

Sept. 12, 1939.

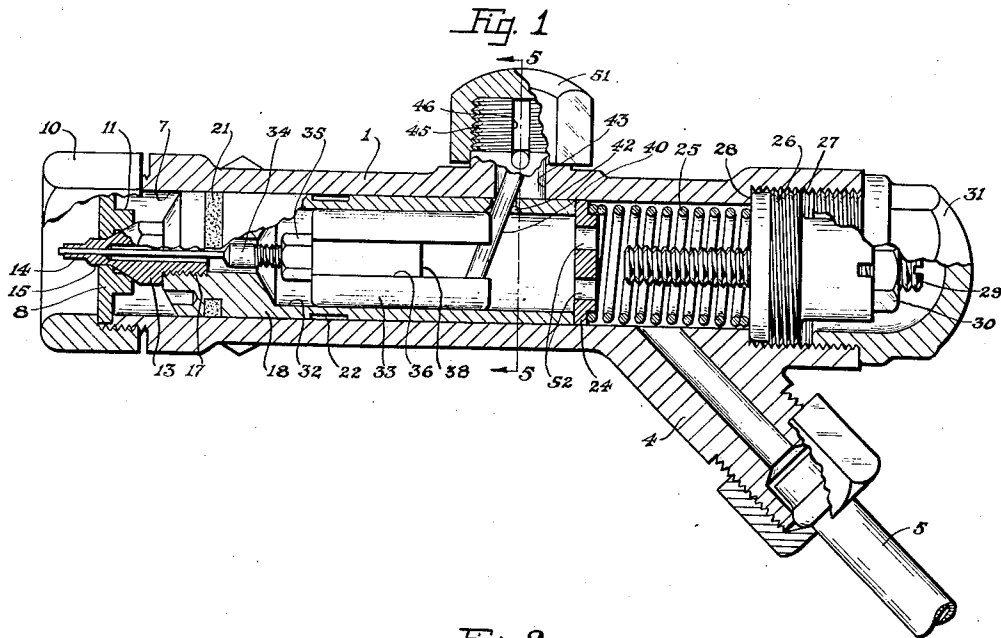
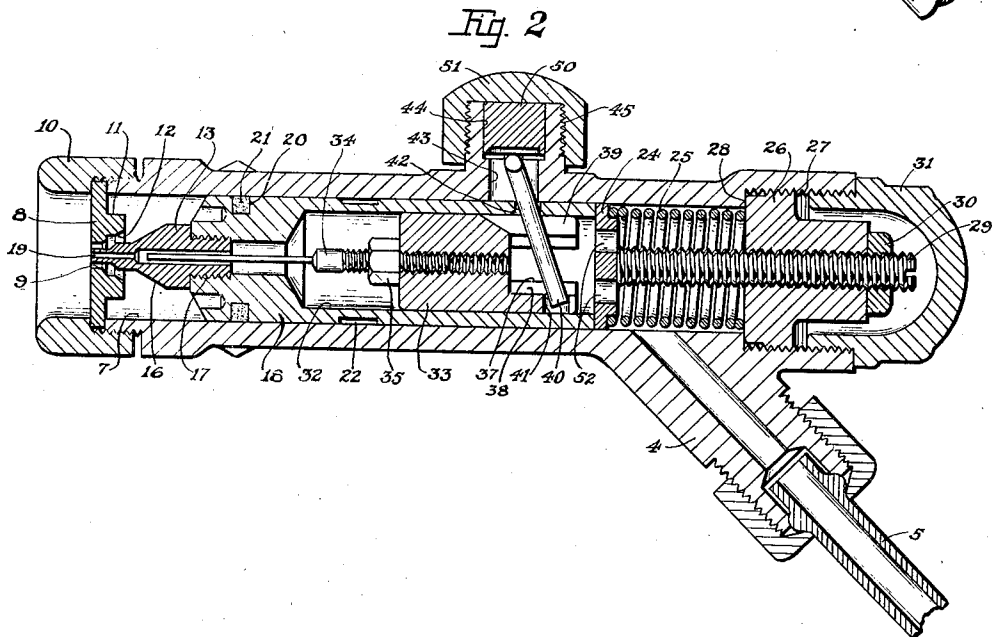
A. J. LOEPSINGER

2,173,072

ATOMIZER

Filed Jan. 10, 1935

2 Sheets-Sheet 1



ALBERT J. LOEPSINGER

INVENTOR.

BY *Harry Dexter Peck*

ATTORNEY.

Sept. 12, 1939.

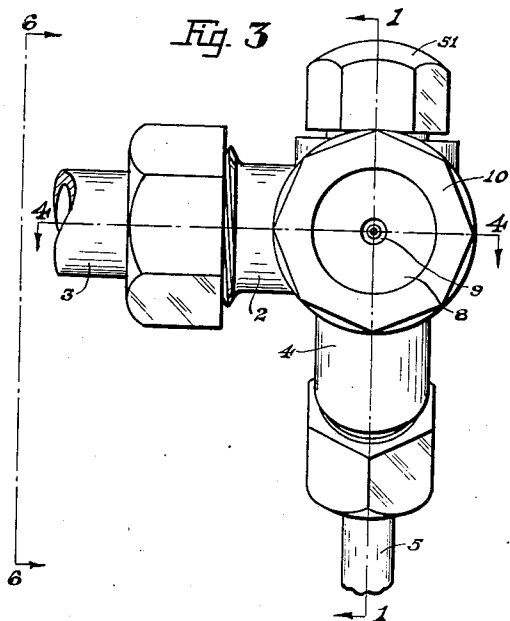
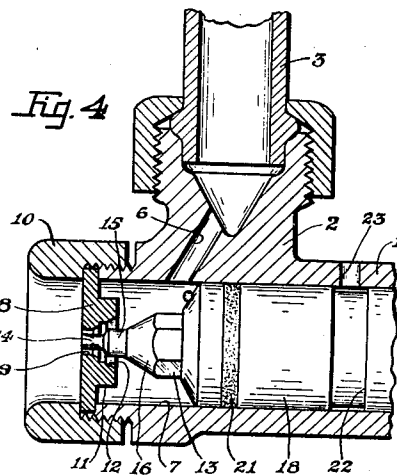
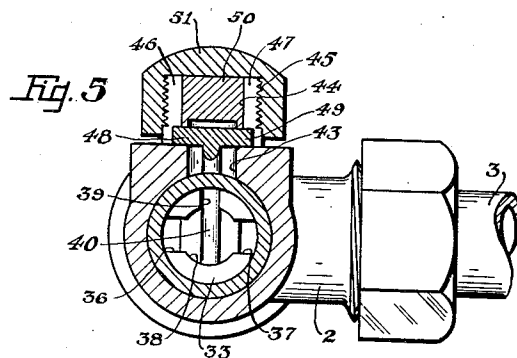
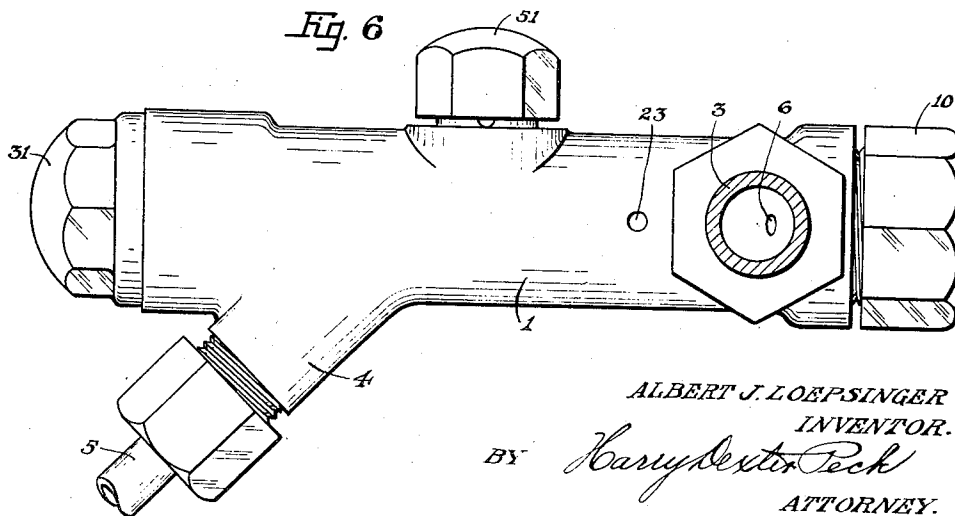
A. J. LOEPSINGER

2,173,072

ATOMIZER

Filed Jan. 10, 1935

2 Sheets-Sheet 2



ALBERT J. LOEPSINGER
INVENTOR.

BY *Harry Dexter Peck*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,173,072

ATOMIZER

Albert J. Loepsinger, Providence, R. I., assignor to
American Moistening Company, Providence,
R. I., a corporation of Maine

Application January 10, 1935, Serial No. 1,198

41 Claims. (Cl. 299—59)

This invention relates to improvements in atomizers. More especially it has to do with an atomizer having a pair of apertures for discharge of a fluid and a liquid so as to effect atomization of the latter, and the invention is particularly directed to improved means for effecting the cleaning and closure of both apertures.

Hereinafter the words "aperture" and "orifice" are used without distinction to mean an opening through which a fluid or a liquid may be discharged. The term "gas" is to be understood and interpreted as meaning fluid, inasmuch as atomization of a liquid may be effected by fluids other than gases.

I am aware that atomizers have been proposed in which the discharge orifices are arranged concentrically and means are provided for cleaning the inner one of them. It is important, however, that both orifices be frequently and thoroughly cleaned since the presence of even a minute particle or a tiny accumulation of dirt or other foreign matter in either orifice may very materially affect the atomization of the liquid. This fact has been appreciated for some time, and I am familiar with the type of atomizer in which separate nozzles fixedly arranged at an angle to one another have separate cleaning rods and more or less duplication of mechanism to effect their individual cleaning.

It is an object of the present invention to provide an atomizer having a pair of apertures arranged in atomizing relation when discharging so that the flow through one of them passes through the space defined by the outer periphery of the other aperture and the discharge from each aperture is in substantially the same direction. It is also an object to provide for closing and cleaning both apertures. In the preferred embodiment of the invention disclosed it is a feature that one aperture is provided in an element which serves to close and clean the other aperture, while other means are provided for closing and cleaning the aperture in said element. It is an especial object to provide for a greater travel or movement of one of said closing and cleaning means than for the other so that one aperture may be closed in advance of the other and opened later. It is also an object to provide mechanism which for the most part can readily be made by automatic machinery, thereby insuring uniformity of production and operation. The improved atomizer is easy to construct, assemble and adjust, and its performance is reliable and effective.

The best mode in which I have contemplated applying the principles of my invention is shown

in the accompanying drawings but these are to be taken as merely illustrative because it is intended that the patent shall cover by suitable expression in the appended claims whatever features of patentable novelty exist in the invention disclosed.

In the accompanying drawings:

Figure 1 is a vertical longitudinal section (as on line 1—1 of Figure 3) of a preferred embodiment of the principles of my invention, the several parts being shown in their relative positions when the atomizer is inactive;

Figure 2 is a view like Figure 1 but with the parts shown in their relative positions when the atomizer is in operation;

Figure 3 is a front elevation of the improved atomizer;

Figure 4 is a partial horizontal, longitudinal section, taken as on line 4—4 of Figure 3;

Figure 5 is a vertical section as on line 5—5 of Figure 1; and

Figure 6 is a side elevation of the atomizer viewed as from the dot-and-dash line 6—6 of Figure 3.

Referring more particularly to the drawings, the body 1 of the atomizer is generally of cylindrical configuration with an offset portion 2 (see Figure 4) provided with a threaded stem to which a supply pipe 3 may be attached for admission of a fluid under pressure which may be a gas such as compressed air or any other fluid suitable for effecting the atomization of a liquid. Another offset portion 4 is provided for connection with a supply pipe 5 for the liquid to be atomized. This liquid may also be supplied under pressure (provided, as will hereinafter appear, it is of a less degree than the fluid pressure) or it may be lifted or drawn through its conduit by the suction created by the discharging gas. A passageway 6 through the portion 2 admits the gas under pressure into one end of a cylindrical bore or chamber 7 which extends axially throughout the body. At this end the chamber is closed by a removable disk 8 having a central opening 9 which constitutes the fluid aperture. This disk is clamped at its edge between the end of the body and an internal shoulder of a hollow nut 10 which projects somewhat forward from the disk 8 and has its internal wall rounded outward at the end.

The disk 8 has on its inner side an annular ridge 11 whose inner wall has a tapered portion 12 which serves as a seat for a liquid nozzle 13. The latter has at its forward end a thin cylindrical wall portion 14 which enlarges into a slightly thicker cylindrical portion 15. This latter portion is of size to make a nice sliding fit with the

cylindrical wall of the discharge orifice 9. Beyond the portion 14, the liquid nozzle has a tapered portion 16, which seats on the tapered portion 12 provided on the disk 9, and a threaded stem 17 which screws into a pressure responsive element or piston 18. The liquid nozzle has an axial bore through it from end to end, with a section 19 of relatively small diameter at the forward end. This section will hereinafter be referred to as the liquid aperture.

The piston 18 makes a free sliding fit with the wall of the body chamber 7, having near its forward end an annular groove 20 containing a ring 21 of suitable packing material. This packing is expected to prevent any escape of air rearward around the piston, but as a further precaution a second annular groove 22 is provided on the piston and a vent hole 23 is located in the body wall so that when the piston is retracted, as shown in Figure 4, the groove 22 and this vent hole 23 will be in register. The rear end of the piston rests against a perforated backing disk 24 which serves as the forward and movable seat for a coiled spring 25. The other or fixed seat for this spring is provided by a nut 26 which screws into an enlarged portion 27 of the body bore and rests against a shoulder 28. A threaded rod 29 screws through this nut 26 and is provided for the purpose of making adjustment of the liquid orifice 19 with respect to the gas orifice 9. As best seen in Figure 2, when the piston is retracted, that is when the atomizer is discharging, the backing disk 24 brings up against the end of the threaded rod 29 and while thus positioned the rod may be turned to effect any desired relation between the two orifices. When this adjustment is completed, the rod is fixed in position by the locking nut 30 and an end cap 31 is screwed into the enlarged portion 27 of the body bore.

The piston 18 has a cylindrical bore 32 in which a plunger 33 is movable. This plunger has a threaded axial hole in which one end of a cleaning element 34 is screwed. The forward end of this element makes a nice sliding fit with the liquid aperture 19 and may be adjusted with respect to the plunger 33 so that when the movable parts are forward, as seen in Figure 1, the end of the cleaning element projects slightly beyond the end of the liquid orifice. A nut 35 locks the element in its adjusted position.

The plunger 33 is externally slotted throughout its length by two diametrically opposed slots 36 and 37 (see Figure 5) and its rear end has an axial bore 38 into which these slots open. The upper wall of this bore is also slotted, as at 39, to permit a leg 40 of a T-shaped lever to extend through it and the bore 38 into a socket 41 in its lower wall. The lever also extends upward through a hole 42 in the top wall of the piston and through another hole 43 in the wall of the body 1. This latter hole is an extension of a bore 44 of an externally threaded stem 45 which is provided with diametrically opposed slots 46 and 47 (see Figure 5) to receive the arms 48 and 49 respectively of the T-head of the lever 40. These arms are held at the bottom of the slots 46, 47 by a removable plug or bushing 50 which in turn is held in the stem 45 by a cap nut 51.

The relative positions of the movable parts when the atomizer is inactive are shown in Figure 1. The piston 18 is held in its forward position by the force of spring 25, with the tapered portion 16 of the liquid nozzle resting tightly on the tapered seat 12 of the disk 9. Thus the liquid nozzle closes the gas orifice. The cylindrical por-

tion 15 of this nozzle is in and extends through the gas orifice 9. The plunger 33 and the cleaning element 34 are also in their forward positions, with the latter extending through the liquid aperture 19 and closing it.

Assuming now that the atomizer is to be put in operation. By some suitable control means (not shown) fluid under pressure will be supplied through pipe 3 and will flow through passageway 6 into the chamber 7 of the body on the forward side of piston 18.

If the liquid is also supplied under pressure, it must be at a less degree than the fluid pressure, in order that the latter, acting upon the piston 18 will overcome both the force of the liquid pressure and the force of spring 25 acting counterwise on the piston. When this occurs, the piston will move rearward in the body chamber 7 to the position shown in Figure 2. This will withdraw the liquid nozzle 13 from the orifice 9 and permit the fluid to discharge therethrough. During the rearward movement of the piston 18, the lever 40 is swung about the axis of its arms 48—49 by virtue of the engagement between the lever and the edge of the hole 42 in the wall of the piston. As the lever thus swings, its lowermost end, being engaged in the socket 41 of the plunger, causes the latter also to move rearward to the position shown in Figure 2.

Since the engagement between the lever 40 and the piston 18 is nearer the axis about which the lever swings than is the engagement between the end of the lever and the plunger 33, the latter is moved a correspondingly greater distance than is the piston. This greater movement of the plunger insures the withdrawal of the cleaning element 34 from the liquid orifice 19 when the liquid nozzle is moved to open the gas orifice 9. Likewise when the moving parts move forward, the greater movement of the cleaning element 34 insures that its end will be projected through the liquid orifice 19 when the latter is moved through the fluid orifice 9. Moreover, the relative lengths of the apertures 9 and 19 and the relative movements of the cleaning elements are such that the fluid aperture cleaning means moves out of its closing and cleaning position prior to the complete removal of the liquid aperture cleaning means from its closing and cleaning position, thus insuring the discharge of the fluid prior to the discharge of the liquid. Conversely, these same relations insure the entry of the liquid aperture cleaning means into its aperture prior to the entry of the fluid cleaning means into its aperture, thus cutting off the liquid discharge before complete cessation of the fluid discharge, even though the latter reduces in intensity following the shutting off of the fluid supply.

The suction created at the liquid orifice by the fluid flowing through the open orifice 9 draws liquid from some convenient supply through pipe 5 into the chamber 7 of the body in the rear of the backing plate 24. This plate is provided with holes 52, through which the liquid flows, and thence travels along the external slots 36—37 of the plunger to the forward end of the chamber 32 of piston 18, from whence it passes into the liquid nozzle and through the aperture 19 to be picked up by the fluid and atomized.

As before noted, the relative positions of the gas and liquid orifices may be adjusted by removing the cover cap 31, loosening the locknut 30, and turning the threaded rod 29 to move the piston and liquid nozzle axially along the body chamber toward or from the gas orifice 19. This

adjustment is preferably made while the atomizer is in operation, so that the result thereof may be determined as it is effected. This enables a nice relative setting of the orifices to be enjoyed with consequent high effectiveness of atomization.

The operation of the device is terminated by shutting off the fluid supply. As the fluid pressure falls, it becomes insufficient to overcome the force of spring 25 and when this occurs the parts move quickly back to their relative positions shown in Figure 1. The cylindrical portion 14 of the liquid nozzle within the fluid orifice 9 can dislodge any lint or foreign matter that may be caught therein. The nicely fitting portion 15 of the liquid nozzle immediately follows and thoroughly completes the cleaning of the fluid orifice 9. The cleaning rod 34 is also pushed forward through the liquid nozzle and its orifice 19 and forces out any particles of dirt or other matter which may have lodged therein. Thus both the fluid orifice and the liquid orifice are automatically cleaned and also closed by the same directional movement of the moving parts.

The design of the atomizer lends itself to quantity production with desired accuracy. The parts may be readily assembled and, as hereinbefore noted, may be nicely adjusted to their relative positions of highest effectiveness while the discharge from the atomizer occurs. And the continuity of this maximum effectiveness is insured by the thorough cleaning of both the fluid and liquid apertures whenever the discharge ceases. Under normal operation this occurs not infrequently due to the response of the control apparatus. Moreover since during intervals of inaction, as when the factory is shut down over week-ends or longer periods, the apertures are maintained closed by their respective cleaning elements, there is no danger of the atomizer becoming clogged or adversely affected by deposit of foreign matter in the apertures. Whenever the fluid pressure is applied, the atomizer promptly responds with both its apertures thoroughly cleaned and ready for most effective discharge.

I claim:

1. An atomizer comprising, in combination, a body having a chamber therein connected with a supply of fluid under pressure and a supply of liquid; a fixed orifice at one end of the chamber for discharge of the fluid; a hollow element constructed and arranged to clean the fixed orifice and being movable in said chamber, carrying at one end a nozzle having an orifice therethrough for discharge of liquid; said element being constructed and arranged to be acted upon by the fluid pressure to move said liquid orifice into atomizing relation therewith in direction away from the air orifice; spring means acting upon said element to move said liquid nozzle through the fluid orifice to clean it and close it, upon reduction of the fluid pressure; a second element movable in the hollow of the first said element having a portion for cleaning the liquid orifice; and a lever fulcrumed on said body having connection with both said elements and being so arranged that movement of the hollow element affects movement of the second element in the same direction.

2. An atomizer comprising, in combination, a body having a chamber connected near one end with a supply of fluid under pressure and connected near the other end with a supply of liquid; a fixed orifice at the fluid connected end of the chamber for discharge of the fluid;

an element slidable in said chamber having an orifice at one end and a passage leading thereto for discharge of liquid; the said element being constructed and arranged to be acted upon by the fluid pressure to move it within said body to position its orifice in atomizing relation to the fluid orifice; means for moving said element on cessation of discharge to clean the fluid orifice; and means comprising an external groove on said element and a vent in said body to prevent passage of the fluid beyond said element to the liquid supply end of the chamber.

3. An atomizer comprising, in combination, a body having a chamber with a fixed orifice for discharge of fluid; a hollow piston having an orifice at one end for discharge of liquid, constructed and arranged to move in said chamber to bring said orifice into atomizing relation; a plunger in the hollow of said piston carrying a cleaning element for the liquid orifice; and a lever fulcrumed on said body and having pivotal connection with both the piston and the plunger; the said connections being so arranged that movement of the piston effects a greater movement of the plunger.

4. An atomizer comprising, in combination, a body having a chamber with a fixed orifice for discharge of fluid under pressure; an element in said chamber carrying a nozzle having an orifice for discharge of liquid, constructed and arranged to move in said chamber in one direction to bring said liquid orifice into atomizing relation with said fluid orifice and in the opposite direction to clean the fluid orifice; a second element movable in said chamber having a portion constructed and arranged to clean the liquid orifice; and means constructed and arranged to move said elements toward the fixed orifice whereby the said nozzle cleans the fixed orifice and the said second element cleans the liquid orifice; the last said means yielding under the pressure of the fluid acting on the first said element to retract the nozzle and position its orifice in atomizing relation to the fluid orifice and to retract the second element from the liquid orifice.

5. An atomizer comprising, in combination, a body having a chamber with an orifice for discharge of a fluid under pressure; a nozzle, having an orifice for discharge of a liquid, constructed and arranged to move relatively with respect to said fluid orifice to position said orifices in atomizing relation during discharge and to clean said fluid orifice when discharge ceases; a cleaning element constructed and arranged to move relatively with respect to said liquid orifice to clean the latter when discharge ceases; means responsive to fluid pressure incident to discharge to move said nozzle to its atomizing relation and said cleaning element out of its cleaning position; and means, responsive to the shutting off of the fluid pressure, constructed and arranged to effect the aforesaid relative movements when discharge ceases, and thereby clean both orifices.

6. An atomizer comprising, in combination, an element having a fixed orifice for discharge of a fluid under pressure; a nozzle, having an orifice constructed and arranged to move into atomizing relation with said fixed orifice when discharge occurs and to clean said fixed orifice when discharge ceases; a cleaning element constructed and arranged to clean the nozzle orifice when discharge ceases; and means, responsive to fluid pressure incident to discharge to move said nozzle to its atomizing relation and said cleaning ele-

ment out of its cleaning position and on cessation of discharge to move said nozzle and element to their respective cleaning positions.

7. An atomizer comprising, in combination, an element having a fixed orifice for discharge of a fluid under pressure; a nozzle, having an orifice for discharge of a liquid, constructed and arranged to move into atomizing relation with said fluid orifice when discharge occurs, and to clean said fluid orifice when discharge ceases; a cleaning element constructed and arranged to move out of cleaning position when discharge occurs and to clean the nozzle orifice when discharge ceases; and means associated with said movable nozzle and said element and responsive to fluid pressure incident to discharge to move said nozzle to its atomizing relation and said element out of its cleaning position, and for moving them to their cleaning positions upon reduction of the fluid pressure.

8. An atomizer comprising, in combination, an element having a fixed orifice for discharge of fluid under pressure; a movable nozzle, having an orifice for discharge of a liquid, constructed and arranged to be moved away from the fixed orifice into atomizing relation therewith during discharge and toward said fixed orifice to clean it when discharge ceases; an element movable with respect to the liquid orifice constructed and arranged to be moved out of cleaning relation to said liquid orifice during discharge and to clean it when discharge ceases; and means, responsive to changes of the fluid pressure, constructed and arranged to effect the movements of said nozzle and element; the said means producing a greater movement of the element than of the nozzle in the same direction of movement.

9. An atomizer comprising, in combination, a body having a chamber with a fixed orifice for discharge of fluid under pressure; an element, having an orifice for discharge of a liquid, constructed and arranged to move within said chamber in direction away from the fixed orifice to bring said orifices into atomizing relation with each other, and to move toward said fixed orifice to clean it; a second element constructed and arranged to move within said chamber in direction away from the movable orifice to permit discharge of liquid therethrough and to move in direction toward the movable orifice to clean it; and means responsive to changes of the fluid pressure controlling the movements of said elements; the last said means being constructed and arranged to effect greater movement of the second element than the movement of the first element in the same direction.

10. An atomizer comprising, in combination, an element having a fixed orifice for discharge of fluid under pressure; a movable nozzle having an orifice for discharge of liquid, arranged concentrically with the first said orifice and movable axially with respect thereto; said nozzle being constructed and arranged in one of its positions to be in atomizing relation with the fixed orifice and in another position to clean said fixed orifice; means responsive to fluid pressure incident to discharge to move said nozzle to its atomizing relation and on cessation of discharge to move said nozzle to its cleaning position; and means constructed and arranged to be likewise movable to clean the nozzle orifice.

11. An atomizer comprising, in combination, an element having a fixed orifice for discharge of fluid under pressure; an element having an orifice for discharge of liquid, arranged con-

centrically with respect to the fixed orifice and movable axially with respect thereto; said element being constructed and arranged in one of its positions to be in atomizing relation with the fixed orifice and in another position to clean said fixed orifice; and means responsive to fluid pressure incident to discharge to move said element to its atomizing relation and on cessation of discharge to move said element to its cleaning position; and a cleaning element constructed and arranged to be actuated by movement of the first said element to effect cleaning of said liquid orifice.

12. An atomizer comprising, in combination, a body having a chamber connected near one end thereof to receive fluid under pressure; an orifice at said end of the chamber for discharge of said fluid; an element movable in said chamber with respect to the fluid orifice and having an orifice for discharge of liquid; said element being constructed and arranged in one of its positions to be in atomizing relation with said fluid orifice and in another position to enter and clean said fluid orifice; said element being moved to its atomizing relation by the fluid pressure in the said end of said chamber; and means adjustable during discharge of said nozzle for determining the atomizing relation of said orifices.

13. An atomizer comprising, in combination, a body having a chamber connected near one end thereof with a supply of fluid under pressure and connected near the other end thereof with a supply of liquid; an orifice at the fluid end of the chamber for discharge of said fluid; an element movable in said chamber with respect to the fluid orifice and having an orifice for discharge of said liquid; said element being constructed and arranged in one of its positions to be in atomizing relation with said fluid orifice and in another position to enter and clean said fluid orifice; said element being moved to its atomizing relation by the fluid pressure in the said end of said chamber; and adjustable means for limiting the movement of said element due to the fluid pressure whereby the atomizing relation of said orifices is determined; the last said means being capable of being adjusted during discharge from both orifices.

14. An atomizer comprising, in combination, a body having a chamber connected near opposite ends with a supply of fluid under pressure and a supply of liquid respectively; a fixed orifice at the fluid end of the chamber for discharge of fluid; an element movable in said chamber having a passage therethrough with an orifice at the end thereof adjacent the fixed orifice for discharge of liquid; said element being constructed and arranged in one of its positions to be in atomizing relation with said fluid orifice and in another position to enter and clean said fluid orifice; said element being moved to its atomizing relation by the fluid pressure in the fluid end of said chamber; and means adjustable during discharge from said orifice for determining the movement of said element due to the fluid pressure whereby the atomizing relation of said orifices is determined.

15. An atomizer comprising, in combination, a body having a chamber with an orifice for discharge of fluid under pressure; a movable element in said chamber having an orifice for discharge of a liquid and being constructed and arranged in one of its positions to be in atomizing relation with the fluid orifice and in another position to clean said fluid orifice; a second mov-

able element in said chamber constructed and arranged in one of its positions to be out of cleaning relation to the liquid orifice and in another position to clean said liquid orifice; and means responsive to changes of fluid pressure controlling the movements of said elements.

16. An atomizer comprising an outer element having an aperture for discharge of fluid under pressure; a second element movable within the outer element, having an aperture for discharge of another fluid and having a portion constructed and arranged to make sliding contact with the wall of the first mentioned aperture; a third element movable within the second element having a portion constructed and arranged to make sliding contact with the wall of the second mentioned aperture; the said elements being constructed and arranged for the movable elements to be moved by fluid pressure to position said apertures for simultaneous discharge therefrom; and means effective upon reduction of said fluid pressure for moving the said portions along the walls of said apertures respectively to clean them.

17. An atomizer head of the type including a casing having an air outlet and a fluid outlet nozzle coaxial with the said air outlet, and means for cleaning said air outlet and said nozzle, characterized by the fact that said nozzle is movably supported within said casing and constitutes the member for cleaning said air outlet, and the means for cleaning said nozzle is coupled to and actuated by movement of said nozzle.

18. An atomizer comprising an outer element having an aperture with a cylindrical wall portion for discharge of fluid under pressure and mechanism contained within said outer element providing a conduit having an aperture for discharge of a second fluid; the said mechanism comprising cleaning means having a cylindrical portion constructed and arranged to make sliding surface contact with the said cylindrical wall portion of the first mentioned aperture, means actuated by the fluid under pressure to effect withdrawal of said cleaning means from contact with said cylindrical wall portion and permit simultaneous discharge of both fluids, and means effective upon reduction of said fluid pressure to cause said portion of said cleaning means to slidably wipe along the said cylindrical wall portion of the aperture of the outer element to clean it.

19. An atomizer comprising an element having an aperture with a cylindrical wall portion for discharge of fluid under pressure, and a second element having an aperture for discharge of a second fluid; one of said elements being bodily movable with respect to the other, and the second element having cylindrical cleaning means constructed and arranged to engage the cylindrical wall portion of the first mentioned aperture throughout the peripheral extent of said cylindrical wall portion and to pass through the first mentioned aperture while so engaged.

20. An atomizer comprising an outer element having an aperture with a cylindrical wall portion for discharge of fluid under pressure, and mechanism contained within said outer element providing a conduit having an aperture for discharge of a second fluid; the said mechanism comprising cleaning means having a cylindrical portion constructed and arranged to make sliding surface contact with the said cylindrical wall portion of the first mentioned aperture throughout the peripheral extent of said cylindrical wall portion, other cleaning means adapted to penetrate said second mentioned aperture, means

actuated by said fluid under pressure to effect withdrawal of both cleaning means from both apertures to permit simultaneous discharge of both fluids, and means effective upon the reduction of said fluid pressure to cause said cylindrical portion of the first mentioned cleaning means to slidably wipe along and clean the said cylindrical wall portion of the first mentioned aperture and to cause said other cleaning means to penetrate and clean the second mentioned aperture.

21. An atomizer comprising a casing adapted to receive air under pressure and provided with a discharge orifice, a nozzle for discharge of liquid mounted in the casing and annularly spaced relative to the orifice whereby an annular opening is provided about said nozzle for discharge of air, cleaning means on the nozzle and normally closing said annular opening, cleaning means slidably within the nozzle and normally closing the nozzle, means for moving both said cleaning means away from said annular opening and said nozzle respectively in response to pressure of the air to permit discharge through both the annular opening and the nozzle during operation of the atomizer, and resilient means arranged to oppose the movements of both said cleaning means occasioned by the air pressure and to cause both said cleaning means to clean and close the annular opening and the nozzle respectively upon the cessation of said air pressure.

22. An atomizer comprising a casing having an aperture for discharge of fluid under pressure, members within said casing and movable with respect thereto, one of said movable members having a tubular extension for cleaning said aperture and surrounding an outlet for discharge of another fluid, another of said movable members being arranged to clean said outlet, means for moving said movable members in response to said fluid pressure to permit discharge of the fluid under pressure through said aperture and discharge of the other fluid through said outlet, and means effective upon reduction of the fluid pressure to move said movable members and thereby effect cleaning of said aperture and said outlet.

23. An atomizer comprising a casing adapted to receive air under pressure and including a tubular body; an end plate constructed and arranged to be adjustably clamped to one end of said body and having associated therewith an outlet for discharge of the air; a nut threaded on said end of said tubular body for clamping said end plate thereto; a nozzle mounted in said casing having a portion constructed and arranged to extend into said outlet for discharge of liquid; cleaning means on said nozzle constructed and arranged to make sliding surface contact with the wall of said outlet and thereby determine the position of said plate transversely with respect to said body; air pressure means for moving said cleaning means away from said outlet; and means effective upon the reduction of the air pressure to move said cleaning means through said outlet and thereby effect cleaning of said outer wall.

24. A self-cleaning atomizer comprising a head having a chamber for atomizing fluid under pressure, means for supplying atomizing fluid under pressure to said chamber, means detachably connected to said head to cover said chamber comprising a laterally movable thin disk having a central outlet port for the fluid under pressure adapted to be clamped to said head, means for supplying liquid to said head including a nozzle

positioned to penetrate said fluid outlet port and operable to center said disk with its outlet port in coaxial alignment with said nozzle before said disk is clamped on said head, means operated by the pressure of the atomizing fluid to withdraw said nozzle to a predetermined position permitting effective operation of the atomizer, and means operating upon discontinuance of said fluid pressure to return said nozzle to fluid outlet port penetrating position.

25. In an atomizer of the type set forth, a casing adapted to receive air under pressure, a pipe for conducting liquid and mounted in the casing, a nozzle associated with said casing provided with a central orifice, a jet connected with the pipe for the discharge of liquid and extending into and in spaced relation to the orifice, a cleaning member normally closing the portion of the orifice exterior of the jet and movable in a direction away from the nozzle, air pressure means for moving the cleaning member away from its closed position, and means for maintaining the cleaning member in closed position when the air pressure is removed.

26. In an atomizer of the type set forth, a casing adapted to receive air under pressure, a pipe for conducting liquid mounted in the casing, a nozzle associated with said casing provided with a central orifice for the discharge of the air and liquid, a jet connected with the pipe for the discharge of liquid and extending into and in spaced relation to the orifice, a cleaning member normally closing the portion of the orifice exterior of the jet and movable in a direction away from the nozzle, air pressure means for moving the cleaning member away from its closed position, and resilient means for urging the cleaning member to closed position.

27. In an atomizer of the type set forth, a casing adapted to receive air under pressure, a nozzle associated with said casing provided with a central orifice, a jet for the discharge of liquid mounted in the casing and annularly spaced relative to the orifice, whereby an annular opening is provided about said jet for the discharge of air, and means mounted in said casing and movable into said annular opening to the point of discharge of the jet for cleaning said annular opening.

28. In an atomizer of the type set forth, a casing adapted to receive air under pressure, a nozzle associated with said casing provided with a central orifice, a jet for the discharge of liquid mounted in the casing and annularly spaced relative to the orifice, whereby an annular opening is provided about said jet for the discharge of air, and cleaning means mounted in said casing and normally closing said annular opening and movable away from said opening in response to pressure of the air during operation of the atomizer.

29. A self-cleaning atomizer having a conduit for a liquid and a chamber for an atomizing fluid under pressure provided respectively with outlet members one of which is resiliently actuated, means supporting said members for relative movement to permit the inner outlet member to penetrate and clean the outlet of the outer member, and means responsive to the pressure of said atomizing fluid to cause relative movement between said outlet members first to position and then to hold said members in proper atomizing relation so long as the fluid pressure of said atomizing fluid is maintained, and means operated upon discontinuance of said fluid pressure to

penetrate and clean the outlet of said inner member.

30. A self-cleaning atomizer comprising relatively movable members provided respectively the one with a circular outlet and the other with a nozzle for the respective discharge of fluid under pressure and of liquid, the said members being positioned by the pressure of the fluid for continuous atomization of the liquid while supplied with said fluid under pressure and means actuated by changes in the pressure of the atomizing fluid incident to interruption of the supply thereof to cause said nozzle to pass through and clean said outlet.

31. A self-cleaning atomizer comprising relatively movable members provided respectively the one with a circular outlet and the other with a nozzle for the respective discharge of fluid under pressure and of liquid, the said members being positioned by the pressure of the fluid for continuous atomization of the liquid while supplied with fluid under pressure, a nozzle cleaning member and means actuated by changes in the pressure of the fluid incident to interruption of the supply thereof for producing relative movement between said members to cause said nozzle to pass through and clean said outlet and to cause said nozzle cleaning member to pass through and clean said nozzle.

32. A self-cleaning atomizer comprising relatively movable members provided respectively the one with an outlet for fluid under pressure and the other with a nozzle for the discharge of liquid, the said members being positioned by the pressure of the fluid for continuous atomization while supplied with said fluid under pressure, and means actuated by changes in the pressure of the atomizing fluid incident to interruption of the supply thereof to cause said nozzle to pass through and clean said outlet.

33. A self-cleaning atomizer comprising a casing and mechanism enclosed therein constructed and arranged to provide a first passageway leading to a main outlet and a second passageway having an outlet for the discharge of a supply of liquid by way of the main outlet and to effect atomization of said liquid by the action of fluid under pressure when supplied to the first passageway, said mechanism including a tubular member for cleaning the main outlet and a member for cleaning the liquid outlet, one of said members being moved relatively to the other by said fluid pressure to atomizing position, and resilient means effective only in response to changes in the pressure of said fluid to cause said members effectively to clean said outlets.

34. A self-cleaning atomizer comprising a casing having a main outlet, mechanism within said casing cooperating therewith to provide an outer passageway leading to said main outlet and an inner passageway having a complementary outlet in axial alinement with said main outlet, means for supplying liquid to one of said passageways, means for supplying fluid under pressure to the other passageway to atomize said liquid, said mechanism including penetrating instrumentalities relatively positioned with respect to said outlets by the normal pressure of said fluid to maintain said outlets open for atomization, and resilient means effective only in response to changes in the pressure of said fluid to cause said outlets to be cleaned respectively by said penetrating instrumentalities.

35. In an atomizer head, a casing having an outlet in one wall, a nozzle coaxial with said

outlet, means supporting said nozzle for axial movement from a position within said outlet to a withdrawn position permitting flow through said outlet, spring means tending to move said nozzle into said outlet, inlet means for introducing a pressure fluid into said casing for discharge through said outlet, means within said casing responsive to fluid pressure therein for moving said nozzle from said outlet, means for supplying liquid to said nozzle for discharge therethrough, a rod coaxial of said nozzle for cleaning the same, and means actuated by movement of said nozzle supporting means for moving said rod into and out of said nozzle.

36. In an atomizer head, a casing including a cylindrical section and a wall closing one end of said cylindrical section, an outlet extending through said wall substantially axially of said cylindrical section, means for introducing a pressure medium into said cylindrical section for discharge through said outlet, a piston in said cylindrical section, spring means tending to move said piston towards said outlet, a nozzle on said piston coaxial with said outlet, a passage through said piston for admitting fluid to said nozzle, said nozzle having an elongated tip movable into said outlet when said piston is moved by said spring means, and means for cleaning said nozzle upon movement of the latter into said outlet.

37. In an atomizer head, a casing comprising a cylindrical section and two end sections secured thereto, one end section having an outlet there-through, inlets for introducing a pressure medium into the outlet end of said cylindrical section and for introducing a liquid into the opposite end thereof, a piston sleeve having a sliding fit within said cylindrical section, a packing on said piston sleeve at the end adjacent said outlet, a nozzle on said piston sleeve and coaxial with said outlet, a spring acting on said piston sleeve for urging said piston sleeve towards said outlet, a passage through said piston sleeve for admitting fluid to said nozzle, a cleaning rod within said piston sleeve, and means coupling said rod to said piston sleeve for actuation thereby comprising a rod carrier slidable within said piston sleeve and a lever pivoted at one end on said casing and extending through openings in said rod carrier and said piston sleeve.

38. In an atomizer head, a casing having an air outlet, a nozzle supported for movement in said casing coaxial with said air outlet, nozzle cleaning means comprising a rod mounted on a carrier, a lever having the ends thereof pivoted on said carrier and said casing, and means movable with said nozzle in engagement with said lever between the ends thereof.

39. In an atomizer head, the combination of a casing; a cleaning rod coaxial with the casing; concentric nozzles coaxial with the cleaning rod, one of said nozzles being slidable longitudinally relative to the other; the said nozzles in operative position providing a central fluid outlet surrounded by an annular fluid outlet; said nozzles also being relatively movable to project the cleaning rod through the central fluid outlet and the inner nozzle through the outer nozzle to eject any foreign matter from the annular fluid outlet.

40. In an atomizer head, the combination of a casing; a cleaning rod coaxial with the casing; concentric nozzles coaxial with the cleaning rod, one of said nozzles being slidable longitudinally relative to the other; the said nozzles in operative position providing a central fluid outlet surrounded by an annular fluid outlet; said nozzles also being relatively movable to project the cleaning rod through the central fluid outlet and the inner nozzle through the outer nozzle to eject any foreign matter from the annular fluid outlet; pneumatic means for effecting the relative movement of said nozzles to the operative position; spring means for effecting the relative movement of said nozzles to the cleaning position; and stops determining the two positions of said nozzles.

41. An atomizer comprising a casing having inlets for two fluids and coaxial nozzles for the discharge of said fluids; one of said nozzles being movable with respect to the other between an operative position and a cleaning position; the said nozzles in operative position being arranged concentrically to provide a central fluid outlet surrounded by an annular fluid outlet, and in cleaning position being arranged with the inner nozzle extending through the outer nozzle; the inner nozzle having at its discharge end a cylindrical portion of suitable outside diameter with respect to the inside diameter of the outer nozzle to provide the said annular fluid outlet, and having adjacent said end portion a second cylindrical portion with an outside diameter substantially the same as the inside diameter of the outer nozzle whereby upon movement of said inner nozzle relatively to the outer nozzle said second portion enters and cleans the annular fluid outlet; pneumatic means for effecting the relative movement of said nozzles to the operative position; and spring means effecting the relative movement of said nozzles to the cleaning position.

ALBERT J. LOEPSINGER.