Jan. 10, 1950 H. A. CARLSON 2,493,804

CARBURETOR ACCELERATING PUMP

Filed Aug. 17, 1945

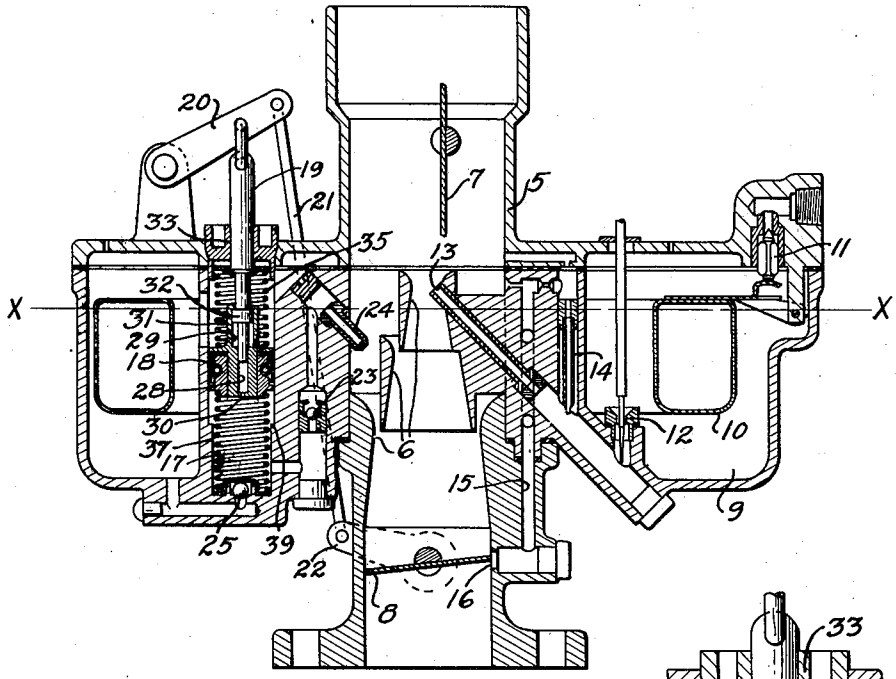



FIG. 1.

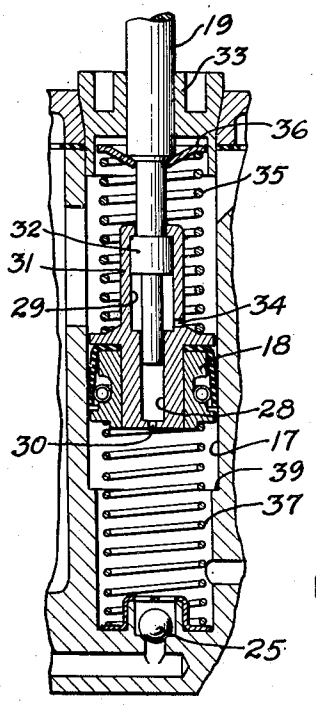



FIG. 2.

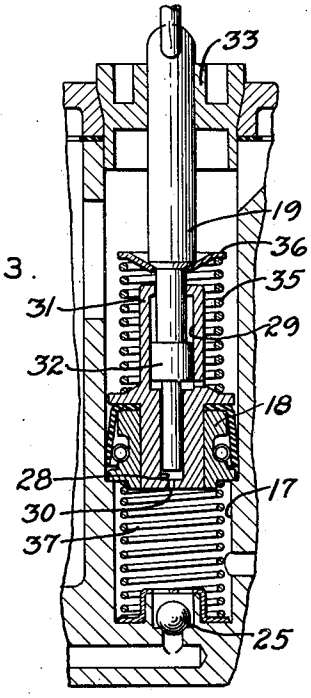



FIG. 3.

*INVENTOR.*
HAROLD A. CARLSON
*BY*
George R. Ericson

Patented Jan. 10, 1950 2,493,804

# UNITED STATES PATENT OFFICE

2,493,804

## CARBURETOR ACCELERATING PUMP

Harold A. Carlson, University City, Mo., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application August 17, 1945, Serial No. 611,052

2 Claims. (Cl. 261—34)

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This invention relates to carburetors for internal combustion engines and consists particularly in a novel accelerating pump device therefor.

When a carburetor having an accelerating pump has been heated to a high degree, the increased vapor pressure of the fuel trapped in the pump pressure chamber may cause some fuel to dribble out through the pump nozzle. Also, some of this fuel may be turned to gas so that no fuel will be discharged during the initial part of the next accelerating stroke. The idea of providing an orifice in the pump piston to vent such gases has been suggested, but in this case, some fuel escapes through the vent during acceleration and the charge injected into the carburetor is, accordingly, weakened. Placing of a valve in the orifice is not a desirable solution because of the increased intricacy and expanse produced thereby. An effective valve of this type must be carefully made and is subject to wear which causes leaks.

An object of the present invention is to provide a carburetor accelerating pump having a constantly open vent with means for preventing or greatly reducing the escape of liquid through the vent during the pumping stroke.

A more detailed object is to provide means for setting up counter pressure in the vent during the pumping stroke to resist the escape of liquid therethrough.

These objects and other more detailed objects hereafter appearing are obtained substantially by the device illustrated in the accompanying drawing in which

Fig. 1 is a vertical section illustrating a carburetor embodying the invention.

Fig. 2 is an enlarged section of the accelerating pump detail.

Fig. 3 is a view similar to Fig. 2, but showing the pump in a different position.

The carburetor in Fig. 1 includes a downdraft mixture conduit 5 having a series of venturis 6. The entry of air into the upper end of the conduit is controlled by a choke valve 7 and a discharge of mixture is controlled by a throttle valve 8 at the lower end. A constant level chamber 9 is formed adjacent the mixture conduit and encloses a float 10 operating a needle valve 11 for maintaining the supply of liquid fuel at the constant level $x$—$x$. The fuel is supplied to the mixture conduit through a main metering orifice element 12 and main nozzle 13 discharging into the smallest venturi 6. Idling fuel is supplied through idling metering restriction 14, passage 15, and port 16 located adjacent the edge of the throttle when closed.

Also located in the constant level chamber is an accelerating pump cylinder 17 in which works the packed piston 18 having an operating rod 19 connected at its upper end to a pivoted lever 20.

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Lever 20 is connected by a link 21 to an arm 22 rigid with the throttle shaft. The arrangement is such that upon opening of the throttle, pump piston 18 is lowered in cylinder 17 to discharge a shot of fuel past outlet check valve 23 and through restricted pump nozzle 24. When the piston is again raised, a new charge is drawn into the cylinder past inlet check 25.

Piston 18 has a pair of aligned chambers 28 and 29, the former communicating with the pressure or pumping chamber in cylinder 17 below the piston by means of a restricted orifice 30. Upper chamber 29 is located in a tubular extension 31 on the piston which has an aperture in its upper wall closely receiving piston rod 19. Rod 19 has a plunger-forming lower portion extending into chamber 28 and 29, that part thereof in chamber 29 having an enlarged guiding collar 32. The portion of the rod extension within chamber 28 fits rather loosely therein. The upper portion of rod 19 fits closely within a guiding bushing 33 formed in the cover of constant level chamber 9. A port 34 in the wall of extension 31 completes the vent passage for the pump pressure chamber including orifices 30 and 34 and chambers 28 and 29. A coiled spring 35 is compressed between piston 18 and a collar 36 on the piston so as to constantly urge the piston downwardly relative to the rod. A second coiled spring 37, lighter than spring 35, is located under the piston. A shoulder 39 in the inner wall of cylinder 17 limits the pumping stroke of the piston. When the pump is inactive, fuel stands in the chambers 28 and 29 up to the constant level. In case the pressure in the cylinder below the piston increases because of excessive temperature, or in case of a formation of gas in the pressure chamber, some liquid or gas or both can escape past the portion of the piston rod extension which loosely fits in lower chamber 28, and thence to atmosphere through port 34 in the wall of piston extension 31. During the discharge movement of the piston, spring 35 collapses slightly causing the plunger forming extension of the piston rod to move downwardly in chambers 28 and 29, thus setting up a counter pressure therein because of restriction 30 so as to resist or prevent the escape of liquid through the vent at this time. Consequently, a strong initial pump discharge is insured. When the pump is inactive, a constantly open relief vent is provided from the pumping chamber through which fuel or gas may escape in case of high pressure within the pump.

The exact arrangement of the relief vent and plunger and other elements are not essential and these may be modified as will occur to those skilled in the art. The exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In a carburetor, a mixture conduit, a constant level bowl, and an accelerating pump comprising a pressure chamber, a movable upper wall therefor, means for yieldingly actuating said wall, and a restricted discharge outlet from said chamber to said mixture conduit, said movable wall having a constantly open, restricted bubble venting passage leading from said chamber and said actuator member having a plunger loosely received in said passage to permit the escape of vented gases therepast, said plunger being movable in said passage during pressure producing movement of said actuator to produce counter pressure in said passage and prevent the escape of fluid from said pressure chamber therethrough during the initial pumping stroke.

2. A carburetor accelerating pump comprising a cylinder having a piston working therein and forming a pressure chamber, a passage extending axially through said piston and forming a gas vent for said chamber, said passage having axially spaced, restricted gas inlet and outlet orifices, and



an actuating stem for said piston including an end part slidably received in said passage with an intermediate, guide portion closely fitting the same and an extreme plunger portion loosely fitting the same and disposed to provide a constantly open space for the escape of gas bubbles through said passage when said piston is stationary while producing a counter pressure in said passage and said inlet orifice, upon actuation of said piston by said stem in the discharge direction to minimize loss of fluid from said chamber.

HAROLD A. CARLSON.


## REFERENCES CITED

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

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,917,562 | Von Becker | July 11, 1933 |
| 2,212,946 | Mock | Aug. 27, 1940 |
| 2,299,863 | Trisler | Oct. 27, 1942 |