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CHOKE CONTROL

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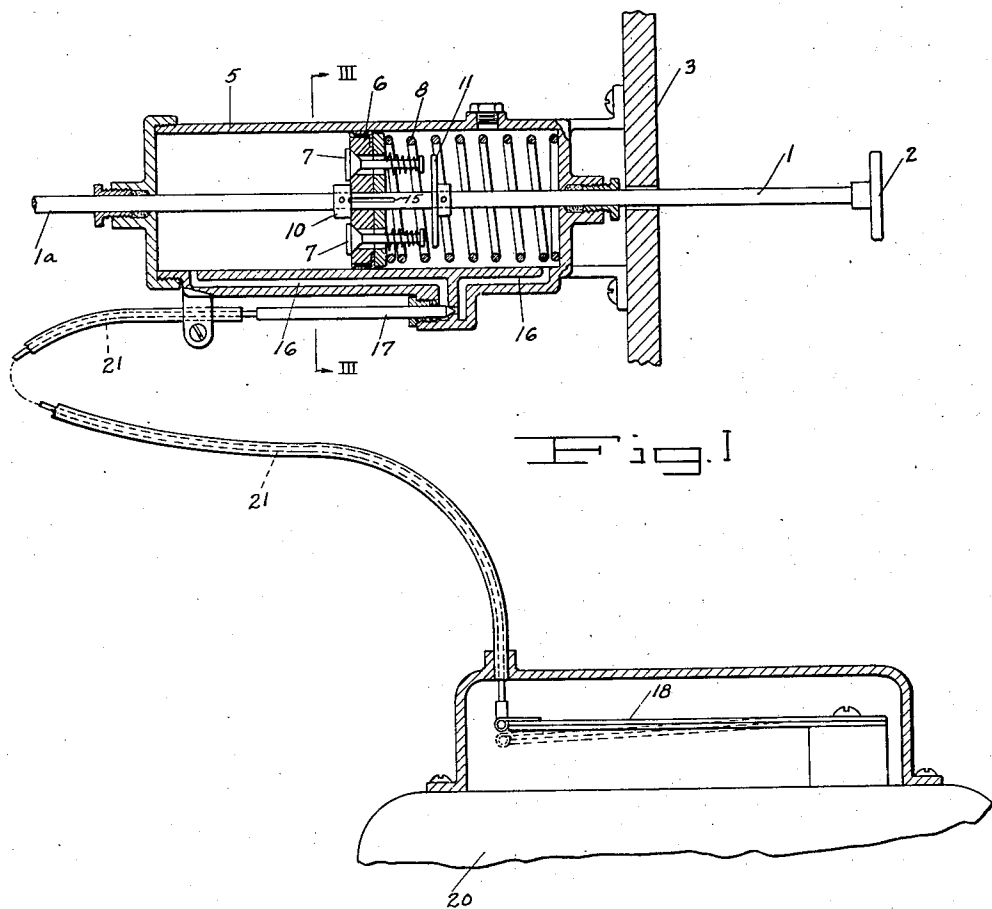
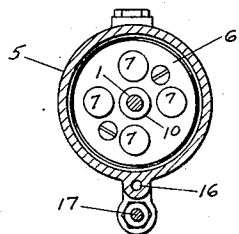


Fig. II



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CHOKE CONTROL

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10 Claims. (Cl. 123—119)

This invention relates to an automatic choke control for automotive motors.

Manual choke controls are well known as are their limitations. If forgotten for a few moments after their purpose is served, they waste fuel and flood the motor.

Thermostatic choke controls have for the most part superseded manual ones, but in turn have disadvantages, particularly in cold weather. They must be set to go clear to the "off" position at about 100 degrees motor temperature or they are wasteful. If the motor is stopped as for a traffic light at about this time, the motor is very difficult to start. They have other disadvantages that are well known.

It is an object of the present invention to combine the virtues of the hand operated choke with the thermostatic choke and eliminate the disadvantages of both kinds.

It is another object of the present invention to so arrange a choke control that it cannot flood the engine or waste fuel for more than a very short time before automatically going off.

It is a further object to arrange the control so that it can be put partly on or full on, according to the driver's judgment and then easily moved either way, instantly, if the judgment appears by results to need correction.

It is a further object to so arrange a self-opening choke that the rate of its opening will vary according to heat of the motor, of which it is an auxiliary, holding the choke and gradually letting it off as the motor warms, when starting from cold, and contrariwise permitting closure to "off" position almost instantly if wrongly pulled on when the motor is at operating temperature.

I attain the stated objects by structure illustrated as a preferred embodiment of the invention in the accompanying drawing, in which:

Fig. I is a sectional elevation of my choke control attached to the instrument board of an automobile;

Fig. II is a diagrammatic view of a part of the motor of an automobile, so placed with respect to the device of Fig. I that it serves to explain the relationship between the motor and the choke control; and

Fig. III is a section on the lines III—III, Fig. I.

In the drawing, 1 is a choke control rod of the type familiar to automobile drivers for many years. 2 is the handle by which it is pulled out from an instrument board 3 to choke the carburetor of the motor, not shown. It is intended to employ this choke control with the well known butterfly choke damper, concerning which no

instruction is necessary. A suitable connection from that part of the rod 1, marked 1a, will work the choke.

On the opposite or back side of the instrument board I mount a hydraulic check cylinder 5 that contains a piston 6 which is movable therein. The piston 6 is equipped with one-way valves 7 and the cylinder 5 will be nearly full of hydraulic fluid. A spring 8 constantly urges the piston 6 against fluid trapped by the one-way valves, at the same time urging the rod 1 to open the choke.

The piston 6 is slidably mounted for relative movement on the rod 1 within limits fixed by the collar 10 and the flanged plate 11.

The mode of operation of this structure is obvious. When the rod 1 is pulled out as shown in Fig. I, where it is pulled part way, the choke will be "on" proportionately to the amount of the pull and will be hydraulically locked in the position in which it is left, saving for a very small by-pass indicated by the groove in that part of the rod 1 where it passes through the piston 6, indicated by the numeral 15; hence, assuming that the rod has just been pulled to the position shown, the motor will be partly choked which amount of choke will slowly become less under the influence of pressure on the piston 6 by the spring 8, which tends to make the groove 15 operative to relieve the trapped fluid behind the valves 7.

There is another very important feature about this device. Should the rod be inadvertently pulled too far, which would flood the motor, it may be instantly pushed back by pressure on the handle 2, relatively displacing the rod 1 with respect to the piston 6, which brings the flanged plate 11 into engagement with the valves 7 and by-passes the piston 6 completely. It is at once seen that the choke rod 1 can be moved freely in either direction so that the motor will just start at the present temperature conditions, left there and that as time passes it will automatically come to full "off" position.

It will be important, however, in the interests of fuel economy to so supplement the by-pass when the motor warms up that the by-passing is hastened; hence the cylinder 5 is equipped with the by-pass tube 16, which is controlled by the valve 17 in turn controlled by the thermostat so positioned that it will be sensitive to heat developed in the motor, diagrammatically indicated by the numeral 20, the transmission between the thermostat 18 and the valve 17 being illustrated by the well known sheathed wire 21.

The valve 17 will be so proportioned as to make the return of the rod 1 to neutral or "off" position almost instantaneous, when the motor is hot.

The representations as to design are conventional and illustrate mechanical and hydraulic principles rather than the structure as it will be actually constructed and used. For example, there are three stuffing boxes when in practice only one will be absolutely necessary, but the designing engineer will understand all of this without further instruction.

It will be immediately perceived that the old manual choke has been rearranged with other elements that do not in any way prevent hand manipulation as before, but when left and the user's attention distracted by driving, it gradually works to "off" position automatically in any event and much faster if the engine is well warmed up. The driver will not in any case be handicapped in applying any degree of choke he wishes in starting the engine after a stop and by this means I have eliminated the greatest fault of the thermostatic choke, which was that if set so that it would be economical after warming up the engine, it tended to go off at so low a temperature that difficulty was experienced if the motor was stopped just at the time the thermostat turned the choke off.

The novel features of this structure that I consider to be new and of my own invention are pointed out in the following claims.

I claim:

1. In a choke control device for an internal combustion motor, a manually operative choke closing device that is equipped with a spring to restore it to open position when released, a hydraulic check that is operatively set to oppose the spring and means controlled by the temperature of the motor that are effective to modify the action of the hydraulic check according to motor temperature.

2. A manually operable choke control device for a motor that is equipped with a spring positioned to restore a choke to open position upon release by the user's hand, a hydraulic check connected thereto that is effective to slow the action of the spring, valve means for varying the action of the hydraulic check and thermostatic means positioned to be sensitive to motor temperature that are effective to control the said valve.

3. In a choke control, a choke operating rod, a spring positioned to urge the rod to open the choke and a hydraulic check arranged to slow the action of the spring, characterized by means operable by manually pushing the rod towards closed position that are effective to by-pass the hydraulic check.

4. In a motor choke control of the character described, a manually operable choke control rod, a spring positioned to urge the rod to open the choke, a hydraulic check that opposes the action of the spring, a by-pass that permits slow

yielding of the hydraulic check and thermostatically controlled means to accelerate the yielding of the hydraulic check that are responsive to temperature conditions of the motor.

5. In a motor choke control, manually operative means for initiating choke conditions, spring means tending to return the choke to inoperative position when manually released, a hydraulic check arranged to slow the action of the spring, a fixed by-pass for the hydraulic check and a supplementary by-pass having a valve and a motor heat sensitive thermostat connected thereto.

6. A manually operable spring closable choke control, defined in part as a choke control rod, a spring that urges the rod to open choke position, a hydraulic check that opposes the spring, a by-pass that is effective to cause the check to yield slowly, a thermostat and a thermostatically controlled by-pass device that is responsive to the temperature of the motor of which the choke control is an auxiliary to further modify the movement of the check according to motor temperature.

7. In a choke control apparatus, a choke control rod that is manually movable to apply or release choke, a spring tending to normally return the choke control rod to release position, a hydraulic check connected to the control rod in such manner that it normally resists the spring to effect slow closing, thermostatic means for increasing the closing rate and means for by-passing the hydraulic check by manually moving the control rod toward release position.

8. In choke control apparatus for a motor engine, a choke applying means, a spring means positioned to restore the choke to normal position, a hydraulic check device that is effective to modify the action of the spring and a thermostatic device which is sensitive to engine temperature that is operatively connected to the hydraulic check to further modify the action of the spring.

9. In a hydraulic check for a choke control, a cylinder, a piston movable in said cylinder, to draw fluid therein, a rod that is manually movable to move the piston one way, valve means in said piston that tend to open to fill the cylinder with hydraulic fluid, by-pass means and spring means that tend to empty the cylinder slowly and means operable by the rod to hold the valve means open when manual force is applied to the rod, tending to expel hydraulic fluid therefrom.

10. In a choke control, a choke operating rod, spring means that are normally effective to restore the rod and choke to inoperative position, a hydraulic check that is arranged to slow the action of the spring, a by-pass for the hydraulic check, a valve in the by-pass that is movable to vary the flow capacity of the by-pass and a motor heat sensitive thermostat operatively connected to said valve.

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