

J. F. J. CLEMENTSON.
OUTBOARD MOTOR FOR BOATS.
APPLICATION FILED APR. 27, 1920.

1,382,955.

Patented June 28, 1921.

2 SHEETS—SHEET 1.

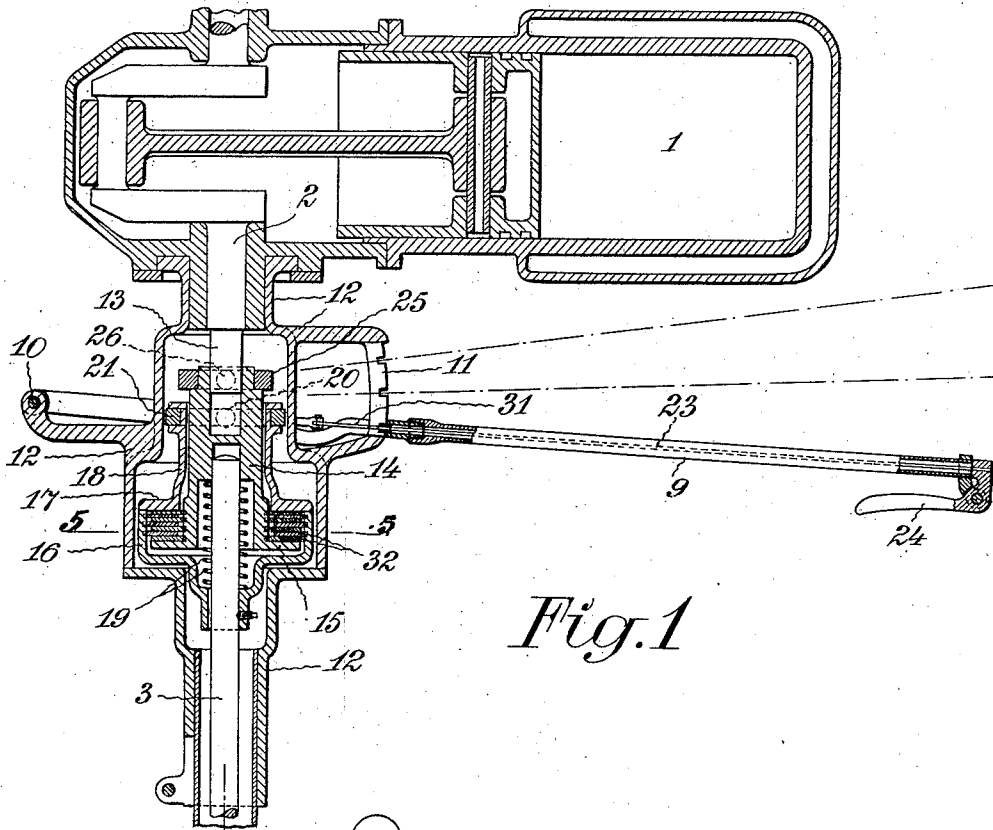
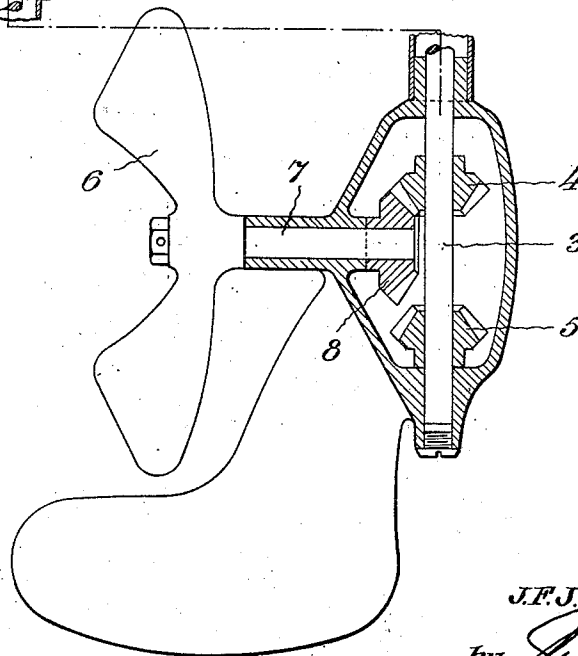


Fig. 1



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2 SHEETS—SHEET 2.

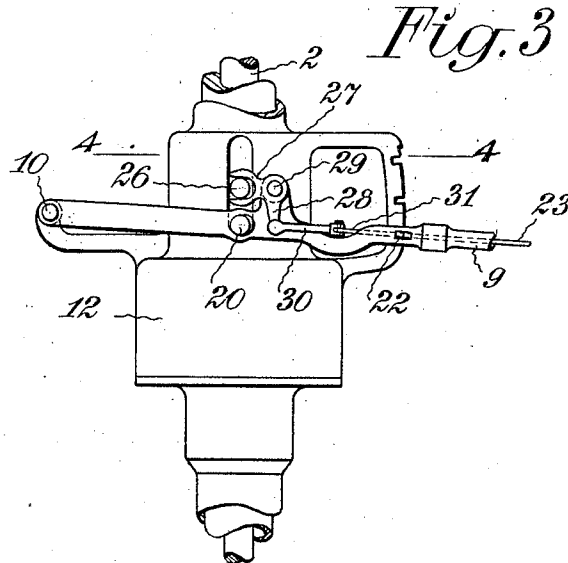
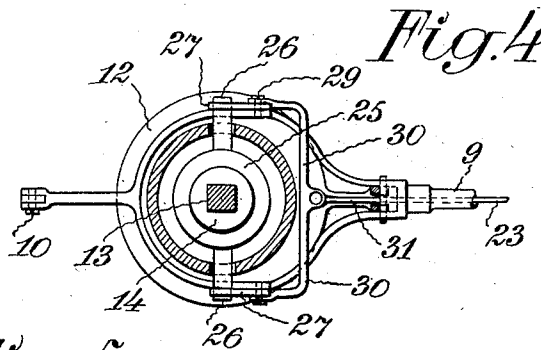


Fig. 5

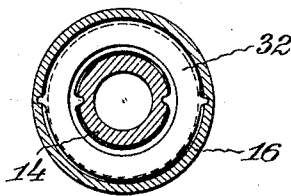
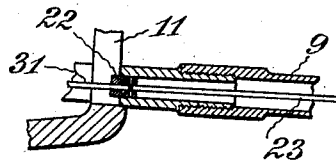


Fig. 2



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UNITED STATES PATENT OFFICE.

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OUTBOARD-MOTOR FOR BOATS.

1,382,955.

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Application filed April 27, 1920. Serial No. 376,946.

To all whom it may concern:

Be it known that I, JOHAN FERDINAND JULIUS CLEMENTSON, a citizen of the Kingdom of Sweden, residing at Malmo, Sweden, have invented a new and useful Improvement in Outboard-Motors for Boats, of which the following is a specification.

My invention relates to an improvement in outboard motors for use in smaller boats, wherein the motor shaft is geared to the propeller shaft by means of a double bevel gear, so that the propeller may be reversed by sliding the gear wheels placed on the motor shaft or an extension thereof, said gear wheels alternately being brought into gear with a gear wheel on the propeller shaft. Such a reversing device, although being of a simple and attractive construction, has however a drawback therein that the reversing or starting of the propeller when the motor is running takes place abruptly and with a considerable shock when the gear wheels are thrown into gear, and this circumstance causes a rapid wearing or a breaking of the gear if the motor is not slowed down when the reversing takes place. In itself it is troublesome and less attractive to slow down the motor at every reversing and it may also by carelessness be omitted, and the present invention refers to a device for carrying out the reversing or starting of the propeller in a safe manner and for the durability of the gear wheels, even if the motor is running at full speed. Said device comprises mainly a friction coupling placed in the extension of the motor shaft and combined with the common tiller in such a way, as is explained below, that the reversing cannot take place before the coupling is disconnected. Thus it is impossible to handle the machinery in a wrong way, which may be risky to the gear.

The invention is illustrated in the accompanying drawings wherein Figure 1 shows the outboard motor in vertical section. Fig. 2 shows a sectional view of the locking device for the tiller and Fig. 3 shows a side view of the said tiller and coacting parts of the machinery. Fig. 4 is a cross section on the line 4—4 in Fig. 3 and Fig. 5 a similar section on the line 5—5 in Fig. 1.

With reference to the drawings 1 indicates the motor and 2 the crank shaft of the same. 3 is a shaft placed in the prolongation of the crank shaft and carrying two bevel gear wheels 4 and 5, each of which

by sliding the shaft 3 alternately can be brought into gear with the bevel gear wheel 8 upon a shaft 7 carrying the propeller 6. By sliding the shaft 3 and the gear wheels 4, 5 the rotary motion of the propeller may be reversed, and it may also be stopped if the gear wheels 4, 5 are brought into an intermediate position, in which neither of them is in engagement with the gear wheel 8. For reversing or stopping of the propeller the shaft 3 must be moved upward or downward and this movement is effected by means of the tiller 9, said tiller being made to turn around a pin at 10 and locked to a quadrant 11, which together with said pin is fixed to a casing 12 surrounding the shafts 2 and 3 and turnable around said shafts.

According to my invention the shafts 2 and 3 are connected with each other by means of a friction coupling thrown into action by the tiller. For this purpose the end of the crank shaft 2 is provided with a prismatic extension 13 upon which a non-rotatable sleeve 14 is slidably mounted said sleeve at its lower end being provided with a flange 15. On the shaft 3 beneath the sleeve 14 a cup 16 is fixed the upper end of which is closed by a cover plate 17 connected with a collar or outer sleeve 18, which partly surrounds the inner sleeve 14. Between the bottom of the cup 16 surrounding the flange 15 and the inner end of a concentric bore within the sleeve 14 a spiral spring 19 surrounding the shaft 3 is arranged, said spring normally tending to force the inner sleeve 14 and the flange 15 upward from the bottom of the cup 16. Between the flange 15 and the cover 17 a number of annular friction plates 32 is arranged, said plates being alternately provided with lugs penetrating into longitudinal grooves in the inner side of the cup and other lugs penetrating into similar grooves in the outside of the sleeve 14, so that the half part of the friction plates is driven by the sleeve 14 and the other half part is driving the cup 16 (compare Fig. 5). The friction plates connected with the cup in the manner described above do not entirely extend to the sleeve 14 and may be rotated relatively to the same, and the friction plates connected with the sleeve in the same manner do not extend entirely to the cup and may be rotated in relation to said cup. By reason of the spring 19 all of the plates however are pressed together between

the flange 15 and the cover 17 and thus the parts described form a friction coupling, which may be disconnected by releasing the spring pressure. In order to obtain a good bearing the shaft 3 however extends within the sleeve 14 (Fig. 1) but it is freely rotatable within the same and thus it does not always partake in the rotary motion of the said sleeve 14, which rotates constantly as long as the motor is kept running.

For reversing or stopping of the propeller even when the motor is running the whole coupling together with the shaft 3 is raised or lowered by means of the tiller 9, said tiller for this purpose being hinged to pins 20 placed upon a ring-shaped member 21 rotatably but not slidably mounted on the outer sleeve 18, which ring at the running of the motor is kept stationary on the outside of the rotating sleeve 18. The tiller 9 is disconnectibly locked to the quadrant 11 by means of a bolt 22 (Fig. 2) connected with a link 23, which is acted upon by a lever or grip 24 hinged to the outer end of the tiller.

For disconnecting the coupling a ring 25 is rotatably but not slidably mounted on the sleeve 14 said ring being provided with extending pins 26 suitably placed right above the pins 20. The pins 26 are inclosed by the fork shaped arms 27 of levers 27, 28 (Fig. 3) pivotally mounted upon pins 29 fixed to the tiller 9. The other arms 28 of the levers are hinged to a U-shaped bar 30 connected with an extension 31 of the link 23, said extension being arranged on the opposite side of the bolt 22 (Figs. 3 and 4).

The device described works in the following manner:—

Provided that the motor and propeller are running at full speed and the different parts of the machinery are in the positions shown in Fig. 1 and that reversing or stopping of the propeller is to be carried out, said reversing or stopping must be effected by raising the tiller to one of the positions indicated by the dash and dot lines shown in the drawing. For carrying out this movement of the tiller the bolt 22 must be disengaged and for this purpose the grip 24 must be pressed against the tiller, *i. e.* upward. Thereby however the extension 31 and the bar 30 cause the levers 27, 28 to be turned in such a way that the pins 26 are pressed downward. The ring 25 thereby presses the sleeve 14 together with the flange 15 downward against the pressure of the spring 19. Thus the coupling is positively disconnected before any vertical movement of the tiller 9 is possible and therefore it is impossible to omit the disconnection of the coupling.

It is not necessary to use a friction coupling, as the coupling also may be provided with claws in the usual manner, but a fric-

tion coupling is however to be preferred as it renders a softer starting of the propeller after the reversing, and it is not necessary to carry out all of the parts of construction exactly in the manner described above or shown in the drawings as they may also be changed for equivalent means without digressing from the scope of invention.

Having now described my invention and in what manner it is to be performed I declare that what I claim is:—

1. Outboard motor for boats comprising a reversible double bevel gear for transmitting the rotary motion of the motor to the propeller, a shaft slidably mounted in the prolongation of the motorshaft and carrying two of the bevel gear wheels of said gear, a disconnectible coupling between said shaft last mentioned and the motor shaft and means for connecting the disconnecting device of said coupling with a locking device for the reversing tiller in such a way that the coupling is disconnected automatically at the disengaging of said locking device.

2. Outboard motor for boats comprising a reversible double bevel gear for transmitting the rotary motion of the motor to the propeller, a shaft slidably mounted in the prolongation of the motorshaft and carrying two of the bevel gear wheels of said gear, a disconnectible friction coupling between said shaft last mentioned and the motor shaft and means for connecting the disconnecting device of said coupling with a locking device for the reversing tiller in such a way that the coupling is disconnected automatically at the disengaging of said locking device.

3. Outboard motor of the character described comprising a motor, a propeller and a disconnectible friction coupling between the motorshaft and the shaft placed in its prolongation, said coupling consisting of an inner sleeve slidably but not rotatably mounted on the motor shaft and provided with a flange, a cup fixed to the extension shaft and provided with a cover, and an outer sleeve fixed thereto, said cup and last mentioned sleeve partly surrounding the inner sleeve and the flange thereon, a number of annular friction plates placed between the flange of the inner sleeve and the cover of the cup and provided with lugs alternately intruding in corresponding longitudinal grooves at the inside of the cup and the outside of the inner sleeve, and a spring placed between the cup and the inner sleeve and tending to press the friction plates together.

4. Outboard motor of the character described comprising a disconnectible friction coupling between the motor shaft and a shaft placed in its prolongation, said coupling consisting of an inner sleeve provided with a flange and an outer sleeve fixed to a

cup surrounding said flange and a number of friction plates arranged between the flange and a cover on the cup, a ring shaped member rotatably but not slidably mounted
 5 on the outer sleeve and provided with pins whereby said ring is hinged to the tiller, another ring shaped member of the same kind mounted on the inner sleeve and hinged to levers arranged on the tiller and
 10 combined with a locking device.

5. Outboard motor of the character described comprising a disconnectible friction coupling between the motor shaft and a shaft placed in its prolongation said coupling consisting of an inner sleeve provided
 15 with a flange and an outer sleeve fixed to a cup between a cover of which and said flange is arranged a number of friction plates acted upon by a spring tending to
 20 press the friction plates together, both sleeves being provided with rings rotatably but not slidably mounted on said sleeves, the ring on the outer sleeve being hinged to the tiller and the ring on the inner sleeve to
 25 levers carried by the tiller and connected by means of a U-shaped bar hinged to an extension of a link for acting upon the locking bolt of the tiller by means of a lever hinged to the outer end of said tiller and to
 30 said link.

6. An outboard motor for boats, comprising a motor, a propeller, a reversible connection for transmitting and reversing rotary motion from the motor to the propeller, and
 35 a disconnectible friction element interposed between the motor and reversible connection for automatically disconnecting the propeller from the motor during the reversing of said reversible connection.

7. An outboard motor for boats, comprising a motor, a propeller, a reversible connection for transmitting and reversing rotary motion from the motor to the propeller, a
 40 disconnectible friction element interposed between the motor and reversible connection, and means for operating said connection for reversing the rotary motion being transmitted, said means automatically disengaging the friction element.

8. An outboard motor for boats, comprising a motor, a propeller, an intermediate shaft, elements connecting said shaft with the propeller and adapted to rotate the propeller in either direction, means for operating
 55 said elements to reverse the direction, a disengageable friction member for transmitting motion from the motor to the shaft and means for automatically operating said friction member when the first-mentioned means
 60 operates the elements to reverse the direction.

9. An outboard motor for boats, comprising a motor, a propeller, an intermediate shaft, elements connecting said shaft with
 65 the propeller and adapted to transmit rotary

motion thereto and to reverse the direction of said motion, a disengageable friction member connecting the shaft with the motor and means for operating said elements adapted to simultaneously disengage said
 70 friction member.

10. An outboard motor for boats, comprising a motor having a crank-shaft, a propeller, a shaft slidably mounted in line with said crank-shaft, a disengageable friction
 75 element connecting the shaft with the crank-shaft, elements adapted to transmit rotary motion to the propeller, said elements being further adapted to reverse the motion of said propeller, and operating means for
 80 actuating the elements to reverse the direction of the propeller, said means having connected therewith means for simultaneously disengaging the friction element when the operating means is actuated to reverse the
 85 direction of the propeller.

11. An outboard motor for boats, comprising a motor having a crank-shaft, a propeller, a shaft slidably mounted in line with the crank-shaft, a disengageable friction
 90 clutch member including a pair of sleeve members, one secured to the crank-shaft, the other secured to the shaft, a series of plates carried by each adapted for frictional engagement, means adapted to operate the
 95 sleeves to engage or disengage said disks, elements mounted on the shaft adapted to transmit rotary motion to the propeller, said elements being adapted to be operated to reverse the direction of the propeller, and
 100 means for operating the elements, the last-mentioned and the first-mentioned means being adapted to operate together.

12. An outboard motor for boats, comprising a motor having a crank-shaft, a sleeve
 105 slidably mounted on the end portion of said crank-shaft, a second sleeve mounted over the first sleeve and extending beyond the end of the first sleeve, a series of disks, alternate disks being mounted on each sleeve
 110 and adapted for frictional engagement, resilient means interposed between the sleeves acting normally to bring the disks into frictional engagement, a shaft connected with the second sleeve, a propeller, elements connecting the shaft with the propeller for transmitting and reversing rotary motion thereto, a lever connected with the elements and connections between the lever and the sleeves, whereby when the lever is operated
 120 to reverse the direction of the propeller, it will at the same time disengage the disks between the sleeves.

In testimony whereof, I have signed my name to this specification in the presence of
 125 two subscribing witnesses.

JOHAN FERDINAND JULIUS CLEMENTSON.

Witnesses:

A. L. HEDENSHIRE,
 J. P. WETCHE.