March 2, 1943. V. R. HEFTLER 2,312,817

CYLINDER LINER

Original Filed July 30, 1940 3 Sheets-Sheet 1

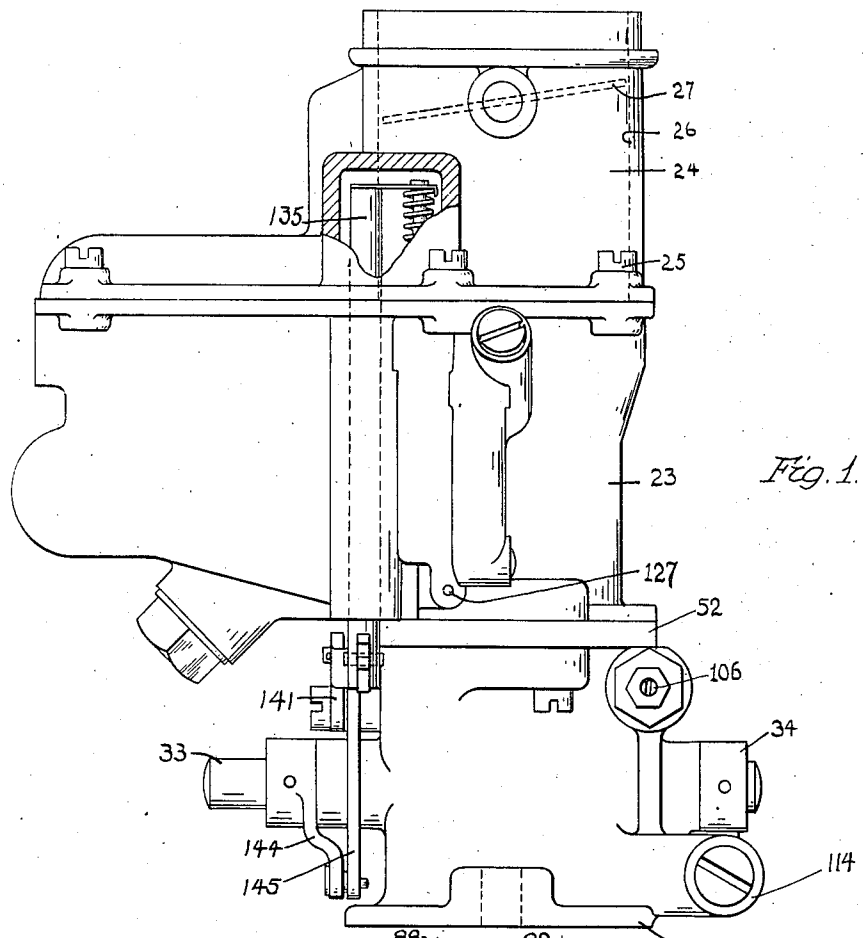


Fig. 1.

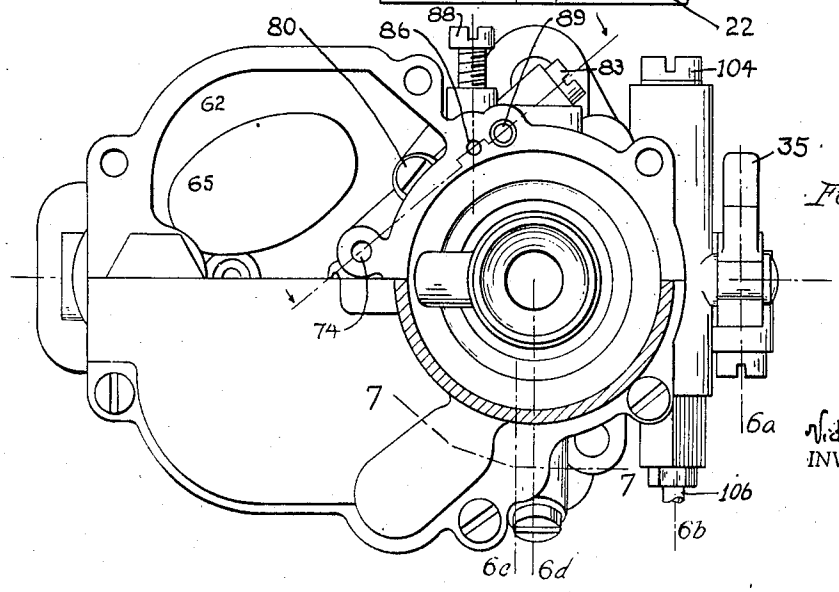


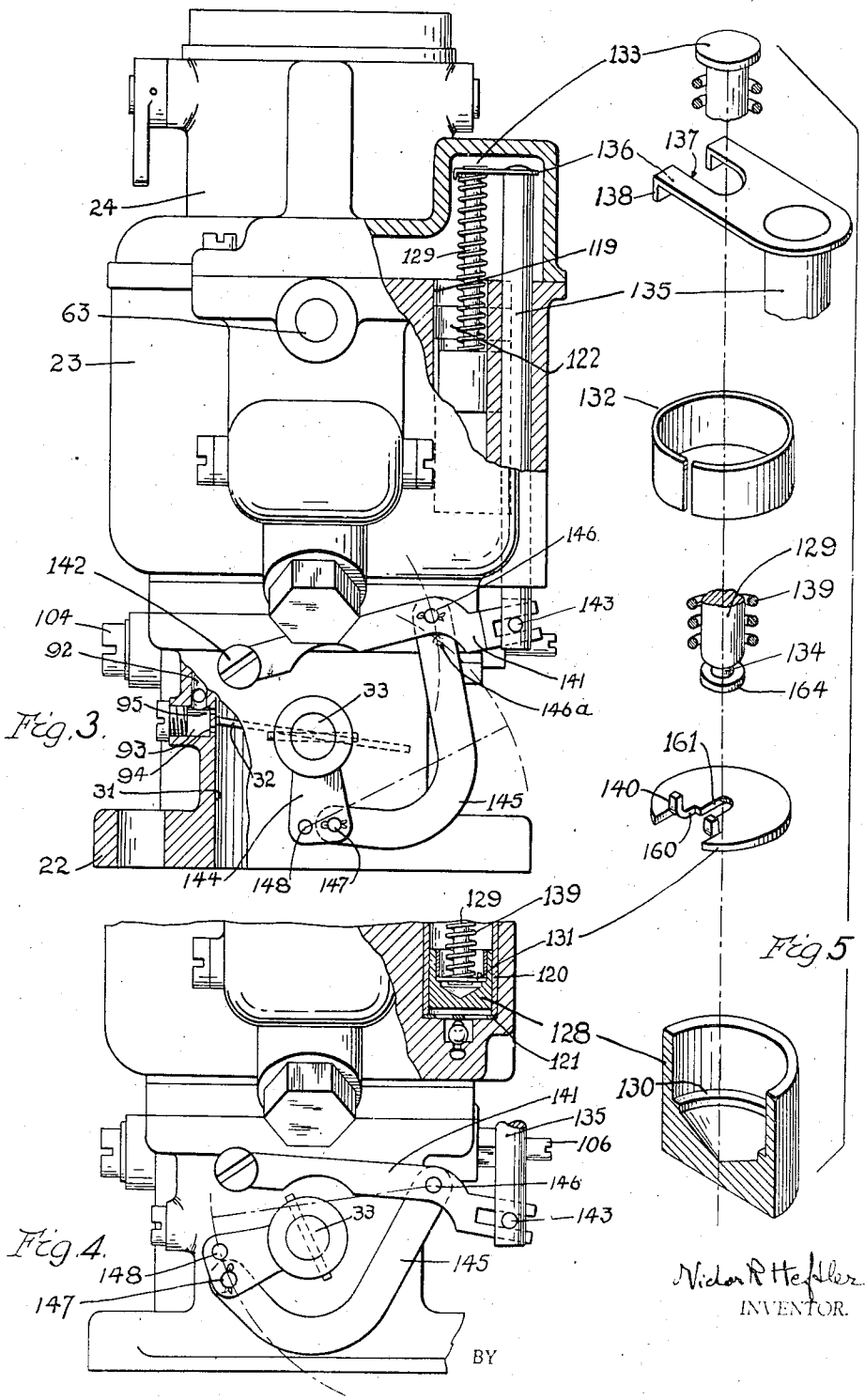
Fig. 2.

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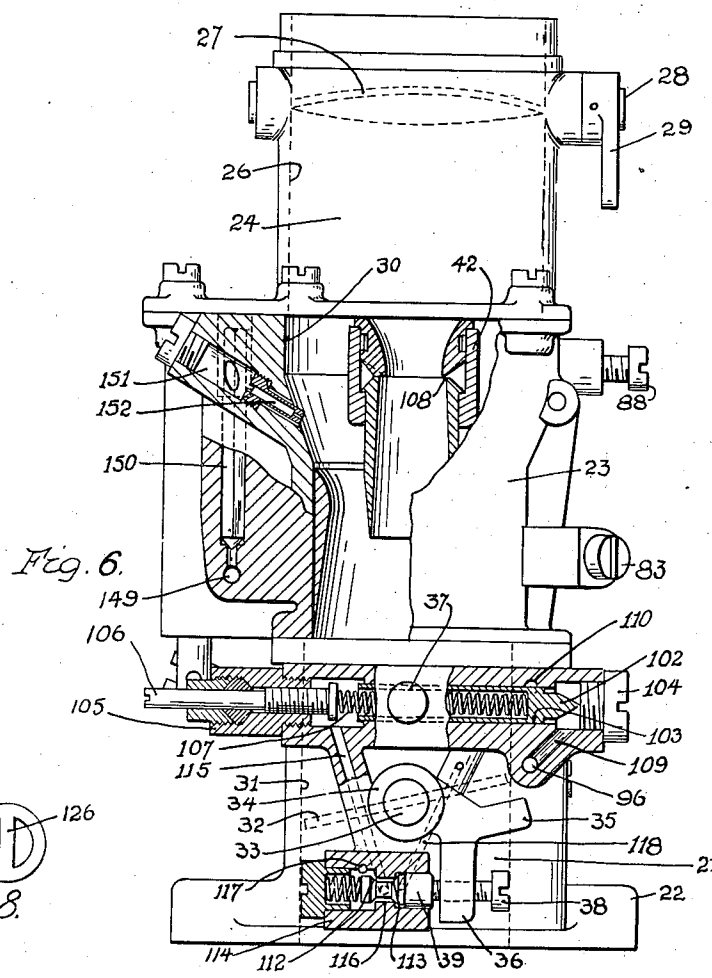


Fig. 6.

Fig. 8.

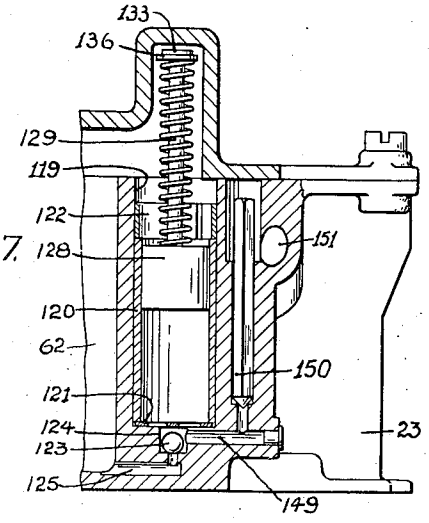


Fig. 7.

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UNITED STATES PATENT OFFICE

2,312,817

CYLINDER LINER

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Original application July 30, 1940, Serial No. 348,431. Divided and this application January 7, 1941, Serial No. 373,459

3 Claims. (Cl. 309—3)

This application is a division of my co-pending application No. 348,431, filed July 30, 1940.

It is an object of this invention to provide a simple and inexpensive construction for the accelerating pump usually provided in carburetors, and to provide a novel mechanism for actuating said pump in which the ratio of pump delivery to throttle movement is greatest at low throttle.

Other novel features which may be disclosed herein but not claimed are claimed in my co-pending applications No. 348,431 filed July 30, 1940, and No. 373,460 filed January 7, 1941.

Fig. 1 is a side elevation of a carburetor embodying my invention, viewed from the lower side of Fig. 2.

Fig. 2 is a plan view, with one-half of the cover removed.

Fig. 3 is a front elevation, viewed from the left side of Fig. 2, with some portions cut away to show the throttle in idling position and the piston of the accelerating pump in its upper position.

Fig. 4 is a fragmentary elevation, from the same point of view, with the pump parts in the lower position.

Fig. 5 is a so-called exploded view, in perspective and on an enlarged scale, of parts of the accelerating pump.

Fig. 6 is an elevation, viewed from the right side of Fig. 2, with some portions in cross section along parallel lines 6*a*, 6*b*, 6*c* and 6*d* of Fig. 2.

Fig. 7 is a partial cross section along the polygonal line 7—7 of Fig. 2.

Fig. 8 is a plan view of the combined washer and valve retainer.

This invention is described as applied to a down-draft carburetor, comprising a downwardly discharging throttle housing member 21, provided with a flange 22 for attachment to an engine manifold (not shown) in the well known manner, over which is secured a mixing chamber body member 23, which, in turn, supports a cover member 24, these three main parts being suitably fastened to one another, by screws 25 for instance. A heat insulating gasket 52 is preferably inserted between the throttle housing member 21 and the mixing chamber body member 23.

The air supply enters through a conduit 26 in the cover member 24, being controlled by a choke valve 27 actuated in any one of the ways now current and well known in the art. Conduit 26 registers with conduit 30 (Fig. 6) in the mixing chamber body member 23, which leads to conduit 31 in the throttle housing member 21. A throttle valve 32, mounted on shaft 33, controls conduit 31 to restrict more or less the free passage of mixture through the carburetor. The means used to actuate the throttle are not shown, they may consist of a lever, not shown, pinned or otherwise fastened to shaft 33. To limit the movement of the throttle, there is fastened on shaft 33 a lever 34 provided with two lugs 35 and 36. Lug 35 co-operates with stop pin 37 to limit the opening movement, while a screw 38 threaded in lug 36 co-operates with the part 39 to limit adjustably the closing movement of the throttle.

Formed in the mixing chamber body member is a constant level fuel chamber 62, in which a level sensitive device controls a fuel inlet in the well known manner. In this illustration, there is used a pair of floats symmetrically located with reference to the median plane of the carburetor, one of which floats is shown at 65 on Fig. 2.

The main normal mixture supply of fuel is effected through a double venturi shown on Fig. 6, but need not be described here, nor is it pertinent to describe in detail the provision made for idling or the provision of a control whereby said idling is rendered inoperative during deceleration, part of which control is illustrated in the lower portion of Fig. 6.

To provide an additional supply of gasoline for acceleration, there is provided a pump, actuated by the throttle. Fig. 7 shows, in cross section, that the mixing chamber body member 23 is bored at 119 to receive a pump cylinder liner 120, a gasket 121 being placed between the end of said liner and the bottom of hole 119. To retain the liner 120 in position, there is used a split elastic ring 122, the free diameter of which is larger than the hole 119 so that it is necessary to elastically deform it to insert it into hole 119; the pressure of the ring against the walls of the hole results in a frictional resistance to longitudinal movement amply sufficient to hold the liner, which is a loose fit in hole 119, against the resistance of the compressed gasket 121 and against the friction of pump piston 128 when the latter is moved upwards. A ball 123 in recess 124 forms a valve which opens to allow fuel to flow through channel 125 from the fuel chamber 62 into the pump but prevents reverse flow. To prevent too great a movement of the ball valve, it is retained in recess 124 by the gasket 121 which is provided with a diametral web 126 attached to the periphery, as shown in Fig. 8, which is a plan view of said gasket. As Fig. 7 is a cross section on a polygonal line, it is not possible to show on this figure how channel 125 is drilled from the outside of the

casting, but reference 127 on Fig. 1, indicates both the start of said drilling and the plug used to close it.

A piston 128 is adapted to slide in the pump cylinder, being actuated by piston rod 129. Piston 128 is drilled and counterbored to form a seat 130, upon which diaphragm 131 is held by elastic split ring 132.

Adapted to reciprocate in a vertical hole in the mixing chamber body member and guided thereby is a pump rod 135 with a riveted bracket 136 provided with slot 137 and downwardly bent ears 138. The piston rod 129 is formed with a head 133 and a neck 134. Diaphragm 131 is a sheet metal stamping provided with a stepped aperture wide enough at 160 to admit the end 164 of the piston rod and narrower at 161, in the center of the diaphragm, so as to just admit the neck 134 of the piston rod. A spring 139 surrounds the piston rod and is compressed between diaphragm 131 and bracket 136; the top end of the spring is inserted between the ears 138 and the rod and holds the latter against lateral displacement; the lower end of the spring is likewise held by the upturned fingers 140 of the diaphragm. The method of assembling these parts is described in my co-pending application No. 454,166.

The pump piston is actuated by the throttle through a linkage made up of walking beam 141, fulcrumed at 142 on the throttle body member, and terminating in a slot to engage pin 143 in the lower slotted end of pump rod 135, of lever 144 fastened to throttle shaft 33 and of connecting link 145, articulated on the walking beam at 146 and on lever 144 at one of the two (or more) holes 147 and 148.

Upon opening the throttle, this linkage will move the pump piston downwards and the fuel in pump cylinder will be forced through channel 149 (Fig. 7) past outlet valve 150 into slanted hole 151 and through accelerating nozzle 152 (Fig. 6) into the main air conduit.

I claim:

1. A pump comprising a body in which is formed a bored hole, a liner slidably inserted in said hole, a resilient gasket in the bottom of said hole and separate friction means acting directly upon said hole to hold said liner in said hole and to compress said gasket.

2. A carburetor accelerating pump comprising a body having a bore, a liner therefor, a resilient gasket in the bottom of said bore and friction means acting directly upon said bore to hold said liner in said bore and to compress said gasket.

3. A pump comprising a body having a bored hole, a liner slidably inserted therein, separate friction means in immediate contact with the wall of said hole and elastically exerting a radial pressure thereon and an abutment between said liner and said friction means whereby said friction means hold the liner in place.

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