April 28, 1964 C. BURNHAM 3,130,598

SINGLE LEVER REMOTE CONTROL FOR OUTBOARD MOTORS

Filed April 13, 1961

2 Sheets-Sheet 1

FIG. 1

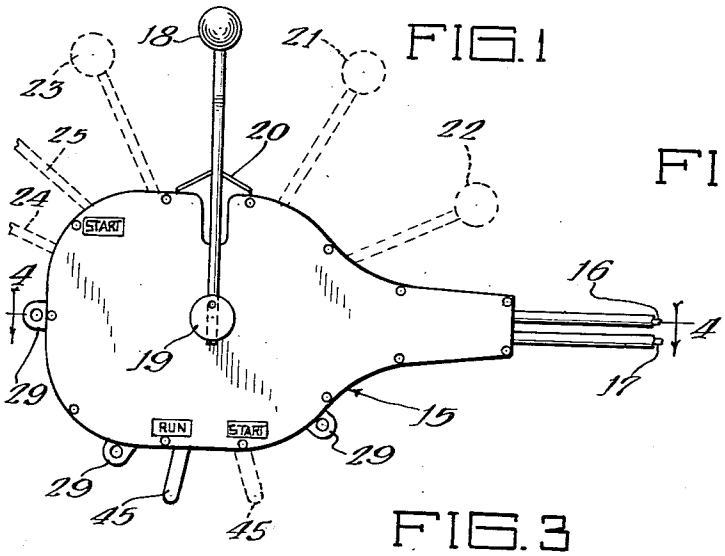


FIG. 2

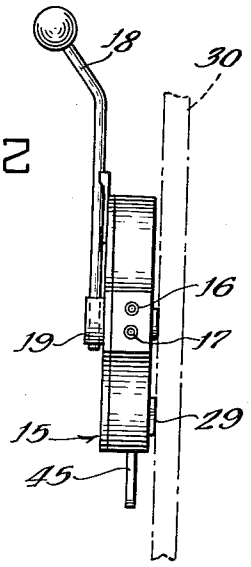


FIG. 3

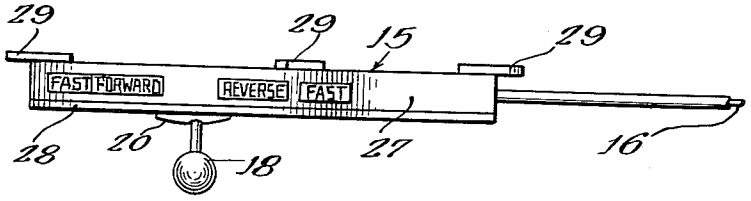


FIG. 4

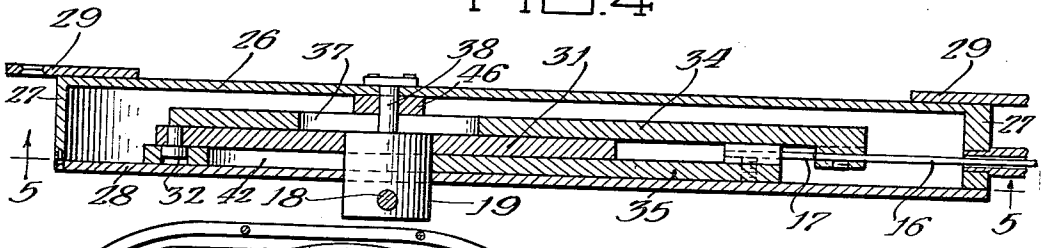
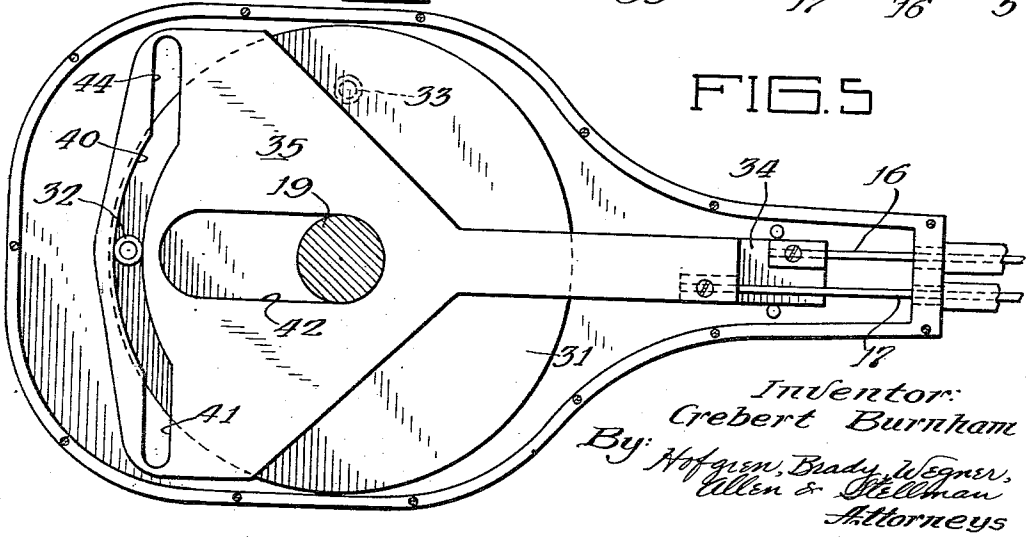


FIG. 5



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April 28, 1964 C. BURNHAM 3,130,598

SINGLE LEVER REMOTE CONTROL FOR OUTBOARD MOTORS

Filed April 13, 1961 2 Sheets-Sheet 2

FIG. 6

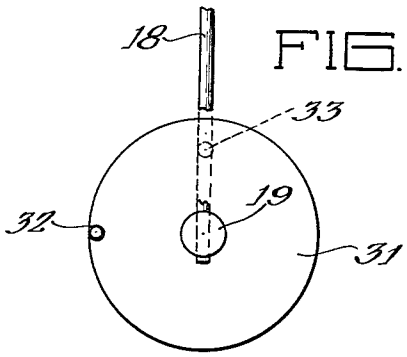


FIG. 9

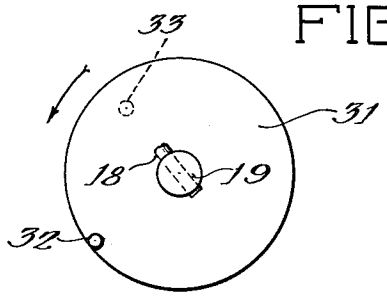


FIG. 7

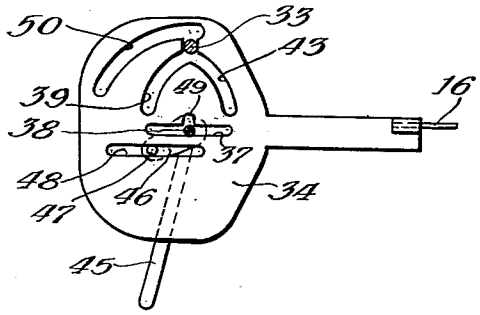


FIG. 10

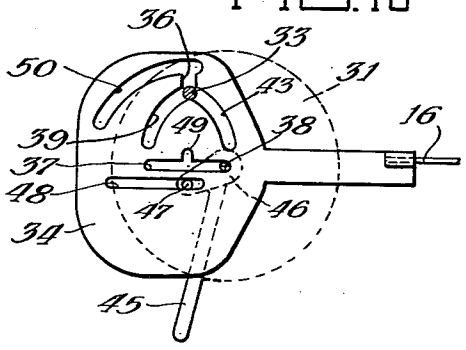


FIG. 8

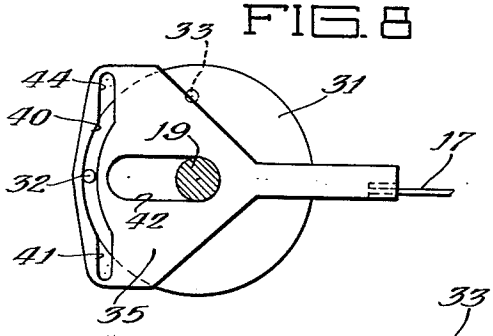


FIG 11

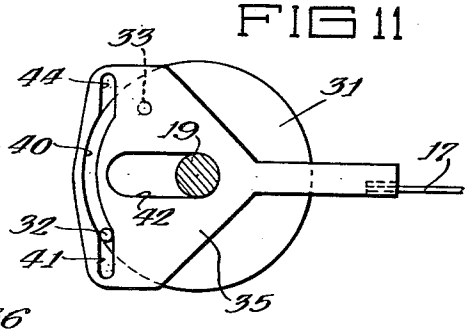
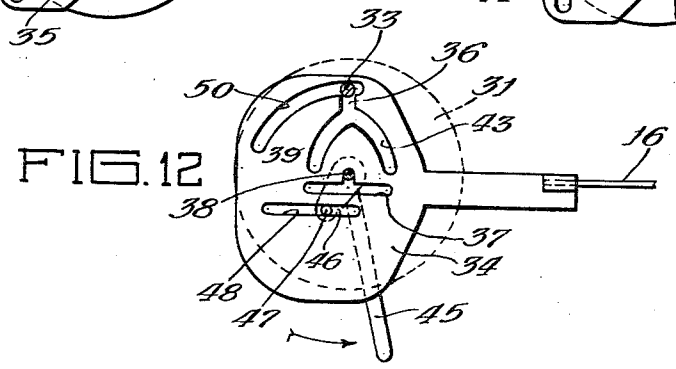


FIG. 12



United States Patent Office

3,130,598

Patented Apr. 28, 1964

3,130,598

SINGLE LEVER REMOTE CONTROL FOR OUTBOARD MOTORS

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Filed Apr. 13, 1961, Ser. No. 102,695

11 Claims. (Cl. 74—472)

This invention relates to a control device and more particularly to a single lever remote control for selective control of throttle and shifting of an outboard motor.

Small boating on inland waterways and in the coastal waterways in often done with an outboard type of motor controlled from a forward position in the boat. A steering wheel is provided for turning the propeller direction relative to the boat for steering purposes and lever controls are provided for controlling the throttle setting and for shifting the motor from forward to reverse. When a boat is approaching a dock or any other stationary object, it may be extremely important to be able to reverse the direction of the outboard motor propeller quickly and easily. The throttle setting of an outboard motor should be low or in idle position before a shift is made. The present control provides a single lever for controlling the throttle setting and shifting where a single direction movement will accomplish proper throttle setting and shifting without further addition.

It is the primary object of this invention to provide a new and improved remote control for outboard motors.

Another object is to provide a new and improved single lever control for a pair of linearly movable controlled members.

Another object is to provide a single lever control for outboard motors and the like of simplified construction providing adequate leverage for smooth effortless operation.

A still further object is to provide a simplified control for a pair of linearly movable controlled members which move in sequence with each member being held stationary while the other is moved and wherein the single control imposing member is moved unidirectionally.

Other objects, features and advantages of the present invention will be apparent in the following description of a preferred embodiment illustrated in the drawings in which:

FIGURE 1 is a side elevational view of the controller embodying the invention.

FIGURE 2 is an end elevational view thereof.

FIGURE 3 is a top plan view thereof.

FIGURE 4 is a horizontal sectional view through the controller taken substantially along line 4—4 in FIGURE 1.

FIGURE 5 is a view of the internal mechanism with the cover plate removed and taken substantially along line 5—5 in FIGURE 4.

FIGURES 6 to 12, inclusive, are diagrammatc views of the control and controlled members showing their various positions in operation.

FIGURE 6 is a view of the control member in neutral position.

FIGURE 7 is a view of the controlled member for shifting the gears of the outboard motor when such member is in neutral position.

FIGURE 8 is a view of the controlled member for the throttle of the outboard member when in neutral position.

FIGURE 9 is a view of the control member in position to shift the motor to forward.

FIGURE 10 is a view of the member shown in FIGURE 7 in position to shift the motor to forward.

FIGURE 11 is a view of the member of FIGURE 8 in the position to shift the motor to forward.

FIGURE 12 is a view of the mechanism in which the

shift control has been moved to a position to allow starting and warm up of the motor without shifting the gears.

The control mechanism described in this application may have application in many industries and for any control requiring linearly moved members to be moved in sequence. The present design is particularly suited for the remote control of an outboard motor. When the motor is out of gear and idling, a condition is present suitable for shifting the motor either into forward or reverse. After the shift has been made, the throttle setting of the motor may be increased at will. The throttle setting should be returned to the idle setting before any shifting occurs. In the present controller there is a single lever controlling both throttle and shifting. The throttle setting is automatically returned to idle setting before the gears are shifted.

Referring to FIGURES 1 to 3, the controller has a housing 15 from which extend a pair of cable members 16 and 17 which extend from the cockpit of the boat rearwardly to the outboard motor. These cables are caused to move linearly by the movement of a single lever or control handle 18 pivoted on a central member 19 supported in the housing. The full line position of the lever releasably held by an auxiliary catch 20 is in the neutral position. When the lever is shifted clockwise to the dotted position 21, the upper cable 16 has moved to shift the motor to reverse. The remaining movement beyond the position 21 toward the position 22 merely increases the throttle setting by linearly moving the cable 17.

Reverse movement of the handle 18, or in a counterclockwise direction as viewed in FIGURE 1 to the dotted line position 23, moves the upper cable 16 to shift the motor to forward. Additional movement toward the dotted line position 24, also clockwise, merely moves the lower cable 17, thus changing the throttle setting of the motor. An intermediate position 25 opposite a legend on the housing "start" indicates an intermediate or partial setting of the throttle which may be used when starting the outboard motor. Suitable legends are printed upon the housing to indicate the direction and throttle setting for positions of the lever, however, such legends are optional.

The housing may be made in various manners, the present construction involving a back wall 26 with upstanding side walls 27 and a cover 28 secured to the side walls. Suitable brackets 29 may be used to mount the controller on a side rail 30 of the boat in the manner illustrated in FIGURE 2. The present construction formed of sheet metal is for illustrative purposes only, other constructions being both possible and contemplated.

The internal mechanism by which the single lever 18 controls the cables 16 and 17 comprises a central plate or control member 31 secured to the central pivot member 19 which is caused to turn in the housing when the lever is swung. The plate has a pair of studs 32 and 33. The stud 33 controls the guided linear movement of a plate 34 having a cam groove embracing the stud. The plate 34 is secured to the cable 16 so that the movement of this plate may shift the gears of the outboard motor. The movement of the throttle control cable 17 is caused by guided linear movement of a plate 35 having a cam groove which embraces the stud 32 on the control member. The operation of the studs in the cam grooves is best shown in the diagrammatic views of the FIGURES 6 to 12. When the control member is in neutral position as shown in FIGURE 6, one stud 33 is directly in line with the handle and the other stud 32 is at 90° therefrom. Both studs will move in an arc about the center of the control member since the control disc 31 is rotatable about the center pivot axis.

The shift control member is best seen in FIGURE 7. In the neutral position as shown the stud is in a straight

portion 36 of a cam groove extending vertically above the center so that movement of the stud in its arcuate path in either direction will cause the shift control plate 34 to move linearly to the right or left as viewed in FIGURE 7. The control plate has a center horizontal slot 37 in which a smaller central shaft 38 reposes. This shaft is shown in FIGURE 4 as passing into the housing and into the central member 19. This central shaft limits movement of the shift member 34 to a linear path when the control member is rotated within the housing. For example, a comparison between FIGURES 7 and 10 will show that upon rotation of the control imposing member 31 from the position of FIGURE 6 counterclockwise to the position of FIGURE 9 causes the shift member 34 to move to the left. The member 34 has moved so that the slot 37 in the center of the member slides past the shaft 38 until the far end of the slot abuts the shaft. Movement is arrested with the stud 33 in proper position only to enter the arcuate portion 39 of the cam groove. No jamming can occur. At this moment the stud 33 has passed downwardly through the vertical portion 36 of the cam slot. Any further turning of the control member will simply move the stud 33 into the arcuate portion 39 of the cam groove. No further movement of the shift plate will occur since the arcuate portion 39 of the cam groove has its center on the center of the shaft 38 and the shift plate is in effect locked in position between the stud 33 and center shaft 38.

From the description of the parts made above, it should be evident that the first movement of the control lever 18 has the effect of moving the shift member 34 by the engagement of the stud 33 and the vertical portion 36 of the cam groove in the shift controlling member. During the time that this movement was occurring, the throttle control was maintained in an idle position. Referring to FIGURE 8, the throttle control member 35 is shown with a cam groove embracing the stud 32. An arcuate portion 40 of the cam groove has its center coincident with the center about which the control member turns. During the movement of the handle from the position shown in solid lines in FIGURE 1 to the dotted line position 23, the stud 32 merely traveled through the arcuate portion 40 of the cam groove without causing linear movement of the throttle control member. The two extreme positions are shown in FIGURES 8 and 11. Once the stud has reached the position at the lower end of the arcuate cam groove portion as illustrated in FIGURE 11, further rotation will cause the throttle control member to move to the right as viewed in FIGURE 11. The lower straight portion 41 of the cam groove guiding upon and embracing the stud 32 will cause the movement specified. An elongated slot 42 in the throttle control plate 35 allows the plate to move linearly without interfering with the rotation of the control member and without interference with the central member 19.

The conditions shown in FIGURES 6 to 11 are those which are encountered when the control lever 18 is shifted from a neutral position to a forward position indicated by the dotted line 23 in FIGURE 1. Certain movements of similar nature occur when the control lever is shifted from neutral to a reverse position as illustrated in dotted lines by the reference 21 in FIGURE 1. Referring to FIGURE 10, the stud 33 will be in the same position in the cam slots of the shift control member, but the shift control member will be to the right of center so that the central shaft 38 will be in the left-hand end of the slot 37. Referring to FIGURES 8 and 11, the throttle plate will not have moved but the stud 32 will be at the upper end of the arcuate cam slot 40. After the shift is made either into reverse or forward, further movement of the lever merely causes movement of the throttle plate. The shift lever has an arcuate cam portion 43 into which the stud 33 moves during throttle control when the shift is in reverse. The throttle control plate has an upper straight portion 44 similar to the lower straight portion 41 for embracing the stud 32 and moving the throttle plate to control motor throttle setting when the conrol is in reverse. The throttle setting thus occurs by movement of the lever in an area beyond the initial movement which causes shifting of the gears of the motor.

The starting of an outboard is usually accomplished with the motor in neutral. However, the throttle setting may be desired somewhat above idle position. In the present control there is an auxiliary lever for rendering the shift member inoperative so that throttle settings may be selected above idle without first shifting the motor into reverse or forward. Referring to FIGURE 1, the auxiliary lever 45 as shown in full line position is opposite the legend "run." In this position both controlled members are operative and under the influence of movement of the lever 18. For starting purposes the lever should be moved to the dotted line position opposite the legend "start." The effect of such movement is best illustrated in FIGURES 7 and 12. Lever 45 has a short arm 46 with a stud 47 thereon riding within a groove 48 in the shift control plate 34. Ordinarily, stud 47 simply rides in the groove and does not affect or hinder the movement of the shift control plate in any manner. The horizontal groove 37 in the shift control plate has an auxiliary upstanding portion 49 at the center thereof to permit the plate 34 to be moved downwardly over the central shaft 38. Such position is illustrated in FIGURE 12. The lever 45 is pivoted on the shaft 38 so that movement to the right from the position of FIGURE 7 to that of FIGURE 12 allows the stud 47 on the lever to pivot the control plate downwardly about the central shaft 38. When this occurs, the stud 33 on the control member 31 moves upwardly out of the vertical portion 36 of the cam groove into an arcuate cam groove portion 50. When the parts are in the position of FIGURE 12 movement of the control lever 18 counterclockwise in FIGURE 1 will carry the stud 33 through the cam groove portion 50 without causing any longitudinal movement of the shift plate. The only control effected by the lever will be the throttle setting in the usual way as previously described. After the motor is sufficiently warm for running, the control lever 18 may be returned to its neutral position so that the starting lever 45 may be returned to its run position which will return the shift controlling plate to an operative relation with the control member 31.

The arcuate portions of the cam grooves described embrace the studs on the control member and serve to hold the controlled members stationary when desired. Except for this function, the arcuate portions of the cam grooves might be enlarged so that the studs simply would not engage any part of the controlled member when the other controlled member was being moved. In the particular design it is desirable, however, to maintain a positive control over both controlled members at all times, thereby avoiding the necessity of any other mechanism to hold either controlled member stationary while the other is being moved. The leverage provided by the distance between the center of rotation of the control member and the studs may be chosen to provide sufficient mechanical advantage for shifting any outboard motor or may be changed to be applicable to other controlled members.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, for some modifications will be obvious to those skilled in the art.

I claim:

1. A single lever remote control unit for outboard motors, comprising: a housing; a control member rotatably mounted in the housing having a control lever; a pair of push-pull controlled members longitudinally slidable in the housing for connection respectively with throttle and shifting controls on the motor; a pair of studs on the control member each movable in an arcuate path relative to the housing with swinging movement of the

control lever; cam groove means on each controlled member engaging one of said studs, said cam groove means having arcuate portions arranged on the path of movement of said studs to permit the stud to move with the control member with push-pull longitudinal movement of only one of the controlled members at a time, said cam groove means being arranged for said studs to move the shift controlled member in said housing prior to movement of the throttle controlled member in said housing and to so move said controlled members in sequence upon swinging movement of the control lever in one direction.

2. A single lever remote control for an outboard motor, comprising: a housing; a control member rotatably mounted in the housing and having a control lever; a pair of controlled members slidably movable in the housing for providing push-pull control respectively of throttle and gear shifting of the motor, said member having a pair of studs and each of said controlled members having cam surfaces engaging one of said studs, at least one of said cam surfaces having an arcuate portion centered on the center of rotation of said control member permitting said one controlled member to remain stationary during movement of the control lever.

3. A single lever remote control for outboard motors, comprising: a housing; a control member rotatably mounted in the housing having a control lever; a pair of slidable controlled members in the housing for connection respectively to throttle and shifting controls on the motor; means forming cam surfaces on each controlled member and a stud on said control member for engaging said cam surfaces and moving the controlled members upon swinging of said control lever, said throttle controlled member having cam surfaces arcuate about the center of rotation of said control member to permit movement of said shifting controlled member while the throttle controlled member remains stationary.

4. A control as specified in claim 3 in which the shifting controlled member also has cam surfaces arcuate about the center of rotation of said control member engaged by the respective stud on said control member following movement of said shifting controlled member whereby the same may remain stationary during further movement of the control lever to move the throttle controlled member.

5. A control as specified in claim 3 in which the shifting controlled member slidably moves longitudinally of the housing in a plane and has an auxiliary arcuate cam surface to receive the stud engaging said member upon selective movement of the shifting controlled member in said plane transversely of said longitudinal movement prior to movement of the control lever whereby the control member controls only the throttle control member.

6. A single lever control unit for a pair of sequentially operated push-pull controlled members, comprising; a pivoted control member adapted to be moved arcuately to provide control; a control lever for said control member, a pair of longitudinally movable controlled members adjacent and besides the control member; a pair of studs on the control member each movable in an arcuate path with movement of the control lever; cam groove means on each controlled member engaging one of said studs, said cam groove means having arcuate portions centered on the center of rotation of the control member for movement of the respective stud therethrough without moving the respective controlled member engaged by said respective stud, said arcuate portions being arranged to provide sequential movement of the controlled members upon arcuate movement of the control member in a single direction.

7. A control as specified in claim 6, wherein one of the controlled members moves longitudinally in a plane and has an auxiliary arcuate cam portion for receiving the stud upon selective movement of the controlled member in said plane transversely of said longitudinal direction and prior to movement of the control lever whereby to remove the one controlled member out of control of the control member permitting only the other controlled member to be controlled.

8. A single lever remote control for an outboard motor, comprising; a housing; a control member rotatably mounted in the housing and having a control lever, said control member having a pair of outwardly extending studs spaced from the center of rotation of the member; a pair of controlled members guided in said housing for push-pull control respectively of throttle and shifting of said motor, each controlled member having cam slots embracing one of asid studs, each cam slot having walls arcuate about the center of rotation of the control member to permit some rotation of the control member without movement of the controlled member.

9. A single lever remote control unit for outboard motors, comprising: a housing; a control member and a pin rotatably mounting the member in the housing, said member having a control level; a pair of push-pull controlled members in the housing for connection respectively with throttle and shifting controls on the motor, said controlled members being plates having a guide slot embracing the pin rotatably mounting said control member; a pair of studs on the control member each movable in an arcuate path around said pin; said controlled member plates each having cam grooves respectively embracing one of said studs, portions of said grooves being arcuate about said pin as a center to permit swinging of the control member without moving the controlled member, said arcuate portions of said grooves being arranged to permit sequential movement of the controlled members upon movement of the control lever in one direction.

10. A control as specified in claim 9 in which the studs on the control member are located about 90° apart relative to the center of rotation of the member.

11. A control as specified in claim 9 in which the studs extend outwardly on opposite sides of the control member and the controlled members are mounted on opposite sides of the member to engage said studs.

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