

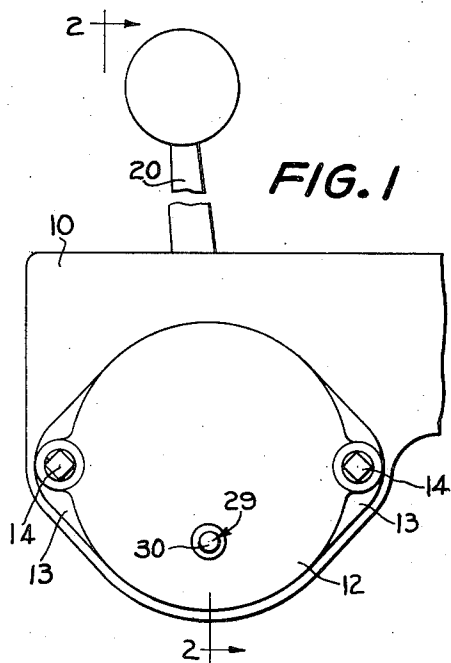
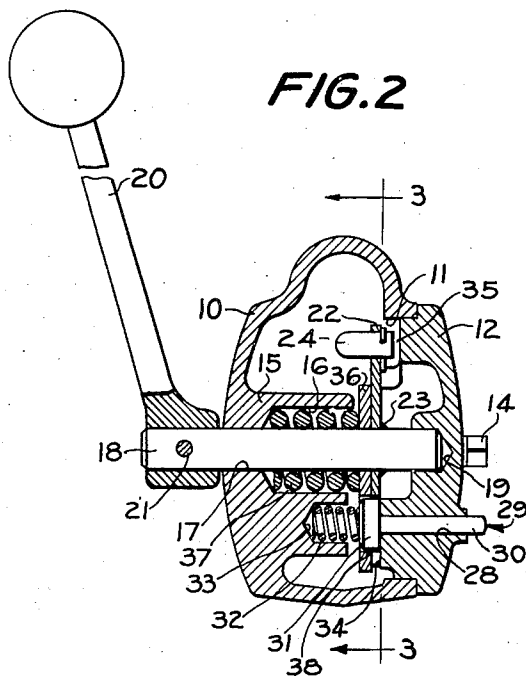
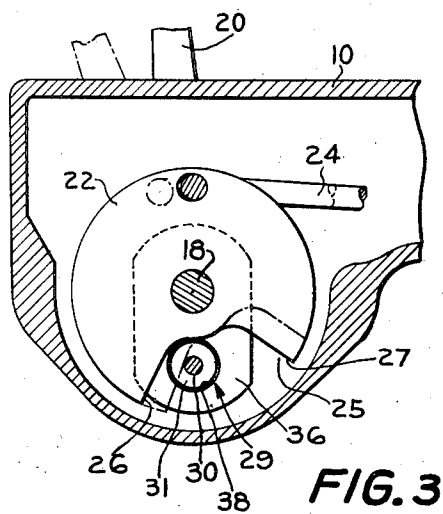
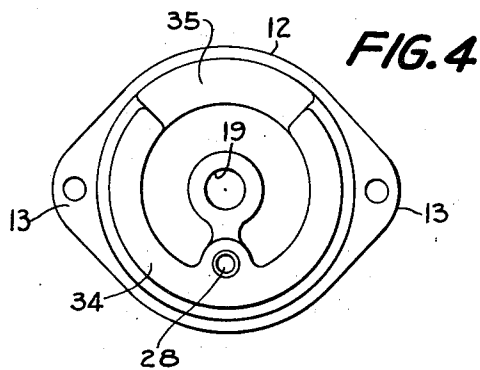
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CONTROL DEVICE WITH ADJUSTABLE STOP

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CONTROL DEVICE WITH ADJUSTABLE STOP

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This invention relates to a control device, and more particularly to means providing adjustable stops for defining or determining different limits of movement of a movable part of the device.

The invention finds particular utility in the speed control means for a Diesel engine, for example. In the case of a tractor or industrial equipment powered by a Diesel engine, it is desirable to provide a speed-governing lever which is manually movable to establish for the engine a wide speed range between a slow idle limit and a high limit; and, as a matter of convenience to the operator, it is desirable to provide a stop beyond which the control lever cannot be moved so that the operator cannot inadvertently cut off the engine by moving the control lever past the slow idle position. At the same time, however, provision must be made for cutting off the fuel supply to the engine by the same control lever. Accordingly, the present invention provides a stop which is adjustable to the extent that normally it serves to prevent inadvertent movement of the speed-governing lever below the slow idle position but which is shiftable to present a secondary stop which determines the position of the lever in that position thereof in which it effects stopping of the engine. The arrangement is particularly useful in a Diesel engine, since such engine has no electrical ignition system which can be cut out or grounded when it is desired to stop the engine; however, the device is not limited in its applicability to Diesel engines and may be otherwise applied, as will be apparent to those versed in the art as the disclosure progresses.

An important object of the invention is to utilize the adjustable stop means in a control device of the type in which a plurality of members having cooperating radial faces are spring pressed into frictional engagement to provide means for maintaining a control lever or the like in any one of several positions between the maximum positions permitted by the stop means. In such device, it is a feature to provide a plate rockable about an axis and having a notch extending angularly therein with respect to the rocking axis so as to provide a pair of edges spaced apart angularly. A stop member extends into the notch and has opposite side portions which are engageable by one or the other of the edges of the notch to limit angular movement of the plate or member. The stop element is displaceable with respect to the plate to dispose a portion thereof of reduced diameter in the notch so that the range of angular movement of the plate may be

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increased. The plate constitutes one of a plurality of friction members, and another is a flat member associated with the plate and frictionally engageable therewith. The flat member is loose or non-rotatable with respect to the plate and has an aperture which is engaged by a portion of the stop element so that the flat member cannot rotate with the plate.

Other objects of the invention include the provision of: a control device of simple and inexpensive construction in the form of a casing which is completely enclosed and which houses the friction means and the stop means; a control device comprising relatively few parts; and a device that may be readily adapted to the control of Diesel engines, for example.

The foregoing and other important objects and desirable features inherent in and encompassed by the invention will become apparent as a preferred embodiment of the invention is fully disclosed in the following detailed description and accompanying sheet of drawings in which:

Figure 1 is a side elevational view of the control device, showing its general external appearance;

Figure 2 is a sectional view on the line 2—2 of Figure 1;

Figure 3 is a sectional view on the line 3—3 of Figure 2, illustrating in dot-dash lines a secondary position of the control lever; and

Figure 4 is a detail view of the cover for the casing, as viewed from its internal face.

The control device illustrated is based on a preferred design in which the main support for the parts to be hereinafter described comprises a casing 10 provided with a substantially hollow interior which opens at one side through a circular opening 11. The supporting structure may be otherwise constructed, according to the particular requirements in any given case. The details set forth here are preferred but should not be taken as limiting the applicability of the invention.

The circular opening 11 is normally closed by a removable cover 12 which is generally circular in shape but having a pair of diametrically opposed apertured ears 13 through which cap screws 14 may be passed to secure the cover to the casing 10. The interior of the casing is provided with a boss 15 which is recessed by a bore 16 with which communicates a reduced counterbore 17. The counterbore 17 provides a bearing for carrying a rockshaft 18. The rockshaft extends completely through the casing 10 and into a bore or recess 19 which is provided in the cover 12 to receive the inner end of the rockshaft. That por-

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tion of the rockshaft that is external to the casing is connected to a control lever 20 so that the rockshaft may be manually rocked. The connection between the rockshaft 18 and lever 20 may comprise a pin 21.

The lever 20 is connected by means of the rockshaft 18 to a movable member here shown as taking the form of a plate or disk 22 which may be fixed to the rockshaft 18 as by welding at 23 (Figure 2). The plate is apertured adjacent its periphery to receive the bent end of a control rod 24 which may extend to speed-control mechanism or other controllable devices. If used on a Diesel engine, for example, the control rod 24 will extend to the governor for the engine. Substantially diametrically opposite the connection with the rod 24, the plate or disk 22 is formed with a notch 25 which extends angularly as respects the axis of the rockshaft 18, the notch thus being provided with a pair of angularly spaced apart stop edges 26 and 27, each on a radius through the rockshaft axis.

The cover 12 is drilled on an axis parallel to the rockshaft axis 18, as at 28, for the purpose of carrying a stop element designated generally by the numeral 29 (Figure 2). This element preferably takes the form of a pin having a cylindrical stem 30 and an enlarged circular head 31. The diameter of the head 31 is substantially larger than that of the stem 30 but is smaller than the angular distance between the edges 26 and 27 on the disk or plate 22. When the stop element 29 is in the position shown in Figure 2, and in the position shown in full lines in Figure 3, the head 31 is in the notch 25 between the stop edges 26 and 27 and thus provides an abutment to be engaged by one or the other of the stop edges. For example, if the control lever is rocked in a counterclockwise direction, as viewed in Figure 3, the stop edge 26 will engage the head of the pin or element 29. If the control lever 20 is rocked in the opposite direction, the edge 27 may engage the opposite side of the head 31 of the pin or element. In the present adaptation of the invention to the control of a Diesel engine, the position of the lever 20 in which the edge 26 engages the head 31 of the pin 29, determines the slow idle speed of the engine; that is, a speed at which the engine will turn over smoothly without load, for example, 600 R. P. M. The position of the lever 20 in which the edge 27 engages the opposite side of the head 31 of the pin may determine a speed at which the engine turns over at, say, 900 to 1100 R. P. M. Thus, it will be seen that the control lever has a wide range of angular movement for determining two different operating speeds of the engine according to the limits imposed by the stop means comprising the head 31 and stop edges 26 and 27. Normally, the lever 20 cannot be moved in a counterclockwise direction beyond the engagement between the edge 26 and head 31 of the pin 29; and hence the operator cannot inadvertently cut off operation of the engine.

According to the present invention, the stop element or pin 29 is shiftable at the will of the operator to provide for increasing the angular movement of the control lever 20, at least in a counterclockwise direction, so that the operator may move the lever 20 to the dot-dash position of Figure 3, which position corresponds to a condition in which operation of the engine is discontinued. For this purpose, the pin 29 is shiftable axially inwardly against a compression spring 32 which is seated in a bore or recess 33

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in the support or casing 10. The spring 32 serves to maintain the pin or element 29 in its normal position, which is the position shown in Figure 2. In this position, the right hand end of the stem 33 extends exteriorly of the cover 12 to provide a portion that is available for manual control, which control is, of course, accomplished by depressing the pin inwardly. Shifting or depressing of the pin inwardly moves the head 31 out of the notch 25 and thus presents the relatively smaller diameter of the stem 30 as an abutment in the path of either of the edges 26 or 27, primarily the edge 26. The operator, then, by holding the pin 29 in its inwardly depressed position, may move the control lever 20 in a counterclockwise direction to the dot-dash line position shown in Figure 3, whereupon the plate 22 will move angularly an increased distance until the edge 26 encounters or stops against the stem 30. With the parts in this position, the operator may release the pin 29; but it will be held in its inner position because of engagement of the head 31 with the portion of the plate or disk 22 bordering on the edge 26, as will be obvious from Figure 3.

Another feature of the invention resides in the means for frictionally controlling various positions of the control lever between the positive positions defined by the stop means described above. Accordingly, the interior surface of the cover 12 is provided with a radial face 34 which is generally in the form of an arc about the rockshaft axis. The arcuate radial face 34 is interrupted at 35 to provide space for the end of the control rod 24. This detail is relatively unimportant, it being necessary only that the arcuate extent of the face 34 be sufficient to accommodate the range of angular movement of the disk 22. The disk 22, being a flat plate, has opposite radial faces, one of which frictionally contacts the radial face 34 on the cover 12. In the present construction, the disk 22 is formed of sheet metal; although a different material may be selected, if desired. The plate or disk 22 is held in frictional contact with the face 34 on the cover 12 by means of a flat member 36 and a compression spring 37. The general configuration of the flat member 36 is shown in Figure 3. This member is loose on the rockshaft 18 and is interposed between the boss 15 and the inner radial face of the plate or disk 22. The member thus loosely depends from the rockshaft 18 and is provided with a circular aperture 38 which receives a portion of the head 31 of the pin or stop element 29. The head 31 of the pin thus holds the member 36 against rotation with the rockshaft 18 or plate 22. The spring 37 is received in the bore or recess 16 in the casing 10 and exerts a force against the member 36 which in turn is transferred to the plate 22 and thence to the cover 12. The member 36 is preferably formed of sheet metal, as is the plate 22; but may be formed of different material, if desired. The pressure of the spring 37 is sufficient to hold the plate or disk 22 in any one of its adjusted positions against ordinary vibration incident to the operation of the equipment with which the control device is used; yet, the frictional engagement between the parts is such as to permit the control lever 20 to be easily and smoothly moved from one position to another.

That portion of the boss 15 on the interior of the casing 10 which is in proximity to the head 31 of the pin 29 is so arranged as to provide a limit to inward movement of the pin. That is to say, depressing of the pin 29 inwardly will result in moving the head 31 out of the path of

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movement of either of the edges 26 or 27 on the plate 22; however, the head 31 does not become completely displaced from the aperture 38 in the member 36. Hence, the head 31 serves, in either position of the pin 29, as means for preventing rotation of the member 36. Preferably, the height of the head 31 is equal to the combined thicknesses of the plate 22 and member 36 and the axial distance through which the pin 29 is movable is greater than the thickness of the plate 22 but less than the thickness of the member 36.

Features of the invention other than those specifically pointed out above will undoubtedly occur to those skilled in the art, as will numerous modifications and alterations, all of which may be achieved without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A control device, comprising: a casing; a rockshaft carried by the casing; a cover for the casing including a recess receiving an end portion of the rockshaft; means on the interior of the cover providing a generally flat face radial to the rockshaft axis; a plate fixed to the rockshaft within the casing and having opposite radial faces, one of which contacts the cover face; a flat member loose on the rockshaft and having opposite radial faces, one of which contacts the other plate face; spring means between the casing and the other face of the flat member for pressing said member frictionally against the plate and the plate frictionally against the cover face; means on the plate providing a notch extending angularly as respects the rockshaft axis to provide a pair of edges spaced angularly apart; a stop pin carried by the cover for shifting along an axis parallel to the rockshaft axis and having a generally cylindrical stem extending through the cover to the exterior thereof, said pin having a generally circular head of a diameter greater than that of the stem but less than the angular spacing between said edges on the plate and normally disposed with the head in the notch and constituting an abutment to be engaged by at least one of said edges to limit angular movement of the plate to a predetermined range, said pin being shiftable via pressure on the exterior portion of the stem to move the head out of and the stem into the notch in the plate to provide a second abutment, one of said edges to limit the angular movement of the plate to a greater range; means providing an aperture in the flat member for receiving a portion of the head of the pin in either position of the pin so that the head holds the flat member against turning with the rockshaft; and biasing means operative between the casing and the pin to yieldably hold the pin in and return the pin to its normal position.

2. A control device, comprising: a support; a rockshaft carried by the support; means on the support providing a generally flat face radial to the rockshaft axis; a plate fixed to the rockshaft and having opposite radial faces, one of which contacts the cover face; a flat member loose on the rockshaft and having opposite radial faces, one of which contacts the other plate face; spring means between the support and the other face of the flat member for pressing said member frictionally against the plate and the plate frictionally against the support face; means on the plate providing a notch extending angularly as respects the rockshaft axis to provide a pair of edges spaced angularly apart; a stop pin carried by the support for shifting along an axis parallel to the rockshaft axis and having a generally

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cylindrical stem including at one end a manually engageable portion and at its other end a generally circular head of a diameter greater than that of the stem but less than the angular spacing between said edges on the plate and normally disposed with the head in the notch and constituting an abutment to be engaged by at least one of said edges to limit angular movement of the plate to a predetermined range, said pin being shiftable via pressure on the aforesaid stem portion to move the head out of and the stem into the notch in the plate to provide a second abutment, one of said edges to limit the angular movement of the plate to a greater range; means providing an aperture in the flat member for receiving a portion of the head of the pin in at least one position of the pin so that the head holds the flat member against turning with the rockshaft; and biasing means operative between the support and the pin to yieldably hold the pin in and return the pin to its normal position.

3. The invention defined in claim 2, further characterized in that: means is provided to limit shifting of the pin to an extent such that the head remains within the aperture in the flat member in either position of the pin.

4. A control device, comprising: a support; a rockshaft carried by the support; means on the support providing a generally flat face radial to the rockshaft axis; a plate fixed to the rockshaft and having opposite radial faces, one of which contacts the cover face; a flat member loose on the rockshaft and having opposite radial faces, one of which contacts the other plate face; spring means between the support and the other face of the flat member for pressing said member frictionally against the plate and the plate frictionally against the support face; means on the plate providing a notch extending angularly as respects the rockshaft axis to provide a pair of edges spaced angularly apart; and means carried by the support and extending through the notch to provide an abutment engageable by at least one of the stop edges on the plate for limiting angular movement of the plate.

5. A control device, comprising: a support; a rockshaft carried by the support; means on the support providing a generally flat face radial to the rockshaft axis; a plate fixed to the rockshaft and having opposite radial faces, one of which contacts the cover face; a flat member loose on the rockshaft and having opposite radial faces, one of which contacts the other plate face; spring means between the support and the other face of the flat member for pressing said member frictionally against the plate and the plate frictionally against the support face; means on the plate providing a notch extending angularly as respects the rockshaft axis to provide a pair of edges spaced angularly apart; and means carried by the support and extending through the notch to provide an abutment engageable by at least one of the stop edges on the plate for limiting angular movement of the plate, said means including a portion engaging the flat member to hold said member against turning with either the rockshaft or plate.

6. A control device, comprising: a support; a rockshaft carried by the support; means on the support providing a generally flat face radial to the rockshaft axis; a plate fixed to the rockshaft and having opposite radial faces, one of which contacts the cover face; a flat member loose on the rockshaft and having opposite radial faces, one of which contacts the other plate face; spring

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means between the support and the other face of the flat member for pressing said member frictionally against the plate and the plate frictionally against the support face; means on the plate providing a notch extending angularly as respects the rockshaft axis to provide a pair of edges spaced angularly apart; and means carried by the support for selective positioning with respect to the plate and support and having a plurality of stop portions of different sizes selectively projectable into the notch and between the stop edges to present optional abutments for limiting angular movement of the plate to different ranges.

7. A control device, comprising: a support; a rockshaft carried by the support; means on the support providing a generally flat face radial to the rockshaft axis; a plate fixed to the rockshaft and having opposite radial faces, one of which contacts the cover face; a flat member loose on the rockshaft and having opposite radial faces, one of which contacts the other plate face; spring means between the support and the other face of the flat member for pressing said member frictionally against the plate and the plate frictionally against the support face; means on the plate providing a notch extending angularly as respects the rockshaft axis to provide a pair of edges spaced angularly apart; and means carried by the support for selective positioning with respect to the plate and support and having a plurality of stop portions of different sizes selectively projectable into the notch and between the stop edges to present optional abutments for limiting angular movement of the plate to different ranges, said means including a portion engageable with the flat member in any position of said means to hold said member against turning with either the rockshaft or plate.

8. In a control device including a support and a member carried thereby for rocking about an axis: means on the member providing a pair of stops spaced angularly apart about the aforesaid axis and extending generally radially to provide a space between said stops; a limiting element shiftable between first and second positions along a path generally parallel to said axis and through the space between said stops, said element having first and second portions, the first portion being of a larger dimension than the other transverse to the path of shifting of said

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element but smaller than the angular distance between said stops, said element in one position thereof presenting the first portion as an abutment to the stops to limit angular movement of said member to a certain number of degrees, and said element in another position thereof presenting the second portion as an abutment to the stops to limit angular movement of the member to a different number of degrees; and means biasing said element to one of its positions and providing for shifting of the element to its other position.

9. In a control device including a support and a member movable thereon in opposite directions along a defined path: means on the member providing a pair of stops spaced apart along the path of movement of the member; and a stop element carried by the support for selective movement between two positions with respect thereto and with respect to the member and having a first portion normally interposed, in one position of the element, between the stops and engageable by the stops to limit movement of the member in opposite directions, said element having a second portion of different dimensions than the first portion as respects the spacing between the stops and positionable, in the other position of the element, between the stops to establish different limits on the movement of the member in opposite directions.

10. In a control device including a support and a member movable thereon in opposite directions along a defined path: means providing a stop on the member; and a stop element carried by the support for selective movement between two positions with respect thereto and with respect to the member and having a first portion normally interposed, in one position of the element in the path of the stop on the member to limit movement of the member in one direction, said element having a second portion of different dimensions than the first portion as respects the path of movement of the stop on the member and positionable, in the other position of the element in the path of the stop to establish a different limit on movement of the member in said one direction.

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No references cited.