Sept. 7, 1965 J. F. MORSE 3,204,733

ADJUSTABLE INTERLOCK FOR AUXILIARY THROTTLE CONTROL

Filed Sept. 3, 1963 2 Sheets-Sheet 1

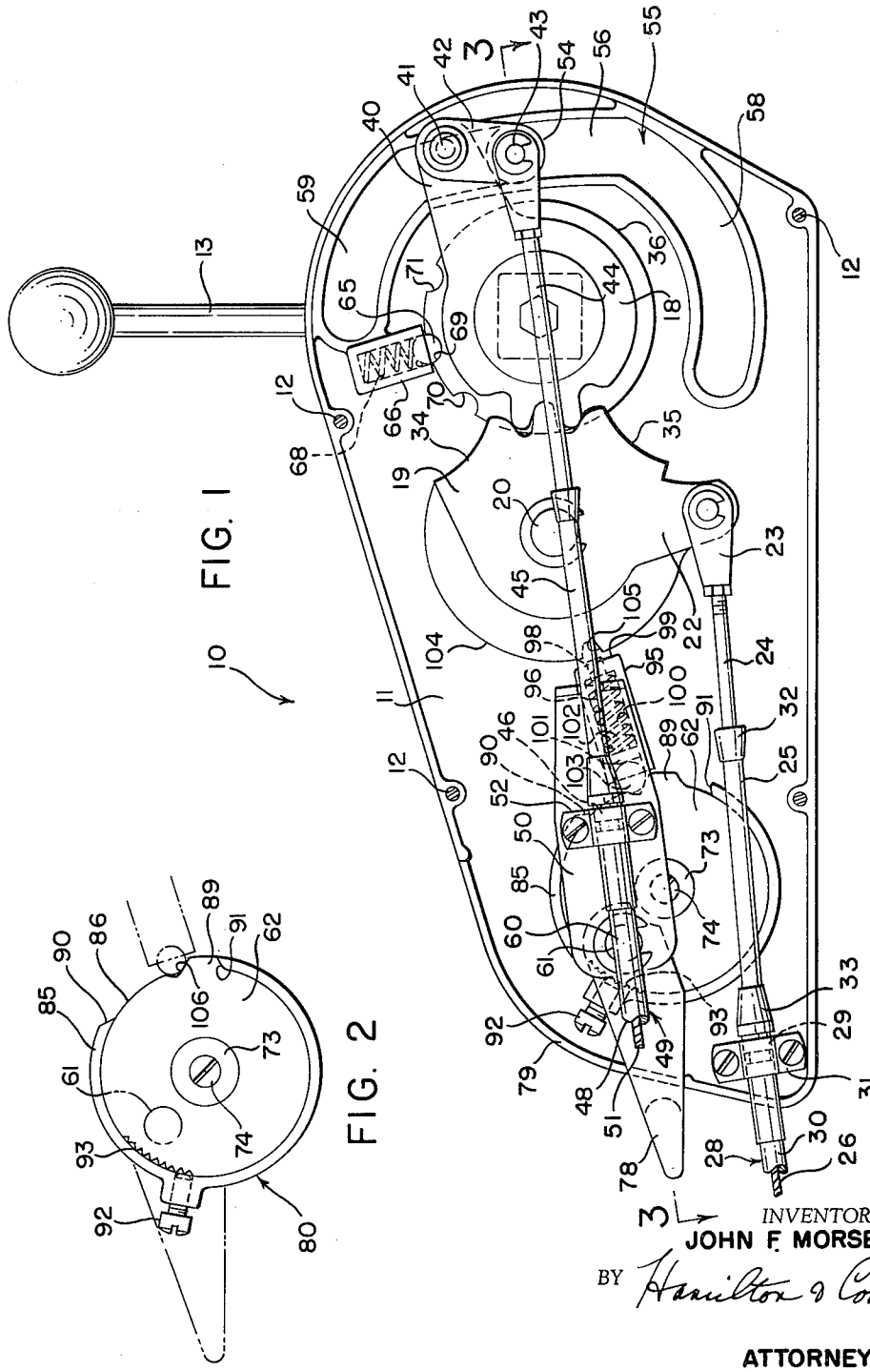


FIG. 1

FIG. 2

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ADJUSTABLE INTERLOCK FOR AUXILIARY THROTTLE CONTROL

Filed Sept. 3, 1963 2 Sheets-Sheet 2

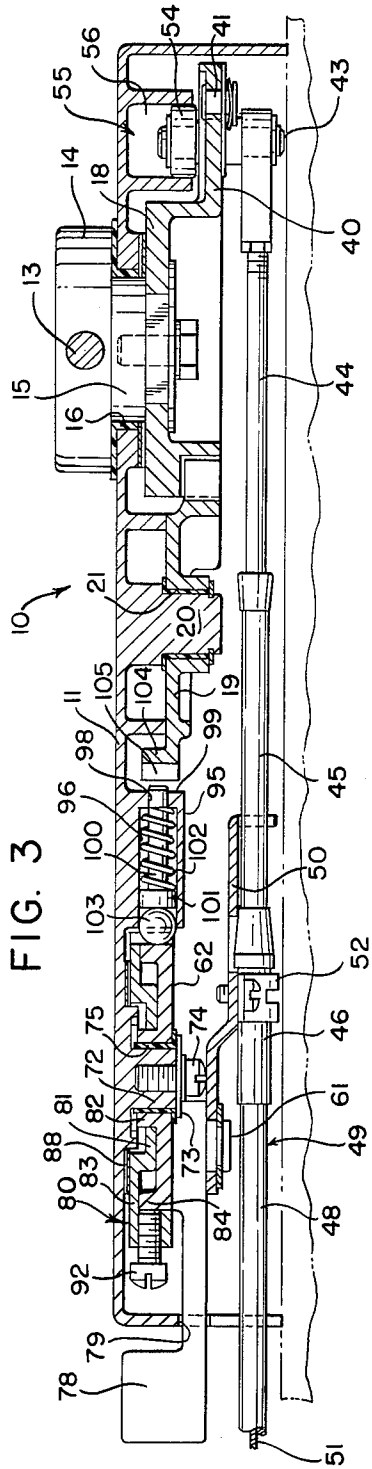


FIG. 3

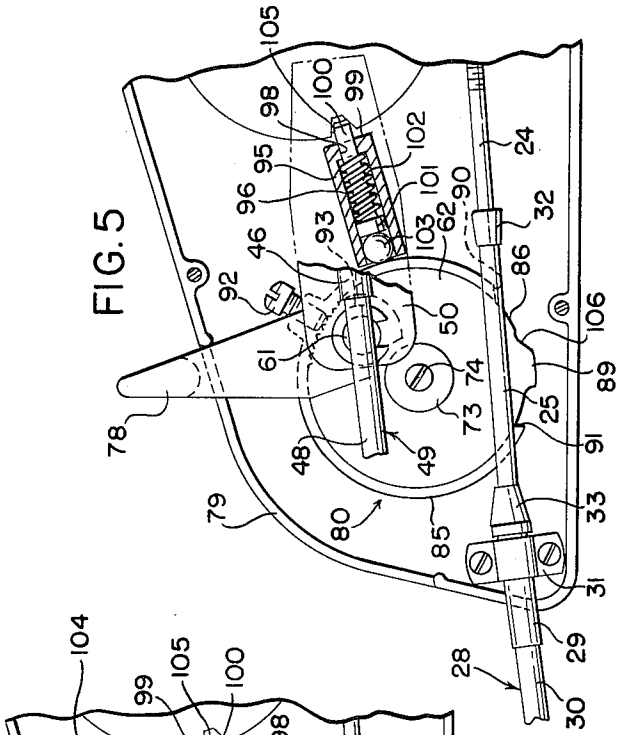


FIG. 5

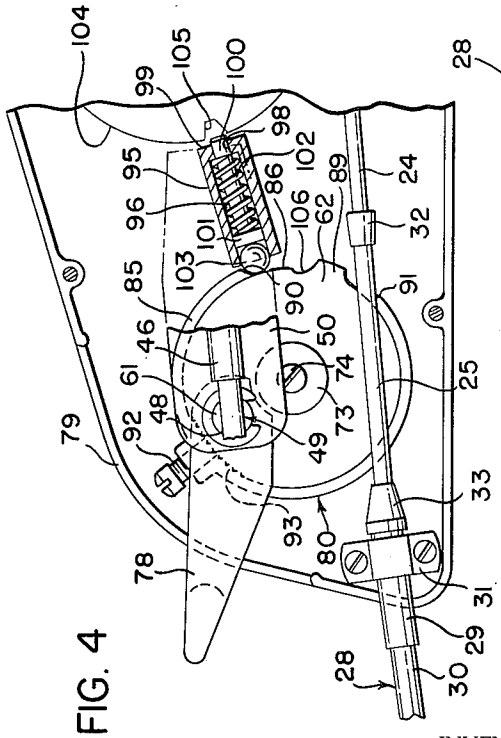


FIG. 4

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United States Patent Office 3,204,733 Patented Sept. 7, 1965

3,204,733

ADJUSTABLE INTERLOCK FOR AUXILIARY THROTTLE CONTROL

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Filed Sept. 3, 1963, Ser. No. 306,237
10 Claims. (Cl. 192—.096)

The present invention relates generally to a single lever control unit adapted for operating both the clutch and throttle of an internal combustion engine. More particularly, the present invention relates to such a single lever control having an auxiliary throttle control for opening the throttle without operation of the clutch. Specifically, the present invention relates to a single lever control having an auxiliary throttle control with a variably selective interlock to preset the idle speed range through which the clutch control mechanism may be actuated.

The variable interlock of the present invention is described in conjunction with a single lever control unit having not only an auxiliary throttle control but also a complete throttle dwell, as is disclosed in my copending U.S. application, Serial No. 306,208, filed September 3, 1963. For the purpose of the present disclosure, suffice it to say that the object of the dwell in such a control unit is to eliminate movement of the throttle through forward or reverse shift range, irrespective of the auxiliary throttle idle setting. However, the control unit disclosed in my aforesaid application has no interlocking mechanism between the auxiliary throttle control and the clutch, or transmission, control. Hence, one could inadvertently attempt to actuate the clutch or transmission means into or out of gear with the auxiliary throttle control advanced beyond a safe speed for manipulation of the clutch.

It is therefore apparent that some safeguards are highly desirable. In my prior U.S. Patent No. 2,987,152, I disclosed a mechanism for use in conjunction with a single lever control unit which provides for a limited range of auxiliary throttle control through which the clutch control mechanism can be actuated before the interlocks take effect. That unit has been quite successful with many installations. However, when a single lever control unit is so designed as to allow some increase in engine speed by actuation of the auxiliary throttle control lever before the interlocks take effect, several considerations must be taken into account.

A primary consideration is the backlash in the linkage and cable of the throttle control. Because of this backlash, the engine speed at the point of clutch engagement, going into gear, may be entirely different than the engine speed at the point of clutch disengagement, coming out of gear. The backlash tends to make the actual throttle position lag behind the position of the control lever so that at the same position of the control lever one is subjected to at least two different throttle openings, depending upon the direction from which the control lever had been rotated to arrive at the given control lever position.

Thus the interlock, if it permits some increase in the engine speed by an auxiliary control prior to actuation of the clutch by the primary control lever, may not be effective to prevent actuation of the clutch beyond its critical speed.

By way of explanation it should be noted that some clutches, such as the dog type, positive engagement mechanisms, as used with many outboard motors, require that engine speed be less than 2000 r.p.m. for engagement of the teeth to be effected without incurring damage.

Nor is the possibility of damage present solely during the engaging operation of the clutch. Such dog type clutches also tend to resist disengagement at speeds higher than idling—primarily because of the driving torque applied between the faces of the dog clutch teeth as well

as the torque between the splines of the propeller shaft on which the movable element of the dog clutch slides. Such a tendency to resist disengagement manifests itself to the operator by an increase in the resistance which the control lever exhibits against actuating pressure by the operator. In overcoming this increased resistance the operator often over actuates the control lever passing across the neutral range to the reverse shift position. This overshifting at excessive engine speeds can cause severe damage, especially since the relative engaging speed of the dog clutch teeth in such a situation is approximately twice that of the engine speed. This doubling of the speed of the teeth is occasioned by the fact that the portion of the dog clutch slidable on the driven shaft by which the propeller rotates is moving in a direction and at a speed corresponding to that in which and at which the propeller is rotating. It is at this speed that the dog clutch engages the teeth on the driving gear moving in the opposite direction at the same speed, hence, a doubling of the relative engaging speed.

Since the amount of backlash which gives rise to these above described deleterious situations varies with each individual installation, it is the primary object of the present invention to provide an interlock having a selective auxiliary throttle range through which the clutch may be actuated.

This and other objects which will become apparent from the following specification are accomplished by means hereinafter described and claimed.

One preferred embodiment is shown by way of example in the accompanying drawings and hereinafter described in detail without attempting to show all of the various forms and modifications in which the invention might be embodied; the invention being measured by the appended claims and not by the details of the specification.

In the drawings:

FIG. 1 is a rear side elevation of a single lever control unit embodying the present invention, with the rear cover plate removed;

FIG. 2 is a fragmentary area of FIG. 1 with certain elements cut away to show the adjustable interlock controls;

FIG. 3 is an enlarged cross section taken substantially on line 3—3 of FIG. 1;

FIG. 4 is a fragmentary area of FIG. 1 showing the auxiliary throttle control advanced to a point just prior actuation of the interlock; and,

FIG. 5 is a fragmentary area similar to FIG. 4 with the auxiliary throttle control fully advanced and the interlock actuated.

In general, a single lever control unit according to the concept of the present invention provides a coordinated control of the throttle and clutch through the entire range of operation, the direction of rotation of the control lever from neutral selectively engaging forward or reverse gear. The actuation of the control lever in either direction from neutral rotates a primary, or drive member, which in turn rotates a clutch actuating secondary, or driven, member. Continued rotation of the primary drive member advances the throttle.

An auxiliary throttle control is also provided on the unit. This auxiliary control has an auxiliary control lever attached selectively to rotate an eccentric pivotally attached to the casing of the throttle control cable. Actuation of the auxiliary control lever moves the casing in a direction opposite to that in which the cable core is moved to open the throttle. This reverse movement of the casing varies the relative position of the core and casing so as to itself control the throttle through a limited range.

An interlock is provided between the eccentric and the

secondary, or driven, member so that only a limited advancement of the throttle by the auxiliary control is permitted during which engagement of the clutch may be effected. Thereafter, further advancement of the throttle by the auxiliary throttle control actuates an interlock between the eccentric and the secondary driven gear to prevent engagement of the clutch. The interlock is actuated by an actuator rotatable with the eccentric, though variably positionable with respect thereto.

Referring more particularly to the drawings, the control unit, indicated generally by the numeral **10**, embodying the concept of the present invention is incorporated in housing **11**. A back plate, not shown, may be secured to the housing by a plurality of bolts **12**, and is preferably provided with suitable means, not shown, for mounting the unit **10** to a control station or a mounting pad on the side of the boat.

A control lever **13** extends radially outwardly of hub **14** which is formed on the axially outer end of control shaft **15**. Shaft **15** is journaled in housing **11**, and a flanged, sleeve bushing **16** is preferably interposed between the shaft **15** and housing **11**.

A primary drive gear **18** is nonrotatably secured to shaft **15** interiorly of housing **11**. The primary drive gear **18**, which is of the type known to the art as an "intermittent," or "interrupted," gear meshes with the secondary, or driven, interrupted gear **19**, when the control lever is in neutral position. The secondary interrupted gear **19** is journaled on a stub shaft **20** extending inwardly of housing **11**. Similarly too, a flanged sleeve bushing **21** is interposed between the gear **19** and stub shaft **20**.

A clutch control arm **22** which moves with the secondary gear **19** and which is shown to be integral therewith, has a swivel connector **23** attached to the outer end of a push rod **24** which telescopes within one end of a sleeve **25** and is attached to the core **26** of the clutch control push-pull cable **28**. The other end of sleeve **25** is pivotally attached to a bushing **29**. The bushing **29** is also secured to the casing **30** of the clutch control cable **28** and is mounted to the interior of the housing **11** by a clamp **31**.

To maintain the interior of the cable **28** as dry as possible, resilient sealing sleeves **32** and **33** may be provided at the joint between the sleeve **25** and push rod **24** and at the joint between the sleeve **25** and bushing **29**, respectively.

While the preferred embodiment is disclosed in conjunction with a cable control for actuating the clutch, it will become apparent from the following description that the present concept is as readily suited for operation with electrically actuated clutches, reversing gears or the like, as with cable actuated clutches.

The gear members **18** and **19** may have teeth of the same pitch, as shown, which are meshed for approximately 35° rotation in either direction from the neutral position of FIG. 1 so that rotation of the drive gear **18** about 35° rotates the driven gear **19** in an opposite direction substantially the same amount. Beyond 35° the teeth become unmeshed and gear **18** can be rotated further to advance the throttle. After the drive gear **18** has been rotated sufficiently to unmesh the teeth, either arcuate face **34** or **35** on driven gear **19** engages the annular peripheral edge **36** of the drive gear so that the driven gear **19** remains stationary during advancement of the throttle.

A throttle control arm **40** extends generally radially outwardly of drive gear **18**. Pivotally connected, as by pin **41**, to throttle control arm **40**, is one end of a delay link **42**. The other end of delay link **42** is pivotally attached, as by pin **43**, to a push rod **44** which is telescopically received within one end of a sleeve **45**. The other end of the sleeve **45** is pivotally attached to a bushing **46** which may be identical with the bushing **29**. The rear end of the bushing **46** is secured to the casing **48** of throttle control cable **49** in the same manner as bushing **29** is secured to casing **30**. Bushing **46** is secured to a swivel clip **50** by a clamp **52** to form an integral part of the hereinafter more fully described auxiliary throttle control.

The push rod **44** is also attached to the core **51** of throttle control push-pull cable **48**.

Pin **43**, which pivotally attaches delay link **42** to push rod **44** also rotatably mounts a roller **54** which extends into and acts as a cam follower in a channel cam, indicated generally by the numeral **55**. The channel cam **55** is generally comprised of three distinct portions: a dwell portion **56** flanked by two throttle advance guide portions **58** and **59**. Guide portion **58** is oriented to actuate throttle advancement after the forward shift range, and guide portion **59** is oriented to actuate throttle advancement after the reverse shift range.

The dwell portion **56** of the channel cam is arcuate about a center in the vicinity of point **60**. It has been found that by placing point **60** in proximity to the eccentric pin **61** by which the swivel clip **50** is pivotally carried on the auxiliary throttle wheel drive member **62**, as the cam follower **54** moves along the dwell portion **56** of channel cam **55**, there will be no relative axial movement between the core **51** and casing **48** of throttle control cable **49**, irrespective of whether the auxiliary throttle control is in idle or throttle advance position.

The location of the throttle control arm **40** and the length of the delay link **42** are preferably such that the cam follower **54** is located at the middle of the arcuate dwell portion **56** when the control lever **13** is in neutral position. In that way movement of the control lever **13** through either forward or reverse shift range effects no relative axial displacement between the core **51** and casing **48** of throttle control cable **49**. However, when the cam following roller **54** enters the guide portions **58** or **59** continued rotation of the control lever **13** causes the push rod **44** to displace the core **51** and advance the throttle.

The juncture of guide portions **58** and **59** to the dwell portion **56** may be located so that the cam follower **54** enters the guide portions just prior to the completion of the shift rotation of driven gears **19**, simultaneously with the completion or just after the completion. It must be understood that a single lever control unit constructed in accordance with the concept of the present invention can provide a perfect dwell, or absolute maintenance of the throttle position, during the shift range by locating the juncture of the guide portions **58** and **59** to the dwell portion **56** such that the cam follower **54** remains within the dwell portion during the entire shift range.

The guide portions **58** and **59**, while they must extend generally rearwardly of the dwell portion **56** need not be at any particular disposition. It has been found that highly satisfactory results may be obtained if the guide portions **58** and **59** are straight or arcuate, as shown. It must be remembered, however, that the disposition of the guide portions **58** and **59** must remain within the length of the delay link **42** from its pivotal connection to the throttle control arm **40** to prevent the unit from binding. As shown, the guide portions **58** and **59** have been made arcuate about the center of gear **18** and no binding can occur as the throttle is moved to fully open position. Further, it should be understood that uniformity in configuration of the guide portion is desirable to assure a throttle advance rate in conformity with the rate at which the control lever **13** is actuated.

A detent means comprising a ball **65** slidable in a housing **66** and biased outwardly by a spring **68** may be provided to engage the peripheral edge **36** of drive gear **18**. A notch **69** in the edge of gear **18** can be provided to indicate neutral position and similar notches **70** and **71** may be provided to indicate the end of the forward and reverse shift ranges, respectively.

The auxiliary throttle control comprises a wheel drive member **62** journaled for rotation about a stub shaft **72** in housing **11**. As best seen in FIG. 3, the wheel

drive member 62 is secured to the stub shaft 72 by a retaining washer 73 mounted on the end of stub shaft 72 by a cap screw 74 and which engages the flange of a flange sleeve bushing 75 upon which the wheel drive member rotates.

A thumb lever 78 is attached to, or, as shown, is formed integrally with wheel drive member 62. Lever 78 extends rearwardly and outwardly through a slot 79 in housing 11 where it can be manually rotated.

The eccentric pin 61 extends outwardly from the face of the wheel drive member 62 and pivotally carries the mounting bushing 50, as hereinbefore described.

Some slack is required in the throttle control push-pull cable 49 outwardly of the control unit for this auxiliary throttle control to operate. This slack is preferably located between the unit 11 and the first place to which the cable is secured to the boat, preferably some four or five feet away. Accordingly, when the thumb lever is rotated from the position shown in FIG. 1 toward that shown in FIG. 5, the mounting bushing 50 is translated forwardly in an arcuate path on its eccentric pin 61. This pulls the casing 48 forwardly, taking up part of the slack in the cable 49. Since the core 51 is held rigid by the positioning of the cam follower 54 in the dwell portion 56 of channel cam 55, a differential rearward movement of the core 51 is exerted which advances the throttle.

An interlock control wheel 80, as best shown in FIG. 3, is mounted contiguously with the auxiliary wheel drive member 62. The inner disk portion 81 of the interlock control wheel 80 rotatably embraces the hub 82 of member 62. An offset extension portion 83 of interlock control wheel 80 which is joined to the disk portion 81 extends radially past the outer lip 84 of the auxiliary wheel drive member 62. An interrupted sleeve portion 85 (FIG. 2), which functions as an interlock actuator, extends axially from the offset extension portion 83 to slidably contact the annular edge portion 86 of the auxiliary wheel drive member 62.

To facilitate rotation of the interlock control wheel 80, a flat ring bushing 88 may be positioned between the housing 11 and the contiguous portion of the wheel 80 which is shown to be the offset extension portion 83.

As best shown in FIGS. 1 and 2, a stop projection 89 extends radially outwardly of the annular edge portion 86 through the span between the terminal edges 90 and 91 of the interrupted sleeve 85. The position of the stop projection 89 with respect to the terminal edges 90 and 91 is adjustable by rotation of the interlock control wheel 80 with respect to the wheel drive member 62. However, once the desired positioning of these parts is obtained, the interlock control wheel 80 is secured against further rotation relative to the wheel drive member 62 by tightening a lock means, such as set screw 92 which extends radially through the sleeve 85 to engage the peripheral edge 86 of the auxiliary wheel drive member 62. To assure the effectiveness of set screw 92 as a lock means, a portion of the edge portion 86 may be serrated, as at 93, upon which the end of the set screw may be impaled.

A barrel housing 95 is located on the interior of the main housing 11 and extends between the auxiliary wheel drive member 62 and the secondary gear member 19. The interior of the barrel housing is provided with a bore 96 communicating with a smaller guide bore 98 in the end wall 99 of barrel housing 95. A slide bolt is axially movable in barrel housing 95. The slide bolt's stem 100 extends through and is slidably received in the small guide bore 98, and the slide bolt head 101 is slidably received in the bore 96.

A compression spring 102 embraces the slide bolt stem 100 and extends between the end wall 99 and the slide bolt head 101. Also slidably received in bore 96 and positioned contiguous with the slide bolt head 101 is a ball 103 which acts as a cam follower means, as will be more fully hereinafter explained.

Rotatable with, and preferably integral with, the secondary driven gear member 19 is a circular member or skirt 104 on the same level as and aligned with the slide lock stem 100. A lock notch 105 is provided in skirt 104 to engageably receive the end of slide bolt stem 100 when the control lever 13 is in neutral position, as shown in FIG. 1.

The ball, or follower, 103 is positioned operatively to engage the auxiliary wheel drive member 62 and the interrupted sleeve 85 in the following manner.

A detent notch 106 is provided in the annular edge portion 86 of the auxiliary wheel drive member 62 to indicate the idle, or unactuated, position of the auxiliary throttle control lever 78, shown in FIG. 1. Preferably the idle indicating detent notch 106 is placed adjacent to the stop projection 89. So long as the ball 103 engages either the notch 106, as in FIGS. 1 and 2, or the annular edge portion 86, as in FIG. 4, the slide bolt stem 100 will not engage the lock notch 105 in gear member 19 and the control lever 13 may be freely rotated to actuate, sequentially, the clutch and throttle.

However, when the ball 103 rolls up the inclined ramp means, or actuating surface, comprising the terminal edge 90 of the interrupted sleeve 85, the slide bolt is translated thereby axially toward the gear member 19, and with the control lever 13 in neutral position, the slide bolt stem 100 will enter the lock notch 105. In this position, shown in FIG. 5, the control lever 13 can not be actuated, but the auxiliary throttle control may be freely rotated with the follower 103 slidably engaging the sleeve 85.

Conversely, when the control lever is in any position other than neutral, attempted axial translation of the slide bolt would cause the end of the slide bolt stem 100 to engage the annular skirt 104 and prevent further movement of the slide bolt toward the secondary gear member 19. By thus restricting the movement of the lock bolt, the follower ball 103 can not traverse the inclined ramp means of the terminal edge 90 of interrupted sleeve 85, and thereby limits the range of the auxiliary throttle control when the primary control lever 13 is in any position other than neutral to the spanning portion between edge 90 and the stop projection 89. This prevents inadvertent advancement of the auxiliary throttle control which could remain unnoticed until the operator would attempt to reduce the speed, by the primary control lever 13, below that at which the auxiliary throttle control had been set.

Accordingly, by varying the position of the sleeve 85 on the auxiliary wheel drive member 62, the range of the auxiliary throttle control can be varied in any particular installation to a preselected amount beyond which the clutch can not be actuated. Such a concept permits the interlock to be effectively adjusted to any given installation to compensate for the backlash present in the system and limit the auxiliary throttle range to that through which the clutch may be safely actuated.

The span between the terminal ends 90 and 91 may be selected such that when the terminal end 91 abuts the stop projection 89, the terminal end 90 will permit only sufficient arc of the auxiliary wheel drive member 62 to be exposed so that the clutch can never be actuated beyond a critical throttle speed.

It should be apparent that a single lever control unit constructed in accordance with the concept of the present invention accomplishes the objects thereof.

What is claimed is:

1. In a single lever control unit for the throttle and clutch of an engine, said control unit being connected to the engine throttle by a push-pull throttle control cable having a core and a casing, said control unit having a housing, a throttle control member journaled in said housing and a clutch control member operatively con-

nected to said throttle control member for movement only during the first portion of movement of said throttle control member, said throttle control member connected to said push-pull cable core for opening and closing the throttle, an auxiliary throttle control member mounted in said housing, said throttle cable casing attached to said auxiliary throttle control member, means for moving said auxiliary throttle control member, movement of said auxiliary throttle control member moving said cable casing in a direction substantially opposite the normal movement of the cable core to advance the throttle, interlocking means, said interlock means movably mounted in said housing to engage said clutch control member, an interlock actuator, an actuating surface on said interlock actuator for moving said interlock into engagement with said clutch control member, said interlock actuator selectively attachable to said auxiliary throttle control so that said actuating surface moves said interlock into engagement with said clutch control member only after a predetermined actuation of said auxiliary throttle control member.

2. In a single lever control unit for the throttle and clutch of an engine, said control unit being connected to the engine throttle by a push-pull throttle control cable having a core and a casing, said control unit having a housing, a throttle control member journaled in said housing and a clutch control member operatively connected to said throttle control member for movement only during the first portion of movement of said throttle control member, said throttle control member connected to said push-pull cable core for opening and closing the throttle, an auxiliary drive wheel mounted in said housing, said throttle cable casing attached to said auxiliary drive wheel, means for rotating said auxiliary drive wheel, rotation of said auxiliary drive wheel moving said throttle cable casing in a direction substantially opposite to normal movement of the cable core to advance the throttle, interlocking means to hold said clutch actuating member in neutral position, an interrupted sleeve selectively positionable about said auxiliary drive member, engagement of said interrupted sleeve with said interlocking means actuating said interlocking means.

3. In a single lever control unit for the throttle and clutch of an engine, said control unit being connected to the engine throttle by a push-pull throttle control cable having a core and a casing, said control unit having a housing, a throttle control member journaled in said housing and a clutch control member operatively connected to said throttle control member for movement only during the first portion of movement of said throttle control member, said throttle control member connected to said push-pull cable core for opening and closing the throttle, an auxiliary drive wheel mounted in said housing, said throttle cable casing attached to said auxiliary drive wheel, means for rotating said auxiliary drive wheel, rotation of said auxiliary drive wheel moving said throttle cable casing in a direction substantially opposite to normal movement of the cable core to advance the throttle, a lock bolt interlock means, said lock bolt interlock means axially slidable in said housing to engage said clutch control member, a lock bolt actuator, an actuating surface on said lock bolt actuator, said lock bolt actuator selectively attachable to said auxiliary throttle control so that engagement of said lock bolt interlock means by said lock bolt actuator axially slides said lock bolt interlock means into engagement with said clutch control member to hold said control member in neutral position.

4. In a single lever control unit for the throttle and clutch of an engine, said control unit being connected to the engine throttle by a push-pull throttle control cable having a core and a casing, said control unit having a housing, a throttle control member journaled in said housing and a clutch control member operatively connected to said throttle control member for movement only during the first portion of movement of said throttle control member, said throttle control member connected to said push-pull cable core for opening and closing the throttle, an auxiliary drive wheel having an annular edge portion mounted in said housing, said throttle cable casing attached to said auxiliary drive wheel, means for rotating said auxiliary drive wheel, rotation of said auxiliary drive wheel moving said throttle cable casing in a direction substantially opposite to normal movement of the cable core to advance the throttle, an axially slidable lock bolt mounted in said housing, follower means, said follower means operatively positioned in contact with one end of said lock bolt and in sliding contact with the annular edge portion of said auxiliary drive wheel, a lock bolt actuator, said lock bolt actuator selectively positionable on the annular edge portion of said auxiliary drive wheel, engagement of said follower means with said lock bolt actuator axially sliding said lock bolt into engagement with said clutch control member, engagement of said lock bolt with said clutch control member when said clutch control member is in neutral holds said clutch control member in neutral, engagement of said lock bolt with said clutch control member when said clutch control member is not in neutral prevents further actuation of said auxiliary drive wheel.

5. In a single lever control unit for the throttle and clutch of an engine, said control unit being connected to the engine throttle by a push-pull throttle control cable having a core and a casing, said control unit having a housing, a throttle control member journaled in said housing and a clutch control member operatively connected to said throttle control member for movement only during the first portion of movement of said throttle control member, said throttle control member connected to said push-pull cable core for opening and closing the throttle, an auxiliary drive wheel having an annular edge portion mounted in said housing, said throttle cable casing attached to said auxiliary drive wheel, means for rotating said auxiliary drive wheel, rotation of said auxiliary drive wheel moving said throttle cable casing in a direction substantially opposite to normal movement of the cable core to advance the throttle, an axially slidable lock bolt mounted in said housing, follower means, said follower means operatively positioned in contact with said lock bolt and sliding contact with the annular edge portion of said auxiliary drive wheel, an interrupted sleeve, said interrupted sleeve selectively positionable about a portion of the annular edge portion of said auxiliary drive wheel, engagement of said follower means with said sleeve axially sliding said lock bolt into engagement with said clutch control member, engagement of said lock bolt with said clutch control member when said control member is in neutral holds said clutch control member in neutral, engagement of said lock bolt with said clutch control member when said clutch control member is not in neutral prevents further actuation of said auxiliary drive wheel.

6. In a single lever control unit for the throttle and clutch of an engine, said control unit being connected to the engine throttle by a push-pull throttle control cable having a core and a casing, said control unit having a housing, a throttle control member journaled in said housing and a clutch control member operatively connected to said throttle control member for movement only during the first portion of movement of said throttle control member, said throttle control member connected to said push-pull cable core for opening and closing the throttle, said clutch control member having an annular skirt, a lock notch in said skirt, an auxiliary drive wheel having an annular edge portion mounted in said housing, said throttle control push-pull cable casing attached to said auxiliary drive wheel, means for rotating said auxiliary drive wheel, rotation of said auxiliary drive wheel moving said throttle cable casing in a direction substantially opposite to normal movement of the cable core to advance the throttle, an axially slidable lock bolt inter-

lock means mounted in said housing, a lock bolt actuator, said lock bolt actuator selectively positionable on said auxiliary drive wheel, engagement of said lock bolt interlock means by said lock bolt actuator axially sliding said lock bolt interlock means into engagement with said lock notch to hold said clutch control member in neutral position.

7. In a single lever control unit for the throttle and clutch of an engine, said control unit being connected to the engine throttle by a push-pull throttle control cable having a core and a casing, said control unit having a housing, a throttle control member journaled in said housing and a clutch control member operatively connected to said throttle control member for movement only during the first portion of movement of said throttle control member, said throttle control member connected to said push-pull cable core for opening and closing the throttle, said clutch control member having an annular skirt, a lock notch in said skirt, an auxiliary drive wheel having an annular edge portion mounted in said housing, said throttle control push-pull cable casing attached to said auxiliary drive wheel, means for rotating said auxiliary drive wheel, rotation of said auxiliary drive wheel moving said throttle cable casing in a direction substantially opposite to normal movement of the cable core to advance the throttle, an axially slidable lock bolt mounted in said housing, follower means, said follower means operatively positioned in contact with said lock bolt and sliding contact with the annular edge portion of said auxiliary drive wheel, an interrupted sleeve, said interrupted sleeve selectively positionable about a portion of the annular edge portion of said auxiliary drive wheel, engagement of said follower means with said sleeves axially sliding said lock bolt into engagement with said clutch control member, engagement of said lock bolt with said lock notch when said clutch control member is in neutral holds said clutch control member in neutral, engagement of said lock bolt with said skirt when said clutch control member is not in neutral prevents further actuation of said auxiliary drive wheel.

8. In a single lever control unit for the throttle and clutch of an engine, said control unit being connected to the engine throttle by a push-pull throttle control cable having a core and a casing, said control unit having a housing, a throttle control member journaled in said housing and a clutch control member operatively connected to said throttle control member for movement only during the first portion of movement of said throttle control member, said throttle control member connected to said push-pull cable core for opening and closing the throttle, an auxiliary wheel drive member mounted for rotation in said housing, a bushing connected to said throttle control cable casing, an eccentric on said auxiliary wheel drive member, said bushing pivotally attached to said eccentric, an auxiliary control lever operatively attached to rotate said auxiliary wheel drive member, a rotation of said auxiliary wheel drive member moving said casing in a direction substantially opposite the normal movement of the cable core to advance the throttle, said auxiliary wheel drive member having an annular peripheral edge, an interrupted sleeve, said interrupted sleeve slidably engaging the annular edge portion of said auxiliary wheel drive member, said sleeve having opposed terminal edges, a lock bolt means for securing said interrupted sleeve in a selected position with respect to said auxiliary wheel drive member, a lock bolt means mounted in said housing, spring means axially biasing said lock bolt means so that said lock bolt means tends to slidably engage the edge of said auxiliary wheel drive member, rotation of said auxiliary wheel drive member through a preselected range maintaining said lock bolt means in contact with the peripheral edge of said auxiliary wheel drive member, further rotation of said auxiliary wheel drive member bringing one terminal edge of said interrupted sleeve in contact with said lock bolt

means, a ramp means on said edge, engagement of said lock bolt means with said ramp means in said interrupted sleeve moving said lock bolt means into engagement with said clutch control member, engagement of said lock bolt means with said control member when said clutch control member is in neutral holds said clutch control member in neutral, engagement of said lock bolt means with said clutch control member when said clutch control member is not in neutral prevents further actuation of said auxiliary wheel drive member.

9. A single lever control unit as defined in claim 8 in which the auxiliary wheel drive member has a radially extending stop projection, a spanning portion between the edge of said interrupted sleeve having said ramp means and the second of said edges, the second of said edges engageable with said stop projection to limit the rotatable positioning of said interrupted sleeve with respect to said auxiliary wheel drive member, the spanning portion between said stop projection and said ramp means on said terminal edge bounding the auxiliary throttle range through which said clutch control member can be actuated.

10. In a single lever control unit for the throttle and clutch of an engine, said control unit being connected to the engine throttle by a push-pull throttle control cable having a core and a casing, said control unit having a housing, a throttle control member journaled in said housing and a clutch control member operatively connected to said throttle control member for movement only during the first portion of movement of said throttle control member, said throttle control member connected to said push-pull cable core for opening and closing the throttle, an auxiliary wheel drive member mounted for rotation in said housing, a bushing connected to said throttle control cable casing, an eccentric on said auxiliary wheel drive member, said bushing pivotally attached to said eccentric, an auxiliary control lever operatively attached to rotate said auxiliary wheel drive member, rotation of said auxiliary wheel drive member moving said casing in a direction substantially opposite the normal movement of the cable core to advance the throttle, said auxiliary wheel drive member having an annular peripheral edge, an interrupted sleeve, said interrupted sleeve slidably engaging the annular edge portion of said auxiliary wheel drive member, said sleeve having opposed terminal edges, a lock means for securing said interrupted sleeve in a selected position with respect to said auxiliary wheel drive member, an axially slidable lock bolt mounted in said housing, a follower means in axially aligned contact with said lock bolt and slidable therewith, spring means axially biasing said lock bolt so that said follower tends to slidably engage the edge of said auxiliary wheel drive member, rotation of said auxiliary wheel drive member through a preselected range maintaining said follower in contact with the peripheral edge of said auxiliary wheel drive member, further rotation of said auxiliary wheel drive member bringing one terminal edge of said interrupted sleeve in contact with said follower, a ramp means on said edge, engagement of said follower with said ramp means in said interrupted sleeve axially sliding said lock bolt into engagement with said clutch control member, engagement of said lock bolt with said control member when said clutch control member is in neutral holds said clutch control member in neutral, engagement of said lock bolt with said clutch control member when said clutch control member is not in neutral prevents further actuation of said auxiliary wheel drive member.

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