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MEANS FOR EXTRACTING THE NAIL USED
FOR THE INTRAMEDULLARY FIXATION
OF A FRACTURED BONE
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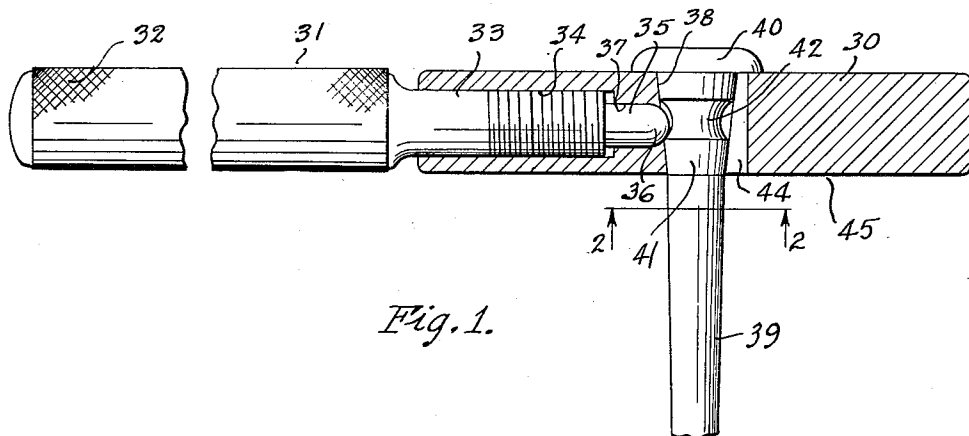


Fig. 1.

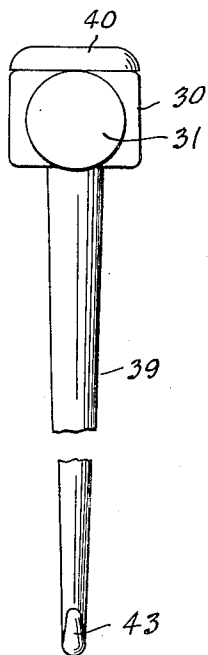


Fig. 2.

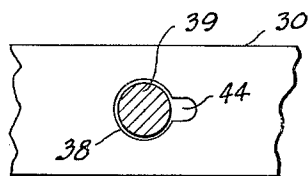


Fig. 3.

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MEANS FOR EXTRACTING THE NAIL USED
FOR THE INTRAMEDULLARY FIXATION
OF A FRACTURED BONECharles Andrew L. Bassett, New York, N. Y., and
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5 Claims. (Cl. 128—92)

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This invention relates to means for the intramedullary fixation of fractured bones, particularly by the Küntscher method, and has for an object to provide an improved and simplified extractor means for the nail used for intramedullary fixation.

A further object is to provide an improved and simplified means for facilitating extraction of the nail.

With the foregoing and other objects in view, we have devised the construction illustrated in the accompanying drawings forming a part of this specification. It is, however, to be understood the invention is not limited to the specific details of construction and arrangement shown, but may embody various changes and modifications within the scope of the invention.

In these drawings:

Fig. 1 is a partial side elevation and partial section of the improved extractor means for the nail;

Fig. 2 is an end view looking from the left of Fig. 1; and

Fig. 3 is a transverse section substantially on line 2—2 of Fig. 1.

In the intramedullary fixation of fractured bones, a suitable opening is drilled or otherwise formed in the fractured bone and the proper size of nail driven through the opening to follow the marrow cavity across the fracture and maintain the fractured bone in proper position and alignment for the knitting or healing operation, and after the fracture has properly knitted or healed the nail is extracted. It will be evident that the operations of properly driving the nail and later extracting it are delicate and highly skilled operations, and it is an object of this invention to provide improved devices for effecting the fixation and facilitating the operation of performing it, and to reduce the danger of injury to the bones and surrounding parts and not interfere with the healing operation.

An improved extractor for withdrawing or extracting the nail is shown in Figs. 1, 2 and 3. Considerable force is required to extract or back the nail out from the bone after it has remained in it for an extended period. The device shown makes it possible to develop a large amount of pull on the nail, and the use of a free hammer blow for this purpose. It comprises a body 30, preferably of stainless steel, although it could be of tool steel or similar material, and it also is preferably rectangular in cross section, as shown in Fig. 2, and a handle or hand grip 31. This hand grip is knurled as shown at 32 to in-

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crease the grip and it is reduced at 33 and threaded so it can be screwed into a threaded passage 34 from one end of the body 30. A free end is further turned down, as shown at 35, to form a rounded or ball point 36 extending through the passage 37 into a transverse tapered opening 38 in the body 30. This tapered opening is to receive a tapered hook member 39 having a button shaped head 40 and a tapered neck 41 seated in the tapered opening 38, and this neck is provided with a peripheral or annular groove 42 to receive the rounded end 36 of the handle member. The hook comprises a tapered shank terminating in a small end bent into the form of a hook 43. The rounded or ball point 36 by cooperation with the concave groove, and also with the tapered opening 38 and neck 41, locks the hook in different positions. At one side of the tapered opening 38 is provided a transverse slot or groove 44 to permit the hook to pass through the opening.

This structure permits easy removal or disassembly of the hook for the purpose of dismantling the tool for cleaning purposes, and it also permits location of the hook 43 at any desired angle to the handle 31 and block 30. In extracting the nail this hook is inserted through the opening at the outer end of the nail and then by hammer blows on the inner wall 45 of the block on the opposite side of the nail from the handle the nail can be readily withdrawn while being guided by the handle, and as the blow is on the opposite side of the nail from the handle the extractor can be readily held in proper position and there is no objectionable blow or jar transmitted to the hand. It also effectively prevents tipping action under action of the blow. As the hook 43 can be turned to any angle the device can be attached to the nail from any side. In driving, a nail may be started with the extractor opening in any given position or direction, but because of configuration of the trabeculae in the bone cavity the nail may rotate while being driven, thus shifting the hole or opening into another position from that in which it was started. This construction of the extractor permits the use of the hook in any position, so that turning of the nail can be compensated for.

After the bone is properly knitted and healing has sufficiently progressed, the nail is removed by means of the extractor, the hook 43 being inserted in the opening in the nail and the nail extracted by hammer blows on the body 30 of the extractor, as described above. This nail is a material improvement over the old forms, as are also the awl, the driver for the nail and the

extractor, greatly facilitating the proper fixation of the fracture, and favoring and facilitating the knitting and healing.

Having thus set forth the nature of our invention, we claim:

1. In the intramedullary fixation of fractured bones which includes the driving of a nail longitudinally in the narrow cavity, an extractor for removing the nail comprising an elongated body provided with a transverse opening intermediate the ends thereof, a hook member provided with a shank in said opening and bent into a hook at its outer end, a hand grip threaded into one end of the body for longitudinal movement relative to the body, cooperating means on the inner end of the hand grip and the shank for locking the shank in the body arranged to become effective and ineffective by longitudinal movement of the hand grip by said threaded means, and said body forming a striking block for a hammer to provide the force for extracting a nail connected to the hook.

2. In the intramedullary fixation of fractured bones which includes the driving of a nail longitudinally in the marrow cavity, an extractor for removing the nail comprising an elongated body provided with a transverse opening intermediate the ends thereof, a hook member provided with a shank mounted to turn in the opening and bent into a hook at its outer end, a hand grip threaded into one end of the body and provided with a rounded inner end extending to said opening, said shank of the hook member being provided with a peripheral groove to receive said rounded end to lock the hook member in the body, and said body forming a striking block for a hammer to provide the force for retracting a nail connected to the hook.

3. In the intramedullary fixation of fractured bones which includes the driving of a nail longitudinally in the marrow cavity, an extractor for removing the nail comprising an elongated body provided with a transverse tapered opening intermediate the ends thereof, a hook member provided with a similarly tapered shank in said opening having a peripheral groove and a head adjacent the shank engaging one side of the body, said member being bent into a hook at its outer end, a hand grip threaded into one end of the body and provided with a rounded inner end to seat in said groove to lock the hook member in the body, and said body forming a striking block for a hammer to provide the force for extracting a nail connected to the hook.

4. In the intramedullary fixation of fractured bones which includes the driving of a nail longitudinally in the marrow cavity, an extractor for removing the nail comprising an elongated body

provided with a transverse opening intermediate the ends thereof, a hook member provided with a shank in said opening and bent into a hook at its outer end located at one side of the body, a hand grip at one end of the body, means connecting the hand grip to the body for longitudinal movement of the hand grip with respect to the body, means controlled by said longitudinal movement of the hand grip for detachably securing the shank in the opening, and said body forming a striking block for a hammer to provide a force in a direction longitudinally of the hook member and transversely of the body for extracting a nail connected to the hook.

5. In the intramedullary fixation of fractured bones which includes the driving of a nail longitudinally in the marrow cavity, an extractor for removing the nail comprising an elongated body including a unitary block provided with a transverse opening intermediate the ends thereof, a hook member provided with a shank in said opening and bent into a hook at its outer end located at one side of the body, a hand grip at one end of the body, means connecting the hand grip to the body permitting relative movement of the hand grip with respect to the body, cooperating means on the hook member and hand grip made effective and ineffective by said movements of the hand grip to detachably secure said member in the opening, and said body on the opposite side of the hook member from the hand grip being extended beyond the shank to form a striking block forming means to receive the blow of a hammer in a direction laterally of the block and longitudinally of the hook member for extracting a nail connected to the hook.

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