Aug. 26, 1941. A. J. HIGGINS 2,254,144

ENGINE CONTROL FOR MARINE ENGINES

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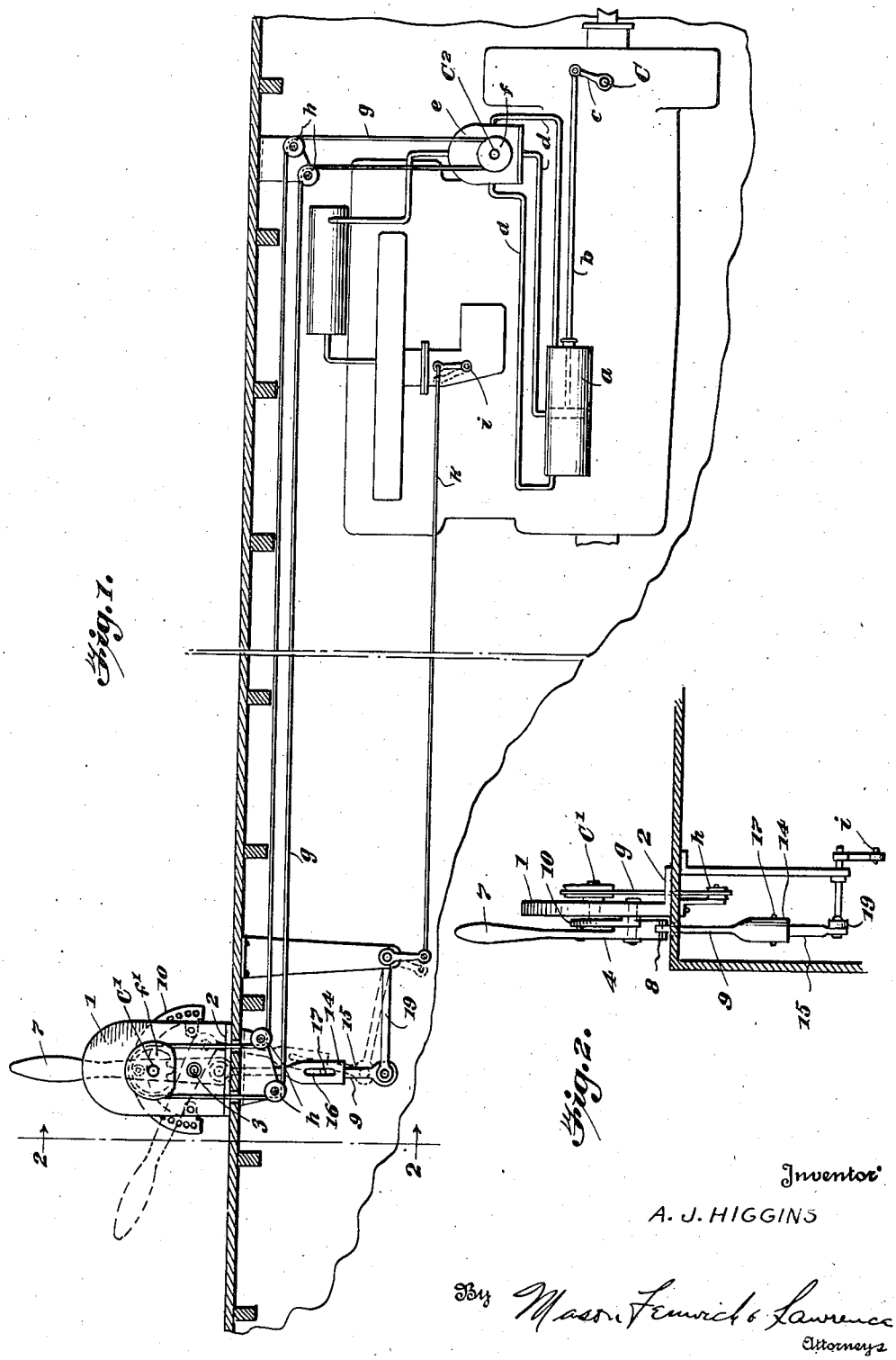


Fig. 1.

Fig. 2.

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Fig. 3.

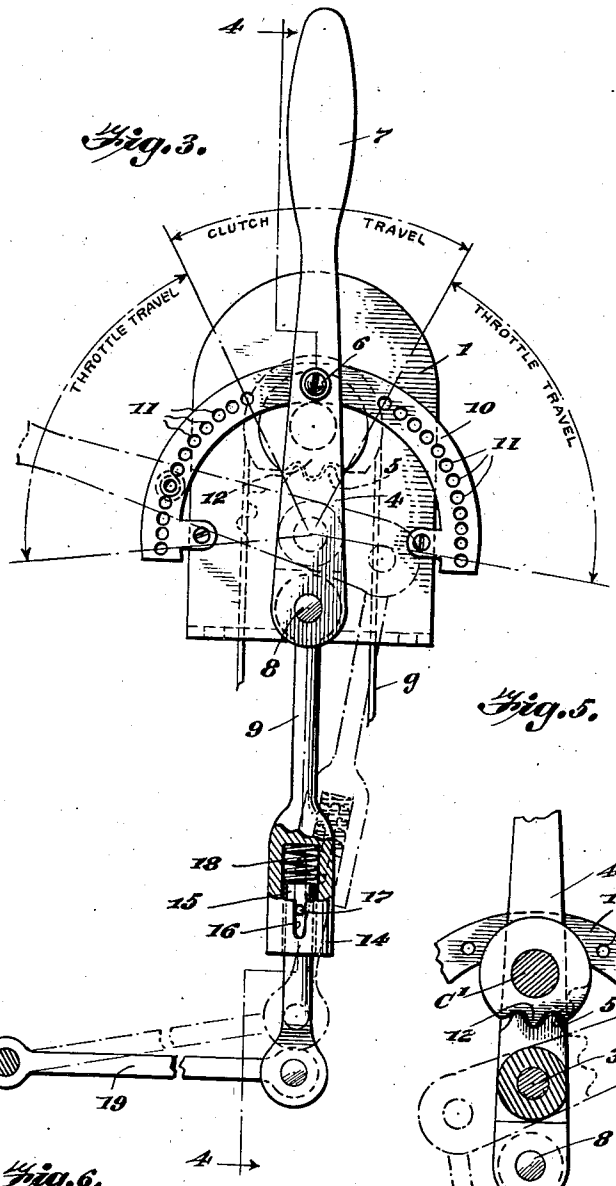


Fig. 4.

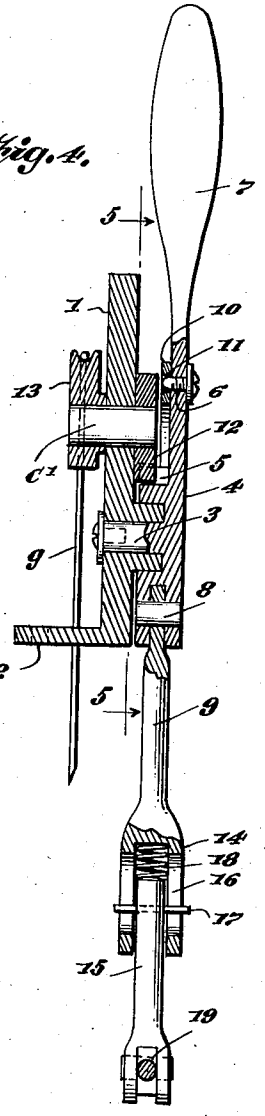


Fig. 5.

Fig. 6.

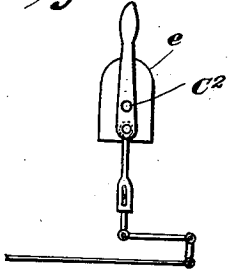
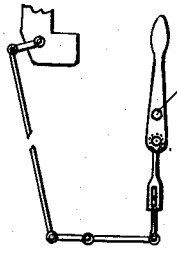


Fig. 7.



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ENGINE CONTROL FOR MARINE ENGINES

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5 Claims. (Cl. 74—472)

This invention relates to marine engines and more particularly to control devices for marine gas engines.

In marine engines it is essential that their control shall be as simple as possible, and, preferably, that it be capable of being located at various positions with respect to the engine as in many instances it is highly desirable that the helmsman, located at a considerable distance from the engine, should be able, himself, to control the engine.

For purpose of maneuverability and safety, it is also highly desirable, if not essential, that it be possible to throw the engine from a position of full speed ahead to full speed astern almost instantaneously, inasmuch as the reversal of the propeller is the only means for braking the vessel and bringing it to a quick stop.

In connection with such rapid reversal of the engine from high speed ahead to high speed in reverse, it is essential, for the safety of the engine, that the supply of fuel be reduced to a minimum during the limited neutral position of the reversing gear mechanism to avoid racing of the engine at that point with the consequent undue wear on the reversing gear mechanism.

A further essential requirement of such a control device is that it be very simple and as nearly fool-proof as possible in view of the fact that many motor boats are handled by inexperienced persons.

Having these problems in mind, the present invention relates to such a device which can be located at remote points with respect to the engine, or, if desired, directly on the reversing gear case; which is operated by single hand lever and which permits the almost instantaneous reversal of the propeller from any speed ahead to any desired speed in reverse or the converse, as may be desired, with means for avoiding undue wear on the reversing gear mechanism and such simplicity in construction and arrangement as renders the same substantially fool-proof.

The invention consists of the novel construction, arrangement and combinations of parts hereinafter more particularly described and claimed.

Two sheets of drawings accompany this specification, in which like reference characters indicate like parts throughout:

Figure 1 is a diagrammatic view of one possible installation of the present invention illustrating a remote control of the reversing gear and carburetor throttle of an engine;

Figure 2 is a fragmentary cross section taken on line 2—2 of Figure 1;

Figure 3 is a front elevation of the improved control device;

Figure 4 is a vertical cross section taken on line 4—4 of Figure 3;

Figure 5 is a fragmentary cross section taken on line 5—5 of Figure 4;

Figure 6 is a diagram of the control device associated directly with the valve of the reversing gear power device; and

Figure 7 is a diagram of the control device associated directly with the reversing gear shaft.

Referring particularly to Figure 1 which is intended to illustrate one possible arrangement of the improved control device at a position remote from the engine C indicates the operative shaft of the reversing gear mechanism of a marine engine, the rotation of which shaft operates to change the direction of rotation of the propeller shaft. As here illustrated, this reversing gear shaft C is operated by compressed air operating through a cylinder *a*, piston rod *b* and lever *c*. The compressed air is supplied to cylinder *a* through suitable pipes *d* which are connected with a control valve *e* having an operative shaft C^2 upon which is a pulley *f* operated by a belt *g* which is passed over suitable guide pulleys *h* to a second pulley *f'* on shaft C^1 of the improved control device.

The carburetor throttle is mounted on a shaft *i* connected by a link *k* to a bell crank 19 which is also connected to the improved control device.

It will be apparent from a consideration of Figure 1 that the control device can be located at various distances and in different directions with respect to the engine merely by the provision of suitable guide pulleys for the belt *g* and linkage in connection with the rod *h*.

It will further be noted that, if desired, the improved control device can be mounted with its reversing gear control shaft C^1 directly coupled to reversing gear shaft C for direct manual control or directly connected to the shaft C^2 of valve *e* for direct control of that valve at that point. Such alternative arrangements are suggested in fragmentary Figures 6 and 7.

Taking up the more detailed construction of the control device and referring particularly to Figures 3 to 5, it consists essentially of a supporting pedestal 1 having a base 2 which may be secured by bolts or screws to any convenient part of the boat. The pedestal 1 is provided with a journal for a stub shaft 3 on a lever 4, which

lever is further provided on its inner face toward the pedestal with segmental gear 5 concentric with the shaft 3. The lever 4 is further provided with a detent screw 6 and has its upper end formed as a hand grasp 7. At its lower end the lever 4 is connected as by pin 8 with a link 9.

Between pedestal 1 and lever 4 and mounted on the pedestal is a quadrant 9 provided with a plurality of detent holes 11 in which the detent screw 6 is adapted to engage and thus frictionally hold the lever 4 in adjusted positions.

The pedestal is further provided with a journal for shaft C^1 which carries on one end adjacent lever 4, a quadrant gear 12, the teeth of which are adapted to engage with the teeth of the quadrant gear 5 formed on lever 4 during a limited portion of the stroke of lever 4, the sector of such enmeshment being indicated in Figure 3 between the arrows, and marked reversing gear. On the other end of shaft C^1 is a pulley 13 carrying belt *g* which, as illustrated in Figure 1, also rides on pulley *f* of valve *e*. Where the control device is to be located immediately adjacent the valve *e* the shaft C^1 will be directly coupled to the shaft C^2. Alternatively, where the control device is to be used as a manual gear shift, the shaft C^1 will be directly coupled or formed integral with the shaft C.

The lower end of the link 9 is illustrated as being formed as an enlarged socket 14 adapted to slidably receive in its bore a rod 15. The sleeve 14 is provided with a through-slot 16 and a pin 17 passes through this slot and rod 15, thus providing a limited lost motion connection between the rods 9 and 15. A compression spring 18 may be conveniently positioned within the socket and between the end of its bore and the end of rod 15 to eliminate shocks at this point. The rod 15 is, as illustrated in Figure 1, connected to bell crank 19 and thus through link *k* to the throttle control valve *i*.

It will be noted that the sector of travel of lever 4 during which the segmental gears connecting the lever with the shaft C^1 are in engagement, is intermediate those sectors of travel on either side of its vertical position, and that during such intermediate sector of travel the extension 9 is in its vertical position corresponding with the closed position of the carburetor valve *i* and throughout this intermediate sector of travel during which the reversing control gears are in mesh, there will be no lift exerted upon bell crank 19 by reason of the lost motion device formed by the slotted sleeve 14 and the slidable connection between rods 9 and 15. Thus, during the entire period of rotation of lever 7 within the sector called reversing gear the throttle valve will be closed, and that at the extreme of this sector on either side pin 17 will engage the bottom of slot 14 and thereupon become operative of bell crank 19 and gradually increase the opening of the throttle up to its maximum open position which would be the extreme throw of the lever 4 either to the left or to the right.

By means of this arrangement of parts, it will be apparent, referring to Figure 1, that by operating the lever 4 by means of the hand grasp 7 it can be thrown from a full speed position at the left hand end of its stroke which may be considered the forward direction of the propeller to a full speed position at the right hand extreme of its stroke in the reverse direction and that during this complete stroke of the lever 4 this motion of the lever will have successively reduced the supply of fuel from the full volume at the extreme left to a mere idling supply of fuel as the lever enters the reversing gear travel sector and that during the passage of the lever through this reversing gear travel sector, the throttle will be held at idling position while the gears are being shifted and that the continued movement of the lever to the right will again gradually open the throttle from idling position to full fuel supply at the extreme right.

Various modifications in the construction of the parts will readily suggest themselves to those skilled in the art, but all within the scope of the present invention as claimed.

Having thus fully disclosed my invention, I claim:

1. A control device for a marine engine having a reversing gear and a carburetor throttle, comprising a support, a lever pivotally mounted on the support, a rotary reversing gear operating member pivotally mounted on the support, segmental gears operatively associating the lever and reversing gear operating member and linkage operatively connecting the lever and the throttle.

2. The device of claim 1, in which the segmental gears are arranged to engage only through a sector medial of the operative stroke of the lever between the extreme positions of full power ahead and full power in reverse.

3. The device of claim 1 in which the segmental gears are arranged to engage only through a sector medial of the operative stroke of the lever between the extreme positions of full power ahead and full power in reverse, and the throttle control leakage includes a link pivoted on the lever and having a lost motion extension.

4. The device of claim 1, with a lost motion device between the lever and the throttle control, comprising a two-part link, said link parts being slidably associated, with means limiting the movement of said parts with respect to each other.

5. A control device for marine engines comprising a support, a lever pivotally mounted on the support having one end provided with a hand grip and the other end provided with an axially extensible link and stop means for limiting said extension, a rotary reversing gear operating member pivotally mounted on the support, and means for operatively associating the lever and reversing gear operating member throughout a limited sector only of the lever stroke, said operative sector of the lever stroke coinciding with the lost motion sliding movement of the link extension as and for the purposes specified.

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