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Whipple et al.

[11] **3,780,842**

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[54] **SINGLE CLUTCH AND THROTTLE LEVER COMBINED WITH A THROTTLE WARM UP LEVER**

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[21] Appl. No.: **265,600**

[52] **U.S. Cl.**..... **192/0.096,** 74/471 R, 74/483 R, 74/876

[51] **Int. Cl.**... **G05g 5/08,** G05g 11/00, G05g 13/00

[58] **Field of Search**..... 192/0.096, 0.098; 74/471 R, 480 B, 483 R, 875, 876

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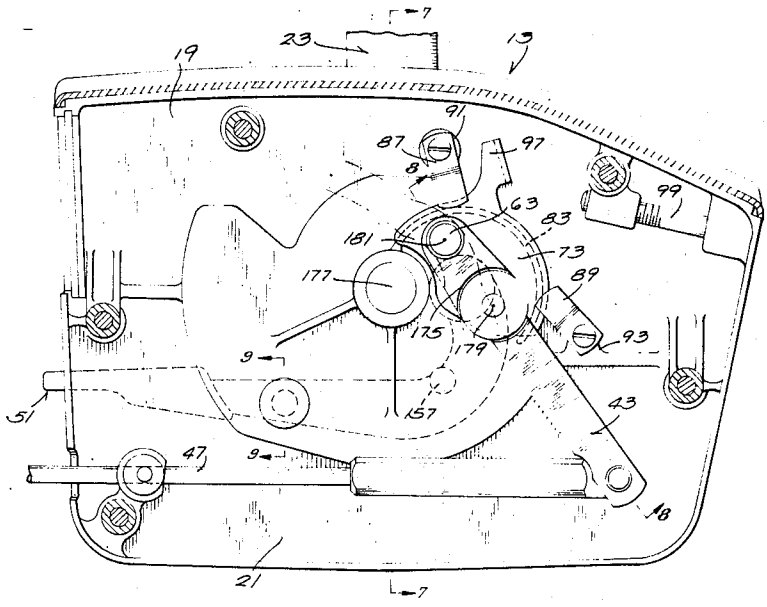
Primary Examiner—Allan D. Herrmann
Attorney—Robert E. Clemency et al.

[57] **ABSTRACT**

Disclosed herein is a control for the throttle and clutch of a marine propulsion device, which control comprises a control lever mounted on a frame for rotation about a first axis, means operably connecting the control lever to a clutch element movably mounted on the frame to cause clutch element movement in response to control lever movement, a warm up lever mounted on the frame for relative rotation therebetween about a second axis located to one side of the first axis in spaced relation therefrom, means connecting the warm up lever to a throttle arm for relative rotation therebetween about a third axis extending from the intermediate portion of the throttle arm and located below the first and second axes and on the one side of the first axis in spaced relation therefrom at a distance greater than the spacing between the first and second axes, and means operably connecting the control lever and the throttle arm for rocking the throttle arm about the means pivotally connecting the warm up lever to the throttle arm and for providing relative rotation between the control lever and the throttle arm about an axis extending from ajdacent one end of the throttle arm and located above the first axis and to the one side of the first axis at a distance less than the spacing between the first and second axes, whereby when the warm up lever is pivotally moved independently of movement of the control lever, the throttle arm is pivoted about the means connecting the throttle arm to the control lever and when the control lever is pivotally moved independently of the warm up lever, the throttle arm is pivoted about the means pivotally connecting the throttle arm to the warm up lever, and interengaging pin and slot means on the control lever and on the warm up lever affording pivotal movement of the warm up lever from an idle position when the the control lever is in the neutral position and affording pivotal movement of the control lever from the neutral position when the warm up lever is in the idle position and preventing pivotal movement of the warm up lever from the idle position when the control lever is displaced from the neutral position and preventing pivotal movement of the control lever from the neutral position when the warm up lever is displaced from the idle position.

21 Claims, 9 Drawing Figures



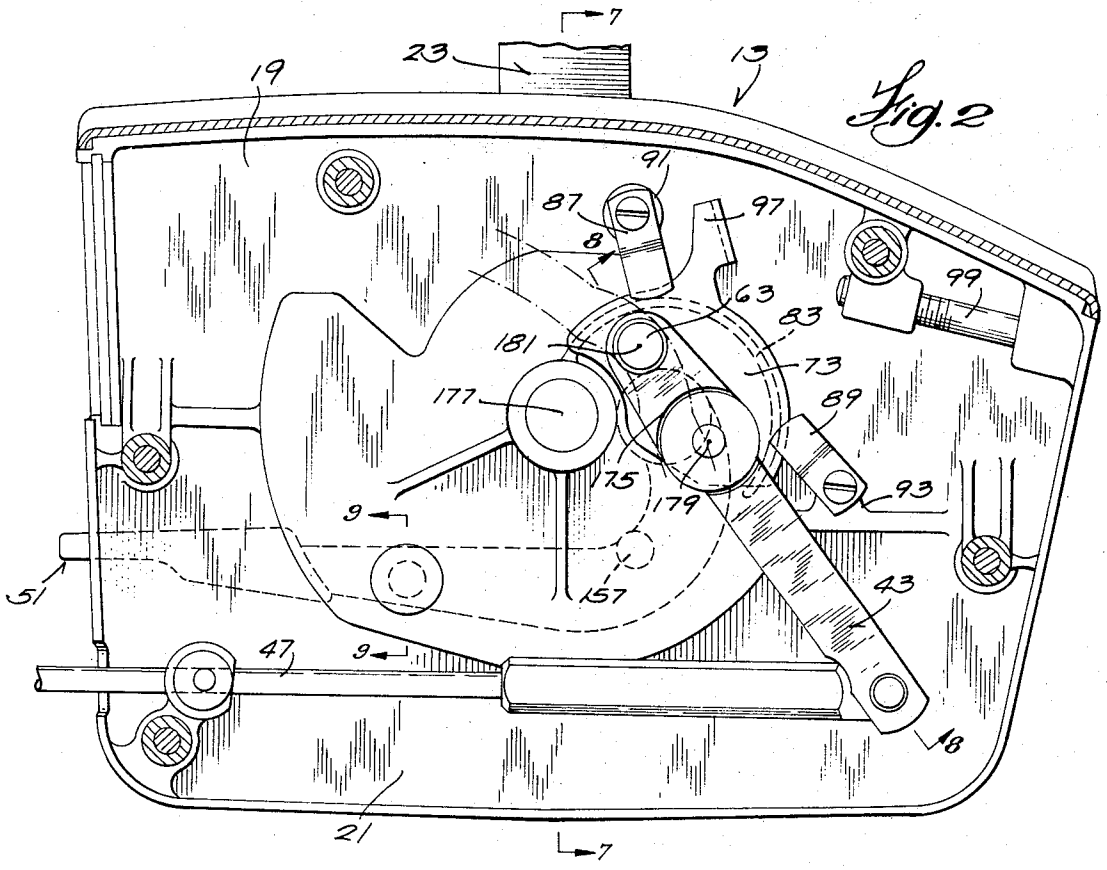


Fig. 2

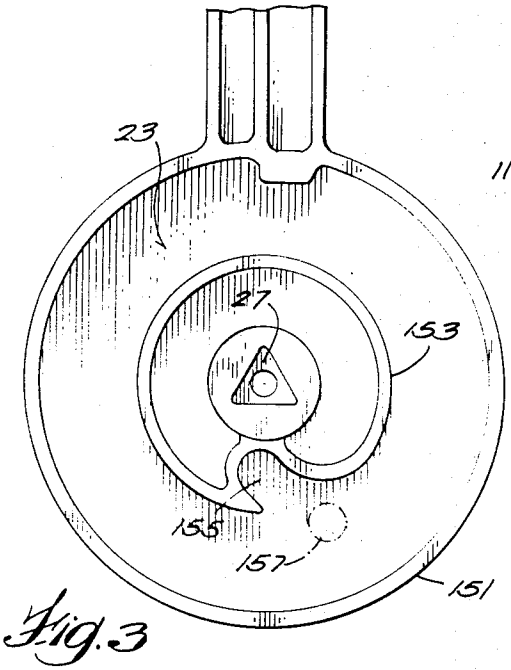


Fig. 3

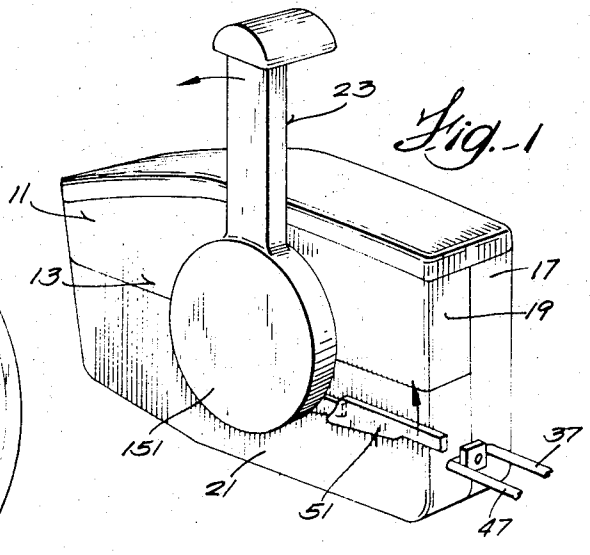


Fig. 1

Fig. 4

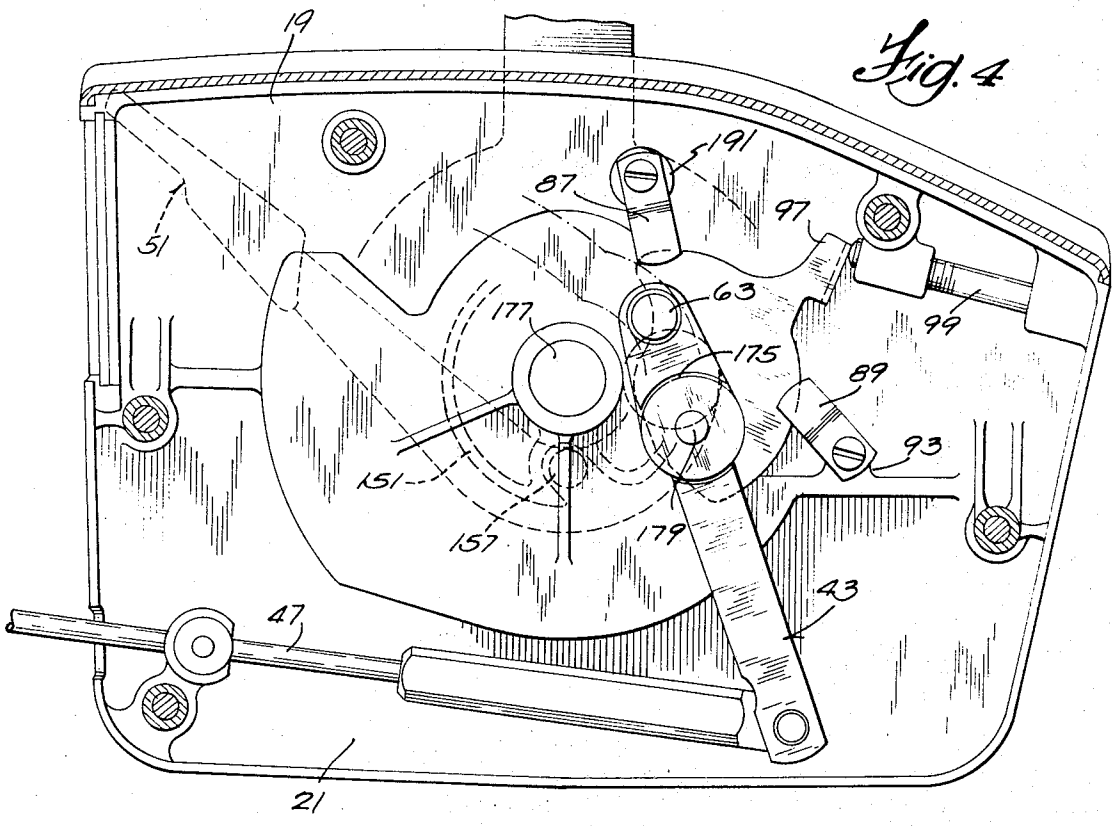

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Fig. 5

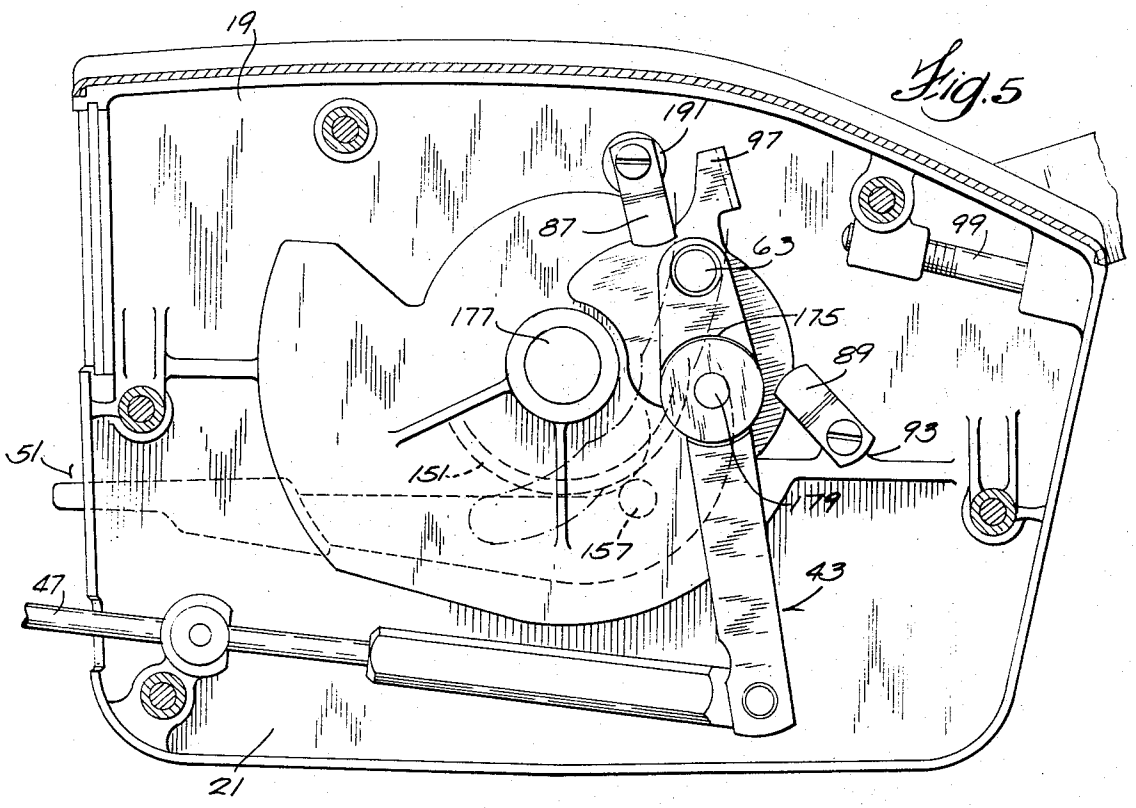
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Fig. 6

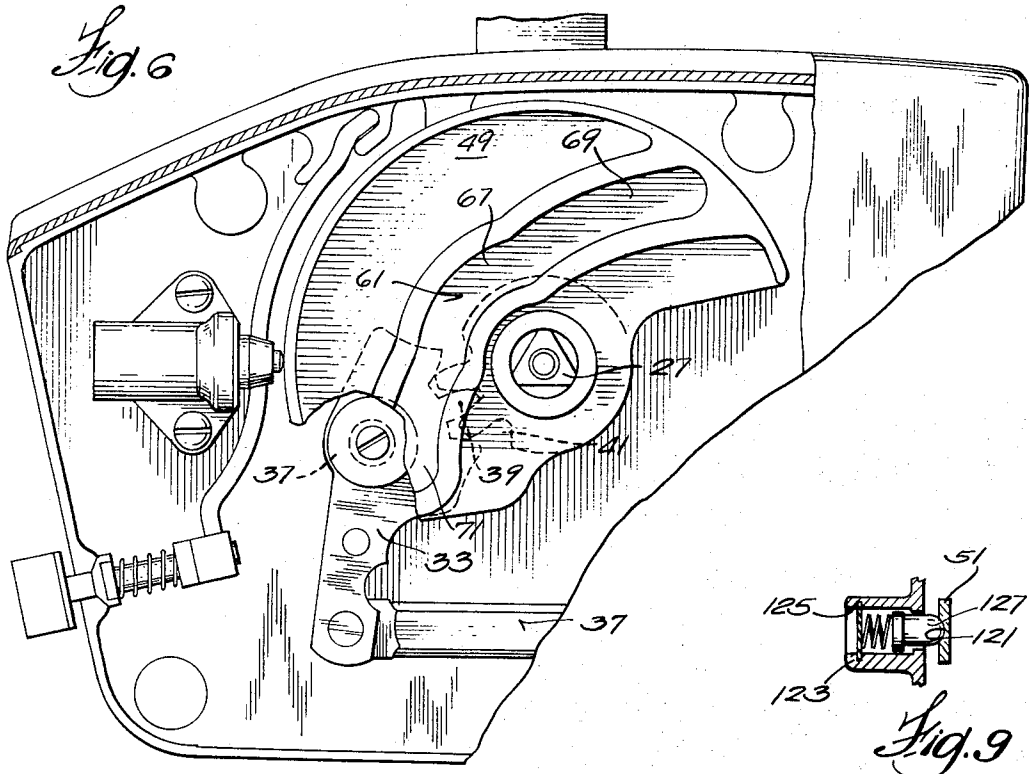

Fig. 9

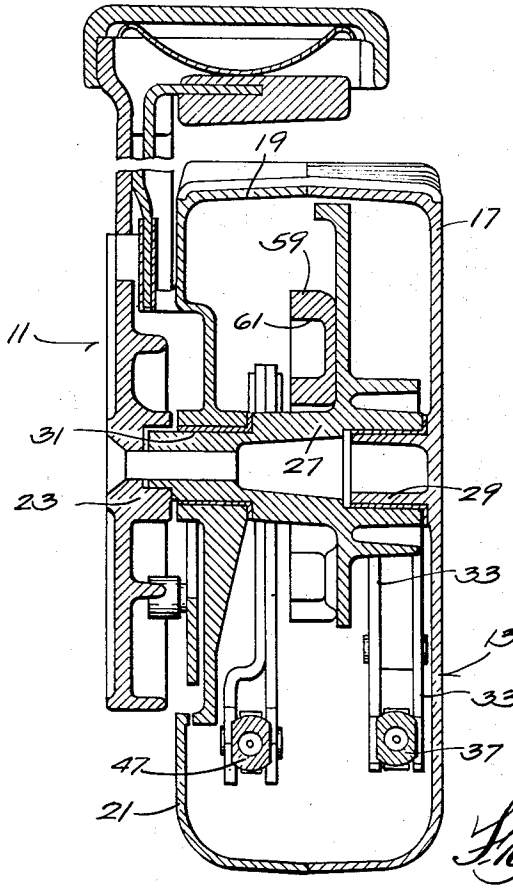

Fig. 7

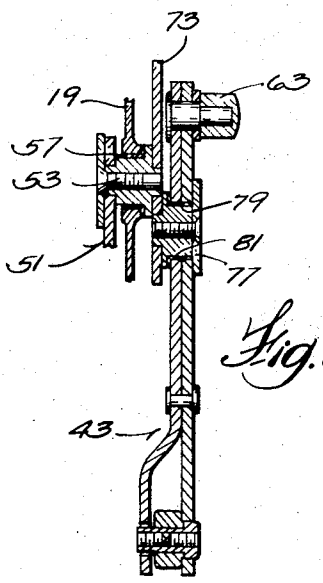

Fig. 8

SINGLE CLUTCH AND THROTTLE LEVER COMBINED WITH A THROTTLE WARM UP LEVER

BACKGROUND OF THE INVENTION

The invention relates generally to single lever controls for regulating the throttle and clutch associated with an internal combustion engine. More specifically, the invention relates to single lever controls for marine propulsion devices, such as outboard motors and stern drive units.

Such "single lever controls" commonly include a main control lever which is pivotally movable in both directions from a neutral position through oppositely extending clutch actuating ranges on either side of the neutral position to effect clutch actuation without affecting throttle setting. In addition, the main control lever of such single lever controls is commonly pivotally movable beyond the clutch actuating ranges through respectively extending spaced throttle control ranges, whereby to facilitate increasing engine speed without affecting the clutch actuation. As a consequence, clutch actuation occurs before material advancement of the throttle can be achieved and, in addition, the clutch cannot again be actuated until the throttle is returned to a low engine speed setting.

Notwithstanding usage of the term "single lever control," such controls have commonly also employed an auxiliary warm up lever which is selectively operable to control the throttle setting and which is movable between an idle position and an advanced throttle setting position so as to facilitate engine warm up when the engine is started and prior to any actuation of the main control lever.

Examples of prior single lever controls including an auxiliary warm up lever are found in the U.S. Shimanckas Pat. No. 3,139,767, issued July 7, 1964, in the U.S. Irgens Pat. No. 3,146,632, issued Sept. 1, 1964, and in the U.S. Morse Pat. Nos. 2,884,109, issued Apr. 28, 1959; 2,966,970, issued Jan. 3, 1961,; 2,971,618, issued Feb. 14, 1961; 2,987,152, issued June 6, 1961; 3,204,733, issued Sept. 7, 1965.

Other examples of single lever controls are disclosed in U.S. Schroeder Pat. Nos. 2,867,131, issued Jan. 6, 1969, and in 2,867,132, issued Jan. 6, 1959. Still another example of such a single lever control construction which was commercially sold by the Kiekhaefer Corporation is shown in FIGS. 5 through 7 of the U.S. Pervier Application Ser. No. 336,223, filed Jan. 7, 1964, and now abandoned.

SUMMARY OF THE INVENTION

The invention provides a single lever control which includes a main control lever and an auxiliary control lever, together with means interconnecting the warm up lever and the main control lever with a throttle arm in such manner as to afford throttle controlling action with a minimum of wear on the movable parts.

More specifically, in accordance with one embodiment of the invention, the warm up lever is mounted for pivotal movement about an axis located in generally horizontally spaced relation to one side of the axis of pivotal movement of the main control lever. In addition, the main control lever has connected thereto, for common movement therewith, a cam plate having therein a cam slot receiving a follower mounted adjacent one end of a throttle arm. Adjacent to its other end, the throttle arm is adapted to be pivotally connected to a push pull cable and, intermediate its ends, the throttle arm is pivotally connected to a link which extends fixedly from the warm up lever.

In further accordance with the invention, when the main control lever is in the neutral position, the pivotal connection between the throttle arm and the cam plate, provided by engagement of the follower in the cam slot, is located above the pivotal axis of the warm up lever and at a horizontal distance from the axis of the main control lever less than the distance therefrom to the axis of the warm up lever. When the warm up lever is in the idle position, the pivotal connection between the warm up lever and the throttle arm is located below the pivotal mounting of the warm up lever and at a horizontal distance from the pivotal axis of the main control lever greater than the spacing of the pivotal axis of the warm up lever from the axis of the main control lever.

When the warm up lever is moved from the idle position so as to advance the throttle setting, the pivotal connection between the warm up lever and the throttle arm moves in an arc downwardly and horizontally toward the axis of the main control lever. When the main control lever is moved from the neutral position, the pivotal connection between the cam plate and the throttle arm moves horizontally away from the pivotal axis of the main control lever and in a path above the pivotal connection between the warm up lever and the throttle arm.

Preferably, the invention further provides a single lever control in which the pivotal connections between the warm up lever, main control lever, and throttle arm referred to above, are employed in combination with cooperating means on the main control lever and the warm up lever to prevent movement of the main control lever from the neutral position when the warm up lever is displaced from the idle position and to prevent displacement of the warm up lever from the idle position when the main control lever is displaced from the neutral position.

More specifically, the invention also provides interengaging slot and pin means on the main control lever and on the auxiliary control lever for preventing movement of the warm up lever from the idle position when the main control lever is displaced from the neutral position and for preventing movement of the main control lever from the neutral position when the auxiliary warm up lever is displaced from the idle position. In addition, the arrangement is such that movement of the auxiliary warm up lever from the idle position in the throttle advancing direction is permitted only when the main control lever is in the neutral position and movement of the main control lever from the neutral position is permitted only when the auxiliary warm up lever is in the idle position.

In the disclosed embodiment of the invention, the main control lever includes a circular surface, together with an arcuately extending slot extending from the circular surface, and the warm up lever includes a roller movable into the slot when the main control lever is in the neutral position. When the main control lever is displaced from the neutral position, engagement of the roller with the circular surface interferes with movement of the warm up lever from the idle position. In addition, when the warm up lever is advanced from the neutral position, and the roller is in the slot, movement of the main control lever from the neutral position is

prevented because of the presence of the roller in the slot. When the roller is withdrawn from the slot consequent to return of the warm up lever to the idle position, the main control lever can be moved from the neutral position.

One of the principal objects of the invention is the provision of a single lever control in which movement of the parts which control the throttle setting results in a minimum of wear to such parts.

Another of the principal objects of the invention is the provision of a single lever control including a housing pivotally supporting both a main control lever with a part located exteriorly of the housing and a warm up lever with a part located exteriorly of the housing, together with interengaging pin and slot means, on the parts of the main control lever and warm up lever located exteriorly of the housing, for preventing movement of the main control lever from neutral when the warm up lever is displaced from the idle position and for preventing displacement of the warm up lever from the idle position when the main control lever is displaced from the neutral position.

Other objects and advantages of the invention will become known by reference to the following description, claims, and accompanying drawings.

DRAWINGS

FIG. 1 is a perspective view of a single lever control which is particularly adapted for use with a marine propulsion device and which embodies various of the features of the invention.

FIG. 2 is a sectional fore and aft view of the device shown in FIG. 1, illustrating the location of various of the components when the main control lever is in the neutral position and the warm up lever is in the idle position.

FIG. 3 is a fragmentary view of a portion of the main control lever embodied in the control shown in FIG. 1.

FIG. 4 is a view similar to FIG. 3 illustrating the location of various of the components when the main control lever is in the neutral position and the warm up lever is in a throttle advance position.

FIG. 5 is a view similar to FIGS. 2 and 4, illustrating the location of the components when the warm up lever is in the idle position and the main control lever is in the forward speed range.

FIG. 6 is a fragmentary view similar to FIGS. 2, 4, and 5, illustrating various other of the components incorporated in the control shown in FIG. 1.

FIG. 7 is a transverse cross sectional view taken generally along line 7—7 of FIG. 2.

FIG. 8 is a fragmentary sectional view taken along line 8—8 of FIG. 2 of the warm up lever linkage.

FIG. 9 is a transverse cross sectional view taken generally along line 9—9 of FIG. 2.

Before explaining the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts set forth in the following general description or illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

GENERAL DESCRIPTION

The drawings are illustrative of one embodiment of a "single lever control" for operating the clutch and throttle of a remotely located marine propulsion device, such as an outboard motor or stern drive unit. As illustrated, the single lever control **11** includes (See FIGS. 1 and 6) a housing or frame **13** including a recessed housing part or half section **17**, an upper housing cover **19**, and a lower housing cover **21**,which covers **19** and **21** together constitute the second half section of the housing **13**.

Included in the single lever control **11** is a main control lever **23**, together with means for pivotally or rotatively mounting the main control lever **23** for movement relative to and exteriorly of the housing **13**. While various arrangements can be employed, in the illustrated construction, such means includes (See FIG. 6) a central shaft **27** which is more or less centrally located in the housing **13**, which, at one end, is rotatively journaled on a boss **29** extending from the recessed housing part **17**, and which, at its other end, passes through a bearing **31** supported by the upper housing cover **19**. Exteriorly of the housing, the central shaft **27** is suitably connected to the main control lever **23** for common rotation therewith.

Clutch control is provided (See FIGS. 6 and 7) by a shift arm or lever **33** which is pivotally mounted on a stud or boss **37** extending from the recessed housing part **17** which, at its lower end, is adapted to be connected to a push pull link or cable **37**, and which includes a gear segment **39** meshing with a cooperating gear segment **41** on the central shaft **27**. Thus, main control lever movement serves to rock the shift lever **33** about its pivotal mounting and thereby to actuate the remotely located clutch.

Throttle control is provided (See FIGS. 2, 4, and 5) by a throttle arm or lever **43** which, at its lower end, is adapted to be connected to a push pull link or cable **47** and which is alternately operable to regulat the setting of a remote throttle in response to movement of either of the control lever **23** or an auxiliary warm up lever **51** (See FIGS. 1 and 2).

As shown best in FIG. 8, means are provided for pivotally mounting the warm up lever **51** on and exteriorly of the housing **13**. While various arrangements can be employed, in the illustrated construction, the warm up lever **51** is fixedly mounted on a stud or shaft **53** extending through a bearing **57** in the upper housing cover **19**. In operation, the warm up lever **51** is movable from an idle position shown in FIGS. 2 and 5 to a throttle advancing position which is shown in dotted lines in FIG. 4.

Means are provided for operably connecting the throttle arm or lever **43** to the main control lever **23** and to the warm up lever **51** for controlling movement of the throttle arm **43** in response to movement of either the main control lever **23** or the auxiliary warm up lever **51**.

While various arrangements can be employed, in the illustrated construction, the means for connecting the main control lever **23** to the throttle arm **43** comprises (See FIGS. 6 and 7) provision on the central shaft **27** of a cam plate **49** with a portion having therein a throttle cam or slot **61** which receives a follower or roller **63** (See FIGS. 2 and 8) pivotally mounted at the upper end of the throttle arm **43**. As illustrated, the cam **61** in-

cludes (See FIGS. 6 and 7) a central portion 67 formed at a uniform radius from the axis of the central shaft 27 and oppositely extending end portions 69 and 71 which project in the direction away from the central portion 67 at distances from the center shaft axis which increase with increasing distance from the central portion 67.

While various arrangements can be employed, in the illustrated construction, the means for connecting the warm up lever to the throttle lever includes (See FIG. 8) a warm up linkage comprising a generally semicircular warm up link or plate 73 having fixedly extending therefrom the stud or shaft 53 which extends through the bearing 57 and which is fixed to the warm up lever 51. The warm up link 73 has fixedly projecting therefrom a second stud or shaft 77 which extends in the opposite direction from the stud 53, which is located in spaced relation from the stud 53, and which extends into a bearing 79 provided in an aperture 81 located in an intermediate portion of the throttle arm 43, whereby the warm up link 73 and warm up lever 51 are pivotal as an entity relative to both the housing 13 and the throttle arm 43, and whereby the warm up lever 51 is located exteriorly of the upper housing cover 19 between the housing cover 19 and the main control lever 23 and whereby the warm up link 73 is located within the housing 13 on the other side of the upper housing cover 19.

Movement of the assembly of the warm up lever 51 and the warm up link 73 is restricted to pivotal movement in a single plane, so as to thereby avoid wobbling by providing the upper housing cover 19 with an arcuate rib 83 which extends from the interior side thereof into sliding engagement with the margin of the arcuate periphery of the warm up link 73. Mounted on respective studs or bosses 91 and 93 projecting from the interior side of the upper housing cover 19 are a pair of spaced clips 87 and 89 which extend into overlying relation to the arcuate margin of the warm up link or plate 73 to retain the link 73 in sliding engagement with the rib 83.

The cooperating gear segments 39 and 41 on the shift arm or lever 33 and on the central shaft 27 are formed so that, when the main control lever 23 is moved, in either rotative direction from the central or neutral position shown in FIG. 2, the shift arm or lever 33 is moved to actuate the clutch of the remotely located engine. Such clutch actuation occurs promptly upon movement of the main control lever 23 from the neutral position.

The throttle cam 61 is shaped such that the follower or roller 63 travels through the central portion 67 without displacing the throttle arm 43 during movement of the shift arm or lever 33 to actuate the engine clutch. However, after completion of the clutch actuation, the follower or roller 63 then enters one of the extending end portions 69 and 71, depending upon the direction and rotation of the main control lever 23, so as to thereafter advance the throttle from idle, without affecting the setting of the shift arm or lever 33.

Means are provided for limiting movement of the warm up lever 51 relative to the housing 13 between an idle setting or position and a throttle advance setting or position. While various arrangements can be employed, in the illustrated construction, the warm up link 73 includes (See FIG. 2) a wing or arm or part 97, located such that counterclockwise rotation of the warm up lever 73 is limited by engagement of the arm 97 with the stud 91 which extends from the upper housing cover 19 and which supports the clip 87. In the other rotative direction, the means for limiting rotation of the warm up lever 51 is preferably adjustable and comprises an element or screw 99 which is adjustably supported by being threaded into the upper housing cover 19 so that its inner end is in the path of movement of the wing or arm 97 of the warm up link 73 and so that its other end is accessible from the exterior of the housing 13 to facilitate adjustment. Such adjustment serves to limit the amount by which the throttle can be advanced during engine warm up.

Means are also provided for releasably locating the warm up lever 51 in the idle position. While various arrangements can be employed, in the illustrated construction, such means includes a partially spherical recess 121 in the side of the warm up lever 51 adjacent to the upper housing cover 19 and a boss 123 extending from the interior side of the upper housing cover 19 and including a bore 125 open on the exterior side, together with a plunger 127 which is spring biased in the direction toward the warm up lever 51 for releasable engagement with the partially spherical recess 121 when the warm up lever 51 is in the idle position. Suitable means are provided for preventing movement of the plunger 127 out of the bore 125.

Interengaging means are also provided on the main control lever 23 and on the warm up lever 51 for affording pivotal movement of the warm up lever 51 from the idle position when the main control lever 23 is in the neutral position, and for affording pivotal movement of the main control lever 23 from the neutral position when the warm up lever 51 is in the idle position, and for preventing pivotal movement of the warm up lever 51 from the idle position when the main control lever 23 is displaced from the neutral position, and for preventing pivotal movement of the main control lever 23 from the neutral position when the warm up lever 51 is displaced from the idle position.

In accordance with the invention, such means comprises providing the main control lever 23 with (See FIGS. 1 and 3) an enlarged circular part or portion 151 located exteriorly of the housing and coaxial with the axis of main control lever movement, together with formation of the side of the enlarged portion 151 adjacent to the housing 13 with a circular surface 153 which is interrupted by an arcuately and radially inwardly extending slot 155 receiving a follower or roller 157 mounted on the adjacent side of a part of the warm up lever 51. The slot 155 is so located that the roller 157 is permitted entry only when the main control lever 23 is in the neutral position. When the main control lever 23 is otherwise located, attempted movement of the warm up lever 51 from the idle position so as to advance the throttle is prevented by engagement of the roller 157 with the circular surface 153. Thus, the warm up lever 51 can only be advanced from the idle position when the main control lever 23 is in neutral.

Advancement of the warm up lever 51 from the idle position when the main control lever 23 is in the neutral position serves to engage the roller 157 in the slot 155 (See FIG. 2). As a consequence, when the warm up lever 51 is advanced from the idle position, such location of the roller 157 in the slot 155 prevents movement of the main control lever 23 from the neutral po-

sition until the warm up lever **51** is returned to the idle position.

Of particular significance to one aspect of the invention is the location and spacing, relative to the main control lever axis **177**, of the pivotal connections of the throttle arm **43** to each of the main control lever **23** and the warm up link **73**, as well as the location and spacing, relative to the main control lever axis **177**, of the pivotal connection of the warm up lever **51** to the housing **13**.

Specifically, as seen in FIG. **2**, the axis **175** of pivotal movement of the warm up lever **51** is located forwardly (i.e., to the right in FIG. 2) of the main control lever axis **177** and at approximately the same horizontal level. The axis **179** of the pivotal connection between the warm up link **73** and the throttle arm **43** is located, when the warm up link **73** is in the idle position, forwardly of the main control lever axis **177** at a greater distance than the spacing of the warm up lever mounting axis **175** from the main control lever axis **177**. In addition, the axis **179** of the pivotal connection between the warm up link **73** and the throttle arm **43** is located, when the warm up link **73** is in the neutral position, below the respective mounting axes **177** and **175** of both of the main control lever **23** and warm up lever **51**. When the warm up lever **51** is moved from the idle position, the pivotal connection of axis **179** between the warm up link **73** and the throttle arm **43** moves in an arc extending rearwardly, i.e., to the left in FIG. 2 and below the position of the axis **179** when the warm up lever **51** is in the idle position.

The axis **181** of the pivotal connection between the throttle arm **43** and the control lever cam plate **59** is generally located above the main control lever axis **177**. In addition, when the main control lever **23** is in the neutral position, the axis **181** of the pivotal connection between the throttle arm **43** and the control lever cam plate **59** is located forwardly (i.e., to the right in FIG. 2) of the main control lever axis **177** at a spacing less than the distance of the warm up lever mounting axis **175** from the main control lever axis **177**. When the main control lever **23** is moved from the neutral position, the axis **181** of the pivotal connection between the throttle arm **43** and the control lever cam plate **59** moves in an arc extending forwardly and above the pivotal connection **179** of the warm up link **73** to the throttle arm **43**.

While the mounting axes **177** and **175** of the main control lever **23** and warm up lever **51** are fixed relative to the housing **13**, the respective pivotal connections **179** and **181** of the throttle arm **43** to each of the warm up link **73** and the control lever cam plate **59** are movable relative to the housing **13** during operation of the warm up lever **51** and main control lever **23**.

It is further pointed out that the pivotal connection **181** of the throttle arm **43** to the control lever cam plate **59** is adjacent to the top of the throttle arm **43**, that the pivotal connection **179** between the throttle arm **43** and the warm up link **73** is located intermediate of the ends of the throttle arm **43**, and that the lower end of the throttle arm **43** is adapted for connection to the push pull cable **47**.

Still further, it is pointed out that pivotal connection of the warm up link **73** to the throttle arm **43** is located forwardly of and below the pivotal connection **175** of the warm up link **73** to the housing **13**.

The described locations of the various axes **175, 177, 179,** and **181** have the very beneficial effect of reducing wear between the movable components of the single lever control **11**.

Various of the features of the invention are set forth in the following claims.

What is claimed is:

1. A control for the throttle of a marine propulsion device, said control comprising a housing, a control lever mounted on said housing for rotation relative to a neutral position, a throttle arm adapted to actuate a remotely located throttle in response to throttle arm movement, a warm up lever, means mounting said warm up lever on said housing for rotation relative to said housing and relative to an idle position and connecting said warm up lever to said throttle arm for relative rotation therebetween about a first axis extending from an intermediate portion of said throttle arm, and means operably connecting said control lever and said throttle arm for rocking said throttle arm about said means pivotally connecting said warm up lever to said throttle arm and for providing relative rotation between said control lever and said throttle arm about a second axis extending from adjacent one end of said throttle arm.

2. A control in accordance with claim **1** wherein said control lever is mounted for rotation about a third axis, wherein said warm up lever is mounted for rotation about a fourth axis located to one side of said third axis in spaced relation therefrom, wherein said first axis is located, when said warm up lever is in said idle position, below said third and fourth axes and on said one side of said third axis in spaced relation therefrom at a distance greater than the spacing between said third and fourth axes, and wherein said second axis is located, when said control lever is in said neutral position, above said third axis and on said one side of said third axis in spaced relation therefrom at a distance less than the spacing between said third and fourth axes.

3. A control in accordance with claim **1** and further including interengaging means on said control lever and on said warm up lever for affording pivotal movement of said warm up lever from said idle position when said control lever is in said neutral position, and for affording pivotal movement of said control lever from said neutral position when said warm up lever is in said idle position, and for preventing pivotal movement of said warm up lever from said idle position when said control lever is displaced from said neutral position, and for preventing pivotal movement of said control lever from said neutral position when said warm up lever is displaced from said idle position.

4. A control in accordance with claim **3** wherein said control lever includes a part located exteriorly of said housing, wherein said warm up lever includes a part located exteriorly of said housing, and wherein said interengaging means is located exteriorly of said housing on said control lever and warm up lever parts.

5. A control in accordance with claim **3** wherein said interengaging means includes an enlarged portion on said control lever adjacent to said housing and wherein said enlarged portion includes a circular surface located adjacent to said housing and concentric with the axis of control lever movement, and a slot extending arcuately and radially inwardly from said circular surface, and wherein said warm up lever extends between said control lever and said housing and includes a fol-

lower extending from the side of said warm up lever remote from said housing and located in position for travel into said slot in response to movement of said warm up lever from said idle position when said control lever is in said neutral position and to engage said circular surface to prevent movement of said warm up lever from said idle position when said control lever is displaced from said neutral position.

6. A control in accordance with claim **1** wherein said means operably connecting said throttle arm and said control lever comprises a cam plate fixed to said control lever for common movement therewith, said cam plate having therein a cam slot with a central portion extending at a uniform radius from the axis of control lever pivotal movement, and end portions extending from said central portion at increasing distances from said axis of control lever pivotal movement, and a follower mounted at one end of said throttle arm and received in said cam slot for translation relative to said cam plate and for rotary movement relative to said cam plate.

7. A control in accordance with claim **1** wherein said housing includes a wall member having an inner surface and an exterior surface, said wall member also having therein first and second spaced apertures, wherein said control further includes a first shaft journaled by said housing, extending through said first aperture and connected, adjacent to said exterior wall member surface, to said control lever for common movement therewith, wherein said control further includes a second shaft journaled by said housing, extending through said second aperture and connected adjacent to said exterior wall member surface to said warm up lever for common movement therewith relative to said housing, wherein said control lever includes an enlarged portion adjacent to said housing,said enlarged portion including a circular surface located adjacent to the exterior wall member surface and concentric with the axis of control lever movement, and a slot extending arcuately and radially inwardly from said circular surface, and wherein said warm up lever extends between said control lever and said wall member and includes a follower extending from the side of said warm up lever remote from said housing wall member and located in position for travel into said slot in response to movement of said warm up lever from said idle position when said control lever is in said neutral position and to engage said circular surface to prevent movement of said warm up lever from said idle position when said control lever is displaced from said neutral position.

8. A control in accordance with claim **7** wherein said wall member further includes a bore having an opening in said exterior wall member surface, a plunger in said bore biased in the direction outwardly of said bore through said opening, means for limiting movement of said plunger outwardly of said bore, and wherein said warm up lever includes, on the side thereof adjacent to said exterior wall member surface, a recess adapted to receive said plunger when said warm up lever is in said idle position.

9. A control in accordance with claim **8** including means for adjustably limiting movement of said warm up lever from said idle position.

10. A control in accordance with claim **9** wherein said means for limiting movement of said warm up lever from said idle position includes a part having common rotation with said warm up lever, and means including an element adjustably supported by said housing in the path of movement of said part so as to vary the permissable movement of said part in response to adjustment of the position of said element relative to said housing.

11. A control in accordance with claim **1** wherein said housing includes a supporting member, wherein said means mounting said warm up lever and connecting said warm up lever to said throttle arm comprises an aperture in said supporting member, means defining an opening in said throttle arm intermediate the ends thereof, and a link located in said housing and including a first stud extending in one direction therefrom, journaled in said aperture for rotary movement relative to said housing, and connected to said warm up lever to provide rotation of said warm up lever in common with said link, said link further including a second stud extending in the direction opposite from said first stud and journaled in said opening to provide relative rotation between said link and said throttle arm.

12. A control for the throttle and clutch of a marine propulsion device, said control comprising a frame, a control lever rotatably mounted on said frame, a clutch element movably mounted on said frame and adapted to actuate a remotely located clutch in response to clutch element movement, means operably connecting said control lever and said clutch element to cause clutch element movement in response to control lever movement, a throttle arm adapted to actuate a remotely located throttle in response to throttle lever movement, a warm up lever pivotally mounted on said frame, means pivotally connecting said warm up lever to said throttle arm intermediate the ends thereof, means operably connecting said control lever to said throttle arm adjacent one end thereof for providing relative rotation therebetween and for rocking said throttle arm about said means pivotally connecting said warm up lever to said throttle arm whereby, when said warm up lever is pivotally moved independently of movement of said control lever, said throttle arm is pivoted about said means connecting said throttle arm to said control lever, and when said control lever is pivotally moved independently of said warm up lever, said throttle arm is pivoted about said means pivotally connecting said throttle arm to said warm up lever, and interengaging means on said control lever and on said warm up lever for affording pivotal movement of said warm up lever from a first position when said control lever is in one position, and for affording pivotal movement of said control lever from said one position when said warm up lever is in said first position, and for preventing pivotal movement of said warm up lever from said first position when said control lever is displaced from said one position, and for preventing pivotal movement of said control lever from said one position when said warm up lever is displaced from said first position.

13. A control for the throttle of a marine propulsion device, said control comprising a housing, a control lever, means rotatably mounting said control on said housing for movement relative to a neutral position and with a part located exteriorly of said housing, a throttle arm adapted to actuate a remotely located throttle in response to throttle lever movement, a warm up lever, means pivotally mounting said warm up lever on said housing for movement relative to an idle position and

with a part located exteriorly of said housing, and means operatively connecting said warm up lever and to said throttle arm for providing relative rotation therebetween, means operably connecting said control lever to said throttle arm for providing relative rotation therebetween, and interengaging means located exteriorly of said housing on said control lever and on said warm up lever parts for preventing pivotal movement of said warm up lever from said idle position when said control lever is displaced from said neutral position, and for preventing pivotal movement of said control lever from said neutral position when said warm up lever is displaced from said idle position.

14. A control in accordance with claim **13** wherein said interengaging means includes an enlarged portion on said control lever adjacent to said housing and wherein said enlarged portion includes a circular surface located adjacent to said housing and concentric with the axis of control lever movement, and a slot extending arcuately and radially inwardly from said circular surface, and wherein said warm up lever extends between said control lever and said housing and includes a follower extending from the side of said warm up lever remote from said housing and located in position for travel into said slot in response to movement of said warm up lever from said idle position when said control lever is in said neutral position and to engage said circular surface to prevent movement of said warm up lever from said idle position when said control lever is displaced from said neutral position.

15. A control in accordance with claim **13** wherein said housing includes a supporting member, wherein said means operatively connecting said warm up lever to said throttle arm comprises an aperture in said supporting member, means defining an opening in said throttle arm intermediate the ends thereof, and a link located in said housing and including a first stud extending in one direction therefrom, journaled in said aperture for rotary movement relative to said housing, and connected to said warm up lever to provide rotation of said warm up lever in common with said link, said link further including a second stud extending in the direction opposite from said first stud and journaled in said opening to provide relative rotation between said link and said throttle arm.

16. A control in accordance with claim **13** wherein said housing includes a wall member having an inner surface and an exterior surface, said wall member also having therein first and second spaced apertures, wherein said control further includes a first shaft journaled by said housing, extending through said first aperture and connected, adjacent to said exterior wall member surface, to said control lever for common movement therewith, wherein said control further includes a second shaft journaled by said housing, extending through said second aperture and connected adjacent to said exterior wall member surface to said warm up lever for common movement therewith relative to said housing, wherein said warm up lever extends between said control lever and said wall member, wherein said interengaging means comprises an enlarged portion on said control lever adjacent to said housing, said enlarged portion including a circular surface located adjacent to the exterior wall member surface and concentric with the axis of control lever movement, and a slot extending arcuately and radially inwardly from said circular surface, and a follower extending from the side of said warm up lever remote from said housing wall member and located in position for travel into said slot in response to movement of said warm up lever from said idle position when said control lever is in said neutral position and to engage said circular surface to prevent movement of said warm up lever from said idle position when said control lever is displaced from said neutral position.

17. A control in accordance with claim **16** wherein said wall member further includes a bore having an opening in said exterior wall member surface, a plunger in said bore biased in the direction outwardly of said bore through said opening, means for limiting movement of said plunger outwardly of said bore, and wherein said warm up lever includes, on the side thereof adjacent to said exterior wall member surface, a recess adapted to receive said plunger when said warm up lever is in said idle position.

18. A control in accordance with claim **17** including means for adjustably limiting movement of said warm up lever from said idle position.

19. A control in accordance with claim **17** wherein said means for limiting movement of said warm up lever from said idle position includes a part having common rotation with said warm up lever, and means including an element adjustably supported by said housing in the path of movement of said part so as to vary the permissable movement of said part in response to adjustment of the position of said element relative to said housing.

20. A control in accordance with claim **13** wherein said warm up lever is operatively connected to said throttle arm intermediate the ends thereof and wherein said control lever is operatively connected to said throttle arm adjacent one end thereof and wherein the other end of said throttle arm is adapted for connection to a push pull cable.

21. A throttle control comprising a housing, a control lever, means rotatably mounting said control on said housing for movement relative to a first position to actuate a remotely located throttle in response to control lever movement, a warm up lever, means pivotally mounting said warm up lever on said housing for movement relative to an idle position to actuate a remotely located throttle in response to warm up lever movement, and interengaging means on said control lever and on said warm up lever for preventing pivotal movement of said warm up lever from said idle position when said control lever is displaced from said first position, and for preventing pivotal movement of said control lever from said first position when said warm up lever is displaced from said idle position.

* * * * *

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,780,842 Dated December 25, 1973

Inventor(s) Roger B. Whipple et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Abstract

line 17	delete "ajdacent", insert --- adjacent ---
line 31	delete "the" (first occurrence)
Column 4, line 40	delete "regulat", insert --- regula
Column 10, line 31	delete "lever", insert --- arm ---
Column 10, line 61	after "control", insert --- lever -
Column 10, line 65	delete "lever", insert --- arm ---
Column 11, line 2	delete "and"
Column 12, line 29	delete "17", insert --- 18 ---
Column 12, line 46	after "control", insert --- lever -

Signed and sealed this 3rd day of September 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents