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BONE REDUCING TOOL

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This invention relates to new and useful improvements in bone reducing tools, and has particular reference to a tool whereby the fragments of a broken bone may be firmly grasped and brought into proper alignment.

The principal object of the present invention is the provision of a bone reducing tool comprising a pair of clamps each having rotatable jaw members and adapted to engage a bone respectively at opposite sides of a fracture therein, and an adjustable connection between said clamps. Said rotatable jaws permit full angulation and relative movement of the bone fragments with the clamps in position thereon, with a minimum of trauma or injury to the bone cortex.

Another object is the provision of a bone reducing tool of the class described, wherein the jaw members are carried by the clamps for both rotational and universal pivoting movement.

A further object is the provision, in a bone reducing tool of the class described, of a pair of clamps and an adjustably extendable member connected respectively at its ends to said clamps for universal pivoting movement.

Other objects are simplicity and economy of construction, dependability, and ease and convenience of manipulation.

With these objects in view, as well as other objects which will appear in the course of the specification, reference will be had to the drawing, wherein:

Figure 1 is a side elevational view of a bone reducing tool embodying the present invention, with parts broken away.

Fig. 2 is a plan view of the tool shown in operative relation to a broken bone.

Fig. 3 is an enlarged section taken on the line III—III of Fig. 2, with parts left in elevation, and with the bone omitted.

Fig. 4 is an enlarged fragmentary section taken on line IV—IV of Fig. 2, with the bone omitted.

Fig. 5 is a fragmentary view showing the face of one of the circular jaw members.

Fig. 6 is a view similar to Fig. 4 showing a modified form of jaw.

Fig. 7 is a fragmentary section taken on line VII—VII of Fig. 6.

Like reference numerals apply to similar parts throughout the several views, and the numeral 2 applies to each of two like clamps, each of said clamps including two elongated body members 4 and 6 arranged to cross intermediate their ends and, as best shown in Fig. 3, pivotally connected at their point of intersection by means of a cylindrical bearing pin 8. Said bearing pin is pro-

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vided at one end with a flange 10 disposed adjacent the outer surface of one of said body members, and being provided with a threaded axial bore extending inwardly from its opposite end for receiving screw 12, the head of said screw bearing against the end of pin 8 and overlapping the outer surface of the associated body member. The corresponding end portions of body members extending in one direction are formed to present hand grips 14, and the oppositely extending ends of said body members for jaw supporting arms 16.

In the preferred form shown in Figs. 1 to 5, a circular jaw 18 is carried at the inner surface of each arm 16 adjacent the free end thereof, said jaws being substantially coaxial and disposed about an axis at right angles to arms 16. Each jaw 18 is attached to the associated arm by means of a shouldered rivet 20 rigidly fixed in arm 16 and extending axially inwardly through a loosely fitting central hole 22 provided therefor in said jaw. Said rivet is provided at its inner end with an enlarged head 24 which is normally spaced apart from the recessed inner surface of said jaw. The outer surface 26 is substantially spherical, and is adapted to rest against the flat inner surface 28 of arm 16, as best shown in Fig. 4. Each jaw 18 is formed to present a plurality of pointed teeth 30 projecting from the inner surface thereof, and spaced about the peripheral edge thereof. Said teeth are adapted to bite into and grip a bone 32 firmly when the clamp is applied thereto as shown in Fig. 2. Due to the loose fit of each jaw on its rivet 20, and since the spherical outer surface 26 of each jaw rests on arm 16, the jaws are free both to rotate and to pivot universally to a limited degree. Thus the jaws may accommodate themselves to a bone having a tapered or irregular surface, and also clamp body members 4 and 6 may be turned relative to said pins for a purpose hereinafter appearing.

An arcuate threaded member 34 is pivotally attached at one end to one of hand grips 14 in spaced relation from pivot 8, by means of pivot pin 36, and extends through a loosely fitting slot 38 formed in the other of said hand grips. A knurled lock nut 40 is carried on the extended end of said threaded member, and is adapted to be brought against the outer surface of the associated hand grip to secure the clamp in its bone gripping position. It will be noted that lock nuts 40 are disposed immediately forwardly from the normal position of the hands of the operator on hand grips 14, and hence may be conveniently manipulated by the operator.