

July 6, 1965

W. W. WEESE ET AL

3,192,950

APPARATUS FOR INJECTING MATERIAL INTO A FLUID FLOW

Filed Sept. 21, 1962

2 Sheets-Sheet 1

FIG. 3

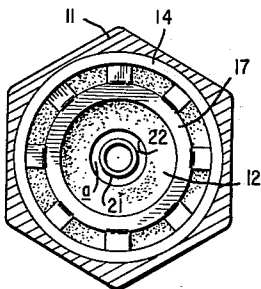


FIG. 1

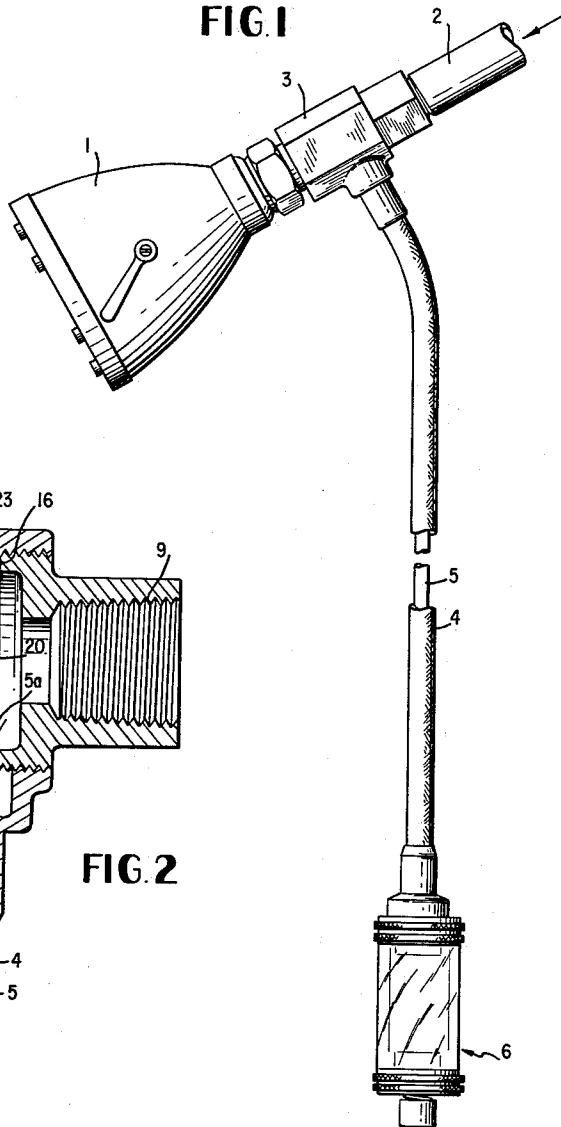
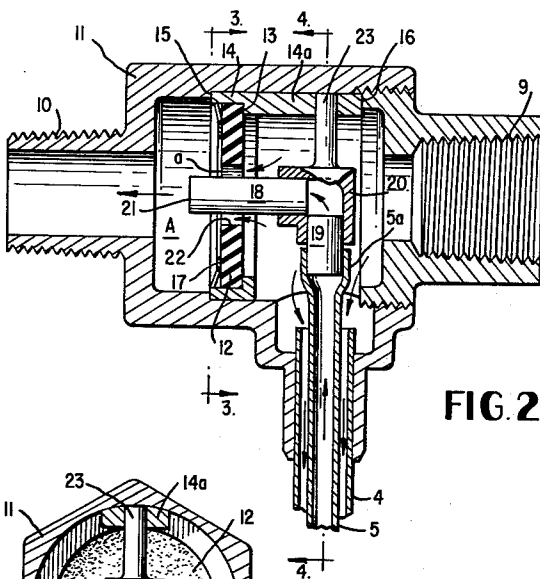


FIG. 2

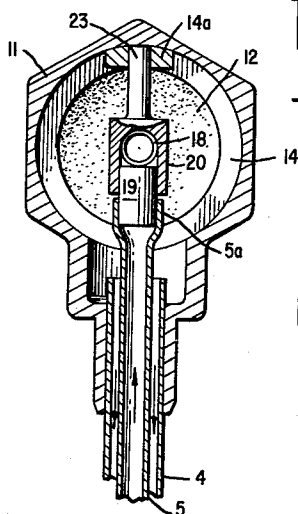


FIG.4

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2 Sheets-Sheet 2

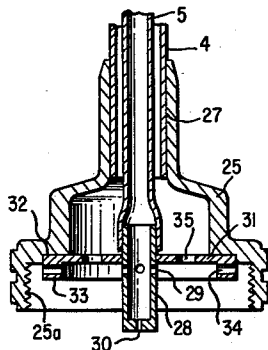
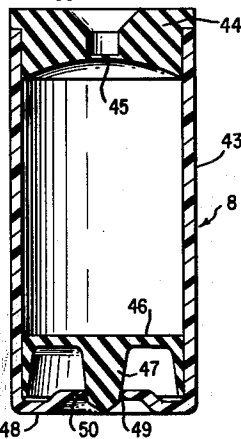
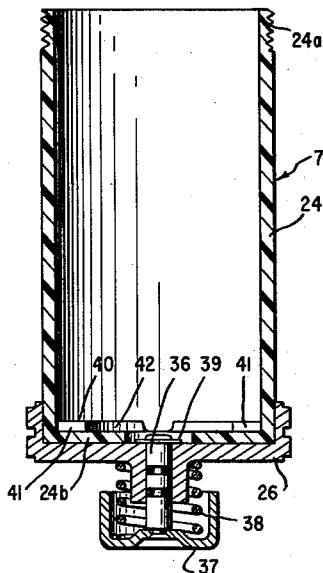


FIG. 5

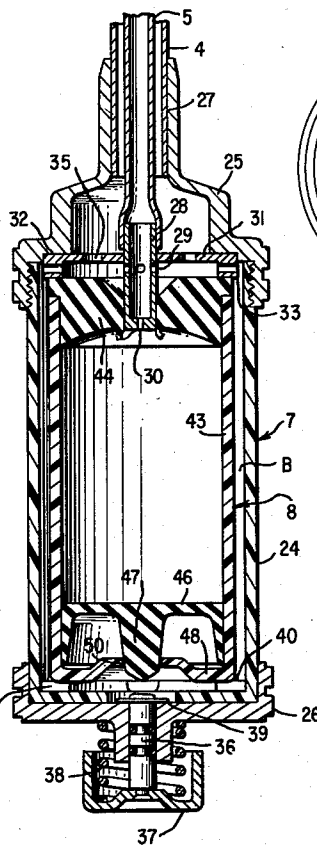
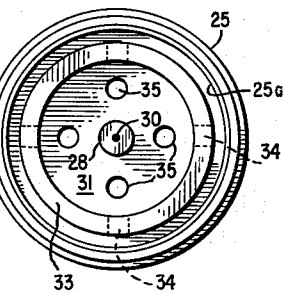


FIG. 8

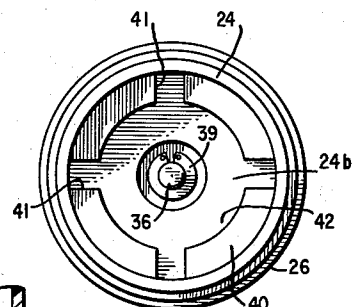


FIG. 9

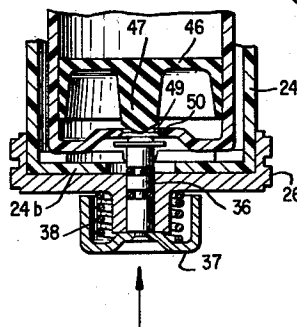


FIG. 7

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APPARATUS FOR INJECTING MATERIAL INTO A FLUID FLOW

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19 Claims. (Cl. 137—564.5)

This invention pertains to an apparatus for injecting material into a flowing fluid body. In particular, it relates to an apparatus for injecting liquid soap, detergent, medicinal, or cosmetic substances into a water line supplying a conventional shower head.

Heretofore, a variety of structures has been devised for the purpose of injecting material into a flowing fluid body. Several such devices have been designed for the specific purpose of injecting cosmetic and medicinal substances into water supplying a shower head. In general, however, such devices have been structurally cumbersome and awkward to operate. Both the loading and changing of material charges frequently proved to be tedious and difficult to accomplish. The operating components of such devices were generally not uniformly accessible to people of different heights or to people occupying different positions in relation to a shower head.

The most significant disadvantages attendant upon previously known injection devices relates to the manner in which material was injected into a water line. Many devices did not achieve a uniform blending of material with the water flowing to the shower head. The degree of control over the rate of injection of material was frequently inadequate such that erratic injection would occur. No provision was made for accommodating the system to changes or variations in the pressure of the water line.

A particular failing resided in an inability to obtain complete introduction of a charge of material into the flowing body of water. Often substantial quantities of material remained in conduits connecting the material charge with the main water line.

An additional inadequacy of previously utilized structures involved a failure to fully utilize the main fluid flow to effect the injection of material thereinto.

Recognizing the distinct need for an improved apparatus for injecting material into a flowing body of fluid, it is an object of this invention to provide such an apparatus which substantially obviates the failings of previously developed structures.

It is a particular object of the invention to provide such an apparatus which is compact in nature and which is convenient and easy to manipulate, particularly with respect to the initiation of the injection of the material, with respect to the loading of the material charges, and with respect to the changing from one type of material charge to another.

A further object of the invention is to provide such an apparatus which enables the obtaining of positive and efficient control over the rate of material injection.

A still further object of the invention is to provide such an apparatus which efficiently and automatically accommodates to changes in the pressure of the flowing fluid body into which material is to be injected.

An additional object of the invention is to present such an apparatus wherein substantially complete injection of a material charge is consistently accomplished.

Another object of the invention is to provide an injection apparatus wherein maximum use is made of the energy of the flowing body of fluid to effect the injection of material thereinto.

Yet another object of the invention is to provide such an apparatus which consistently accomplishes uniform blending of material with main fluid flow.

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A further object of the invention is to provide an injection apparatus having operating components which are readily accessible to persons of different heights occupying different positions in relation to a shower head. In particular, it is an object of the invention to provide an apparatus wherein the operating components may be located at a point remote from and beneath the shower head and which are freely moveable.

A final object of the invention is to provide an injection apparatus, including a material container which facilitates the loading and changing of material charges, including a fluid flow diverter which fully utilizes the flow energy to effect the injection of material thereinto, and including an injection unit which is selectively operable and which accomplishes a substantially complete injection of material into the main body of flowing fluid.

For accomplishing the objects of this invention there is envisioned an injection apparatus including fluid flow diverting, material injecting, and material containing components.

The fluid flow diverting component of the apparatus includes main passage means through which the fluid flow passes en route to a point of use such as a shower head. Apertured, resilient wall means extend transversely across this main passage means. A first conduit means is mounted in fluid communication with the main passage means upstream of the wall means. Second conduit means extend into the main passage means and terminate in an outlet downstream of the resilient wall means. The outlet of the second conduit means is located adjacent an apertured portion of the resilient wall means such that fluid passing through the apertured portion of the wall means will flow past this outlet and tend to induce a pressure reduction therein. The first and second conduit means are in fluid pressure transmitting relation, such that fluid diverted from the main passage means into the first conduit means by the resilient wall means will exert pressure on fluid in the second conduit means.

The injection component of the apparatus comprises a housing and means for supporting a quantity of material within this housing. The first conduit means extending from the flow diverting component communicates with the housing for supplying fluid to the interior thereof to effect the expulsion of material. The second conduit means extending from the flow diverting component intersects the housing for transporting material away therefrom. Port means intersect the wall of the second conduit means within the housing. Such port means are in fluid communication with the first conduit means so that fluid may flow from the first conduit means directly into the second conduit means.

The material containing component of the apparatus comprises the means for supporting a quantity of material within the housing of the injection component. The material containing component includes material enclosing means having a closure for one end in which is incorporated a material outlet. Releasable sealing means are provided for this outlet. Piston means are positioned in the other end of the material enclosing means and disposed to be axially slideable therealong to expel material through the outlet. A resilient projection extends from the piston means. Gripping means carried on the enclosing means are adapted to grip the piston means projection transversely of the axis of the piston means. The projection is separable from the gripping means in response to a force exerted axially of and toward the piston means.

In the preferred embodiment, the first and second conduit means are both flexible and coaxially related. Additionally, the injector housing and the material enclosing means are both tubular and transparent in nature. The length of the conduits is such as to enable the injector unit and its enclosed material container to be

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disposed remote from and beneath a shower head so as to be conveniently accessible to a user.

Flow restricting means are preferably incorporated in fluid communication with both the first and second conduit means to enable the obtaining of positive control over the rate at which material is injected into the fluid flow.

In describing the structural and operational characteristics of the invention reference will be made to a preferred form of the apparatus as illustrated in the accompanying drawings. In these drawings:

FIGURE 1 is a side, elevation view of a shower head in combination with a material injecting apparatus;

FIGURE 2 is a sectioned, longitudinal view of the fluid diverter component of the apparatus illustrated in FIGURE 1;

FIGURE 3 is a sectioned, transverse view of the diverter component of the apparatus, as viewed along the section line 3—3 of FIGURE 2;

FIGURE 4 is a sectioned, transverse view of the diverter component of the apparatus, as viewed along the section line 4—4 of FIGURE 2;

FIGURE 5 is a sectioned, elevational view of axially separated elements of the injector and material containing components of the apparatus;

FIGURE 6 is a sectioned, elevational view of the assembled components illustrated in FIGURE 5;

FIGURE 7 is a sectioned, fragmentary view of the lower portion of the assembly illustrated in FIGURE 6, showing the operation of a material releasing plunger;

FIGURE 8 is a bottom plan view of the upper element, i.e. an injector component closure, of the FIGURE 5 assembly; and

FIGURE 9 is a top plan view of the lower element, i.e. the injector component housing, of the FIGURE 5 assembly.

The preferred form of the apparatus, as illustrated in FIGURE 1, includes a conventional shower head 1 in fluid communication with a water line 2. A diverter unit 3 is interposed in the water line 2 upstream of the shower head 1. Coaxial branch conduits 4 and 5 extend from the diverter 3 to a material injector assembly 6. As shown in FIGURE 6, injector assembly 6 includes an injector unit 7 housing a material container 8.

Diverter unit 3 is attached to water line 2 by a conventional threaded coupling 9 and is attached to the shower head 1 by a conventional coupling 10, both of which couplings are illustrated in FIGURE 2.

The body 11 of the diverter unit 3 defines a passage A for a flow of water so as to place the water line 2 and the shower head 1 in fluid communication. Within the interior of the diverter unit 3 and extending transversely across the passage downstream of conduit 4 is a resilient wall member 12. Wall member 12 is disc-like in nature and is seated against an abutment 13 formed in a mounting ring 14. Mounting ring 14 is in turn seated within body 11 against a recessed annular abutment 15. An axial extension 14a of mounting ring 14 engages an abutment 16 to positively secure the mounting ring 14 against axial movement. A conventional annular spring type of retaining ring 17 may be employed to hold the resilient wall member 12 against the seat 13, as illustrated.

Branch conduit 4 intersects housing 11 to communicate with the interior passage A. Branch conduit 5, as shown in FIGURE 2, is coaxially disposed within conduit 4 in spaced relation therewith. Preferably, conduits 4 and 5 are unrestrained and flexible to facilitate the movement of the injector assembly 6 relative to the shower head 1.

Inner branch conduit 5 includes a portion 5a which extends into the passage A. Short conduit sections 13 and 19 are secured in a right angle relationship in a mounting block 20 so as to define a right angled portion

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or extension of the conduit 5. This extension has an end portion 21 which projects through an aperture 22 in resilient wall 12 to terminate in an opening downstream of the wall and adjacent its aperture.

As illustrated, the end portion 21 of the conduit 5 passes freely through the aperture 22 so as to provide a relatively small annular opening a for restricting the flow of water through the passage A and channeling this flow around the past the conduit portion 21.

Mounting block 20 is secured in proper alignment within the passage A by mounting means such as an integral pin 23 which extends from and is attached to the portion 14a of mounting ring 14.

As shown in FIGURE 6, coaxial conduits 4 and 5 extend to and are in fluid communication with the interior of the injector unit 7. Injector unit 7 includes a transparent, generally tubular wall portion 24, a cap 25 and a base 26.

Tubular wall portion 24 is separably associated with the cap 25 through means of a male threaded portion 24a integrally formed in the upper end of tubular portion 24 and a female threaded portion 25a integrally formed in the lower end of cap 25.

Outer conduit member 4 is attached to the cap 25 at a sealed junction 27. Inner conduit 5 passes through cap 25 to terminate in a removable end portion 28. Removable end portion 28, which is frictionally secured in the body of conduit 5, includes a plurality of lateral ports 29 and an end orifice 30. End portion 28 is secured by a transverse plate 31 which is mounted in a recessed seat 32 formed in the cap 25. Plate 31 has an axially extending flange or lip 33 in which are formed a plurality of radially directed orifices 34. A plurality of axially directed ports 35 are formed in the body of the plate 31 to provide fluid communication between the outer conduit 4 and the orifices 34. As is apparent, the ports 35 also provide fluid communication between the outer conduit 4 and the ports 29 formed in the end portion 28 of the inner conduit 5.

Tubular housing portion 24, which is desirably both transparent and cylindrical, is secured to the base 26. In the base 26 there is mounted an axially movable plunger 36. Plunger 36 includes an operating knob 37. A coil spring 38 positioned between the base 26 and the operating knob 37 biases the plunger 36 axially outwardly, away from the interior of the injector unit 7. A flange 39 mounted on the plunger 36 on the interior of the base 26, prevents the separation of the plunger 36 and the base 26. As illustrated in FIGURE 5, a radial flange portion 24a extending from tubular portion 24 has a central aperture which enables the plunger 36 to be projected into the interior of the injector unit 7.

A rim-like seat 40 is contained in the base of the injector unit 7 to support the material container 8. As shown in FIGURE 9, a plurality of radially directed slots 41 are formed in the rim 40, which slots communicate with a recessed central area 42.

The material container 8 comprises a generally tubular and transparent portion 43. A closure 44 fabricated preferably of rubber or plastic material is positioned in the upper end of tubular portion 43. Closure 44 includes a rupturable outlet 45. A piston 46, preferably formed of rubber or resilient plastic material, is positioned in the base of tubular portion 43. Piston 46 includes an axially extending projection 47.

A radially extending flanged portion 48 extending from tubular portion 43 includes a central aperture 49 coaxially aligned with the piston extension 47. Aperture 49 includes a sharpened edge or rim 50 adapted to receive and transversely grip the projection 47. As illustrated in FIGURE 5, when piston 46 is disposed in its lowermost position, in the material container 8, the projection 47 extends through the aperture 49 and is restrained and thus gripped by the rim 50.

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Material container 8 includes a charge of material disposed between the closure 44 and the piston 46, which material is intended to be injected into water flowing to the shower head 1. Such material may comprise any of a wide variety of substances such as liquid soaps, detergents, cosmetic materials, medicinal materials, pharmaceutical materials, and other substances.

With the individual elements of the apparatus having been described the operation of the apparatus and its various components may now be examined.

When a person wishes to load a container of material in the apparatus to initiate its operation, tubular portion 24 of the injector unit 7 is unscrewed from the injector cap 25. A container 8 of material is then positioned within the tubular portion 24 as shown in FIGURE 6. When inserted into the injector unit 7, the material container 8 would be disposed with the piston 46 adjacent the plunger 36. When first inserted, the projection 47 would be gripped by the rim 50 so as to seal the lower end of the material container 8. As the cap 25 is screwed into the wall portion 24, the projecting portion 28 of the inner conduit 5 would be forced against and rupture the material outlet 45. Portion 28 would thus extend through the material container closure 44 such that its inlet, i.e. orifice 30, would be in fluid communication with the material contained within the container 8. In being forced through the closure 44, the portion 28 of conduit 5 would become sealingly engaged with the closure 44 while the ports 29 would be positioned between the container 8 and the cap 25.

With the injector unit 7 and material container 8 assembled as shown in FIGURE 6, the container 8 is supported within the injector unit 7 in spaced relation therewith. Tubular member 43 is of lesser outside diameter than the inside diameter of tubular wall 24 so as to define an annular space B between these two wall members.

Rim 40 supports the base portion 48 of the material container 8 above the recess 42. With the components assembled as shown in FIGURE 6, rim 40 and rim 51 on annular flange 33 engage the lower and upper ends respectively of the container 8 so as to prevent its axial movement.

Fluid communication between the outer conduit 4 and the base of the material container 8 is provided through the communicating conduit 4, ports 35, orifices 34, annular space B, slots 41 and recess 42.

With the elements of the apparatus in their assembled relationship, the lateral ports 29 in the inner conduit 5, in conjunction with the plate ports 35, provide a direct fluid communication between the interiors of the outer conduit 4 and the inner conduit 5.

Subsequent to the assembly of the injector unit 7 and the material container 8 a user may effect the injection of the material housed by the container 8 into the flowing water stream by merely pressing the operating knob 37. When this knob is pressed, the plunger 36 is pressed against the end of the projection 47 so as to force the projection 47 axially out of engagement with the rim 50. When projection 47 clears the rim 50, the base of the piston 46 is effectively placed in fluid communication with the water flowing through line 2. The restriction to water flow caused by the wall member 12 diverts water from line 2 into the interior of conduit 4 from whence it flows through the ports 35 and orifices 34, through the annular space B, slots 41, and recess 42, and passes through the opening 49 to act upon the base of piston 46 so as to tend to urge it axially toward the outlet 45.

Under the influence of this diverted water pressure, the piston 46 will advance axially within the tubular portion 43 to expel material from the container 8 and cause it to enter the orifice 30 of the inner conduit 5. Material entering the inner conduit 5 will flow upwardly to issue from the open end of outlet 21. The restriction exerted by the annular passage *a* will tend to induce a relatively high velocity flow of water axially of and surrounding

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the conduit portion 21. Through a venturi or aspirating phenomena, this flow will tend to produce a pressure reduction in the open end of the outlet portion 21. This pressure reduction will facilitate the flow of material from the container 8 into the water stream moving toward the shower head 1.

The rate at which material is expelled from the container 8 is affected directly by the dimensioning of the orifices 34, the orifice 30 and the viscosity of the material. Orifices 34 regulate the pressure applied against the piston 46 and thus regulate the expelling force applied to the material within the container 8. The dimension of the orifice 30 determines the resistance imposed within the outlet conduit 5 to the expulsion of the material from the container 8. The combined control effects of orifices 34 and 30 produce uniform material blending in the water flow.

Due to the transparent material of the tubular portion 24 and the tubular portion 43, the degree and rate of expulsion of material from the injector assembly 6 may be readily observed.

In the event of fluctuations of water pressure in line 2, resilient wall 12 will flex so as to allow the annular opening *a* to vary in size in proportion to the imposed line pressure. In this way, the apparatus is readily accommodated to variations in line pressure so as to insure the imposition of material expelling pressures on the piston 46 which are modulated within a desired range. Thus, if a sudden pressure increase should occur in line 2, the opening *a* would enlarge so as to tend to reduce the restricting force imposed by the apertured wall 12. In this manner the imposition of excessive pressure upon the piston 46 would be avoided. Conversely, should line pressure drop, the annular opening *a* would tend to constrict from a previously distended position so as to create an augmented restriction to flow. In this manner there would be a relative increase in the degree of diverted flow into the conduit 4 so as to maintain an adequate pressure acting upon the piston 46.

As will be appreciated, with coaxial conduit members 4 and 5 being both flexible and free, the injector assembly 6 will hang freely downwardly to assume a position below and remote from the shower head 1. This position and the freedom of movement of the injector assembly 6 insures convenient access to the assembly by persons of different heights and by persons assuming a variety of positions in relation to the shower head 1. The coaxial nature of the conduits 4 and 5 facilitates the moving of the injector assembly 6 to a convenient position of operation by a user. The resistance to free movement and the tangling tendencies which would be inherent in a multiple conduit structure are entirely avoided.

With a supply of material containers 8 made conveniently accessible to a person using a shower, an individual, without moving from the shower area, may readily disengage the separable components of the injector unit 7 and insert replacement material conduits 8 as may be desired.

In describing the operation of the apparatus of this invention, the advantages attributable to the apparatus have been demonstrated.

The overall apparatus is structurally simple in nature, reliable in operation, and compact. Uniform blending is achieved and the apparatus automatically accommodates to pressure changes in the flow of fluid into which material is to be injected. Positive pressure control is maintained on the material injecting mechanism. A scavenging arrangement is provided to prevent the accumulation of a stagnant body of material between the injector unit and the fluid flow.

The nature of the injector unit facilitates the changing and replacement of material charges. The orifice in the inlet end of the material feeding conduit of the injector unit affords positive control, over the injection rate in relation to the viscosity of the material. The replaceable

nature of this orifice enables the apparatus to be appropriately accommodated to a wide range of materials with materially different viscosities.

The overall apparatus may be easily incorporated in conventional shower line installations without materially altering the original installations. Positive means are provided by means of which a user may selectively determine when material is to be blended with water flowing to the shower head. The injector control unit and material loading unit is disposed beneath the shower head so that it may be conveniently reached. This disposition enables convenient operation and control of the injection apparatus by persons of different heights. The freely movable nature of the flexible conduits and the coaxial nature of these conduits enables the injector assembly to be freely moved. In this way, the injector assembly may be grasped and operated by a user at a position considered to be the most comfortable and convenient.

The overall apparatus induces an injection of material by applying both a positive material expelling force and by creating a pressure reduction ahead of the material in the fluid flow. This dual effect insures optimum injection efficiency.

The use of the cartridge type of material container in the injection assembly facilitates the loading of material charges and the substitution of one charge for another.

While the invention has been described with reference to preferred embodiments of the apparatus components, it is readily apparent that certain modifications may be made with respect to the disclosed structure. For example, under certain circumstances it may be feasible to contain solid material within the injector assembly for injection into a flowing body of fluid. In certain applications it may be desirable to provide means for interrupting the injection of material into a fluid flow after it has been initiated, but subsequent to the depletion of the supply of material. Should this be desired, any of several conventional valving arrangements may be incorporated in the apparatus. One convenient arrangement would be to incorporate a conventional needle valve in the material outlet conduit 5.

The closure 44 of the material container 8 has been disclosed as being provided with a rupturable material outlet 45. Where desired, a removable outlet stopper could be utilized in lieu of the rupturable membrane portion.

The spring biased plunger 36 for releasing material from the material container 8, as disclosed in this application, constitutes a particularly reliable and structurally simple operating mechanism. However, several alternative material releasing devices might be employed.

Modifications such as those described, as well as other changes, additions and deletions in the disclosed structure, may be effected within the scope of the invention as defined in the appended claims.

We claim:

1. An apparatus for introducing material into a flow of fluid, said apparatus comprising:
 - passage means for said flow of fluid,
 - apertured, flow diverting means extending transversely across the interior of said passage means,
 - first conduit means in fluid communication with said passage means upstream of said flow diverting means, and
 - second conduit means intersecting and extending into said passage means, said second conduit means having an outlet downstream of said flow diverting means and an inlet to receive material,
 - means for introducing material into said inlet of said second conduit means,
 - port means adjacent said inlet of said second conduit means and intersecting a wall portion thereof, said port means being in fluid communication with said first conduit means whereby fluid may flow from

said first conduit means directly into said second conduit means.

2. An apparatus for introducing material into a flow of fluid, said apparatus comprising:
 - passage means,
 - a resilient wall extending transversely across the interior of said passage means, said resilient wall having a central aperture for restricting the flow of fluid through said passage means,
 - first conduit means in fluid communication with said passage means upstream of said resilient wall, and
 - second conduit means extending into said passage means upstream of said resilient wall, said second conduit means having a material inlet and a portion spaced from, coaxial with, and positioned within said first conduit means, said second conduit means also having a portion which passes freely through the aperture in said resilient wall and terminates in an outlet downstream of and adjacent to said resilient wall whereby fluid from said passage means passing through said apertured wall will tend to induce a pressure reduction in said outlet,
 - means for introducing material into said inlet of said second conduit means,
 - port means adjacent said inlet of said second conduit means and intersecting a wall portion thereof, said port means being in fluid communication with said first conduit means whereby fluid may flow from said first conduit means directly into said second conduit means.
3. An apparatus for expelling material, said apparatus comprising:
 - a housing,
 - means for supporting a quantity of material within said housing,
 - first conduit means communicating with said housing for supplying fluid to the interior thereof,
 - second conduit means intersecting said housing for transmitting material away therefrom, and
 - port means intersecting the wall of said second conduit means within said housing, said port means being in fluid communication with said first conduit means whereby fluid may flow from said first conduit means directly into said second conduit means,
 - said fluid from said first conduit means being in pressure-transmitting relation with said means-supported material and being adapted to expel material from said housing into said second conduit means.
4. An apparatus for expelling material, said apparatus comprising:
 - a housing including a transparent tubular portion and end closures, at least one of which closures is separable from said tubular portion,
 - means for supporting a quantity of material within said housing,
 - first conduit means intersecting a housing closure for supplying fluid to the interior of said housing in pressure-transmitting relation with said means-supported material and adapted to expel material from said housing,
 - second conduit means spaced from, coaxial with and positioned within said first conduit means and in fluid communication with said means-supported material for transmitting expelled material away from said housing,
 - port means laterally intersecting the wall of said second conduit means within said housing, said port means being in fluid communication with said first conduit means whereby fluid may flow from said first conduit means directly into said second conduit means, and
 - orifice means for restricting the flow of material into said second conduit means.
5. An apparatus as described in claim 4 including

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plunger means for selectively releasing material from said means for supporting a quantity of material.

6. An apparatus as described in claim 4 wherein said orifice means is detachably associated with said second conduit means.

7. An apparatus as described in claim 4 including additional orifice means for restricting the flow of fluid leaving said first conduit means.

8. A container for material to be injected into a flow of fluid, said container comprising:

material enclosing means,

a closure for one end of said material enclosing means, said closure having a material outlet,

means for releasably sealing said material outlet,

piston means positioned in another end of said enclosing means and axially slideable therealong to expel material through said outlet,

a resilient projection extending from said piston means, and

gripping means on said enclosing means for gripping said piston means projection transversely of the axis of said piston means, said projection being separable from said gripping means in response to a force exerted axially of said piston means.

9. A container for material to be injected into a flow of fluid, said container comprising:

a transparent tubular portion,

a closure for one end of said tubular portion, said closure having a rupturable material outlet,

a piston positioned in the opposite end of said tubular member and axially slideable therealong to expel material through said outlet,

a resilient projection extending axially of said piston, and

a wall member extending transversely across said opposite end of said tubular member and having an aperture to receive said piston projection, said aperture being defined by a sharpened annular rim adapted to yieldably grip said projection, and said projection being separable from said rim in response to a force exerted axially of and toward said piston.

10. An apparatus for injecting fluid material into a liquid flow, said apparatus comprising:

a housing having a separable closure,

first conduit means in fluid communication with the interior of said housing for supplying liquid thereto, second conduit means extending into said housing for transporting fluid material away therefrom,

a fluid material container,

means for supporting said fluid material container within said housing in spaced relation therewith,

a piston in one end of said fluid material container, said one end of said container being in fluid communication with said first conduit means,

a material outlet in another end of said fluid material container, said material outlet being in fluid communication with said second conduit means, and

port means intersecting said second conduit means external of said fluid material container, said port means being in fluid communication with said first conduit means.

11. An apparatus for injecting fluid material into a liquid flow, said apparatus comprising:

a housing including a transparent tubular portion and end closures, at least one of which closures is separable from said tubular portion,

first conduit means intersecting a housing closure for supplying fluid to the interior of said housing,

second conduit means spaced from, coaxial with and positioned within said second conduit means for transmitting material away from said housing,

a fluid material container, said container including a transparent tubular portion coaxial with, annularly spaced from and positioned within the transparent tubular portion of said housing,

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means for supporting said fluid material container within said housing such that said container is spaced from said housing so as to define a passageway extending between said housing and container from one end of said housing to the other,

a closure for one end of said transparent tubular portion of said fluid material container, said closure having an outlet in communication with an inlet of said second conduit means, a piston positioned in the opposite end of said tubular portion of said fluid material container, said piston being axially slideable through said tubular portion to expel material through said closure outlet of said container,

a resilient projection extending axially of said piston,

a wall member extending transversely across said opposite end of said tubular portion of said fluid material container and having an aperture to receive said piston projection, said aperture being defined by a sharpened annular rim adapted to yieldably grip said projection, said projection being separable from said transverse wall member in response to a force exerted axially of and toward said piston,

plunger means in the end of said housing adjacent said resilient piston projection, said plunger being resiliently biased away from said projection and moveable toward said projection to impose an axial force thereon to disengage it from said rim,

said first conduit means being in fluid communication with said passageway between said housing and said container whereby, when said resilient piston projection is freed from said rim, fluid from said first conduit means may pass through said aperture to transmit fluid pressure to said piston to urge it toward said material outlet,

port means laterally intersecting the wall of said second conduit means outside of said fluid material container but within said housing, said port means being in fluid communication with said first conduit means whereby fluid may flow from said first conduit means directly into said second conduit means,

and orifice means for restricting the flow of material entering said second conduit means.

12. An apparatus as described in claim 11 wherein said orifice means is detachably associated with said second conduit means.

13. An apparatus as described in claim 11 including further orifice means for restricting the flow of fluid leaving said first conduit means.

14. An apparatus for injecting material into a flow of fluid, said apparatus comprising:

passage means for said flow of fluid,

apertured, resilient wall means extending transversely across the interior of said passage means,

first conduit means in fluid communication with said passage means upstream of said wall means,

second conduit means extending into said passage means upstream of said resilient wall means, said second conduit means passing freely through an aperture in said resilient wall means and terminating in an outlet downstream of said resilient wall means

whereby fluid from said passage means passing through said aperture will tend to induce a pressure reduction in said outlet,

a housing,

means for supporting a quantity of material within said housing,

said first conduit means communicating with said housing for supplying fluid to the interior thereof to effect the expulsion of material therefrom,

said second conduit means communicating with said housing for transmitting expelled material away therefrom to the flow of fluid in said passage means, said first conduit means and said second conduit means being in fluid pressure transmitting relation whereby fluid diverted from said passage means into said first

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conduit means by said resilient wall means may exert pressure on fluid in said second conduit means, port means intersecting the wall of said second conduit means within said housing, said port means being in fluid communication with said first conduit means whereby fluid may flow from said first conduit means directly into said second conduit means.

15. An apparatus as described in claim 14 wherein said first and second conduit means are flexible and wherein said second conduit means is disposed within, spaced from, and coaxial with said first conduit means, said apparatus further including:

first orifice means for restricting the flow of fluid leaving said first conduit means and entering said housing, and

second orifice means for restricting the flow of material entering said second conduit means in said housing.

16. An apparatus for injecting fluid material into a liquid flow, said apparatus comprising:

passage means for said liquid flow, apertured, resilient wall means extending transversely across the interior of said passage means,

first conduit means in fluid communication with said passage means upstream of said wall means,

second conduit means extending into said passage means upstream of said resilient wall means, said second conduit means passing freely through an aperture in said resilient wall means and terminating in an outlet downstream of said resilient wall means whereby fluid from said passage means passing through said aperture will tend to induce a pressure reduction in said outlet,

a housing having a separable closure,

said first conduit means being in fluid communication with the interior of said housing for supplying liquid thereto,

said second conduit means extending into said housing, for transporting fluid material away therefrom,

a fluid material container,

means for supporting said fluid material container within said housing in spaced relation therewith,

a piston in one end of said fluid material container, said one end of said container being in fluid communication with said first conduit means,

a material outlet in another end of said fluid material container, said material outlet being in fluid communication with said second conduit means,

port means intersecting said second conduit means external of said fluid material container, said port means being in fluid communication with said first conduit means.

17. An apparatus as described in claim 16 wherein said housing and said material container include transparent tubular portions, wherein said first and second conduit means are flexible, and wherein said second conduit means is disposed within, spaced from and coaxial with said first conduit means, said apparatus further including:

first orifice means for restricting the flow of fluid leaving said first conduit means and entering said housing,

second orifice means for restricting the flow of material entering said second conduit means in said housing,

and means for selectively releasing material from said container, said means being operable externally of said housing.

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18. An apparatus for injecting fluid material into a liquid flow communicating with a shower head, said apparatus comprising:

passage means for said liquid flow,

apertured, resilient wall means extending transversely across the interior of said passage means,

first conduit means in fluid communication with said passage means upstream of said wall means,

second conduit means extending into said passage means upstream of said resilient wall means, said

second conduit means passing freely through an aperture in said resilient wall means and terminating

in an outlet downstream of said resilient wall means whereby fluid from said passage means passing

through said aperture will tend to induce a pressure reduction in said outlet,

a housing having a separable closure,

said first conduit means being in fluid communication with the interior of said housing for supplying liquid thereto,

said second conduit means extending into said housing for transporting fluid material away therefrom,

a fluid material container,

means for supporting said fluid material container within said housing in spaced relation therewith,

a plunger in one end of said fluid material container, said one end of said container being in fluid communication with said first conduit means,

a material outlet in another end of said fluid material container, said material outlet being in fluid communication with said second conduit means, and

port means intersecting said second conduit means external of said fluid material container, said port means being in fluid communication with said first conduit means.

19. An apparatus as described in claim 18, wherein said housing and said material container include transparent tubular portions, wherein said second conduit means is disposed within, spaced from and coaxial with said first conduit means, and wherein said first and second coaxial conduit means extend freely downwardly from said passage means whereby said housing is disposed remote from and beneath said passage means, said apparatus further including:

first orifice means for restricting the flow of fluid leaving said first conduit means and entering said housing,

second orifice means for restricting the flow of material entering said second conduit means in said housing, and

means for selectively releasing material from said container, said means being operable externally of said housing.

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