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Kobayashi

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[45] **June 26, 1973**

[54] **SINGLE LEVER CONTROL APPARATUS FOR MARINE ENGINE**

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[73] Assignee: **Nippon Cable System Inc.**, Hyogo-ken, Japan

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[30] **Foreign Application Priority Data**

Aug. 14, 1971 Japan 46/61720

[52] **U.S. Cl.** **74/876**, 74/877, 192/.096, 192/.098

[51] **Int. Cl.** **G05g 13/00**, F16d 23/00

[58] **Field of Search** ..... 192/.096, .098; 74/876, 877

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Attorney—Stevens, Davis, Miller & Mosher

[57] **ABSTRACT**

A single lever control apparatus for marine engine for operating the clutch and the throttle. The throttle operating member and the clutch operating member are operated independently of each other and when out of operation they are locked to preclude an inadvertent operation.

15 Claims, 9 Drawing Figures

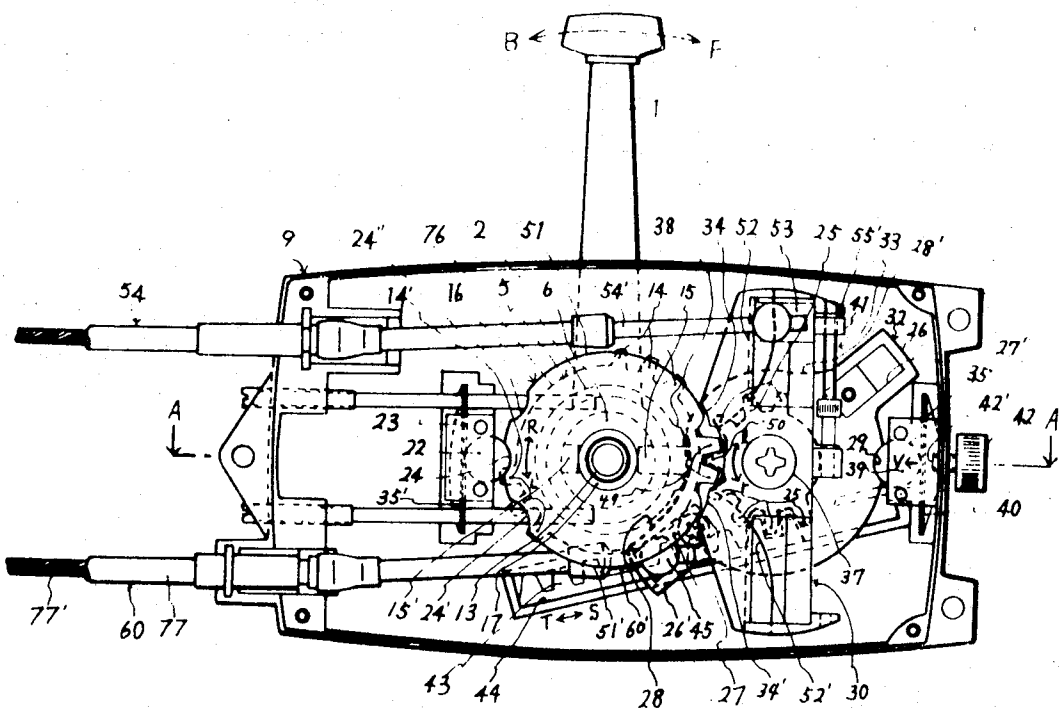

FIG. 1

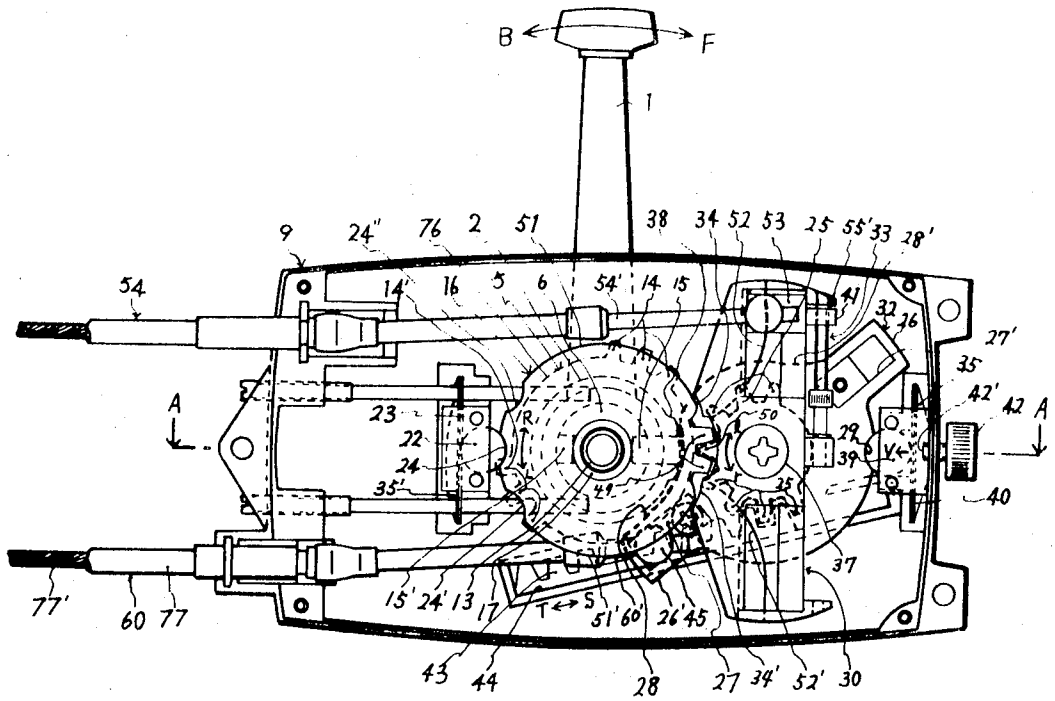

FIG. 2

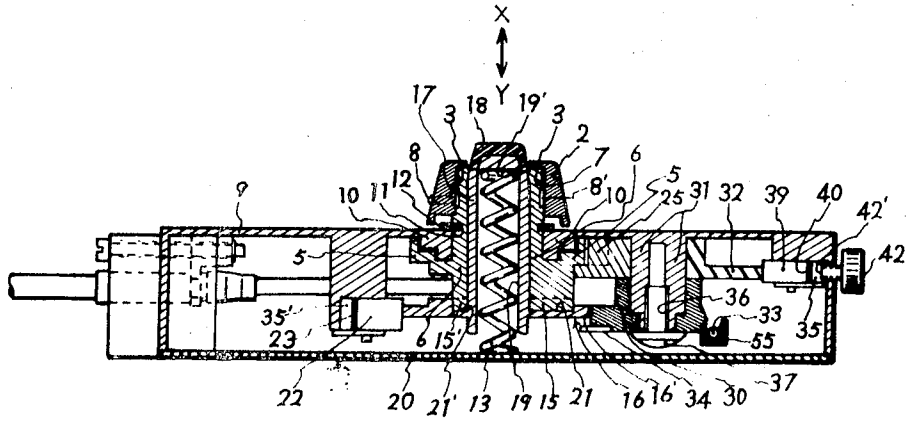

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FIG. 3

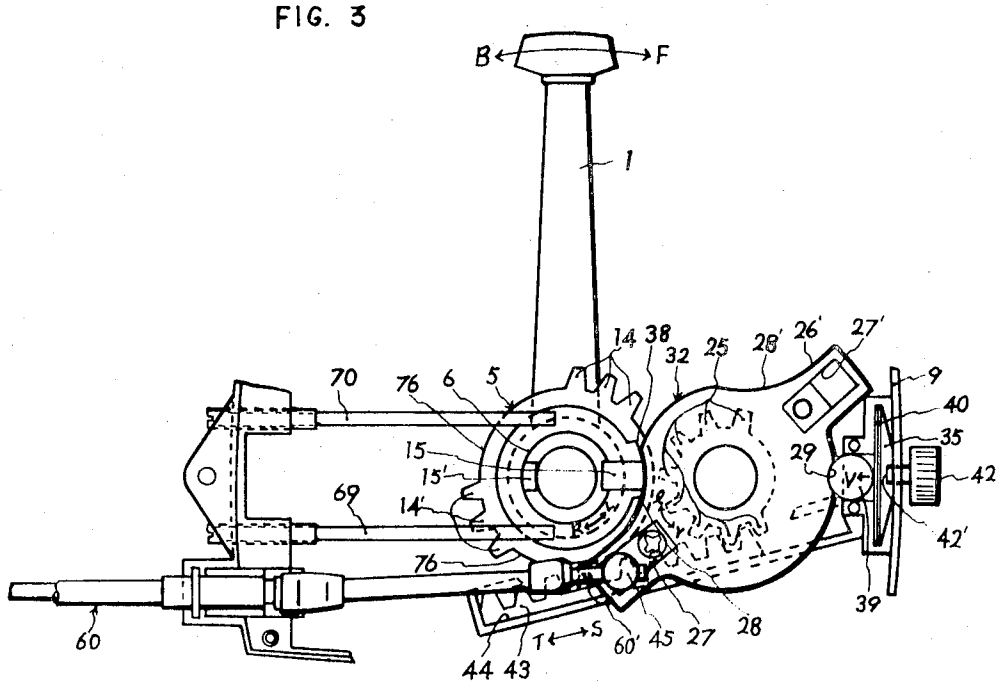

FIG. 4

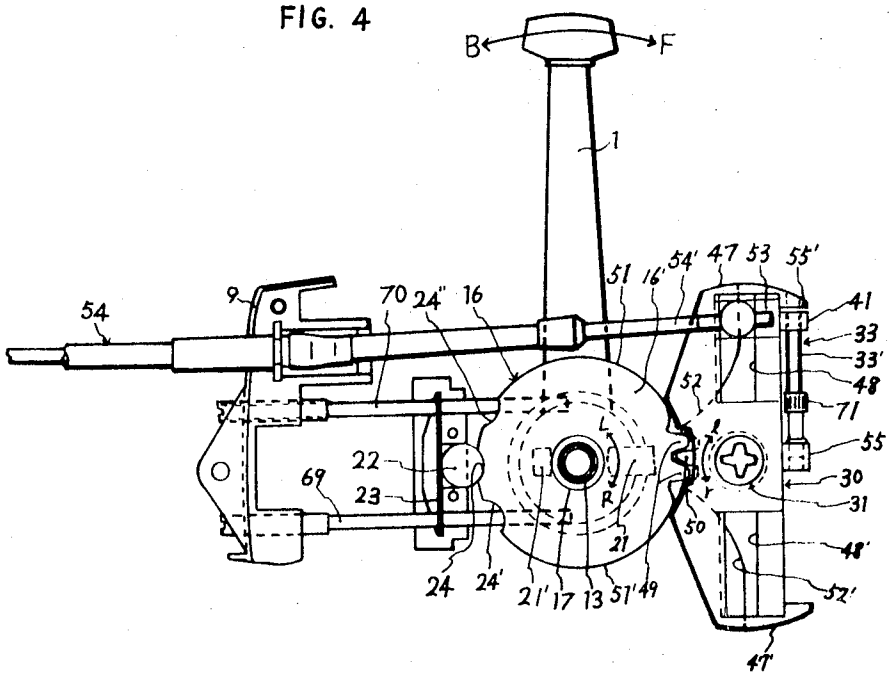

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FIG. 5

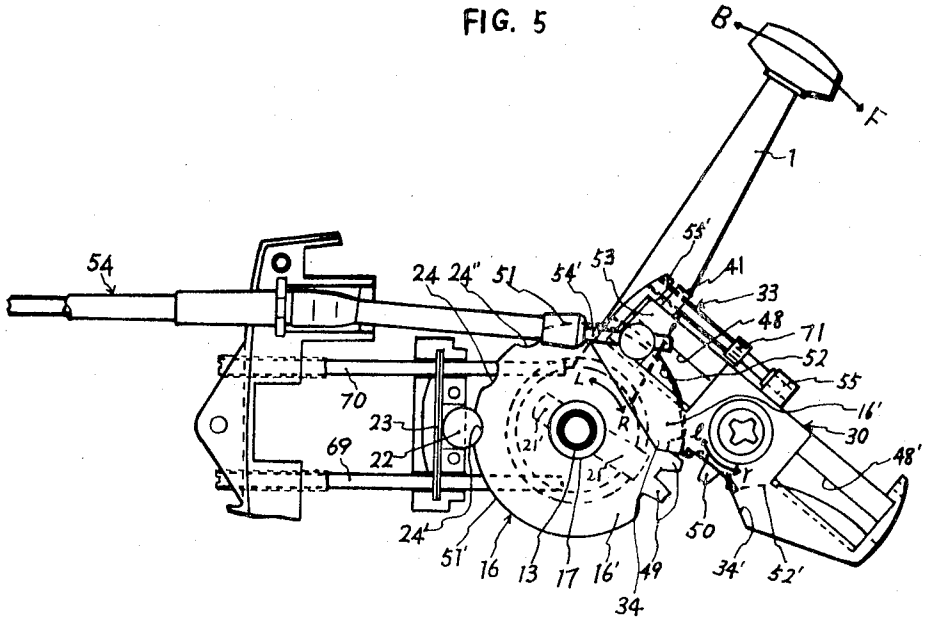

FIG. 6

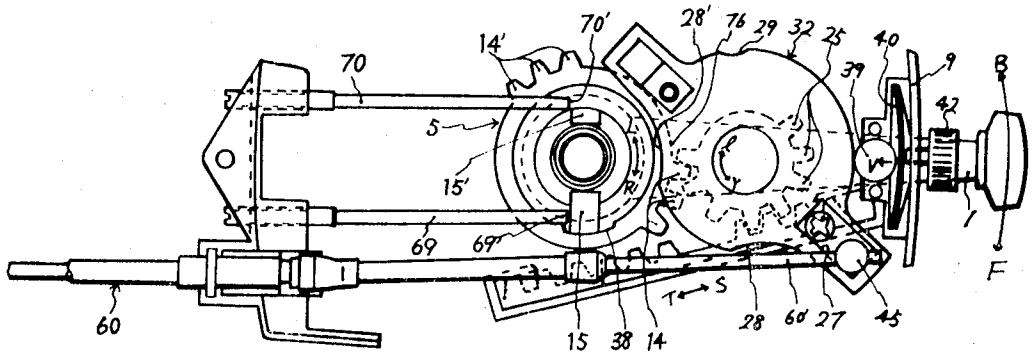

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FIG. 7

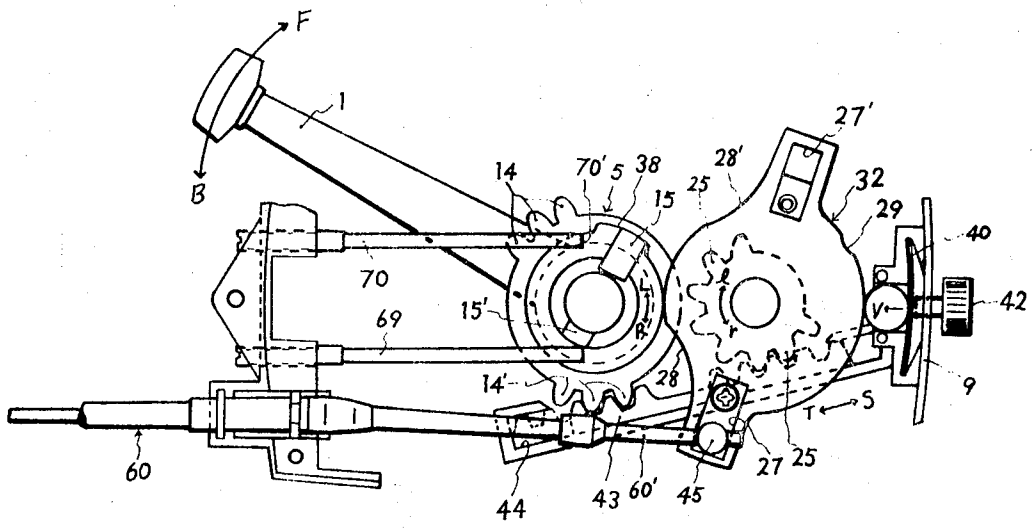


FIG. 8 -(1)

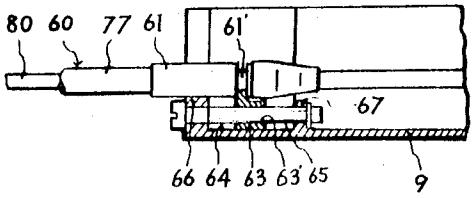
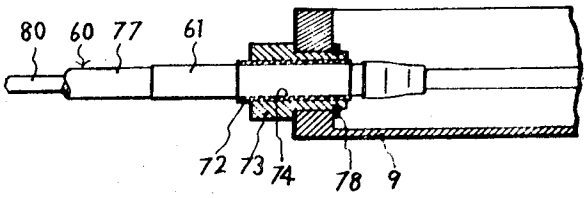


FIG. 8 -(2)



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SINGLE LEVER CONTROL APPARATUS FOR MARINE ENGINE

The present invention relates to a novel control apparatus for marine engines, more particularly to an apparatus for controlling the clutch and throttle of a marine engine by a single lever.

It is generally required that the apparatus of this type can be operated with ease and safety even by an unskilled person. Accordingly, such apparatus must fulfil the following essential requirements. The apparatus must be so designed that the throttle will not operate before the reengagement of the clutch. In order to retain the boat at a given position against a tide or to enable the boat to move forward or backward at a constant speed, the apparatus must include a mechanism for keeping a constant throttle range even when the control lever is released from the hand. The apparatus must incorporate safety means for keeping the clutch completely in a locked state during the operation of the throttle and further means for locking the clutch in neutral position during the warming up of the engine while permitting the throttle to operate as desired so that the boat will not inadvertently start to operate for safety.

With the conventional apparatuses of the type described, it has been experienced that the throttle advances before the clutch has completely engaged in forward or backward position, or the control lever when released from the hand rotates due to vibration or rolling or pitching of the boat to impart a varying speed to the boat since the throttle can not be locked at the desired range. It has further been experienced that the throttle is not completely locked during the operation of the clutch or the clutch can not be locked satisfactorily during the operation of the throttle. These are drawbacks heretofore encountered with respect to safety and operation.

The present invention contemplates provision of an apparatus which fulfils the essential requirements described and which is easy to operate, applicable for engines of various types, suitable for mass production and yet compact and lightweight.

An object of the present invention is to provide a mechanism which keeps the throttle out of operation before the clutch has completely been engaged in forward or backward position.

Another object of this invention is to provide a mechanism for locking the throttle while the clutch is in operation and for locking the clutch while the throttle is in operation.

Another object of this invention is to provide a mechanism whereby the throttle range can be kept constant even when the lever is released from the hand so as to maintain the speed of the boat at a constant level.

Still another object of this invention is to provide an apparatus for versatile uses which is applicable to a throttle cable of the push or pull type and which is capable of operating two engines.

It has been found that these objects can be achieved by an apparatus wherein a throttle operating member and a clutch operating member are rationally designed and adapted for multi-purposes and which includes simple but efficient means for relating these members with each other as well as for engaging these members with a transmission shaft serving as the pivot for the control lever.

With reference to the accompanying drawings illustrating specific embodiments, the present invention will be described below.

FIG. 1 is an elevation showing the rear of an embodiment of the control apparatus of this invention, with a rear cover removed, the view illustrating the apparatus when the control lever is in neutral position;

FIG. 2 is a view in section taken along the line A—A in FIG. 1;

FIG. 3 is an elevation showing a mechanism for operating the throttle when the control lever is in neutral position;

FIG. 4 is an elevation showing a mechanism for operating the clutch when the control lever is in neutral position;

FIG. 5 is an elevation showing the mechanism for operating the clutch when the clutch is engaged in forward position;

FIG. 6 is an elevation showing the mechanism for operating the throttle when the control lever is pivoted to a full extent in forward;

FIG. 7 is an elevation showing the mechanism for operating the throttle when the control lever is being pivoted toward the backward position; and

FIG. 8-(1) and 8-(2) are sectional views on an enlarged scale principally showing the means for mounting the outer cable of a throttle cable in backwardly and forwardly movable manner for fine adjustment.

Referring to FIGS. 1 and 2, a control lever 1 has a base portion 2, along the axis of which there is formed a hole 3. The hole 3 is formed at its inner face with a number of projections 4 extending in the axial direction. A transmission shaft 6 in the form of a cylinder has, in the outer peripheral surface at its end, a number of grooves 7 extending in the axial direction and engageable with the projections 4 at the desired position so as to lock the lever 1 to the transmission shaft 6 adjustably. To prevent the disengagement of the lever 1 from the transmission shaft 6, a screw 8 is driven through the base portion 2 into a groove 8' in the outer peripheral surface of the transmission shaft 6.

The transmission shaft 6 is rotatably supported by a bearing boss 10 of a case 9, and a ring 12 for preventing the removal of the transmission shaft 6 is fitted into a groove 11 in the outer peripheral surface of the transmission shaft 6. The transmission shaft 6 is integrally formed with a transmission gear 5, along the outer periphery of which several gears 14 and 14' are formed in separate two areas. The transmission shaft 6 has projections 15 and 15' at its end. A hollow shaft 17 rotatably and slidably fitted in the transmission shaft 6 is integrally formed with a clutch operating gear 16 at one end thereof. Fitted to the other end of the shaft 17 is a push button 18 slightly projecting from the base portion 2. In the coaxial cavity 19 of the shaft 17 between its bottom 19' and the rear cover 20 of the case 9, there is provided a spring 13 which urges the shaft 17 in the direction X as seen in FIG. 2. On the other hand, the plane portion of the clutch operating gear 16 is in contact with the end face of the transmission shaft 6, whereby the displacement of the shaft 17 in the direction X is prevented.

The plane portion of the clutch operating gear 16 includes recesses 21 and 21' for receiving the projections 15 and 15' on the end of the transmission shaft 6. In a normal state, the projections 15, 15' and the recesses 21, 21' are in fitting engagement with each other under

the action of the spring 13, so that when the lever 1 is moved pivotally, the clutch operating gear 16 is rotated at the same time.

The push button 18 serves to disengage the transmission gear 5 from the clutch operating gear 16. The push button 18, when depressed in the direction Y in FIG. 2, disengages the recesses 21, 21' of the clutch operating gear from the projections 15, 15' of the transmission shaft, with the result that the rotation of the transmission gear 5 does not cause the clutch operating gear 16 to rotate. It is further so designed that even the slightest rotation of the lever 1 brings either one of the stoppers 34, 34' of a clutch operating member into facing relation to the plane portion 16' of the clutch operating gear 16 to prevent the clutch operating gear 16 from moving in the direction Y and thereby retain the push button 18 against depression. This assures safety in that during the operation of the boat the clutch operating gear 16 and the transmission shaft 6 are held in engagement with each other to keep the clutch engaged. Further since the clutch operating gear 16 is formed in its outer periphery with a concave portion 24 in engagement with a column-like member 22, the gear 16 is held against free rotation even when the push button 18 is depressed to disengage the clutch operating gear 16 from the transmission gear 5 while the lever 1 is in neutral position.

FIG. 8-(1) shows means for mounting a throttle cable on the case 9. The case 9 has holding portions 66 and 67 which hold an adjusting bolt 65 in rotatable manner. The adjusting bolt 65 has a head exposed from the case 9 and a threaded stem positioned within the case 9 and carrying a slide piece 63 in screw-thread engagement therewith. The slide piece 63 is slidably fitted in a groove 64 and caught in the groove 61' of a holder 61 fixed to the end of the throttle cable 60. Accordingly, when the adjusting bolt 65 is driven, the slide piece 63 moves along the groove 64 causing the holder 61 and the outer cable 77 of the throttle cable secured thereto to move forward or backward, with the result that a rod 60' and the inner cable connected thereto advance or retract the throttle. Thus, without operating the lever 1 but only by driving the adjusting bolt 65, the throttle range can be adjusted, for example, for warming up the engine. FIG. 8-(2) illustrates another embodiment of means for mounting the throttle cable on the case 9 which serves the same purpose as with the embodiment of FIG. 8-(1). A cylindrical adjuster 73 with an internal thread 74 extends through and is rotatably mounted on the case 9. Screwed into the adjuster 73 is a holder 61 formed with an external thread 72 and fixed to the end of the throttle cable 60. The rotation of the adjuster 73 adjusts the throttle as in the foregoing embodiment.

A pivot 31, formed integrally with the case 9, supports a throttle operating member 32 and a clutch operating member 30 in rotatable manner. The pivot 31 has an internal threaded portion 36 into which a screw 37 is driven to retain these members in position.

The throttle operating member 32 has several gears 25 engageable with the teeth 14, 14' of the transmission gear 5 and with a rack gear 43 and arms 26, 26' of the opposite sides of the pivot 31. The arms 26, 26' have slots 27, 27' respectively. The throttle operating member 32 has arcuate concave faces 28, 28' along its outer periphery. When a locking face 38 at the plane portion of the clutch operating gear 5 comes into sliding contact with the concave face 28 or 28', the throttle operating member 32 is thereby locked. The outer periphery of the throttle operating member further includes a notch 29 which, when brought into engagement with a column-like member 39, locks the throttle operating member 32. The column-like member 39 is placed in a recess 35 formed in the case 9 along with a spring 40 and is urged by the spring 40 in the direction V in FIG. 3 into pressing contact with the outer peripheral surface of the throttle operating member 32.

The case 9 includes a guide groove 44 in which the rack gear 43 is slidably disposed. When the lever 1 is in neutral position and is shifted to forward position, the rack gear 43 meshes with the teeth 25 of the throttle operating member 32 (see FIGS. 3 and 6), while when the lever 1 is shifted to the backward position, the rack gear meshes with the teeth 14' of the transmission gear 5 and the teeth 25 of the throttle operating member 32 to rotate the throttle operating member 32 as illustrated in FIG. 7.

In the slot 27 of throttle operating member 32, there is disposed a metal member 45 to which the rod 60' of the throttle control cable 60 is attached in rotatable manner. The metal member 45 can be locked at the desired position within the slot 27, and the locking position can be determined in accordance with the stroke of the throttle. In accordance with the present embodiment, the rod 60' will be pulled when the lever 1 is shifted in forward or backward direction. However, if it is necessary to push the rod 60' depending upon the type of the engine, the metal member 45 and the rod 60' may be positioned in the slot 27' on the other side. Further in the case where an ordinary inexpensive pull cable is used in place of the push-pull cable as employed in this embodiment, the cable may be placed in each of the slots 27 and 27'. It is also possible to use a gear instead of the rack gear 43.

The clutch operating member 30 is mounted on the pivot 31 with the throttle operating member 32 disposed thereon. As shown in FIG. 4, the clutch operating member 30 has arms 47, 47' formed with slots 48, 48', teeth 50 meshing with the teeth 49 of the clutch operating gear 16 and arcuate concave faces 52, 52'. The arcuate concave faces 52, 52' are adapted for sliding contact with the circumferential surfaces 51, 51' of the clutch operating gear 16 to lock the clutch operating member 30. A slide piece 53 is slidably mounted in the slot 48, and the rod 54' of a clutch cable 54 is attached to the slide piece 53 in pivotable manner.

The slide piece 53 is provided with a nut 41 with an internally threaded portion into which is driven the externally threaded portion 33' of an adjusting bolt 33 rotatably supported on two holding portions 55, 55' on the clutch operating member 30. Secured to the adjusting bolt 33 is a knob 71 which, when rotated, drives the adjusting bolt 33 to move the nut 41 thereon. The slide piece 53 therefore moves within the slot 48, varying the radius of pivotal movement of the clutch operating member 30, i.e. the distance between the pivot 31 and the position where the clutch cable is disposed. Accordingly, adjustment can be made by the knob 71 in accordance with the stroke of the clutch, more specifically by the continuous movement of the nut 41. Thus fine adjustment can be made as desired.

The operation and the advantages of this invention will now be described. FIG. 5 shows the clutch mechanism wherein the lever 1 is shifted to forward position, i.e. in the direction F and the clutch is completely en-

gaged in forward position. When the lever **1** is moved toward the forward position, the transmission shaft **6**, transmission gear **5** and the clutch operating gear **16** are rotated accordingly, and the teeth **49** of the clutch operating gear **16** meshing with the teeth **50** of the clutch operating member **30** drive the clutch operating member **30** in the direction *r* in the drawing, causing the slide piece **53** disposed in the slot **48** to push the rod **54'** of the clutch cable **54** and thereby engage the clutch in forward position. In the case where a clutch is constructed as engaged in forward by pulling a clutch cable, the slide piece **53** may be disposed in the slot **48'**. In this position the circumferential portion **51** of the clutch operating gear **16** comes into sliding contact with the concave face **52** of the clutch operating member **30** to lock the clutch operating member **30.** On the other hand, the column-like member **22** engages the notch **24'** of the clutch operating gear **16** under the action of the plate spring **23,** thereby notifying the operator of the completion of engagement of the clutch. If the lever **1** is further pivoted toward the forward direction the boat will be advanced, so that the engagement notified to the operator through the hand is effective in directing his attention toward the front for safety.

Before the clutch is completely engaged in the forward position, the toothless outer peripheral surface **76** of the transmission gear **5** is in opposing relation to the teeth **25** of the throttle operating member **32** without causing the throttle operating member **32** to rotate. In addition, the locking face **38** of the transmission gear **5** in sliding contact with the arcuate concave face **28** of the throttle operating member **32** prevents the rotation of the throttle operating member **32.** When the clutch has completely been engaged, the locking face **38** disengages from the concave face **28** permitting the teeth **14** of the transmission gear **5** to mesh with the teeth **25** of the throttle operating member **32** to rotate the throttle operating member **32** in the direction *r* (see FIG. **6**), whereby the rod **60'** of the throttle cable **60** fixed to the slide piece **45** positioned in the slot **27** of the throttle operating member **32** is pulled to advance the throttle range, with the result that the boat achieves the highest speed. When the lever **1** is pivoted to the position where the throttle range is the greatest, the side face of the projection **15** on the transmission shaft **6** is blocked by the end face **69'** of an adjusting bolt **69** driven into the case **9** and the lever **1** is prevented from further rotation. Since the clutch operating member **30** is completely maintained in the locked state during the operation of the throttle, it is assured that the clutch will not inadvertently be shifted nor will it be brought into halfengaged state.

When the lever **1** is pivoted from the maximum forward drive position toward neutral position, the throttle operating member **32,** with its teeth **25** meshing with the teeth **14** of the transmission gear **5** which is rotated together with the lever **1,** is pivoted in the direction *l* in FIG. **3** to return the throttle cable **60** to the original position and allow the column-like member **22** to fit in the notch **24'** of the clutch operating gear **16.** Further pivotal movement of the lever **1** to neutral position causes the teeth **49** of the clutch operating gear **16** to mesh with the teeth **50** of the clutch operating member **30** and return the clutch operating member **30** to the original position, whereby the rod **54'** of the clutch cable **54** is also returned to the original position. The column-like member **22** in engagement with the notch **24'** is disengaged therefrom to fit into the notch **24.**

If the lever **1** is pivoted toward the backward position, i.e. toward the direction B, to drive the boat backward or to apply the brake thereto during forward operation, the clutch operating member **30** having its teeth **50** meshing with the teeth **49** of the clutch operating gear **16** to be rotated together with the lever **1** is driven in the direction *l*, pulling the rod **54'** of the clutch cable **54** to engage the clutch. When the clutch is completely engaged in backward position, the outer peripheral portion **51'** of the clutch operating gear **16** comes into contact with the arcuate concave face **52'** of the clutch operating member **30** to lock the clutch operating member **30.** Through further pivotal movement of the lever **1** toward the backward position, the teeth **14'** of the transmission gear **5** mesh with the rack gear **43** (see FIG. **7**) to move the same in the direction S, causing the rack gear **43** to drive the throttle operating member **32** in the direction *r* by engagement with the teeth **25** thereof. With this movement, the slide piece **45** in the slot **27** pulls the rod **60'** of the throttle cable **60** to advance the throttle range. When the lever **1** is further pivoted, the side face of the projection **15** of the transmission shaft **6** contacts with the end face **70'** of an adjusting bolt **70'** whereupon the shaft **6** is prevented from further rotation and gives maximum backward drive. In this way, the maximum throttle range is limited by the adjusting bolt **69** for the forward drive and by the adjusting bolt **70** for the backward drive, so that the adjustment of the adjusting bolts readily achieves the control in conformity with the performance of the engine. Moreover, the throttle range can be adjusted with ease in accordance with the skill of the operator.

Further when the lever **1** is pivoted backward while the clutch is in operation, the throttle operating member **32** is prevented from rotation with its concave face **28** in contact with the locking face **38** of the transmission gear **5.** Consequently there is no possibility of inadvertent starting of the boat. The movement of the lever **1** from maximum backward drive position to neutral position gives an operation reverse to the foregoing, the description of which will be omitted. Further to keep the boat operating at a constant speed as when it is to be maintained at a given position against the tide by operating the throttle operating member **32,** the knob **42** on the case **9** is driven to cause the plate spring **40** to press the column-like member **39** into contact with the outer periphery of the throttle operating member **32** so as to prevent the rotation of the throttle operating member **32.**

To warm up the engine, the push button **18** is depressed in the direction Y in FIG. **2** with the lever **1** in neutral position to disengage the recesses **21, 21'** of the clutch operating gear **16** from the projections **15, 15'** of the transmission shaft **6.** Since the clutch operating gear **16** is prevented from rotation by the column-like member **22,** the lever **1,** when pivoted from this position, will rotate only the transmission gear **5,** whereby the throttle will be operated as already described for warming up the engine. It is noted that when the push button **18** is depressed to release the clutch operating gear **16** from the transmission shaft **6** and the lever **1** is pivotally moved, the push button **18** will not be returned to the original position even if the button is released from the hand due to the sliding contact of the

projections 15, 15' with the plane portion of the clutch operating gear 16. Further the returning of the lever 1 to neutral position after completion of warming up of engine permits the spring 13 to urge the push button 18 and the clutch operating gear 16 back to the original position, permitting the recesses 21, 21' to engage with the projections 15, 15' whereby the mechanism is made ready for usual control.

Because the lever 1 is so designed as to be positioned at the center of the case 9 in the desired direction radially of the transmission shaft, and because the clutch operating member 30 has opposite arms 47, 47' including the slots 48, 48' and the throttle operating member 32 has opposite arms 26, 26' including the slots 27, 27', two units may be connected together in a back-to-back arrangement to operate two engines at the same time. More specifically, the levers 1 of the two control units arranged are set in the predetermined positions respectively, and one control unit is connected to the throttle cable and clutch cable at the arms 26' and 47' and the other control unit is connected to the throttle cable and clutch cable at the arms 26 and 47 respectively. In this case, there can be operated the both levers by one hand when the grips of the levers are located closed to each other. Generally, in the case where such control units are used in combination, there arises a need to employ the parts which are symmetrical on the left and right and accordingly it is necessary to use two kinds of different parts, whereas the present apparatus is advantageous in that one type of the unit will serve the purpose.

Further with the present apparatus, it is possible to control two engines by one unit at the same time. For such application, the throttle cable and clutch cable for one engine are connected to one arm of each of the throttle operating member 32 and clutch operating member 30 and the throttle cable and clutch cable for the other engine are connected to the other arm of each of the throttle operating member 32 and the clutch operating member 30. The connection of the throttle cable and clutch cable with the engine may be made on starboard for one, and on port for the other in opposite relation.

As already described, the present apparatus has various functions and advantages, which will be summarized below:

1. The throttle does not operate before the clutch has completely been engaged in forward or backward position.

2. During the operation of the clutch, the throttle is locked, whereas the clutch remains locked while the throttle is in operation.

3. The clutch operating gear 16 can be disengaged from the transmission shaft 6 only in neutral position, with the resulting advantage that warming up of the engine can be performed with safety and that even when the push button is inadvertently depressed while the boat is in operation, the clutch will not be shifted.

4. Complete engagement of the clutch in forward or backward position is delivered to the operator through the hand, so that it is effective in directing his attention toward the front and the back for safety.

5. The locking mechanism keeps the throttle range constant even when the lever 1 is released from the hand.

6. The push button, when merely depressed with the lever in neutral position, makes the apparatus ready for engine warming up. After warming up, the push button is returned to the original position and the apparatus is made ready for usual operation simply by returning the lever to neutral position.

7. The apparatus is applicable for various types of engines. The throttle cable of the engine may be of the push or pull type. Where it is required that the inner cable of the throttle cable be adapted only for pulling action, two pull cables can be used in place of one push-pull cable, with each connected to each arm of the throttle operating member. Manipulation of the adjuster on the case makes it possible to operate the throttle for warming up the engine without using the lever. The combination of two units of the identical construction in back-to-back arrangement provides a control apparatus for a twin engine.

8. It is possible to operate two engines with only one control apparatus.

What is claimed is:

1. A single lever control apparatus having a housing for operating the clutch and throttle of an engine comprising a transmission shaft (6) adjustably carrying a control lever (1), a clutch operating member and a throttle operating member to be driven by said transmission shaft (6), and a rack gear (43), said transmission shaft (6) having a transmission gear 5 and a locking face (38), said throttle operating member being rotatably supported on a stationary pivot (31) and having gears (25), a locking face (28) and an arm (26) to be connected to the throttle, the locking face (28) of said throttle operating member (32) be engageable with the locking face (38) of said transmission shaft to lock said throttle operating member (32) with the teeth (25) thereof meshing with said rack gear when said control lever (1) is in neutral position, the teeth (14) of said transmission gear being meshable with the teeth (25) of said throttle operating member (32) to rotate said throttle operating member when said control lever (1) is pivoted toward one direction, the teeth (14') of said transmission gear being meshable with said rack gear (43) to rotate said throttle operating member in the same direction through said rack gear (43) when said control lever (1) is pivoted toward the other direction.

2. The apparatus as set forth in claim 1, wherein a holder (61) or adjuster (73) is secured to the outer cable (77) of a cable (60) for the throttle at the position where the outer cable extends into said housing (9) so as to adjust the throttle range by moving only the outer cable.

3. The apparatus as set forth in claim 1, wherein said throttle operating member (32) has an arm (26') to be connected to the throttle in symmetrical relation to the arm (26) with respect to said pivot (31).

4. The apparatus as set forth in claim 1, wherein said clutch operating member (30) is rotatably supported on said stationary pivot (31) and has teeth (50), arcuate concave faces (52, 52') and an arm (47) to be connected to the clutch, said teeth (50) being meshable with a gear (16) to be driven by said transmission shaft when said control lever (1) is in neutral position, said arcuate concave faces (52, 52') being engageable with the circumferential faces (51, 51') of said gear (16) to lock said clutch operating member (30) when said control lever (1) is pivoted a given angle from neutral position toward forward and backward positions.

5. The control apparatus as set forth in claim 4, wherein said throttle operating member (32) is locked while said clutch operating member (30) is in opera-

tion and said clutch operating member (30) is locked while said throttle operating member (32) is in operation.

6. The control apparatus as set forth in claim 4, wherein the gear (16) to be driven by said transmission shaft (6) is integrally formed with a shaft (17), said shaft (17) extending through said transmission shaft (6) rotatably and slidably in the axial direction and having an exposed end to provide a push button, said push button when depressed being capable of disengaging said clutch operating member (30) from said gear (16) only in neutral position, said clutch operating member (30) being locked by said gear (16) when thus disengaged.

7. The control apparatus as set forth in claim 4, wherein the arm (47) of said clutch operating member (30) slidably carries a slide piece (53) to be connected to the clutch, said slide piece (53) being continuously adjustable with respect to its position relative to said pivot (31) by an adjusting bolt (33) screwed into said slide piece.

8. The control apparatus as set forth in claim 4, wherein said clutch operating member (30) is formed with an arm (47') in symmetrical relation to the arm (47) with respect to its pivot (31).

9. The control apparatus as set forth in claim 4, wherein said throttle operating member (32) and said clutch operating member (30) are formed with arms (26') and (47') in symmetrical relation to the arms (26 and 47) with respect to their pivot (31) respectively.

10. The control apparatus as set forth in claim 4, wherein a holder (61) or adjuster (73) is secured to the outer cable (77) of a cable (60) for the throttle at the position where the outer cable extends into said housing (9) so as to adjust the throttle range by moving only the outer cable.

11. The control apparatus as set forth in claim 5, wherein the gear (16) to be driven by said transmission shaft (6) is integrally formed with a shaft (17), said shaft (17) extending through said transmission shaft (6) rotatably and slidably in the axial direction and having an exposed end to provide a push button, said push button when depressed being capable of disengaging said clutch operating member (30) from said gear (16) only in neutral position, said clutch operating member (30) being locked by said gear (16) when thus disengaged.

12. The control apparatus as set forth in claim 11, wherein the arm (47) of said clutch operating member (30) slidably carries a slide piece (53) to be connected to the clutch, said slide piece (53) being continuously adjustable with respect to its position relative to said pivot (31) by an adjusting bolt (33) screwed into said slide piece.

13. The control apparatus as set forth in claim 11, wherein said throttle operating member (32) and said clutch operating memebr (30) are formed with arms (26' and 47') in symmetrical relation to the arms (26 and 47) with respect to their pivot (31) respectively.

14. The control apparatus as set forth in claim 12, wherein said throttle operating member (32) and said clutch operating member (30) are formed with arms (26' and 47') in symmetrical relation to the arms (26 and 47) with respect to their pivot respectively.

15. The control apparatus as set forth in claim 14, wherein a holder (61) or adjuster (73) is secured to the outer cable (77) of a cable (60) for the throttle at the position where the outer cable extends into said housing (9) so as to adjust the throttle range by moving only the outer cable.

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