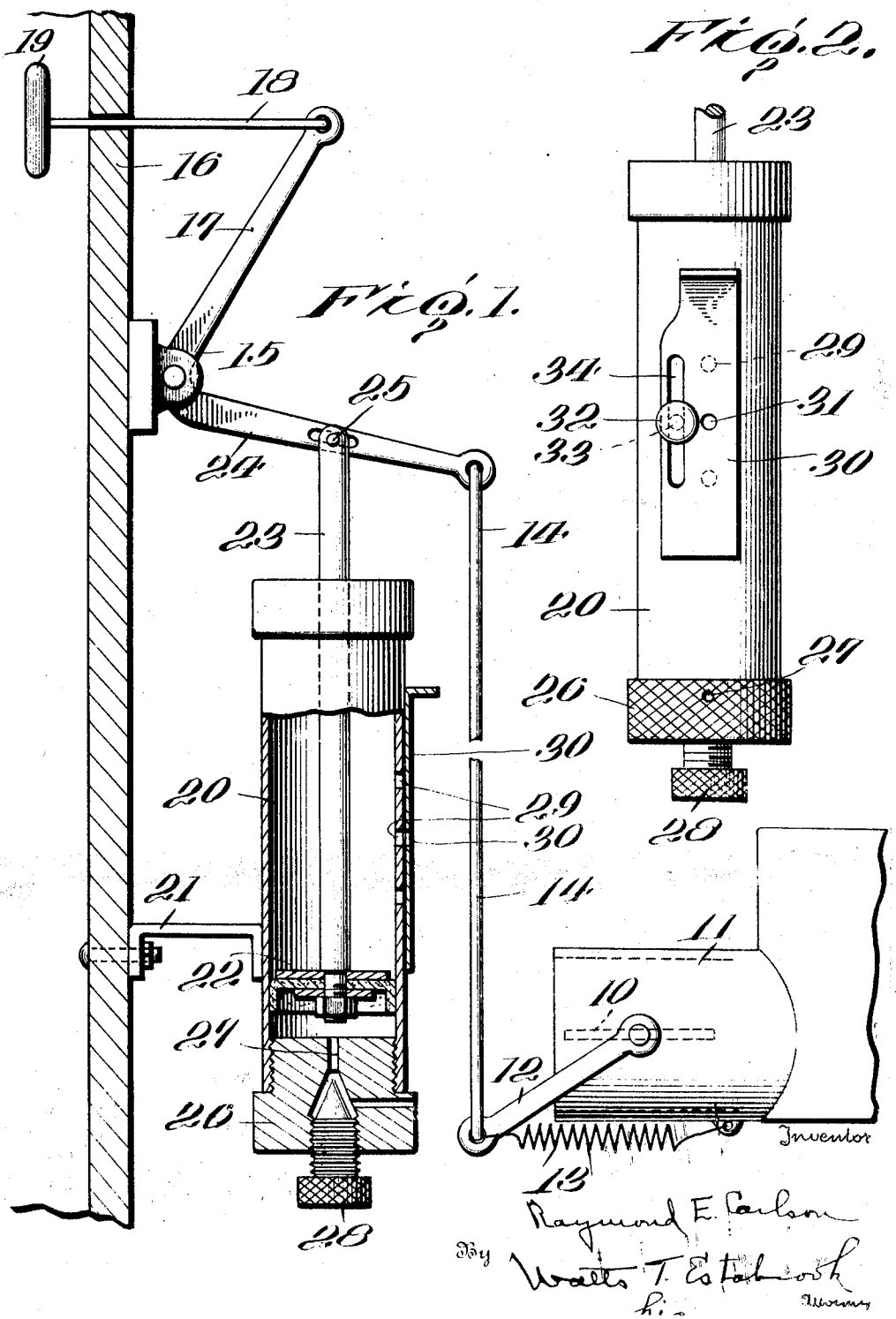
Oct. 27, 1925. 1,558,590

R. E. CARLSON

CONTROL FOR CARBURETORS

Filed Sept. 27, 1924



Patented Oct. 27, 1925. 1,558,590

UNITED STATES PATENT OFFICE.

RAYMOND E. CARLSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

CONTROL FOR CARBURETORS.

Application filed September 27, 1924. Serial No. 740,368.

To all whom it may concern:

Be it known that I, RAYMOND E. CARLSON, a citizen of the United States, and resident of Washington, District of Columbia, have invented new and useful Improvements in Controls for Carburetors, of which the following is a specification.

This invention relates to an improvement in controls for carburetors, and particularly to governing the rate of change of air fuel ratio in the starting of an internal combustion engine.

It is difficult to start internal combustion engines in cold weather on the mixture which carburetors are manually adjusted to supply, because of the difficulty of vaporizing gasoline at low temperatures. To assist in the starting of the engine, various manually operated means are provided for shutting off or choking the air supply to the carburetor; controlling the auxiliary air valve, and moving the carburetor metering valve.

Operators of automobiles are inclined to overlook these manually operated devices and allow the engines to operate under a very rich mixture with the result that the engines are damaged and further the engine does not operate as efficiently on a rich mixture as on a lean mixture or a mixture properly proportioned for effective performance of the engine under varying conditions of weather and power plant characteristics.

An object of this invention is in the provision of means for manually adjusting the carburetor to supply a rich mixture during the starting of the motor, and to automatically cause the means to gradually return the carburetor to a normal condition of the operation after the engine had become sufficiently warm to operate under the conditions of the normal mixture to which the carburetor is adjusted to supply, and the possibility of damage to the engine and the ineffective operation thereof is eliminated.

The invention consists of certain novel features of construction and combination of parts which will be hereinafter described and pointed out in the claims.

In the accompanying drawing:

Figure 1, is a view in vertical section and partly in elevation, showing the invention applied to the mechanism of a choke valve of a carburetor, and:

Figure 2 is a view in elevation of the cylinder.

In the drawing, the application of the invention has been shown applied to the choke valve 10, of a carburetor 11, however it is perfectly feasible to apply the device to auxiliary air intake valve and the metering valve of the carburetor, however it has not been deemed necessary to illustrate these various applications of the device, as the principle of operation is the same.

The choke valve 10 is joined in the air inlet of the carburetor and has an arm 12, connected thereto, to which a spring 13, is attached, one end of the spring being connected to the carburetor, for normally holding the valve open. The arm 12, is connected by a link 14, to a bell crank 15. The bell-crank 15, is mounted on the front of the dash or instrument board 16, of an automobile, and the upper arm 17 of the bell crank has a rod 18, pivotally connected thereto. The rod 18, extends through the dash-board 16, and has a knob 19, thereon to be grasped by the operator for opening and closing the choke valve 10.

Mounted on the dash-board 16 beneath the bell-crank 15, is an air-cylinder 20, by means of a bracket 21. A piston 22 is mounted to slide in the cylinder 20, and is provided with a rod 23, which extends through the upper end of the cylinder 20 and connected to the lower arm 24 of the bell-crank 15 by a pin 25 which extends through a slot 26 in the arm 24.

The cylinder 20, has a plug 26 fitted in the lower end thereof, and the plug is provided with an air duct 27 leading therethrough to the interior of the cylinder. A needle valve 28 has screw-threaded engagement with the plug and enters the conduit for the purpose of regulating the leakage of air from the cylinder 20.

The wall of the cylinder is provided with a series of perforations or openings 29, 29, three being shown, therein, and a side valve 30 is mounted on the cylinder and provided with an opening 31, adapted to be brought into registry with one of the series of openings 29, for governing the position of the choke valve 10. The valve 30 is held in its adjusted position and in registry with the respective opening 29, by means of a nut 32 mounted on a screw thread stud 33 which is mounted on the cylinder 20 and extends through a slot 34 in the valve 30.

The valve 30 is set so as to cause the opening 31 therein to register with one of the

openings 29, of the cylinder 20, and as shown in the drawing, is in registry with the immediate opening, and when so adjusted the choke valve 10 will not be entirely closed. That is, should the operator pull the rod 18, inwardly by grasping the knob 19, and draw the valve 10 to closed position, the spring 13, would pull the piston downward in the cylinder 20, until the piston passes the opening 29, in the cylinder 20. The position which would be assumed by the choke-valve 10, that is partially closed, would remain in this position after the operator had released the knob 19. However the piston 22 will now gradually fall or drop in the cylinder 20, causing the choke-valve to return to the open position as the air escapes or bleeds through the duct 27, according to the adjustment of the needle valve 28, and forcing the air out of the cylinder 20, which was drawn in when the piston 22 was pulled upwardly in the cylinder on the operation of the rod 18.

The downward movement of the piston 22 as the air beneath it gradually escapes through the duct 27, causes the piston-rod 23 of the piston to actuate the bell-crank 15, lowering the arm 24, and thereby operating the link 14 which will cause the choke valve to swing to an open position.

The foregoing description of the operation is the same for the various adjustments of the valve 30 with respect to the series of openings 29 of the cylinder 20. The uppermost opening 29 is employed and the opening 31 of the valve 30 brought into registry therewith in cold weather when it is desired to more fully close the choke valve 10, and provide a richer mixture delivered to the engine.

It will therefore be appreciated that with this device the amount of air to be admitted to the fuel delivered to the engine in starting can be regulated by the valve 30. That the choke valve 10, will be gradually brought to a full open position automatically due to the gradual fall of the piston 22 in the cylinder 20, and which may be regulated by the needle valve 28.

There is no danger of the choke valve being left fully or partially closed by the operator, because immediately upon releasing the knob 19 by the operator the cylinder 20 and piston 22, in connection with the spring 13, begin to function to produce a gradual opening of the choke valve, and this degree of opening of the choke valve is governed by the needle 28, and the extent of closing of the choke valve is governed by the valve 30.

Having described my invention what I claim, is:—

1. The combination with a carburetor, of a valve, means for operating the valve for causing the delivery from the carburetor of a richer mixture of fuel than employed in the normal operation of an engine, and means for gradually causing said valve to function to produce a normal mixture to be delivered from the carburetor.

2. The combination with a carburetor, of manually operated means for causing the delivery from the carburetor of a richer mixture of fuel than employed in the normal operation of an engine, and means for gradually causing said manual means to function to produce delivery of a normal fuel mixture.

3. The combination with a carburetor having a choke valve, of manual means for operating the valve to restrict the supply of air to the carburetor, and automatic means associated with said manual means for gradually returning the choke valve to open position.

4. The combination with a carburetor, of manually operable means for restricting the supply of air to the carburetor, and automatic means associated therewith for gradually increasing the admission of air to the carburetor.

5. The combination with a carburetor, of manual operable means for restricting the supply of air to the carburetor consisting of a valve, a bell-crank associated therewith, and means for operating the bell-crank, and an air cylinder having a piston therein, said piston being connected to the bell-crank, said cylinder and piston automatically causing said manually operated means to operate to gradually increase the admission of air to the carburetor.

RAYMOND E. CARLSON.