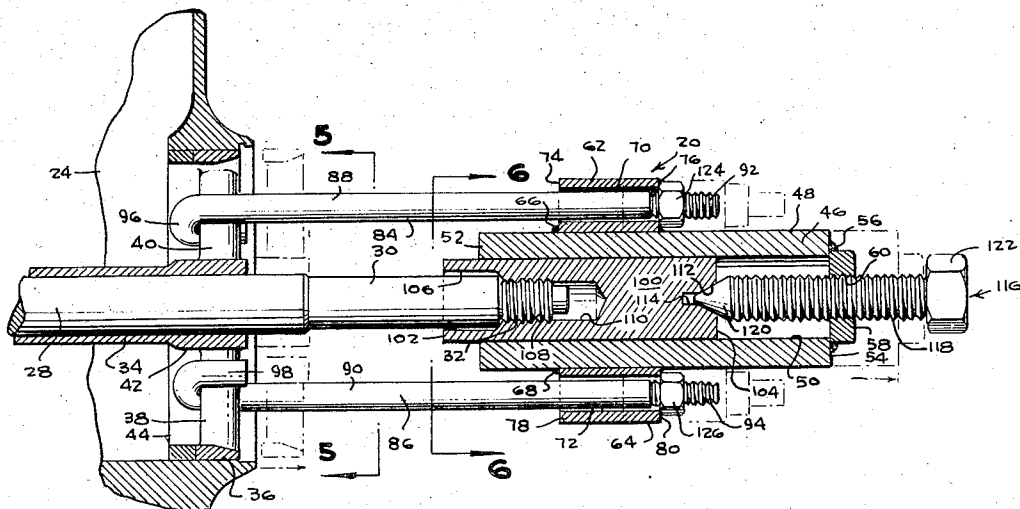
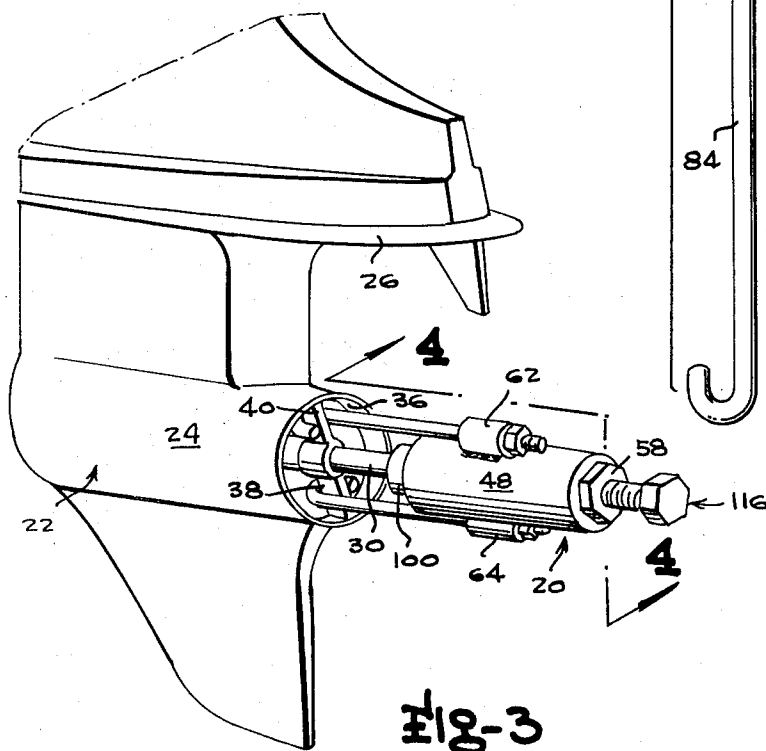
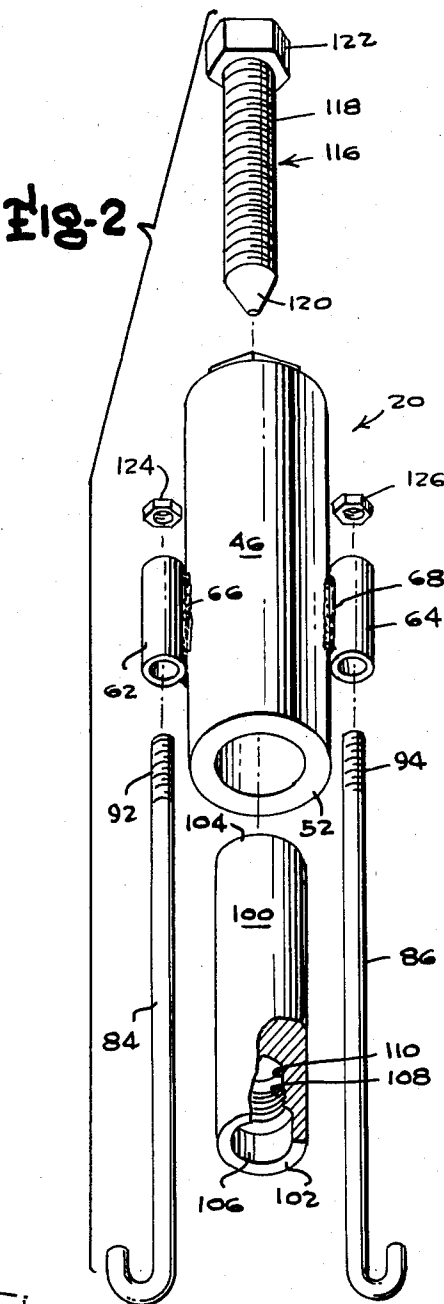
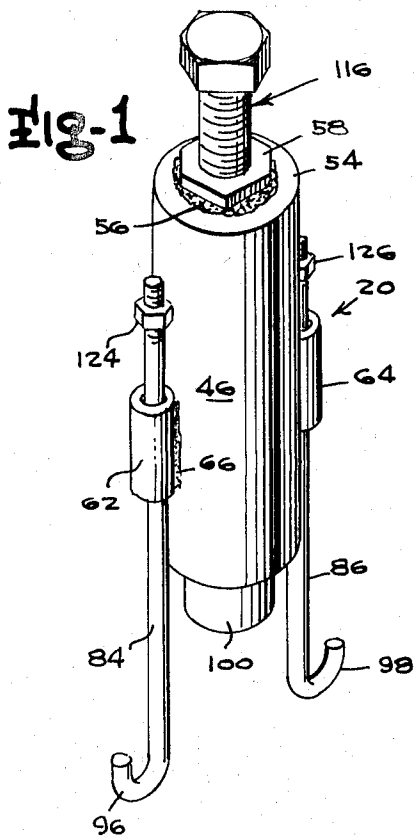
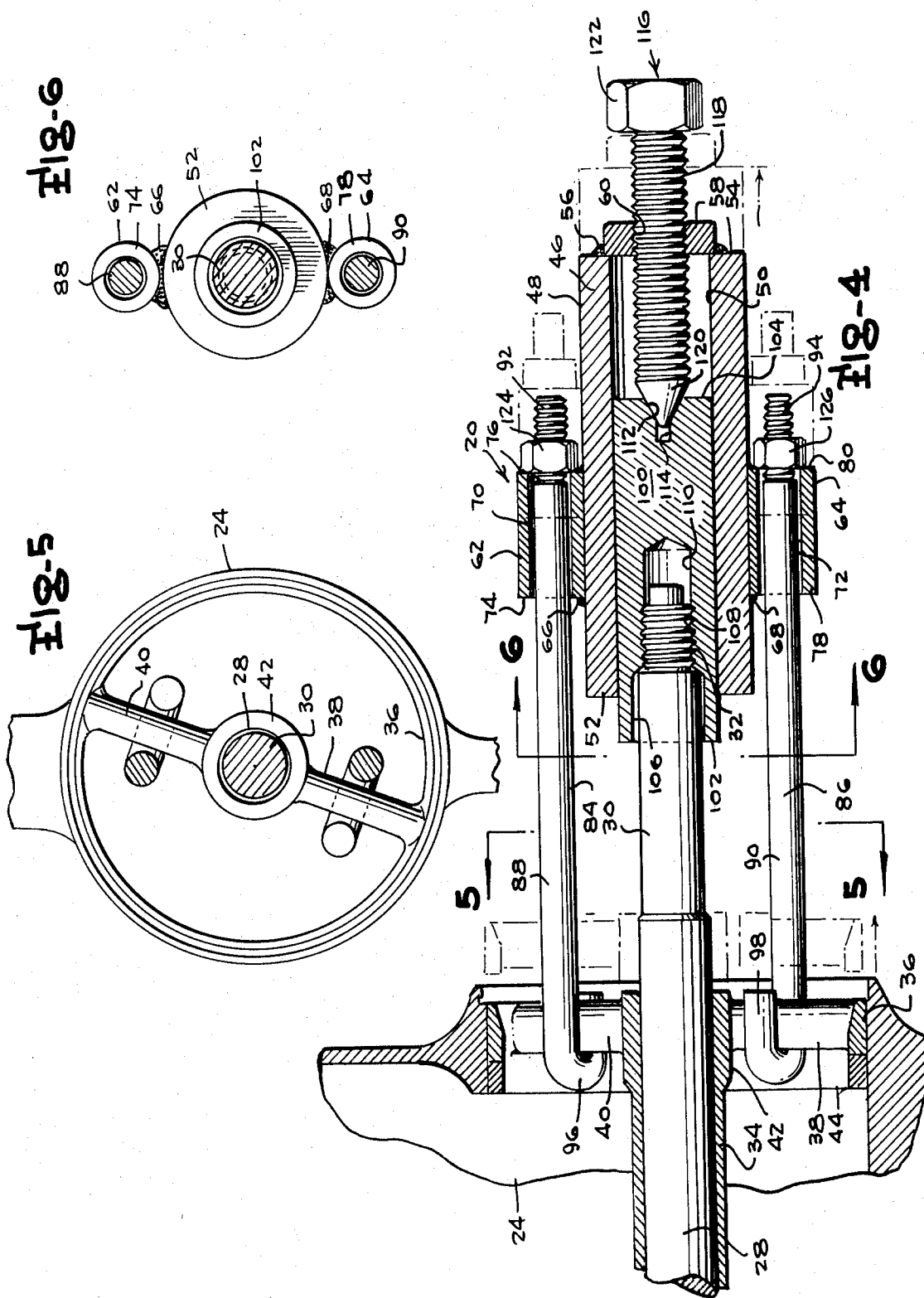








PULLER FOR BEARING CARRIER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to that category of special purpose tool employed in the extraction of a component from a housing, and more particularly to outboard motor lower unit service tools.

2. Statement of Prior Art

Prior patents dealing with extractor tools are representatively shown in the below listed prior U.S. Patents:

Patent No.	Patentee	Issued
1,258,699	J. Neumaier	March 12, 1918
1,347,809	G. E. Frisz and J. D. Wiltshire	July 27, 1920
1,478,648	J. Grahek	December 25, 1923
3,594,890	Harold E. Cordell	July 27, 1971

SUMMARY OF THE INVENTION

Outboard marine engine and engine drive lower units involve a fixed position shaft for the propeller. Such shaft is retained in the lower unit housing by a bearing carrier of elongated form, the bearing having a diametrically outwardly extended web with a ring bearing against the housing wall. Extraction of the bearing is a very difficult undertaking, particularly after extended use or other malfunction. The present invention provides a tool for extraction of the bearing carrier which insures correct linear removal without damage of the components. The removal operation is one in which the tool extracts the carrier while maintaining pressure against the propeller shaft.

The features of construction of the extraction tool are such that the tool is readily adapted to units having different shafts by substitution of components without extensive disassembly of the tool.

The tool is uncomplicated in operation and is inexpensive to fabricate and sell. Other and further objects and advantages of the invention will become apparent to those skilled in the art from a consideration of the following specification when read in conjunction with the annexed drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a tool constructed and assembled in accordance with the teachings of this invention;

FIG. 2 is an enlarged disassembled view of the tool from a lower perspective;

FIG. 3 is a fragmentary view showing the tool on reduced scale;

FIG. 4 is an enlarged longitudinal cross section taken substantially on the line 4—4 of FIG. 3, looking in the direction of the arrows and illustrating the tool movement in phantom lines;

FIG. 5 is a sectional view showing details on line 5—5 of FIG. 4; and

FIG. 6 is another detail sectional view on line 6—6 of FIG. 4.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to the drawings in more detail, the tool

hereof is therein identified generally by reference character 20. The proposed environment of use is best shown in FIGS. 3 through 5 wherein the tool is shown as employed in the extraction of the bearing carrier assembly of the lower unit 22 of an outboard motor. While the implement is adapted for use in other and different circumstances its manner of operation is best understood by reference to this specific example. Here, the lower unit includes a housing 24 below the cavitation plate 26. The engine shaft is coupled via gearing (not shown) to a propeller shaft 28, having a reduced projecting end 30. On the end 30 is a threaded extension 32. The propeller shaft is normally maintained in fixed position by the gearing and other unillustrated components, and the shaft is journaled in an elongated, tubular bearing 34. The bearing is retained in place in the housing by a bearing carrier comprising a ring 36 which is press-fit within the housing, and having a web consisting of diametric arms 38 and 40 which extend from the ring 36 to an enlarged end 42 of the bearing. The ring seats against a carrier stop ring 44. As indicated above, such components vary somewhat as between outboard motor assemblies of different type and design, and that selected for inclusion herein has been provided by way of illustrative example only.

The implement 20 hereof is particularly adapted to the extraction of the bearing carrier assembly from the housing. To this purpose, the implement 20 comprises an elongated tubular main sleeve 46 formed of heavy metallic stock and including an outer side 48 and an inner side 50, the latter defining a longitudinal slideway. From the standpoint of orientation, the main sleeve has an inward open end 52, and an opposite outward end 54. Affixed to the outward end 54, as by welding 56, is a nut member 58 having a threaded bore 60 which is substantially co-axial with the slideway of the main sleeve.

Fixedly secured to the outer side 48 of the main sleeve intermediate the ends thereof and at substantially diametrically opposite positions are secondary sleeve members 62 and 64. The secondary sleeve members are anchored by welds 66 and 68 or the like, and each is of tubular form having a passageway, 70, 72, respectively, formed therein. The secondary sleeves are open at each of their ends 74, 76 and 78, 80, and the passageways thereof are substantially parallel to the slideway of the main sleeve.

Elongated hook members 84 and 86 are provided for use in association with the secondary sleeve members. Each hook member is of heavy metallic construction and includes an elongated shaft 88, 90 having a threaded distal end 92, 94 and an opposite proximal reverted end 96, 98, the latter forming hooks.

Disposed slidably within the main sleeve 46 is a thrust member 100 having a first end 102 and a second end 104. Formed in the thrust member and opening on the first end thereof is a compound chamber having a first, smooth wall section 106, a reduced second threaded portion 108, and a smooth third portion 110. Similarly, the second end of the thrust member is provided with a socket having a tapered entry section 112 and a well 114.

It will be understood that the particular design of the thrust member 100 is variable, and the tool is preferably furnished with interchangeable thrust members with openings in the end 102 to accommodate various types of outboard motor shaft.

The implement 20 further comprises a thrust actuator 116 comprising an elongated outwardly threaded shaft 118 threadably engaged in the bore 60 of the nut 58, the shaft having a pointed smooth end 120 which is abutted movably against the tapered entry section 112 of the thrust member 100. On the remote end of the shaft 118, exteriorly of the nut 58, is a head 122.

Operation involves initial engagement of the thrust member 100 with the fixed propeller shaft, effected in this example of the invention by the interconnection of the threaded extension 32 of the shaft with the second threaded portion 108 of the chamber thereof. The hook ends 96 and 98 of the hook members are engaged over the arms 38 and 40 of the bearing web in opposite hand fashion. The shafts 84, 86 extend through the secondary sleeves and nuts 124 and 126 are employed to tighten the same in place. Thereafter torque is applied to the head 122 of the thrust actuator via a wrench or like tool. The end 120 of the thrust member rotates against the entry section 112 of the thrust member which is fixed longitudinally by its connection with the shaft. As the thrust actuator is moved inwardly, the bearing carrier is withdrawn as indicated by the phantom lines in FIG. 4.

I claim:

1. An implement for extraction of a component being positioned about a fixed shaft, the implement comprising:

- an elongated tubular main sleeve including a sleeve outer side, the sleeve having an inward end and an outward end and the sleeve defining a slideway;
- a nut member, having a threaded bore formed therein, said bore being axially aligned with the slideway; the nut member being fixedly mounted at the outward end of the sleeve;
- a pair of secondary sleeve members of tubular form fixedly secured to the outer side of the main sleeve at substantially diametrically opposite locations thereon;

the secondary sleeve members having passageways therein arranged substantially parallel to the slideway of the main sleeve;

hook members, each including an elongated shaft, a hook end and an opposite threaded end, the shafts extending through the secondary sleeves, and having nuts engaged on the threaded ends thereof with the hook ends projecting forwardly of the inward end of the main sleeve, the hook members engaging said web;

a thrust member slidably positioned in the slideway, the thrust member having a first end extended in the direction of the inward end of the main sleeve, and a second end extending toward said nut member;

a thrust actuator comprising a threaded shaft contacting the second end of the thrust member, the shaft being threadably engaged in the nut member, rotation of the threaded shaft forcing the thrust member against said fixed shaft and causing the withdrawal of the web from the housing;

the first end of the thrust member has a chamber formed therein with a threaded chamber section; and

the fixed shaft is outwardly threaded for connection with said chamber section.

2. The invention of claim 1, wherein:

the hook ends of the hook members are oppositely disposed for engagement with the web.

3. The invention of claim 1, wherein:

the main sleeve is of a length greater than the thrust member.

4. The invention of claim 1, wherein:

the second end of the thrust member has a socket formed therein;

the threaded shaft is provided with means rotatable in said socket and engaging against the socket for the application of force thereto.

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