridge, and a drill guide formed on said frame means and oriented with respect to the curved supporting edge of the frame and the edge of said supporting means so as to guide the drill through the femur neck.

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