May 29, 1928.

1,671,387

E. W. TROTMAN

OUTBOARD MOTOR INSTALLATION

Filed Nov. 15, 1927

3 Sheets-Sheet 1

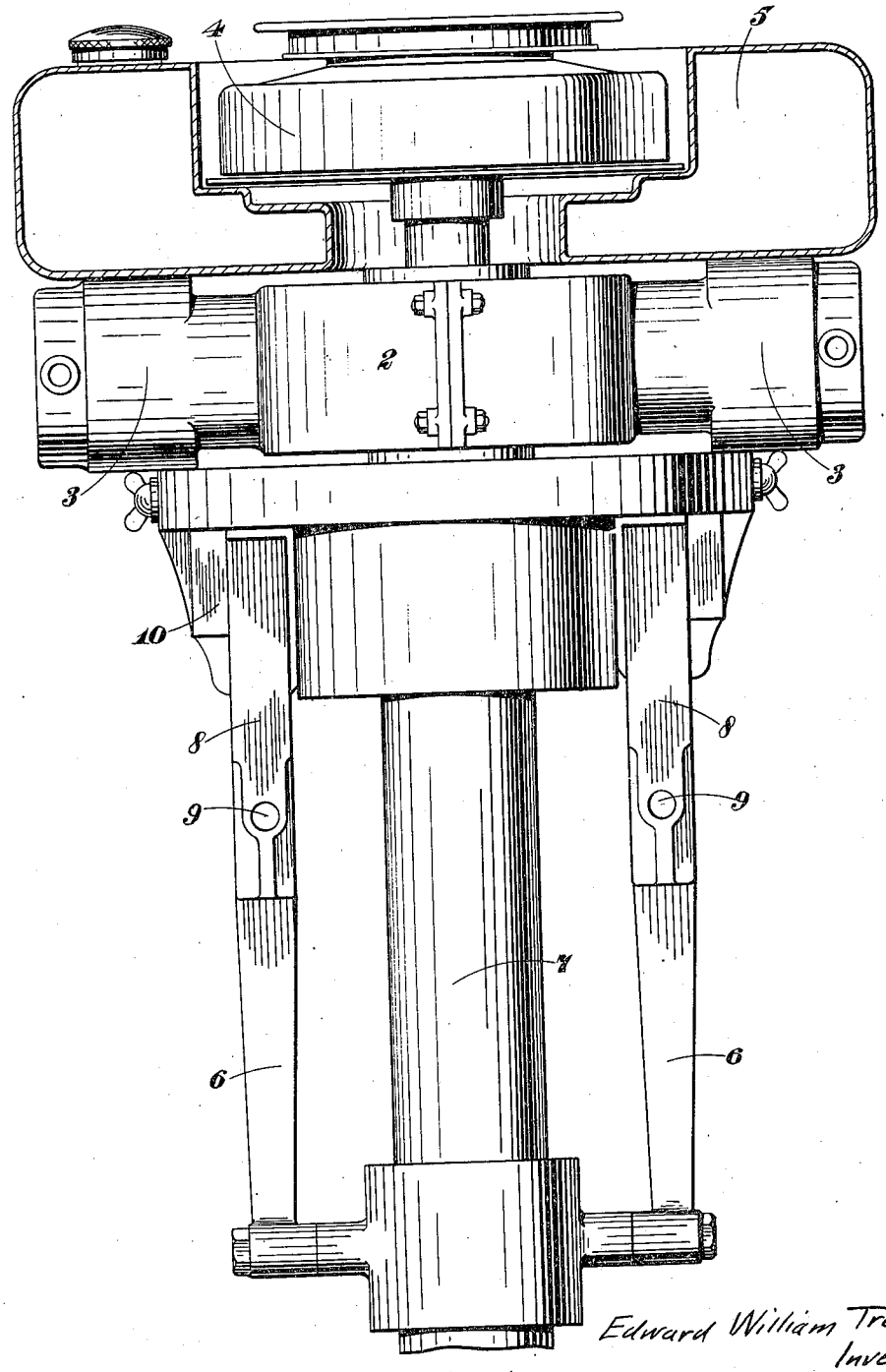


Fig. 1.

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By Edwin Dawkins
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OUTBOARD MOTOR INSTALLATION

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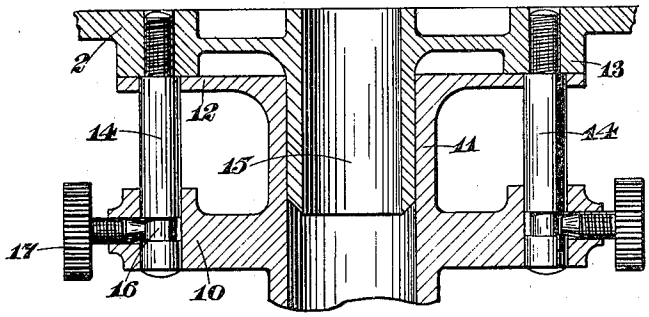


Fig. 2.

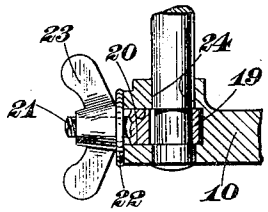


Fig. 3.

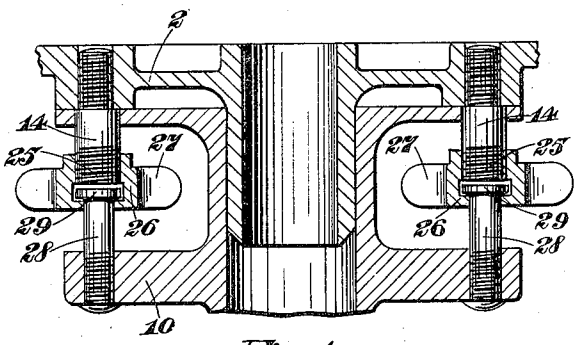


Fig. 4.

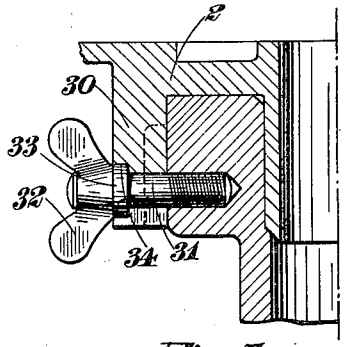


Fig. 5.

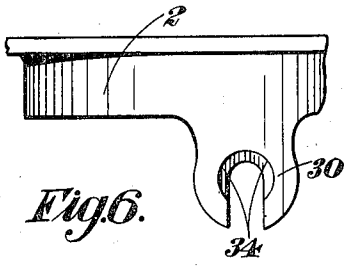


Fig. 6.

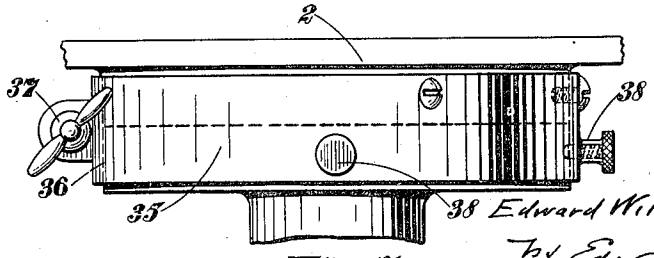


Fig. 7.

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OUTBOARD MOTOR INSTALLATION

Filed Nov. 15, 1927 3 Sheets-Sheet 3

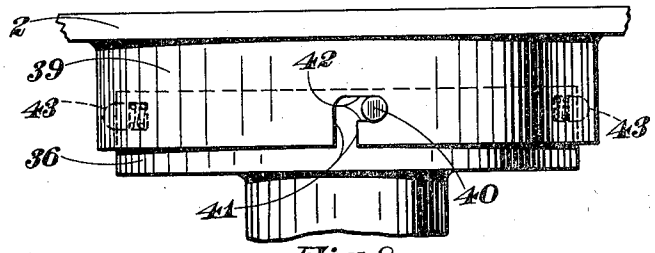


Fig. 8.

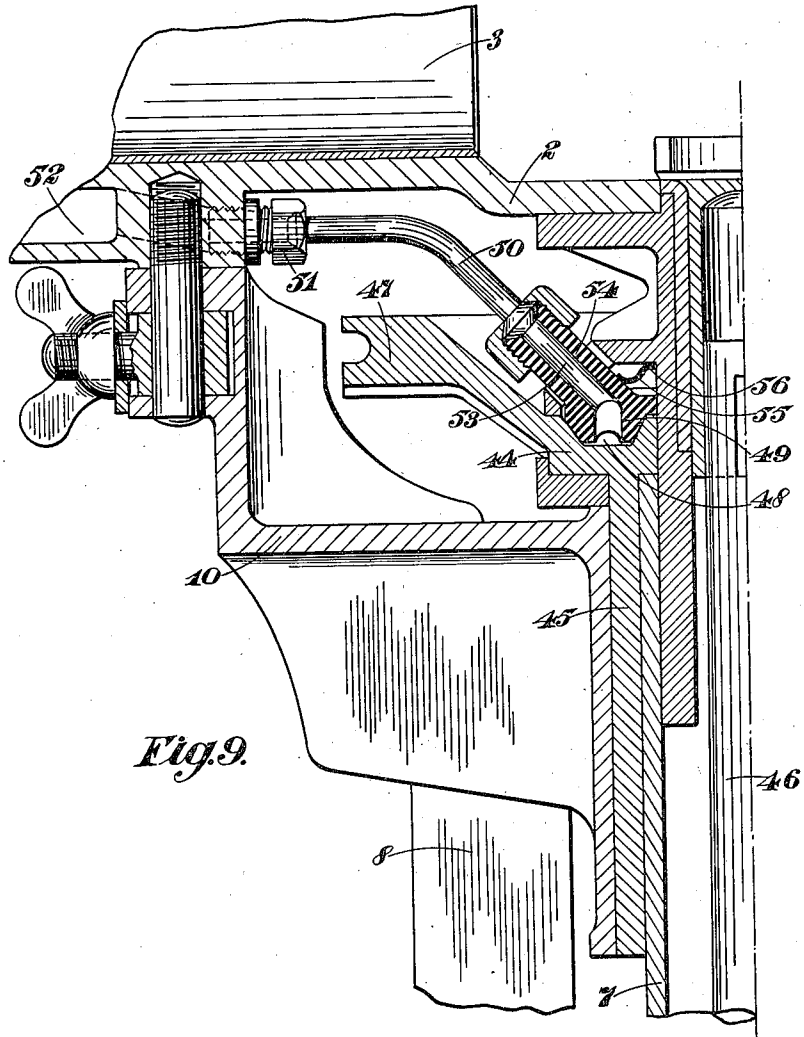


Fig. 9.

Edward William Trotman
Inventor

By Edwin Bauknight
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Patented May 29, 1928. 1,671,387

UNITED STATES PATENT OFFICE.

EDWARD WILLIAM TROTMAN, OF WOLVERHAMPTON, ENGLAND.

OUTBOARD-MOTOR INSTALLATION.

Application filed November 15, 1927, Serial No. 233,334, and in Great Britain November 27, 1926.

This invention relates to outboard motor installations, of the kind in which the power portion has a vertically arranged crankshaft (or substantially so) with one or more cylinders radial thereto and constitutes a unit which is detachably connected with another unit beneath it for attachment to a boat and supporting the transmission shaft and propeller.

It has previously been proposed to provide on the lower unit arms having at their ends hinged clamping bows adapted to grip around the outer ends of the respective cylinders. Alignment of the two units was ensured by the bearing boss for the crankshaft entering a sleeve surrounding the transmission shaft in the lower unit.

The object of the present invention is to provide an improved method of connecting and disconnecting the two units so that these operations can be rapidly carried out, whilst the parts employed for the purpose are of a simple nature, easily manufactured, and of neat appearance.

According to this invention, the two units are connected by fasteners, each comprising a number of parts, of which one is fixed to one unit and, in effecting the locking, is adapted by a vertical movement to enter another part of the fastener which is attached to the other unit.

In the accompanying drawings, showing various methods of carrying out the invention:

Figure 1 is an outline elevation of the complete motor, omitting all unnecessary parts,

Figures 2–8, to a larger scale than the foregoing, are fragmentary views showing various methods of connecting the power portion of the motor with the lower unit by which attachment is made to the boat, and

Figure 9 is a fragmentary axial section to a still larger scale showing not only an attachment means between the two parts of the motor but also the means for simultaneously connecting or disconnecting the water-cooling supply.

In Figure 1, which illustrates an engine having twin opposed cylinders actuating a crankshaft whose axis, as is usual in these engines, is vertical or substantially so, the crankcase is indicated at 2, the cylinders at 3, the flywheel at 4, and a fuel tank at 5 arranged above the cylinders and surrounding the flywheel. The means by which the motor is secured to the stern of the boat is constituted by a pair of brackets 6 arranged one on each side of the casing 7 surrounding the engine shaft (not shown). These brackets are of inverted U-form adapted to engage the transom or equivalent part of the boat, the inner limbs 8 of the brackets being shorter than the outer ones and carrying clamping screws engaging the holes 9 to effect the fixing of the motor to the boat.

By the present invention the power portion or unit comprising the engine and its associated parts including the fuel tank are disconnectible from the bracket and the parts carried by the latter, including the propeller and transmission gear, the bracket with these parts being hereunder termed the lower unit. The various methods by which the connection is made between the two parts of the motor are illustrated in Figures 2–8 and constitute further features of the invention.

The casing 7 depends from, and, to provide for steering by swivelling the propeller, is angularly free in a platform 10 which may be of the general form shown in Figures 2, 4, 7 and 8, or as in Figures 1 and 9. This platform is provided with a pivotal connection (not shown) with the upper ends of the brackets 6, so that the motor can tilt fore and aft in the known manner.

On its upper side is a hollow neck 11 having a flange 12, and upon the latter rests an annular web 13 on the underside of the crankcase 2. From this web depend pins 14 which extend through holes in the flange 12 and also into holes in the platform 10. A tubular boss 15 on the crankcase 2 enters the hollow neck 11 forming a spigotal register betwen the power and lower units.

The pins 14 form quick attachment means for the two units, and in Figure 2 they are grooved as at 16 for engagement by a cone-ended thumb screw 17 mounted in the edge of the platform 10. The cone end may exert a wedge effect on the lower side of the groove 16 to draw the parts firmly together. Thus it is only necessary to slack off the screws 17 to enable the power unit to be lifted off the lower unit, it being understood that there is a splined or equivalent connection (not shown) between the engine crankshaft and the transmission.

In an alternative method as shown in Figure 8, the depending pins 14 are adapted to extend into holes 18 provided in pinch blocks 19 of a known kind carried in the lower unit. These pinch blocks 19 are mounted in recesses 20 in the lower unit and have threaded extensions 21 passing through washers 22 closing the mouths of the recesses, and wing nuts 23 engage with the extensions 21 bearing on the washers so that the depending pins 14 are thereby gripped between the block and the side of a hole 24 in the lower unit through which they extend into the pinch block. If preferred the depending pins 14 on the power head may have formed in them a depression or groove 16 where the pinch block engages so that when the latter is tightened up there is a positive engagement in addition to the frictional, which prevents disengagement until the pinch blocks are slacked back to a sufficient extent. The pins 14, however, may be plain as in Figure 9.

An alternative, and in many cases a preferable connection, is shown in Figure 4. In this the end of the pins, which are somewhat shorter than before, are screw-threaded at 25 and are adapted to be engaged with what are in effect union nuts 26 having thumb grips 27 and rotatably mounted on stems 28 coaxial with the pins 14 and provided at their ends with collars 29 which render the nuts 26 endwise fast when tightened up. This arrangement has the advantage that the nuts cannot become detached or lost.

It will be understood that any other equivalent quick connecting device or devices may be employed as an alternative. Thus, as shown in Figures 5 and 6, slotted lugs 30 may be provided instead of the depending pins 14, and these lugs are arranged to engage with studs 31 or set screws provided in the lower unit and engaged by wing nuts 32 which bear on the lug and clamp it. The end of the wing nut which bears on the slotted lug may be cylindrical as at 33 to enter a cylindrical recess 34 in the face of the slotted lugs. This provides a positive instead of a merely frictional engagement.

In the alternative construction shown by Figure 7, a split clamping band 35 is secured to the power unit and is adapted to engage the edge of a circular platform 36 on the lower unit. At the split it is provided with a tangentially arranged screw 37 adapted to close the band and grip the platform 36. Locating spring detents 38 may be employed between the band and the platform.

In Figure 8 the power unit is provided with a depending flange or a band 39 to encircle a part such as the circular platform 36. In this case the locking of the two units is effected by pins 40 on the part 36 engaging slots in the other part which extend first axially as at 41 and then circumferentially as at 42 about the crankshaft axis in the manner of a bayonet joint. A spring plunger 43 carried by one part engages a recess in the other.

As the removal of the power portion from the lower unit would ordinarily necessitate a disconnection of the cooling water supply pipe, the following simple jointing means illustrated in Figure 9 may be employed. A collecting plate 44 for the water is concentrically formed or mounted on a sleeve 45 carrying the casing 7 surrounding the vertical transmission shaft 46, the sleeve being angularly movable by an integral wheel 47 with a tiller (not shown) attached thereto for controlling the propeller to steer and reverse the boat. In the upper face of the plate 44 is a concentric groove 48 with sides converging downwardly. Into this groove fits either a ring, or, as shown, a block 49 (one for each cylinder) diametrically arranged, and of non-metallic substance such as ebonite.

These blocks can be pressed into the groove by springs 55 constituted by forming radially extending spaced fingers on a ring of flat resilient material 56 arranged just above the plate 44, the fingers 55 bearing on the blocks. The latter carry pipe branches 50 connected at 51 to each cylinder jacket 52, and a passage 53 in each block connects with its branch and with the bottom of the groove 48 to supply to it water collected by the plate. Stationary guides, which may be constituted by the above mentioned fingers or by projections on the plate carrying them, engage the parts 54 of the blocks to which the branches are connected to prevent the blocks moving with the plate 44 and sleeve 45 when the latter are moved angularly for steering purposes. When the power head is disconnected the blocks simply lift out of the groove 48, and when reconnected, they readily re-enter the groove and are retained there by the springs.

The invention thus provides for the easy separation of the two principal parts of the motor and their re-attachment with rapidity and security.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. In an outboard motor installation, the combination of a power unit including a vertically arranged crankshaft, a crankcase enclosing said crankshaft and carrying a cylinder radially arranged thereto, a second unit separate from and below the power unit adapted to be attached to a boat, a propeller and transmission mechanism carried by the second unit, and connecting means between the two units constituted by a depending part on the power unit, forming a register between the said two connected units comprising a pin extending from one unit

adapted to enter and to be secured in a socket upon the other unit in alignment with said pin, substantially as set forth.

2. In an outboard motor installation, the combination of a power unit including a vertically arranged crankshaft, a crankcase enclosing said crankshaft and carrying a cylinder radially arranged thereto, a second unit separate from and below the power unit adapted to be attached to a boat, a propeller and transmission mechanism carried by the second unit, connecting means between the two units constituted by a depending part on the power unit adapted to engage a co-operating part on the other unit, a water-collecting plate located around the axis of the engine shaft, an annular groove in said collecting plate, and a block adapted to fit said annular groove attached to and forming locating means for a conduit which supplies cooling water from the annular groove to the cylinders, substantially as set forth.

3. In an outboard motor installation, the combination of a power unit including a vertically arranged crankshaft, a crankcase enclosing said crankshaft, and carrying a cylinder radially arranged thereto, a second unit separate from and below the power unit adapted to be attached to a boat, a propeller and transmission mechanism carried by the second unit, and connecting means between the two units, in which the two units are secured together by a quick fastening device comprising a pin extending from one unit and screw-threaded for engagement by a threaded socket rotatably mounted endwise fast upon the other unit in alignment with the pin, substantially as set forth.

4. In an outboard motor installation, the combination of a power unit including a vertically arranged crankshaft, a crankcase enclosing said crankshaft, and carrying a cylinder radially arranged thereto, a second unit separate from and below the power unit adapted to be attached to a boat, a propeller and transmission mechanism carried by the second unit, and connecting means between the two units, in which the fastener comprises a screw-threaded pin extending from one unit and adapted to enter a threaded socket rotatably mounted in alignment with the pin and anchored upon the other unit, substantially as described.

In testimony whereof I have signed my name to this specification.

EDWARD WILLIAM TROTMAN.