

Feb. 3, 1953

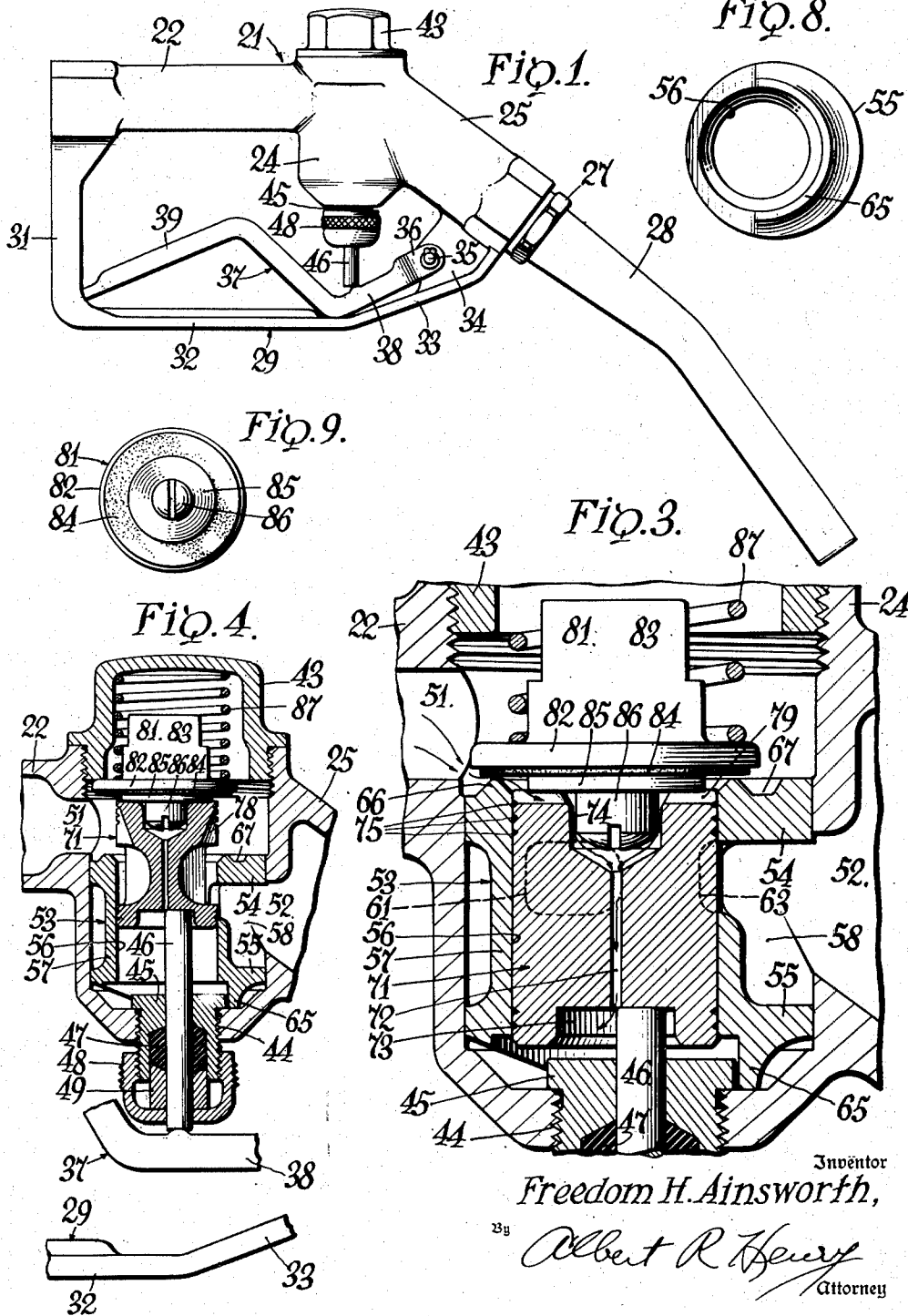
F. H. AINSWORTH

2,627,418

FLOW CONTROL NOZZLE FOR GASOLINE DISPENSERS

Filed May 8, 1950

2 SHEETS—SHEET 1



Feb. 3, 1953

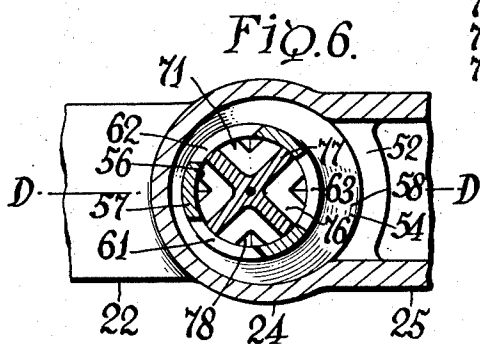
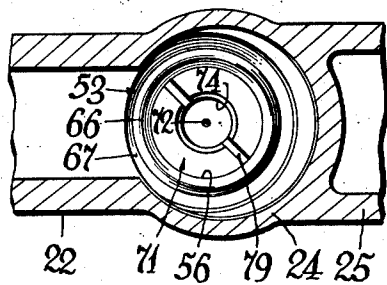
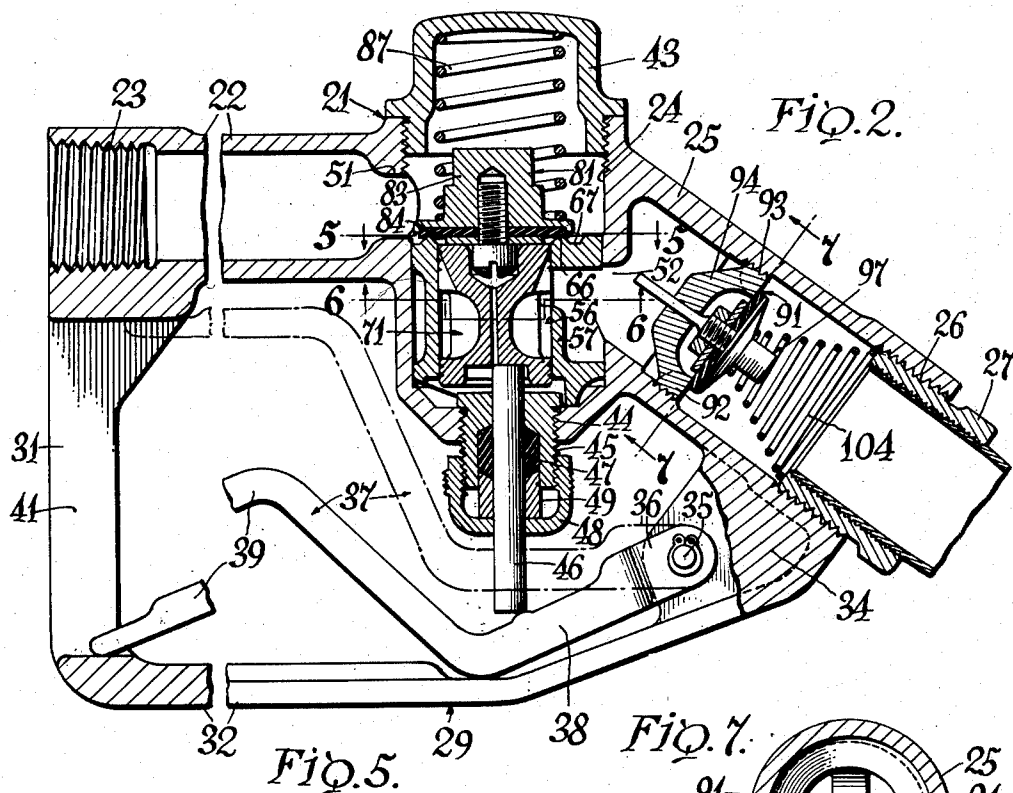
F. H. AINSWORTH

2,627,418

FLOW CONTROL NOZZLE FOR GASOLINE DISPENSERS

Filed May 8, 1950

2 SHEETS—SHEET 2



UNITED STATES PATENT OFFICE

2,627,418

FLOW CONTROL NOZZLE FOR GASOLINE DISPENSERS

Freedom H. Ainsworth, Salisbury, Md., assignor
to The Wayne Pump Company, Salisbury, Md.,
a corporation of Maryland

Application May 8, 1950, Serial No. 160,785

7 Claims. (Cl. 277-70)

1

This invention relates to flow control nozzles applicable to gasoline dispensing pumps, and it has particular reference to the provision of an improved manually operable valved nozzle by means of which the liquid may be delivered smoothly at all rates of flow.

Retail sales of gasoline to motorists are commonly made by causing the liquid to flow through a motor driven pump and meter unit into a discharge hose having a manually operable valved nozzle at its end, which is inserted into the filling opening of the gasoline tank. Many meter pumps now in service are provided with a register which indicates the money value of the gasoline, as well as the quantity in gallons. The motorist may ask for a tank full of gasoline, or a certain number of gallons, or a certain amount in terms of value. In each event, the attendant invariably opens the nozzle valve to its fullest extent, after inserting the end of the nozzle in the tank opening, in order to expedite delivery. At the end of the operation, however, the attendant partially closes the nozzle and simultaneously watches the register, or the tank opening, so that the customer's order may be exactly filled.

It is well understood that the partial closing of the delivery valve, in order to reduce the rate of flow, is commonly attended by chatter or hammer in the hydraulic system, and that control and regulation of the flow rate by manipulation of the nozzle lever is a difficult matter. There has been, for many years, a demand and need for a gasoline dispensing nozzle so constructed as to minimize the burden on the attendant, and to alleviate the difficulties attending the variations in the rate of flow. Various efforts have been made to solve the problem, but, insofar as I am advised, such proposals as have heretofore been made have been open to some practical objection. A survey of a representative number of service stations adequately establishes that the great majority of dispensing meter pump units are still equipped with valved nozzles constructed in much the same manner as those employed a score of years ago.

According to the present invention, a valved, manually operable, dispensing nozzle is provided, which, from superficial or exterior appearance looks like the conventional type of nozzle. This, in itself, is deemed to be an advantage, as the various makes of encased meter pumps are more or less standardized with respect to providing a hook or support for the nozzle when not in use, and controls through which current supply to the motor, and proper conditioning of the register, may be effected. An unconventional type of nozzle

2

would therefore not readily be applicable to many dispensers now in service.

Functionally, the improved nozzle includes valve elements which operate to shut off the flow of liquid when the nozzle is closed, and to prevent seepage or drainage of the liquid when the nozzle is not in use. These two functions, which are found in substantially all nozzles, and in fact are practically mandatory, are here combined with a third metering valve element, adapted to operate conjointly with the other valve members, to regulate the variations in the flow rate, in such manner as to eliminate pulsations or hydraulic hammer. Stated otherwise, the present nozzle makes provision for controlling the flow so that a low, as well as high, flow rate may be obtained without undue hardship on the attendant, or pulsations in the system. Provision is also made for hydraulically balancing the valve elements, thereby neutralizing one force tending to interfere with smooth action, and also to damp any vibrations in the valve member during closing movement, thereby eliminating another source of chatter and erratic operation.

Structurally, the improved nozzle is characterized by having relatively few parts for the fulfillment of its functions, and these are of simple form, lending themselves readily to economical forming and finishing operations. All parts of the nozzle are easily accessible for servicing or repair, should the need therefor arise. More specifically considered, the nature of the invention will be apparent from the following detailed description of a preferred embodiment, illustrated in the accompanying drawing, wherein:

Fig. 1 is an elevation of the dispensing nozzle;

Fig. 2 is an enlarged fragmentary axial section through the nozzle, with the valve elements shown in closed position;

Fig. 3 is an additionally enlarged fragmentary section similar to the section of Fig. 2, showing the valve elements at the instant of initial opening or final closing movement, and with one of the valve elements turned at forty-five degrees to the position shown in Fig. 2;

Fig. 4 is a fragmentary section similar to Fig. 2, with the valve elements in fully open position;

Figs. 5, 6, and 7 are sections respectively taken on the correspondingly numbered section lines in Fig. 2;

Fig. 8 is a bottom plan of the valve sleeve body;

Fig. 9 is a bottom plan of the shut-off valve element;

Fig. 10 is a perspective of the metering valve element; and,

Fig. 11 is a perspective of the check or drain prevention valve element.

Referring first to Figs. 1 and 2, it will be seen that the nozzle comprises a main body 21 having a substantially cylindrical hollow inlet section 22 at one end, provided with internal threads 23 for attachment to the coupling of a discharge hose. The section 22 merges into a main valve chamber portion 24, which in turn is contiguous with a discharge section 25, provided with internal threads 26 to receive a coupling nut 27 secured to one end of the delivery spout 28. The inlet and discharge sections are further interconnected by a guard 29 having a slotted normally disposed portion 31 at the inlet end, a portion 32 spaced from and substantially parallel to the inlet section 22, and an angularly disposed portion 33.

A web 34, interposed between the discharge section 25 and the guard portion 33, is suitably drilled to receive a pivot pin 35 which passes through aligned apertures in clevis sections 36 of an operating lever 37, which is bent to provide a plunger actuating portion 38 and a hand grip portion 39. As shown in Fig. 2, the end of the lever 37 rides in the slot 41 of the guard portion 31, as the lever is shifted between the extreme positions shown in the full and broken lines. When in the full line or closed valve position, the guard portions 31 and 32, in conjunction with the slot 41 and the end of the lever 37, may be utilized in conjunction with the dispenser nozzle support to lock or otherwise secure the nozzle to the pump casing, and preclude improper operation of the apparatus. It may be noted that the lever 37 is connected to the web 34 through a fixed or single pivot point. It has heretofore been proposed to incorporate movable or compound pivot points for nozzle operating levers with the hope of increasing smoothness and ease of operation. As will be made more apparent hereinafter, this expedient is not necessary for satisfactory performance of the present invention.

The valve chamber portion 24 is open at opposite ends, the upper end opening being of relatively large diameter, and internally threaded to receive a cupped closure and retainer cap 43. The lower end of the portion 24 is formed with an opening of less diameter, which is provided with threads 44 into which is fitted an axially drilled gland nut 45, extending through the valve body toward the lever 37. The nut 45 provides a guide bearing for a plunger rod 46, which, when the valve is closed, projects downwardly into engagement with the portion 38 of the lever 37. The joint between the plunger 46 and the gland 45 is made liquid tight by means of packing 47 and a knurled compression nut 48 and follower 49. It will be readily apparent that, as the lever 37 is manipulated, the plunger 46 will move linearly in and out of the valve body.

The midportion of the valve chamber 24 is finished to provide a cylindrical cavity, communicating, through ports 51 and 52, respectively with the inlet and discharge sections 22 and 25. It will be seen that the inlet and outlet ports are spaced both axially and circumferentially of the chamber. A sleeve 53, formed with end walls 54 and 55, is tightly fitted into the bore of the chamber 24, thereby to provide a fluid tight joint between the bore and the contacting portions of the sleeve, and prevent seepage or direct flow between the ports 51 and 52 (see also Fig. 3). The sleeve 53 is provided with an axial bore 56 which is eccentric with respect to the axis of the sleeve,

as will be readily apparent from the various sectional views.

Referring also to Fig. 6, it will be seen that the space between the end walls 54 and 55 is relieved, or is not as large in radius as the ends, to provide a cylindrical wall 57 delimiting the eccentric bore 58. The relieved portion thereby increases in radial length from a minimum on one end of a reference diameter $D-D$, to a maximum at the opposite end of the same diameter. This space, designated by the reference numeral 58 in Fig. 6, may, for want of a more apt term, be called a volute discharge chamber, although obviously its contour is not necessarily a true spiral. It will be noted also that the maximum radial length of the volute chamber is on the downstream side of the valve, the stated reference diameter $D-D$ substantially coinciding with the longitudinal axis of the valve body, and with the center of the discharge port 52.

The wall 57 is formed with a plurality of ports 61, 62, and 63, which provide communication between the bore 56 and the chamber 58. It will be noted that the ports 61 and 62 are spaced from and are symmetrically located with respect to the longitudinal axis or reference diameter $D-D$, while the port 63 is symmetrically located on such diameter, and faces toward the region of maximum volume of the chamber 58. It being presupposed that flow through the nozzle from inlet to discharge sections is through the ports 61, 62, and 63, the purpose in making the bore 56 eccentric with respect to the sleeve 53 may now be more fully understood. Volumetric flow through these ports into the chamber 58 is cumulative from the upstream to the downstream side, or, stated otherwise, the volume of liquid discharging from the downstream side of the chamber 58 is greater than the volume discharging into the chamber on the upstream or small volume side. Hence, the increasing volume of the chamber 58 accommodates the increasing volume of liquid, thereby contributing to the overall performance. It should be stated, however, that while this feature has been found highly desirable for best operation, valved nozzles made in accordance with the broad principles of the invention may be fabricated with concentrically located bores, and of course the precise porting arrangement may be modified.

As best shown in Figs. 3 and 8, the lower end of the sleeve 53 is beveled on one side below the cylindrical end wall 55, to provide an arcuate foot 65 serving to locate the sleeve with respect to the bottom of the valve chamber 24, and also providing clearance around the gland nut 45. Referring further to Fig. 5, the upper end of the sleeve 53 is provided with an annular valve seat 66 of generally triangular cross section, delimited by an annular groove 67 and the internal wall of the bore 56.

The bore 56 receives a spool or plug valve element, generally designated by the reference numeral 71, and shown in perspective in Fig. 10. The spool comprises a generally cylindrical body, of slightly less diameter than that of the bore 56, so that it will freely fit therein. The spool is axially drilled to provide a duct 72, and the lower end is counterbored to provide a recess 73 which abuts the inner end of the plunger 46. The upper end is also countersunk to form a recess 74, for a purpose which will immediately be made clear. The ends of the spool are turned to provide a series of annular grooves 75, and, between the ends, the spool is formed with a

5

number of cavities or pockets 76, spaced from each other by webs 77 which maintain the spool properly aligned during movement in the bore 56. Triangular notches 78, having their apices adjacent the upper end of the spool 71, extend downwardly and inwardly to merge into the pockets 76, and the upper end of the spool is formed with a diametrical slot 79.

As will be more fully pointed out hereinafter, the duct 72 enables liquid to flow between the ends of the plug valve 71, to provide balancing and damping functions. It will be seen that the duct is of relatively small diameter, compared to the diameter of the valve itself, or to the areas of the various ports. Too small a diameter for the duct 72 would render the action unnecessarily sluggish, while too great a diameter would detract from the desired damping action. To a certain extent, at least, the diameter of the duct 72 will depend upon the pump pressure. As a practical example, when applied to a gasoline pump establishing, with open nozzle position, a delivery of about fifteen gallons per minute from the spout 28, the duct 72 may have a diameter of one-sixteenth of an inch. Apart from permissible variations in this dimension, it will be seen that, in any event, the duct 72 will be of small diameter in comparison to the areas of the other openings.

A disc valve 81 is positioned above the valve element 71, and is adapted to seat on the annular valve seat 66. The element 81 comprises a flanged disc 82 which is integral with a boss 83, and a resilient gasoline-resistant sealing washer 84 which fits into the disc 82, which is retained by a metallic washer 85 and screw 86. The valve element 81 is urged toward the seat 66 by means of a helical spring 87, which fits over the boss 83 and is retained within the cavity of the cap 43. It will be noted that the head of the screw 86 enters the recess 74 of the valve element 71, and this is a comparatively loose connection, so that the valve element 81 may have considerable freedom for gyratory movement, and thus be self-aligning with respect to its seat 66. The valve 81 constitutes the main or shut-off valve of the nozzle. By forming the main valve with a plane seating washer 84 to seat on the rather narrow annular seat 66, only the slightest opening movement is required to admit fluid into the duct 72, and thus hydraulically balance the plug valve 71. A very slight additional movement exposes the apices of the notches or metering ports 78, to admit liquid around the plug valve 71 and into the passageways of the sleeve 53.

A check or drain prevention valve 91 is positioned on the downstream side of the nozzle in the section 25. This valve includes an externally threaded annulus 92, positioned in internal threads 93 formed in the section 25. The annulus 92 is formed with a diametrically positioned arched spider 94, the center of which is drilled to form a bearing aperture 95. The outer end surface of the annulus is finished to provide a flat valve seat 96. A valve element 97 is made up of a disc 98 having an integral boss 99 on one end and a pin 101 on the opposite end, which is threaded adjacent the disc to receive a retaining washer 102 and nut 103. The end of the pin 101 is guided in the aperture 95, and the valve element 97 is urged toward its seat by a conical spring 104, the outer end of which abuts the inner end of the nut 27. As is customary with gasoline nozzles, the rate

6

of the spring 104 is such as to cause the valve 91 to open when subjected to pump discharge pressure, and to retain the valve on its seat when the nozzle is not in use, thereby to prevent drainage or leakage.

When the operating lever 37 is in the full line position as shown in Fig. 2, the spring 87 forces the shut-off valve 81 against the seat 66, and this in turn forces the plug valve 71 and plunger 46 downwardly, to position the upper end of the valve 71 slightly below the seat 66, and to maintain the plunger 46 against the section 38 of the lever 37. The closing of the valves 81 and 71 releases the pump pressure from the check valve 91, which thereupon closes under the urge of the spring 104. Upon starting the pump, hydraulic pressure is exerted against the inlet side of the valve 81, thus imposing an additional force holding the valve closed, and the pump will short circuit itself through the usual bypass relief valve. The attendant then places the spout 28 in the filling opening of the automobile, and squeezes the lever section 39 to institute delivery.

As the valve 81 is unseated, the initial flow of liquid is under the valve washer 84, over the edge of the seat 66, and through the slot 79 of the plug valve 71, into the duct 72, and thence into the space below the valve 71, as shown in Fig. 3. This initial flow thereby equalizes the hydrostatic pressure on opposite sides of both valves 71 and 81, and accordingly reduces the force opposing the valve movement to that imposed by the spring 87. Some liquid leaks into the annular grooves 75, thus serving as a lubricant to facilitate further the smoothness of the operation. As the lever 37 is moved to a greater extent, the apices of the notches 78 become exposed, and flow will thereupon take place to the discharge section 25, through the pockets 76 and ports 61, 62, and 63 of the sleeve 53.

It will be noted that the initial flow through the notches 78 is quite limited, inasmuch as the area is small, and hence there is a high degree of throttling. When the pressure on the discharge side of the nozzle reaches a sufficient value, the check valve 91 will open, thereby permitting gasoline to flow from the nozzle end. The rate of flow increases as the valve continues to open, reaching a maximum in the position shown in Fig. 4. Due to the balancing of fluid pressures on opposite sides of the plug valve 71, the valve may be readily held in any desired position, and hence a metered or trickle flow may be obtained without pulsation or chatter. It will be noted, particularly from Fig. 4, that when the valve is wide open, the lower end of the spool 71 engages the bore 56 of the sleeve 53 below the ports or passageways 61, 62, and 63. While there is a slight clearance between the plug valve 71 and the bore of the sleeve, it is insufficient to permit significant flow therethrough during the dispensing operation, and the space or compartment below the plug valve 71 therefore remains full of liquid, at inlet pressure, to maintain the hydrostatic balance.

The attendant may release the lever 37 slowly, or even let it drop freely. With the usual nozzles, a rapid release of the lever has been attended by pronounced and severe hydraulic hammer, while attempts to close the valve more slowly are frequently accompanied by chatter. With the present nozzle, it will be seen that the volume of liquid beneath the plug valve 71 serves as a cushion to

retard valve closing, irrespective of how the attendant manipulates the lever 37. The action is more than a simple dash pot effect, for even with dash pot devices, there may be a flutter or vibration of the valve element itself, which is reflected into the hydraulic system.

As the valve moves to closed position, the liquid trapped beneath the spool 71 flows back, for all practical purposes, through the duct 72, the relatively slow rate of flow providing a damping effect and cushioning the closing movement. There is, of course, some clearance between the periphery of the lower end of the spool, and the wall 56 of the sleeve bore, and therefore it is possible for a few drops of liquid to leak through the clearance gap. It has been found that, to such extent as flow occurs around the end of the spool, it is not deleterious, being insufficient to interfere with proper closing of the check valve 91, or to cause dripping from the end of the spout 27. The pressure differential between the ends of the valve 71 is small, and of course the rate of flow diminishes gradually as the notches 73 become progressively covered. The final closing movement takes place as the tips of the notches 73 are occluded by the wall 56, thus interrupting flow through the passageways 61, 62, and 63, and thereupon the engaging but independently movable main valve 81 finds its seat.

It will thus be seen that the present invention provides a nozzle particularly adapted for use with gasoline dispensers, in which provision is made for balancing, metering, and damping, as well as for the known effects of providing a main shut-off valve and a drain prevention check valve. While the invention has been described with respect to a single and preferred embodiment, it will be apparent that various changes may be made without departure from its principles and the scope of the appended claims.

I claim:

1. A dispensing nozzle comprising a body having a valve chamber, a slidable plunger extending into said chamber at one end thereof, an operating lever for moving the plunger into the chamber, a sleeve fitted in the chamber and having a lower end forming a closed fluid compartment with the wall of the chamber adjacent the inner end of the plunger, a discharge port formed in the body between the ends of the sleeve, an inlet port formed in the body above the upper end of the sleeve, the said upper end of said sleeve being above the discharge port and forming with the wall of the chamber a fluid tight joint, said sleeve being formed with an axial bore and with fluid passageways through the wall of the sleeve between the ends thereof, a seat on the upper end of the sleeve, a shut-off valve positioned in the chamber above the sleeve and normally seating on said seat, a spring in the chamber urging said shut-off valve to closed position, a plug valve in the bore of the sleeve and loosely engaging the shut-off valve at one end and the plunger at the opposite end, said spring thereby urging the plug valve and plunger downwardly with respect to said chamber, a duct in the plug valve freely communicating with said compartment and with the upper end of the plug valve adjacent the shut-off valve, tapered metering ports formed in the body of the plug valve adjacent but below the upper extremity thereof, additional larger ports also formed in the body of the plug valve in communication with said metering ports and the passageways in the sleeve, a discharge section for the body contiguous with the valve chamber and the

discharge port, and a spring loaded check valve positioned in said discharge section.

2. A dispensing nozzle comprising a body having a valve chamber and inlet and outlet ports communicating with the chamber, said ports being misaligned both axially and circumferentially of the chamber, a sleeve in the chamber formed with a relieved central portion in constant fluid communication with the discharge port, the end portions of the sleeve spanning the discharge port and forming with the wall of the chamber fluid tight joints, one end portion of the sleeve terminating axially of the chamber in spaced relation to the inlet port, said sleeve being formed with an axial bore disposed eccentrically to the axis of the sleeve, fluid passageways formed in the wall of the relieved portion of the sleeve, said sleeve being so positioned in the chamber that the relieved portion of greatest radial length is substantially aligned with the discharge port, a plug valve slidably mounted in the bore, metering ports and cavities formed in the surface of the plug valve and adapted to establish fluid communication between the inlet and outlet ports only when the plug valve is open, an independent duct in the plug valve communicating with opposite ends thereof, a shut-off valve loosely mounted on the inlet end of the plug valve, a seat on the inlet end of the sleeve for the shut-off valve, a spring in the chamber engaging the shut-off valve and urging it toward its seat, and an operating plunger extending into the chamber at the end opposite the spring and engaging the plug valve, the end of the sleeve adjacent the plunger forming with said chamber a closed clearance space, said plug valve duct freely communicating with said space.

3. A dispensing nozzle comprising a body having a valve chamber and inlet and outlet ports communicating therewith, a main valve seat disposed transversely of the chamber, a main valve adapted to seat on said valve seat and a spring engaging the main valve to urge it toward its seat, said inlet and outlet ports being on opposite sides of the seat, a bore formed through the seat and extending therebelow, fluid passageways formed in the wall delimiting said bore and in constant communication with the outlet port, a discharge chamber extending around the wall of said bore, said chamber being of progressively greater radial length toward the outlet port, a plug valve slidably positioned in said bore, said plug valve having end portions engaging the internal wall of the bore and being of such length that it may move into the bore to lie below said main valve seat, cavities formed in the surface of the plug valve between its ends and adapted, when and after the plug valve is moved out of the bore to place the inlet port in communication with said passageways and thereby the discharge port, said plug valve further being of such length that, when moved its maximum operative distance out of the bore the inner end thereof is below said passageways, a plunger extending into said valve chamber and engaging the inner end of the plug valve, an operating lever pivoted to the nozzle body for actuating the plunger to displace the plug valve and thereby raise the main valve from its seat, and a constantly open duct extending through the plug valve and independent of said cavities to admit fluid to the inner end of said plug valve when the main valve is displaced, thereby to balance the fluid pressures on the ends of said plug valve.

4. A dispensing nozzle comprising a body hav-

ing a valve chamber and spaced inlet and outlet ports communicating therewith, a sleeve positioned in the chamber and having end portions tightly engaging the wall of the chamber and a reduced intermediate portion communicating with the outlet port, one end of said sleeve and the wall of said chamber forming a closed clearance space, said sleeve being formed with an axial bore and a valve seat on one end around the bore, said inlet port being above said valve seat, a disc valve adapted to be positioned on said seat, a spring urging the disc valve toward said seat, passageways formed in said sleeve intermediate its ends and in communication with the outlet port, a plug valve slidably positioned in the bore and engaging the disc valve at one end, a plunger extending into the chamber and said closed clearance space and engaging the opposite end of the plug valve thereby providing means to move the plug valve and simultaneously lift the disc valve from its seat, an axial duct formed in the plug valve, said duct being in fluid communication with the seating surface of the disc valve whereby, when said disc valve is freed from its seat fluid pressure is transmitted to said closed clearance space at the opposite end to hydraulically balance the plug valve, metering ports formed in the surface of the plug valve adjacent the disc valve end, and cavities formed in the surface of the plug valve below the metering ports and in communication therewith and with said passageways, said opposite end of the plug valve, when said plug valve is moved by said plunger, engaging the wall of the bore to provide a seal against substantial liquid flow from the clearance space below said opposite end into said passageways.

5. A dispensing nozzle comprising a body having a valve chamber and spaced inlet and outlet ports communicating therewith, a sleeve positioned in the chamber and having an upper end positioned below the inlet port and a lower end below the outlet port, said lower end forming with the wall of the chamber a closed clearance space, said upper end being above the outlet port, a bore formed in the sleeve, fluid passageways formed in the sleeve intermediate its ends and communicating with the outlet port, the ends of said sleeve tightly fitting the bore to provide fluid tight joints between the inlet and outlet ports, a shut-off valve positioned between the inlet port and the upper end of the sleeve, a seat for the shut-off valve at the upper end of the sleeve, a spring in the chamber normally urging the shut-off valve toward its seat and thereby interrupting fluid communication between the inlet port and the bore, a plug valve slidably positioned in said bore and adapted, when the shut-off valve is seated, to be contained in the bore below said shut-off valve seat, a plunger extending into the chamber and said clearance space below the sleeve and having its inner end engaging the lower end of the plug valve, an operating lever for moving the plunger and thereby the plug valve, the upper end of the plug valve, upon movement thereof by the plunger, engaging said shut-off valve to unseat the same, a fluid duct below the shut-off valve seat extending to the lower end of the plug valve and to said clearance space to transmit fluid pressure to the lower end of the plug valve when the shut-off valve is unseated, metering ports formed at the upper end of the plug valve, said ports being of progressively greater size from the upper toward the lower end of the plug valve, the lower ends of said metering

ports being adapted to communicate with said fluid passageways.

6. A dispensing nozzle comprising a body having an inlet section, a main valve chamber portion, and a discharge section, said valve chamber portion being formed with a chamber, a sleeve positioned in the chamber, a fluid inlet port formed between the inlet section and the valve chamber above the sleeve, a discharge port formed between the chamber and the discharge section and between the ends of the sleeve, said sleeve having end portions tightly engaging the walls of the chamber to forestall direct fluid communication between said inlet and discharge ports, one of said ends forming with the valve body a closed clearance space, said sleeve being relieved between its ends to form a discharge space, said sleeve being further formed with a bore and with fluid passageways between its ends to place said bore in fluid communication with said discharge space, a plug valve slidably positioned in said bore, said plug valve being formed with a duct extending between its ends and with ports in the surface of the plug valve, said plug valve at one end and said duct being in constant open fluid communication with said closed clearance space, said plug valve ports being adapted to be closed from said inlet port when said plug valve is fully positioned within the sleeve and to be in communication with said inlet port and with the fluid passageways of the sleeve when said plug valve is moved to extend above the sleeve, a shut-off valve positioned above the plug valve and adapted to close fluid communication between said inlet port and said plug valve when said shut-off valve is in closed position, a spring urging said shut-off valve and said plug valve into normally closed position, a plunger extending from the exterior of the body into the valve chamber and engaging the lower end of the plug valve within said closed clearance space, and an operating lever for moving the plunger.

7. A dispensing nozzle comprising a body having a valve chamber, a sleeve formed with enlarged end portions tightly fitted in said chamber, one end of said sleeve forming with the valve body a closed clearance space, inlet and outlet ports respectively communicating with the chamber at the end of the sleeve opposite the clearance space and intermediate the ends thereof, said sleeve being formed with a bore extending between its ends and with fluid passageways communicating with said outlet port, a valve seat on the end of the sleeve adjacent the inlet port, a shut-off valve positioned above said end and adapted to be seated thereon, a spring normally urging said shut-off valve toward its seat, a plug valve slidably positioned in the bore of the sleeve and engaging the shut-off valve at one end, an open duct formed in the plug valve and communicating with opposite ends thereof and with said clearance space, said duct and clearance space being adapted to be placed in fluid communication with said inlet port upon initial opening of the shut-off valve, thereby to balance the hydrostatic pressure upon the ends of said plug valve prior to substantial movement thereof in said sleeve, porting cavities formed in the walls of the plug valve between the ends thereof and adapted when and after said plug valve is moved in the sleeve toward the inlet port to place said inlet port in fluid communication with said fluid passageways and said discharge port, said cavities being of less circumferential dimension at the inlet end of the plug valve than between the

11

ends thereof, a plunger extending into the valve chamber and closed clearance space at the end opposite the shut-off valve and engaging the plug valve at one end, said plunger being offset from the end of the plug valve duct opening into said clearance space, and an operating handle for moving the plunger into said chamber to displace the plug and shut-off valves.

FREEDOM H. AINSWORTH.

REFERENCES CITED

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

12

UNITED STATES PATENTS

Number	Name	Date
1,215,146	Haeseler	Feb. 6, 1917
1,821,206	Caswell	Sept. 17, 1931
1,990,741	Marvel	Feb. 12, 1935

FOREIGN PATENTS

Number	Country	Date
427,586	Great Britain	of 1935

10