

July 20, 1948.

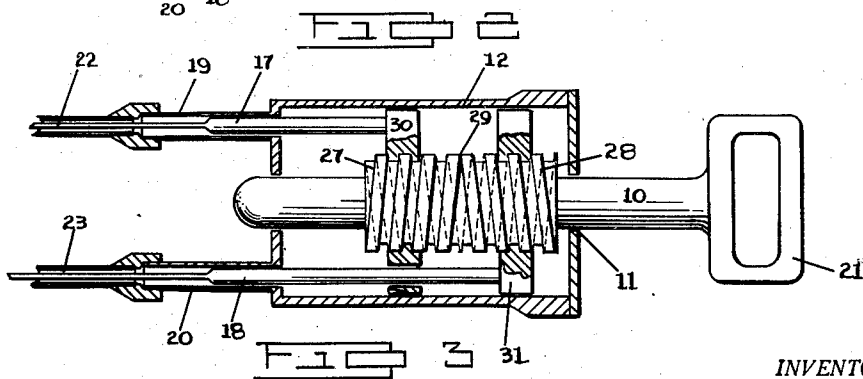
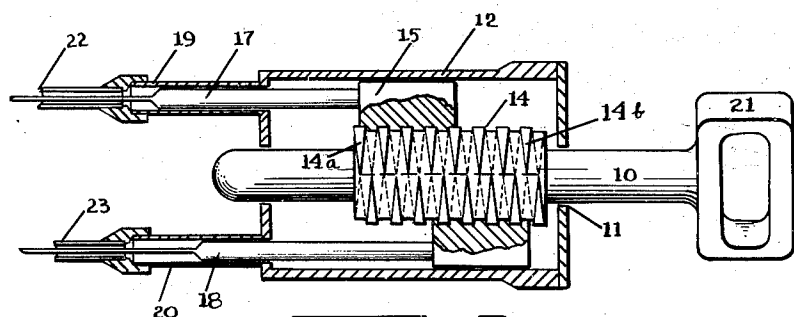
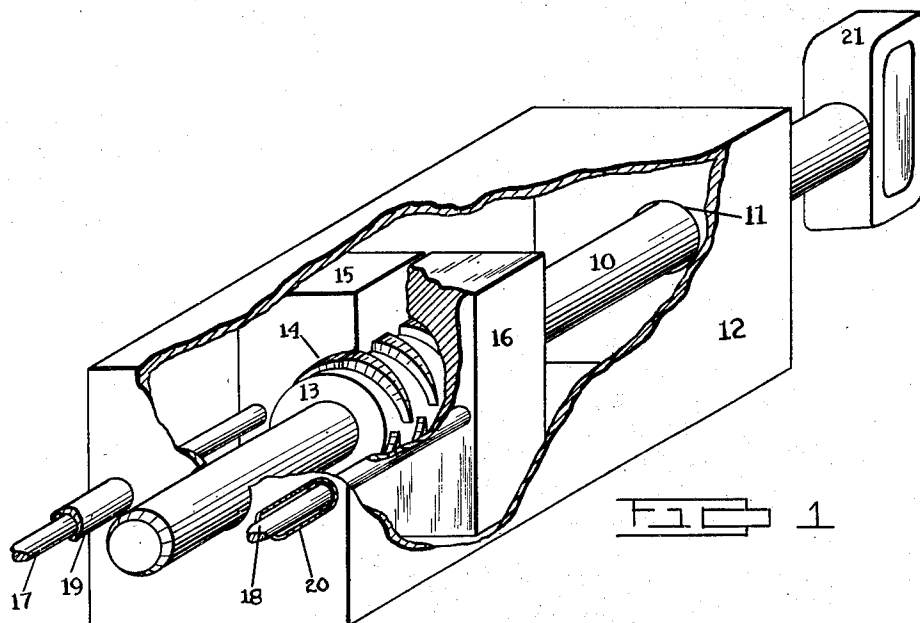
E. J. CASAROLL

2,445,602

ADJUSTABLE CONTROL DEVICE

Filed July 19, 1945

2 Sheets-Sheet 1



INVENTOR.
ERNEST J. CASAROLL

BY

Gray and Smith

ATTORNEYS

July 20, 1948.

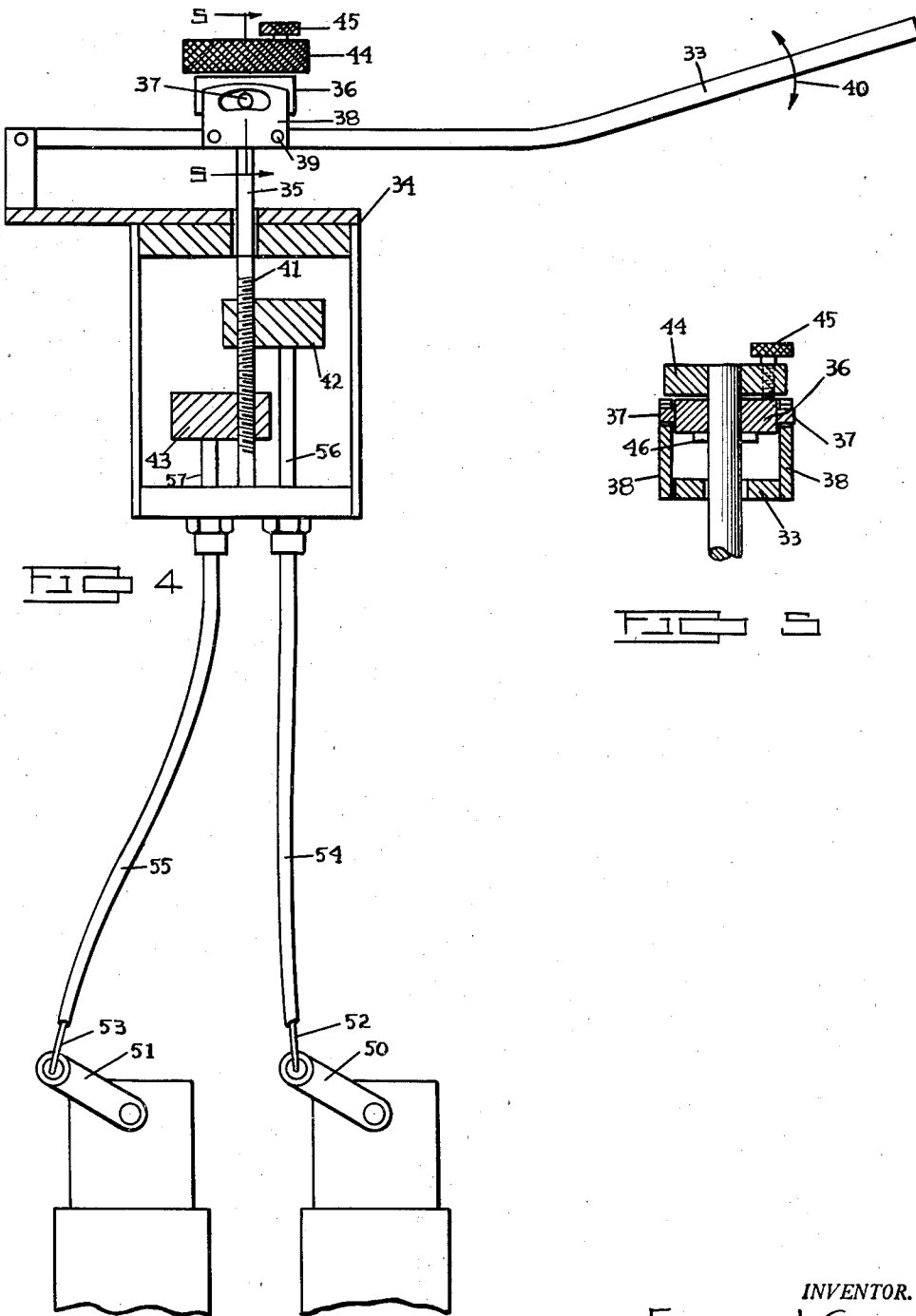
E. J. CASAROLL

2,445,602

ADJUSTABLE CONTROL DEVICE

Filed July 19, 1945

2 Sheets-Sheet 2



INVENTOR.
ERNEST J. CASAROLL
BY *Gray and Smith*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,445,602

ADJUSTABLE CONTROL DEVICE

Ernest J. Casaroli, Detroit, Mich.

Application July 19, 1945, Serial No. 605,955

6 Claims. (Cl. 74-471)

1

This invention relates to an adjustable control device applicable to the simultaneous control of two mechanisms whose co-adjustment is required, and which co-adjustment requires that the similar devices be adjusted in opposite sense. The invention disclosed herein is described as applied to the control of carburetor adjustments for internal combustion engines wherein the carburetor adjustment of one engine must be advanced and the corresponding adjustment on the carburetor on another engine retarded in order that the engines will be synchronized and so operated that each will assume its share of the load on the unit.

An object of the present invention is to provide a control device which will permit the adjustment of two cooperating mechanisms in opposite sense so that their degree of cooperation may be equalized through the use of a single adjusting mechanism.

A further object of this invention is to provide a control device that will permit an adjusted control of two cooperating mechanisms by the operation of a single control device.

Although the control device of the present invention is described as applied to a multi-engine unit and in particular as applied for the simultaneous adjustment of two carburetors attached to such units, it is not limited in its use to such an application, but may be used wherever a similar or corresponding effect is desired.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is an isometric view of the device with a portion of the enclosing case broken away to show the internal working parts.

Fig. 2 is a plan view partially in section of the device shown in Fig. 1.

Fig. 3 is a plan view partially in section and showing a modified form of control device embodying the present invention.

Fig. 4 is a plan view partially in section of a further modified control device embodying the present invention and adapted for the simultaneous control of two separately adjustable carburetors, and showing a modified type of operating handle and adjustment screw for the more positive adjustment and convenient operation of the unit.

Fig. 5 is a cross-section taken substantially on

2

the line 5-5 of Fig. 4 in the direction of the arrows.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts 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.

Referring to Fig. 1, the shaft 10 rotatably supported by bearing surfaces 11 in the enclosing structure 12 has at 13 a portion of the shaft increased in diameter, on the surface of which is cut a double threaded screw 14, one thread of which 14a is a right-hand thread, and the other thread of which 14b a left-hand thread. Engaged with the threads 14a is the half nut 15. Engaged with the threads 14b is the half nut 16. Half nut 16 is a left-hand threaded nut, and half nut 15 a right-hand threaded nut so as to travel on the left and right threaded portions respectively of the threaded portion 14.

Attached to the nuts 15 and 16 are the rods 17 and 18 respectively emerging from the housing 12 through protective housings 19 and 20. As shown, the housing 12 and the half nuts 15 and 16 are rectilinear in cross section. The half nuts 15 and 16 are slightly smaller than the internal dimensions of the housing 12 so as to move axially therein but are held against rotation relative thereto.

Rotation of the handle 21 attached to the shaft 10 rotates the reversely threaded screw 14 effecting an axial movement of the half nuts 15 and 16. By virtue of the opposite threaded construction above described motion in opposite direction will result between them upon each rotation of the handle 21. Thus, nut 15 when moving in one direction will slide past the nut 16 which will be moving in the opposite direction. Since the rods 17 and 18 are attached to their respective half nuts, one will be retracted and the other advanced depending upon the direction of rotation of handle 21. Wire control cables 22 and 23 of the so-called "push-pull" type are connected with the rods 17 and 18 respectively and lead to the parts to be adjustably controlled, in the present instance carburetor controls of separate internal combustion engines (not shown). By rotation of the handle 21, the two engines, whose carburetors are thus reversibly adjusted are synchronized. Having reached this synchronized

3

condition, the operator may use the same device to effect either an increase or decrease in the synchronized engine speeds by pulling or pushing the handle 21 to effect axial movement of the shaft 10 relative to the housing 12. By this action, both machine nuts are slid within the container 12 in the same direction and to the same amount, and the rods 17 and 18 and the control wires of the cables 22 and 23 are moved a corresponding amount.

Referring to Fig. 2, the handle 21 is shown after being rotated from the position of Fig. 1 with the reversed threaded nuts 15 and 16 having assumed, thereby, a different relative position from that shown in Fig. 1.

In the modified construction shown in Fig. 3, the same principle of operation is employed. A structural change here shown is in the screw threaded portion 29 which is of the double reverse thread type and is composed of two sections of threaded length, one provided with a right-hand thread 27 and the other with a left-hand thread 28. Engaged with the respective portions of threaded length 29 are full nuts 30 and 31. Rotation of the handle 21 now causes a relative motion between the nuts 30 and 31 effecting a relative motion between the control wires 22 and 23. Likewise, a pushing or pulling of the handle 21 causes its axial movement relative to the housing 12 and the simultaneous movement of control wires 22 and 23 without relative motion between them.

Referring to Fig. 4, a further modified device embodying the present invention is shown wherever a different adaptation of the method of controlling the device and of adjusting the separate operating units is shown. At 33 is an elongated operating handle pivotally mounted on the housing 34. The operating shaft 35 extends through handle 33 and is connected with a rotatably mounted block 36 on which are mounted two pins 37 which engage slotted plates 38 attached to handle 33 by screws 39. Movement of the handle 33 in the directions as indicated by arrow 40 imparts a corresponding axial motion to the shaft 35. The shaft 35 has a reversely threaded portion 41 on which is mounted a right-hand control nut 42 and a left-hand control nut 43. Rotation of the shaft 35 is accomplished by rotation of a knurled nut 44 rigidly attached to the end of shaft 35 adjacent the rotatably mounted block 36. Having accomplished the desired relative adjustment, of the nuts 42 and 43, further rotation of the knurled nut 44 is prevented by a clamping screw 45 which jams against the rotatably mounted block 36 and locks the knurled nut 44 and the shaft 35 against further rotation. The block 36 is held against axial movement by the collar 46 as shown in Fig. 5. Rotation of block 36 during the time that knurled nut 44 is being adjusted and screw 45 is loosened, is permitted only to the extent of the length of the slots in the slotted plates 38, which are of sufficient lengths to permit a rocking movement of the pins 37 therein when the handle 33 is operated.

The device shown in Fig. 4 when used for the adjustment of two interconnected internal combustion engines would be used substantially as follows: The operator observing a difference in speed between the two engines as indicated by tachometers or other indicating device would rotate the knurled nut 44 either in a clockwise or counterclockwise direction until by observing the engine tachometers or other indicating device it was shown that they were synchronized. The

4

synchronized operation of the engines at desired speeds, either increased or decreased, is then accomplished by a fore or aft movement of the handle 33 effecting an opening or closing of the two carburetors simultaneously. The movement of the nuts 42 and 43 is transmitted to the carburetor control arms indicated at 50 and 51 by the control wires 52 and 53 of the "push-pull" cables 54 and 55 the outer sheaths of which are connected to the housing 34 in any suitable manner. The control wires 52 and 53 are connected respectively with push rods 56 and 57 which in turn are connected with the nuts 42 and 43 respectively.

A device of the present invention in any of the forms here shown permits the accurate synchronized adjustment of connected engines or other devices connected for synchronous operation and permits a ready control thereof through various operating cycles. When used, for example, to control spaced aircraft engines, the device permits the pilot to synchronize the engines at a given speed and thereafter to simultaneously accelerate the synchronized engines by a single operation of the control device. The modified construction shown in Fig. 4 is particularly recommended for this use. For the synchronized control and operation of spaced engines, as in marine construction, the form of the device shown in Figs. 1 to 3 is particularly recommended as the turning of the handle 21 permits varying the relative speeds of the engines as is frequently desired to facilitate handling of the boat. This is particularly true of small boats of the cabin cruiser type in which twin screws are provided, each of which is driven by a separate engine. By varying simultaneously the speeds of such engines, the handling of such a boat is greatly facilitated.

I claim:

1. An adjustable control device for controlling a plurality of engine throttles or the like and comprising a housing, a shaft in said housing mounted for rotation and axial movement relative thereto, means for rotating said shaft and for moving said shaft axially relative to said housing, a right-hand threaded portion and a left-hand threaded portion on said shaft, a threaded follower mounted one each on said right-hand threaded portion and said left-hand threaded portion for movement in opposite directions upon rotation of said shaft in either direction and for axial movement as a unit with said shaft, and a connecting member leading from each of said threaded followers to one engine throttle.

2. An adjustable control device as claimed in claim 1 and further characterized in that the means for rotating said shaft and for effecting axial movement thereof is a single handle secured to the end thereof.

3. An adjustable control device as claimed in claim 1 and further characterized in that said threaded followers comprise threaded half-nut members mounted against rotation within said housing.

4. An adjustable control device as claimed in claim 1 and further characterized in that said shaft is adjustably rotated by a rotatable knob member and is moved axially by a swinging lever connected therewith.

5. An adjustable throttle control for a plurality of separate internal combustion engines, said control comprising a threaded shaft having a right and left hand threaded portion, a threaded

5

follower engaging the right hand threaded portion, a second threaded follower engaging the left hand threaded portion, a connection between each of said followers and the throttle of one of said plurality of separate internal combustion engines, and manual control means for rotating said shaft to move said followers simultaneously in opposite directions and for axially moving said shaft and followers as a unit.

6. An adjustable control device for controlling the throttles of a plurality of separate internal combustion engines or the like, said control device comprising a threaded shaft mounted for rotary and axial movement having a right and left hand threaded portion, a threaded follower engaging the right hand threaded portion, a second threaded follower engaging the left hand threaded portion, a connection between said followers and the throttles of said plurality of separate internal combustion engines, and manual control means for moving said shaft and said followers and including a rotatable adjusting knob secured to said shaft for rotating said shaft and moving said followers simultaneously in opposite directions

6

and a single control lever secured to said shaft for effecting axial movement of said shaft and said followers.

ERNEST J. CASAROLL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
853,719	Munro	May 14, 1907
1,065,142	Key	June 17, 1913
1,454,505	Christen	May 8, 1923
1,723,537	Wright	Aug. 6, 1929
1,889,295	Rosatelli	Nov. 29, 1932
2,073,891	Vogler	Mar. 16, 1937
2,313,768	Putt	Mar. 16, 1943

FOREIGN PATENTS

Number	Country	Date
310,148	Italy	July 29, 1933
424,814	Great Britain	Feb. 28, 1935