

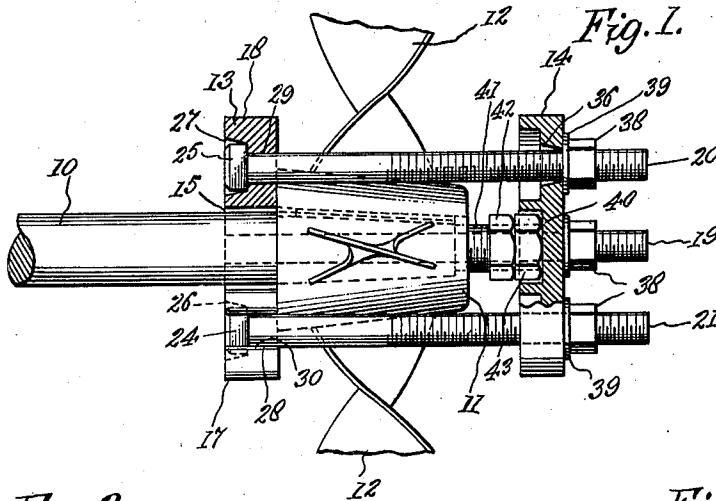
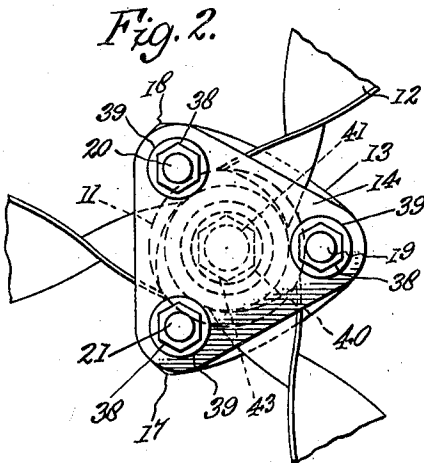
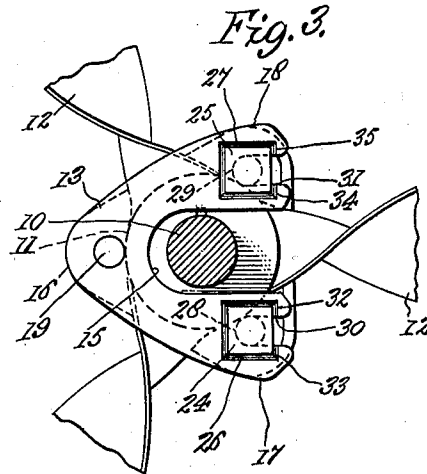
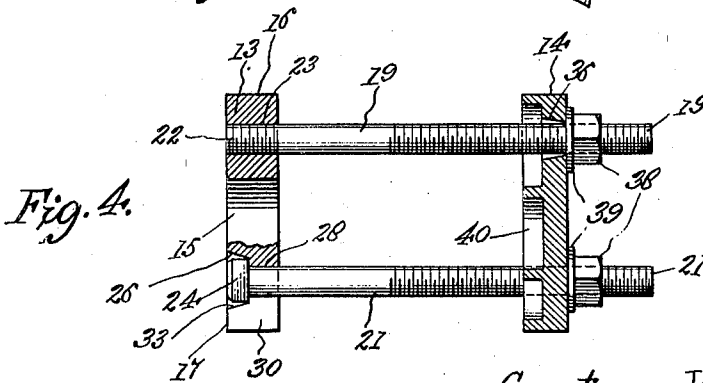
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PROPELLER PULLER

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PROPELLER PULLER

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1 Claim. (Cl. 29—85)

The present invention relates to improvements in propeller pullers and more particularly relates to an improved device for dislodging, and possibly also removing from its shaft, the propeller such as used in marine propulsion, although the invention is applicable to airplanes, wheel pullers and the like.

An object of the invention is to simplify the construction of previous devices intended for a similar purpose, and to consequentially render it an easier matter for the application of the device to the shaft and to the hub of the propeller.

It is a further object of the invention to provide an improved device for starting propellers from their jammed position on the propeller shaft in which the construction is rugged and economical and whereby the parts are capable of quick and easy assembly and disassembly.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claim appended hereto.

In the drawing, wherein like symbols refer to like or corresponding parts throughout the several views.

Figure 1 is a fragmentary side view of a propeller and its shaft showing the improved puller partly in section and partly in elevation as applied in its initial position.

Figure 2 is an end view looking from the right end of Figure 1.

Figure 3 is an end view looking from the left end of Figure 1, and

Figure 4 is a sectional view taken through the improved pulley apart from the propeller and its shaft.

Referring more particularly to the drawing, 10 designates a propeller shaft, 11 the hub of the propeller and 12 the blades of the same.

In the instance shown, as seen in Figure 2, the propeller has three blades 12 radiating from the hub 11 and is of a well known type of marine propeller.

In practice the propeller hub 11 is provided with a tapered bore and keyway fitting snugly to propeller shaft 10 which is also tapered as indicated in Figure 1 to receive the tapered bore of the hub 11. The tapered end of propeller shaft 10 is also provided with keyway and key to receive said hub 11. The propeller shaft is further provided with a threaded end 41 to receive the nut 42 and the lock nut 43 for holding propeller hub tightly on the propeller shaft.

The improved puller comprises generally two plates 13 and 14. The plate 13, illustrated most clearly in Figure 3, is of a U-shape or a horse-shoe form having a slot 15 to be received over the shaft 10 with a closed end 16 forming a yoke and an open end opposite the yoke so that legs 17 and

18 are open at the right hand side but closed by the yoke 16 at the opposite side. The general configuration of the plate 13 is triangular as indicated in Figure 3. Its corner portions are intended to be disposed opposite the spaces between adjacent propeller blades 12. The plate 13 is of a width or diameter greater than the hub 11 so as to properly connect with the bolts 19, 20 and 21. The bolt 19 has a threaded end 22, as best seen in Figure 4, for the purpose of screwing into a threaded opening 23 made in that corner or angle portion of the plate 13 which occurs at the yoke 16. After being screwed into the opening 23, the bolt 19 is irremovably and non-rotatably secured in this opening. The bolt 19 is therefore permanently associated with plate 13.

The other two bolts 20 and 21 are removably associated with plate 13. These bolts are formed with heads 24 and 25 square or of some other straight line configuration. These bolts are intended to occupy sockets 26 and 27 formed in the outer face of the plate 13 and extending about the openings 28 and 29 which are made through the plates to accommodate the shanks of the bolts 20 and 21. The sockets 26 and 27 are also straight lined or have straight walls agreeing in number with the straight walls of the heads 24 and 25 whereby the heads 24 and 25 are snugly and non-rotatably, yet removably, received into such sockets.

The socket 26 and its opening 28 communicate with a slot 30 opening out through the free edge of the leg 17. The other socket 27 and its opening 29 communicate with a slot 31 opening out through the free edge of the leg 18. The slots 30 and 31 are inferior in width to the adjacent straight side of the bolt heads 24 and 25 so that shoulders 32 and 33 are formed at the sides of the opening 28 to prevent bolt head 24 from escaping outwardly in the direction of slot 30; and shoulders 34 and 35 are similarly situated with respect to the slot 31 for preventing bolt head 25 from escaping outwardly in that direction.

The bolts are threaded throughout major portions of their lengths and at their opposite ends extend through plain openings 36 in a plate 14. Nuts 38 are threaded on the bolts 19, 20 and 21 and washers 39 are preferably fitted loosely over the bolts and between the nuts and the outer face of the plate 14.

As shown to advantage in Figure 2, the plate 14 is also of triangular form. In the corner or angle portions are the openings 36. The corner or angle portions extend out radially a suitable distance so as to enable the bolts 19, 20 and 21 to clear the hub 11 of the propeller. In the center of the inner face of plate 14 is a socket 40 to receive the end of the propeller shaft 10 and if desired locknut 43.

In the use of the device, by shifting the bolts 20 and 21 in a direction to remove their heads 24 and 25 from the sockets 26 and 27, the shanks of such bolts may be shifted out through slots 30 and 31 thus disconnecting the bolts entirely from plate 14. The bolt 19 however is permanently associated with plate 13. By removing the nuts 38 and the washers 39 from the bolts, the plate 14 may simply be pulled completely off all three bolts. In other words the plate 13 with its permanent bolt 19 remains in one part and may be applied to the propeller shaft 10 by fitting the U-shape plate 13 over shaft 10, the shaft being received through the open side of the slot 15. This is done in the position of the plate 13 and its connected bolt 19 that will enable the bolt 19 to clear the blades 12, thereupon the plate 13 may be slid along the shaft 10 enabling the bolt 19 to slip along the outside of the hub 11 between two adjacent blades 12 of the propeller. Thereupon the other two bolts 20 and 21 are fitted through adjacent gaps between propeller blades and engaged with the plate 13 by inserting the shanks of the bolts through the slots 30 and 31 and thereafter drawing the bolts axially to require the heads 24 and 25 thereof to enter the sockets 26 and 27; whereby the bolts become non-rotatable and cannot escape from plate 13. The companion plate 14 is therefore slipped over the three threaded ends of the bolts 19, 20 and 21 and brought up to a position with its socket 40 receiving the end of shaft 10, as shown in Figure 1. The washers 39 and nuts 38 are then put upon the bolts and tightened up.

As shown in Figure 1, the plate 13 will engage against the inner end of the propeller hub 11. When the nuts 38 are tightened, therefore, the plate 13 will be pulled in a right hand direction, that is in the direction of the plate 14 which is held stationarily by its impingement against shaft end 10. Thus the propeller hub 11 will be forced along shaft 10, dislodging the same from its tight engagement with the shaft. As soon as it has been loosened the entire puller may be removed and the propeller lifted off the shaft.

In removing the device, the nuts 38 are run off the ends of the bolts and removed with the washers 39, the plate 14 then being pulled off the threaded bolt ends. The bolts 20 and 21 are then shifted inwards in an axial direction along shaft 10 until their heads disengage the sockets 26 and 27, the bolts 20 and 21 being thereupon moved outward from shaft 10 thus freeing the same entirely from the horse-shoe shaped plate 13 which is thus free to be withdrawn in the radial direction occupied by the permanent bolt 19. By having the permanent bolt 19 engaged permanently with the yoke or closed side 16 of the slot 15, and opposite to the open side or mouth of the slot 15, the plate 13 with its permanent bolt 19 may be moved into and out of position by simply a direct radial movement of these parts with the permanent bolt 19 entering the space between adjacent propeller blades 12 and the open mouth of slot 15 presented to shaft 10. In this way it will not be necessary to fit the plate 13 to the shaft 10 at a point so far to the left of Figure 1 as to enable bolt 19 to escape the propeller, and thereupon shift the whole device to the right until plate 13

abuts against hub 11. The slots 30 and 31 are also arranged in directions in which the bolt shanks 20 and 21 may be easily removed from plate 13 without being in any way interfered with by the hub 11 or the blades 12 of the propeller. In this way the device lends itself to being put in position and removed in cramped spaces.

It will be appreciated from the foregoing that the invention involves a practical tool for quickly and safely removing boat propellers from propeller shafts and that the device is constructed to withstand considerable strain, being fabricated in such manner as to make it possible to slip the tool sidewise over propeller and shaft. To loosen the propeller it is first necessary to back off the propeller shaft nut. Propeller puller is thereupon placed in position as described, and by tightening the nuts the necessary pull is created to loosen the propeller.

The propeller puller may of course be varied; by re-spacing the location of bolts. This tool can be made to remove two, three or four blade propellers.

Inasmuch as the sockets for the bolt heads prevent the bolt heads from turning when the nuts are being tightened or loosened, this arrangement of the heads and sockets will prevent the propeller puller from falling off the propeller and propeller shaft when the propeller has been loosened, thus making it possible to use this puller even while the boat is in the water, and obviating the necessity of drydocking for propeller removal.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claim.

What is claimed is:

A puller for removing propellers from their shafts comprising a substantially U-shaped plate having a central opening with a lateral slot opening through the edge of said plate, said slot adapted to receive a propeller shaft therein, a bolt permanently connected with the plate at a point substantially opposite said slot, said plate also having openings at opposite sides of the plate and slots communicating with said openings and opening through the edges of the plate, said plate having substantially rectangular seating portions within said openings and slots, headed bolts having shanks for engaging through the slots into said openings, the heads of the bolts being substantially rectangular and adapted to removably but non-rotatably fit in said openings and seating portions, a second plate having a central flanged portion for fitting against the end of the shaft, said second plate having openings for freely receiving said bolts, the bolts removably fitted in the first mentioned plate being adapted, when removed, to be drawn outwardly through the openings of the second plate whereby an unobstructed space is provided between the first and second plates, and movable means on the bolts engaging said second plate for drawing the first plate toward said second plate.

GUSTAVE WALTER. 70