Nov. 11, 1947. H. A. CARLSON 2,430,492

ACCELERATING PUMP

Filed Oct. 29, 1945

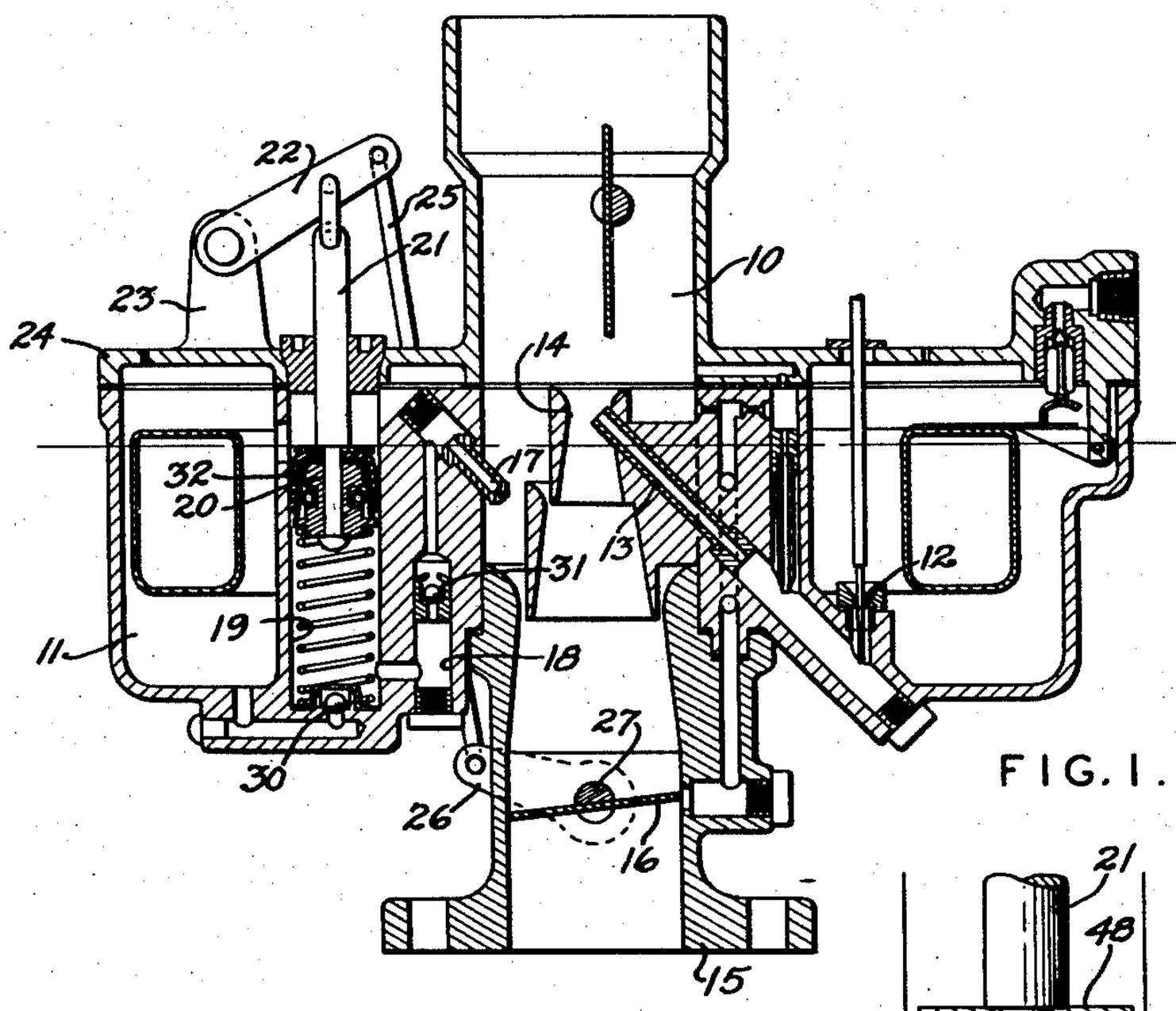

FIG. 1.

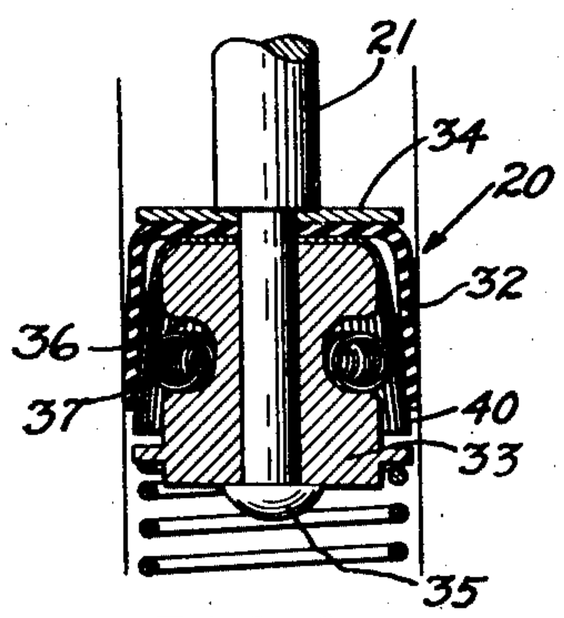

FIG. 2.

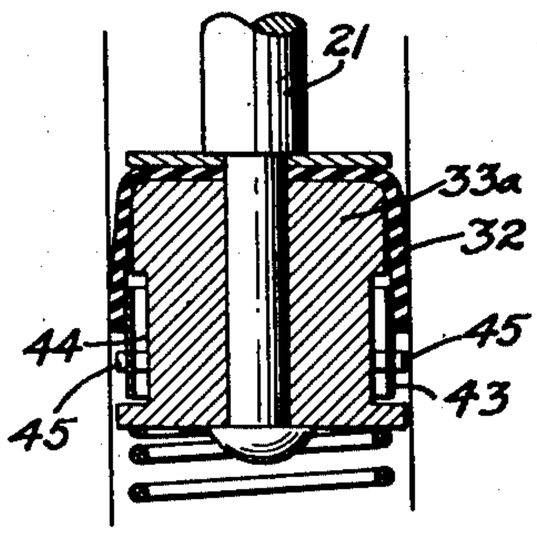

FIG. 4.

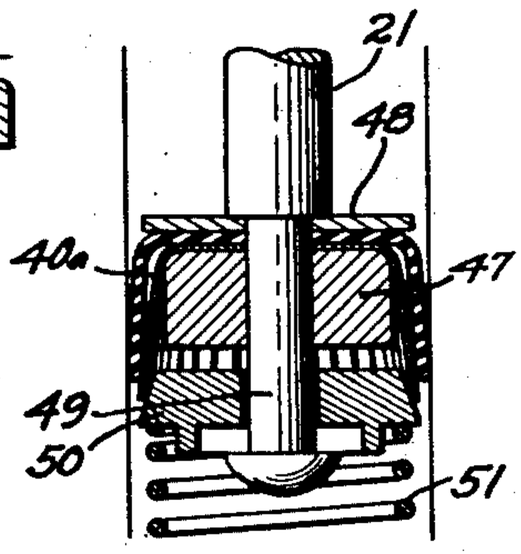

FIG. 6.

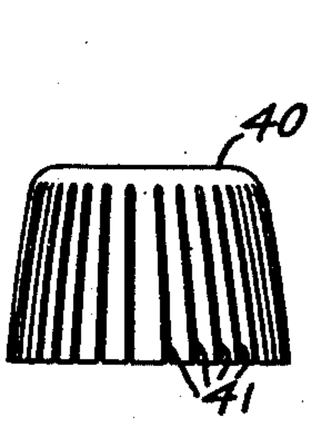

FIG. 3.

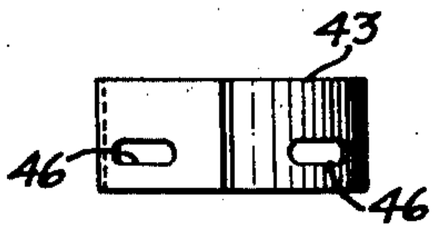

FIG. 5.

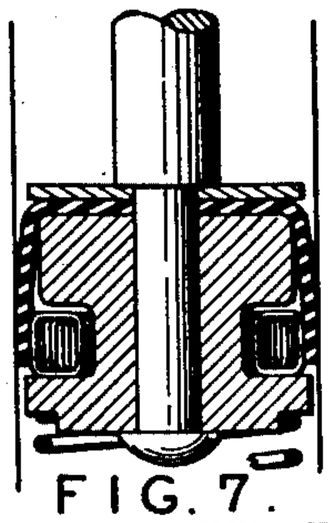

FIG. 7.

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ACCELERATING PUMP

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2 Claims. (Cl. 309—34)

1

This invention relates to pump pistons, particularly of the type having a flexible cup-shaped packing and consists in novel means for holding the packing firmly in engagement with the cylinder wall so as to prevent leaks.

A piston of the above type as used in a carburetor accelerating pump, for instance, has a cup-shaped packing leather which is urged outwardly into engagement with the cylinder wall by a coiled spring formed circularly. The spring engages the packing leather substantially along a line contact and, even though the spring is restrained relative to the piston body, the packing may be caused to flex longitudinally during pumping, in such a manner that the spring either slips entirely off the bottom of the packing or engages the packing substantially above the edge thereof. In either case, the relaxing of radial pressure on the edge of the leather permits the fluid being pumped or the air above the piston to leak past the edge of the packing.

It is an object of the present invention to provide distending means for a piston packing of the above type which is adapted to hold the edge of the packing firmly against the piston wall at all times.

This object and other more detailed objects hereafter appearing are attained by the device illustrated in the accompanying drawing in which

Fig. 1 is a vertical transverse section illustrating an automotive carburetor having an accelerating pump embodying the invention.

Fig. 2 is an enlarged section showing the pump piston.

Fig. 3 is an elevation showing a detail of Fig. 2.

Fig. 4 is an enlarged section of a piston showing a modified form of the invention.

Fig. 5 is an elevation showing a detail of Fig. 4.

Fig. 6 is a section of a piston embodying still another modification.

Fig. 7 shows a fourth form of the invention.

The carburetor shown includes a downdraft mixture barrel 10 having a constant level fuel chamber 11 formed thereon. The main fuel supply passes through a metering orifice element 12 in the bottom of chamber 11 and a main fuel nozzle 13 discharging into a Venturi tube 14 centrally carried in the mixture conduit. The discharge of mixture from the flanged lower end 15 is controlled by a butterfly throttle valve 16. When the throttle valve is opened, an accelerating charge is supplied through a restricted auxiliary nozzle 17 connected by passage 18 to accelerating pump cylinder 19 in which works a piston 20. The piston is connected by a rod 21 to a

2

lever 22 pivoted on a post 23 above cover 24 of the constant level chamber. Lever 22 is connected by a link 25 to a lever 26 rigid with throtlte shaft 27.

Fuel is drawn into cylinder 19 past an inlet check 30 and is discharged past an outlet check 31. During the discharge stroke, considerable pressure is created in cylinder 19 below the piston. To prevent loss of this pressure around the piston, the latter is provided with a packing 32, conveniently formed of a cup-shaped piece of leather. This packing is clamped between the body 33 of the piston and a washer 34 seated against a shoulder on the piston rod, the rod being riveted over at 35 to maintain the assembly. Body 33 is provided with a central circumferential recess 36 receiving a coiled spring 37 bent circularly to conform.

Interposed between the spring and the leather packing, there is provided a generally cup-shaped element 40 having annularly arranged longitudinal slots 41 so that the radial pressure exerted by spring 37 will cause element 40 to expand circumferentially and urge the packing leather firmly against the cylinder wall. Element 40 has side wall structure formed substantially flat axially and only slightly inclined from vertical so that, regardless of the relative position of the spring and packing leather, spring pressure will be exerted against the lower edge of the leather.

In Fig. 4, a self-expanding, resilient, spit ring 43 is substituted for spring 37 and element 40 in the previous form. The spring is received within a recess 44 in the pump body 33*a* and its outer surface engages and extends substantially in both directions, that is above and below, the edge of packing leather 32. The piston body is provided with a series of tangs 45 which are received in slots 46 in ring 43 to maintain the assembly.

In Fig. 6 an expansible cup-shaped element 40*a* is applied between piston body 47 and a washer 48, somewhat as in Fig. 2. Slidably received on extension 49 of the piston rod is a frusto-conical member 50 having tapered side wall structure urged into engagement with cupped element 48 by a coiled spring 51 compressed between the member and the bottom of the cylinder. When the piston is depressed, the pressure created in the cylinder urges member 50 upwardly so as to distend cup member 48 and urge the edge of the packing leather firmly against the cylinder wall.

In Fig. 7, a self-expanding spring is shown, as at Fig. 4, but this spring is of a helically wound type, except that the coils are wound square in-

stead of circular. Thus, an axially flat part of the spring engages the pump packing at its edge and extends substantially above and below the edge thereof, as in the previous form.

In each of the forms, the pump packing can flex substantially in a longitudinal direction without withdrawing the edge of the packing from the distending action of the spring device. The portion of the device which engages the packing may be flat or slightly curved to provide an extended surface. Various other details may be modified as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. A pump piston assembly comprising a piston rod having an annular shoulder, a piston body with an annular recess, a cup-shaped packing of flexible material received on said body, a cup-shaped element received between said packing and said body and having side wall structure engaging and extending in both directions axially from the edge of said packing, and spring means seated in said annular recess in said piston body and urging said element and packing outwardly.

2. A pump piston assembly comprising a piston rod having an annular shoulder, a piston body, a cup-shaped packing of flexible material received on said body, a distending device within said packing comprising radially acting spring

means, and a cup-shaped, expandable element between said spring means and said packing and having its outer surface engaging and extending in both directions beyond the edge of said packing, said packing and expandable element being clamped between said rod shoulder and said piston body and said piston rod extending through said packing, said expandable element, and said body and having a securing element at its end overlying said body.

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