Sept. 10, 1935. G. A. YANOCHOWSKI 2,013,798

CHOKE VALVE CONTROL MEANS

Filed April 9, 1932

Fig. 1.

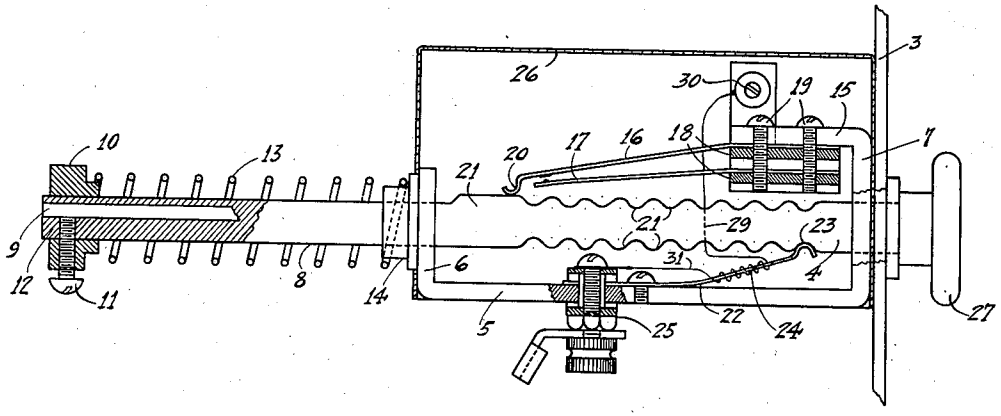
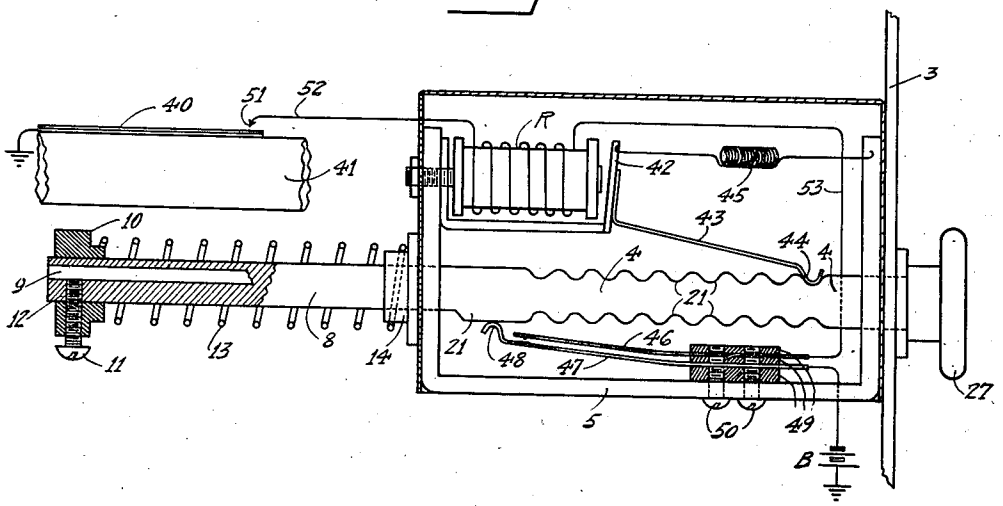


Fig. 2.



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Patented Sept. 10, 1935 2,013,798

UNITED STATES PATENT OFFICE

2,013,798

CHOKE VALVE CONTROL MEANS

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Application April 9, 1932, Serial No. 604,291

4 Claims. (Cl. 74—2)

My invention relates to a choke valve control for internal combustion engines and more particularly to means for automatically restoring the same to its normal position. The choke valve control for carburetors of internal combustion engines used as the propelling means for motor vehicles is usually located upon the dashboard of the vehicle where it appears as a button fixed to a rod which is connected by suitable means to the carburetor choke valve. In such a choke valve control system the rod and button and the associated apparatus are arranged in such a manner that they will remain in any position to which they may be moved. In starting an automobile engine the operator grasps the button and moves it to its full choke position in which position it remains until the engine starts when it is pushed part of the way in to its half choke position. Then as the engine warms up and functions properly the choke valve is returned to its off position. Oftentimes the operator neglects to restore the choke button to its off position and as a result raw gasoline is allowed to enter the cylinders of the engine. This prevents the engine operating at its highest efficiency and also wastes gasoline.

It is an object of my invention to overcome the above mentioned defects by providing means for automatically restoring the apparatus to its off position after the lapse of a predetermined period in which the engine can warm up sufficiently to operate properly.

A feature of my invention is the inclusion in a choke valve control system of automatic means for restoring the apparatus to normal.

Another feature of my invention is the provision of thermal means for controlling the automatic restoring means of said choke valve control system.

Other features and advantages will become apparent from the following detailed description, reference being had to the accompanying drawing wherein,

Fig. 1 shows a single preferred embodiment of my invention; and

Fig. 2 shows another embodiment in a more elaborate form.

Referring now to the drawing in which similar reference characters in the different views indicate similar parts, an instrument board 3 is provided with an orifice through which extends a rod 4. A supporting member 5 having upturned ends 6 and 7 is secured to the rear of the dashboard in any suitable manner. The rod 4 extends through orifices in the ends 6 and 7 and has a reduced end portion 8 provided with a longitudinal bore 9 adapted to receive a wire or other suitable link means leading to the carburetor. A collar 10 which fits around the portion 8 of rod 4 is provided with a set screw 11 which passes through an orifice 12 in the portion 8 and secures the collar 10 to the rod 4 and the wire (not shown) in the bore 9. A spring 13 surrounds the portion 8 of the rod 4 and has one end resting against the collar 10 and the other against the upturned end 6 or a collar 14 provided for this purpose.

The description immediately following is particularly directed to Fig. 1 of the drawing in which the extreme end 15 of the upturned portion 7 of the supporting member 5 is bent back until it is substantially parallel to the main portion of member 5. A pair of spring contacts 16 and 17, insulated by strips 18 are secured to the portion 15 by means of screws 19 and are suitably insulated therefrom. The contact 16 has a curved end 20 which normally rests on a shoulder 21a on the rod 4. The rod 4 is also provided with notches or serrations 21. A thermostatic detent 22 is secured in any suitable manner to the supporting member 5 and the curved end 23 thereof is arranged to engage one or another of the notches 21 to hold the rod 4 in actuated position. The thermostatic detent 22 is constructed of metals of different co-efficients of expansion so that when electrical current passes through the electrical heating coil 24 the detent 22 becomes heated and bends sufficiently to remove the curved end 23 from the notched portion of rod 4 for purposes hereinafter explained. One end of the electrical conductor comprising coil 24 is joined to a terminal member 25 which is connected to a suitable source of current such as a battery B and the other end is connected to terminal 30 for inclusion in an electrical circuit hereinafter described. A cover cap 26 fits over the apparatus to prevent foreign material from affecting the switch. Button 27 is secured to the end of the shaft 4 which protrudes through the instrument board 3.

The operation of the device is as follows:

In starting the engine the operator grasps the button 27 and pulls it away from the instrument board 3 (to the right as seen in Fig. 1) to its full extent. The curved end 23 of the detent 22 rides over the serrations 21 during this movement and comes to rest in one of the notches. The end 20 of contact spring 16 moves from the raised portion 21a to the reduced portion 8 and thereby is lowered sufficiently to engage the

spring contact 17 and close an electrical circuit which may be traced from a grounded battery B to the terminal 25, conductor 31, heat coil 24, conductor 29, terminal 30, contact springs 17 and 16 and then to ground and back to battery. After a short interval the button 27 is pushed in a bit from the full choked position to the half choked position where it should be left for possibly a half minute or a minute depending upon the operation of the engine. When the engine becomes sufficiently heated to operate properly the button should be returned to its normal postiion. The spring 13 is compressed when the rod 4 is drawn out and tends to return the shaft to its normal position. The detent 22 is sufficiently flexible to permit the manual movement of rod 4 but is strong engough to prevent its movement under the influence of spring 13 until the bimetallic thermostatic detent 22 has become heated by current flowing through coil 24.

If the operator fails to restore the rod 4 to its normal position within a reasonable time the rod 4 will be automatically restored in the following way. The electrical current passing through the heat coil 24 causes the detent 22 to warp sufficiently to withdraw the end 23 from the notch 21 within which it is resting. The compressed spring 13 then returns the rod 4 and its associated choke valve apparatus to normal position. As the rod 4 is restored the raised portion 21a again engages the raised portion 20 of contact 16 and separates it from contact 17 thereby breaking the electrical circuit for the heating coil 24 and placing the apparatus in its normal position.

The modification of my invention shown in Fig. 2 is similar in construction to the one in Fig. 1 with the exception that an electromagnetic device is provided to withdraw the holding pawl, the circuit of the electromagnet being controlled by a thermostatic switch arranged to be heated by the products of combustion in the engine. In this figure the thermostatic switch 40 is associated with the exhaust manifold 41 of the engine. The thermostatic switch 40 is constructed of metals having different co-efficients of expansion; the portion 40a lying adjacent the exhaust manifold becomes heated and affects the portion 40b which, after the continued application of heat, bends or warps and contacts the contact 51 and connects the same to ground.

It is to be understood that the thermostatic switch can as readily be associated with any other part of the engine which is subject to the proper temperature variations. The electromagnetic device R is secured to the mounting frame 5 in any suitable manner and has an armature 42 which controls a detent 43 having a curved end 44 adapted to enter the notches 21 formed in the rod 4. A spring 45 assures the proper positioning of the detent 43. Spring contacts 46 and 47 are secured to the mounting frame 5 by screws 50. Insulating means 49 are provided to insulate the contacts 46 and 47 from each other and from the mounting frame 5. The end 48 of contact 47 normally engages the raised portion 21a of the rod 4.

The operation is somewhat similar to that of the apparatus shown in Fig. 1. The end 44 of the detent 43 rides over the serrations when the rod 4 is manually moved but maintains the rod 4 in its adjusted position against the influence of the compressed spring 13. When the rod 4 is moved from its normal position to its off normal position the end 48 of contact 47 engages the reduced portion 8 and allows contacts 46 and 47 to engage each other to close one of the normally open portions of an electrical circuit for electromagnet R.

After the engine has run a predetermined period the thermostatic switch 40 will become heated due to its association with the exhaust manifold of the engine and the portion 40b will move into engagement with contact 51. An energizing circuit for the electromagnet R will now be closed which can be traced from battery B, contacts 47 and 46, conductor 53, coil of the electromagnet R, conductor 52, contact 51, thermostatic switch 40 to ground and back to the battery. The electromagnet R operates and attracts its armature 42 which withdraws the detent end 44 from the notch 21 in which it has been resting. The spring 13 then causes the rod 4 to be moved to its normal position where shoulder 21a engages the end 48 and separates the contacts 46 and 47 thereby interrupting the energizing circuit of electromagnet R which restores its armature 42 to normal position under the influence of spring 45.

In the operation of an automobile especially in cold weather the choke valve is almost always maintained in partially operated position for a short period of time after the engine has been started. It often occurs that the operator forgets about the choke valve and drives the car for a considerable distance without restoring it to normal. It will be noted that the means herein disclosed acts automatically to restore the choke valve to its normal inoperative position after the engine has been in operation for a substantially predetermined period of time.

This period of time may be substantially definitely determined in the form shown in Fig. 1 of the drawing by the tension placed on the holding member 22. In the modification shown in Fig. 2 the period during which the choke valve will be maintained in its operated position may be determined by the adjustment of the contact 51.

While I have described my invention in certain particular embodiments, I desire that it be understood that modifications and alterations may be made and that I intend no limitations upon my invention other than those imposed by the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. In a choke valve operating means control apparatus a rod for operating the choke valve operating means, said rod having a notched portion, a normal position and an off-normal position for said rod, a thermostatic detent comprising a bimetallic member having a portion cooperating with said notched portion to maintain said rod in said off-normal position, heating means for said detent for removing said cooperating portion of said bimetallic member from the notched portion of said rod and means for returning said rod to its normal position.

2. An automatic control device comprising a rod having a normal and an off-normal position, an electromagnet, a detent associated with said electromagnet for maintaining said rod in its off-normal position, a heated element, and a thermostatic switch comprising a bimetallic member associated with said heated element adapted to complete an electrical circuit for said electromagnet to render said detent ineffective.

3. A device of the character described including a rod having a normal position and an off-

normal position, a shoulder on said rod and notches on said rod, a detent adapted to enter said notches for maintaining said rod in its off-normal position, a bimetallic thermostatic member controlled by the temperature of associated apparatus, an electrical circuit under the influence of said bimetallic member and said rod, means including an electromagnet in said circuit for rendering said detent inoperative, a pair of contacts in said electrical circuit under the control of said shoulder on said rod for completing said electrical circuit when said rod is moved off-normal and breaking said circuit when said rod is moved to its normal position.

4. A device of the character described including a rod having a normal position and an off-normal position, a detent for maintaining said rod in its off-normal position, an electromagnet controlling said detent, an electrical circuit including said electromagnet therein, a pair of contacts in said electrical circuit for making and breaking said electrical circuit under the influence of said rod, means comprising a bimetallic thermostatic switch actuated by the temperature of associated apparatus to complete said electrical circuit and thereby operate said electromagnet thereby rendering said detent ineffective, and means for returning said rod to its normal position.

GEORGE A. YANOCHOWSKI.