Nov. 21, 1961 R. M. HEDEMAN 3,009,653

MULTI-FLAVOR DRINK DISPENSER

Filed May 6, 1960 2 Sheets-Sheet 1

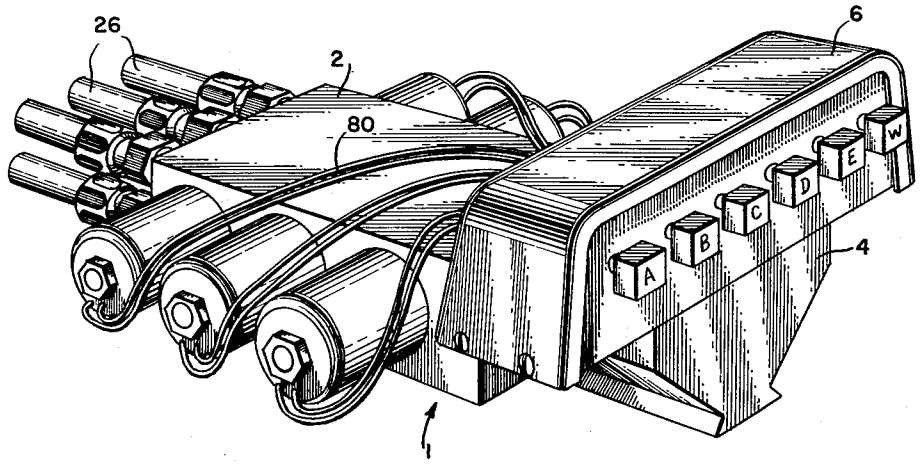

FIG. 1.

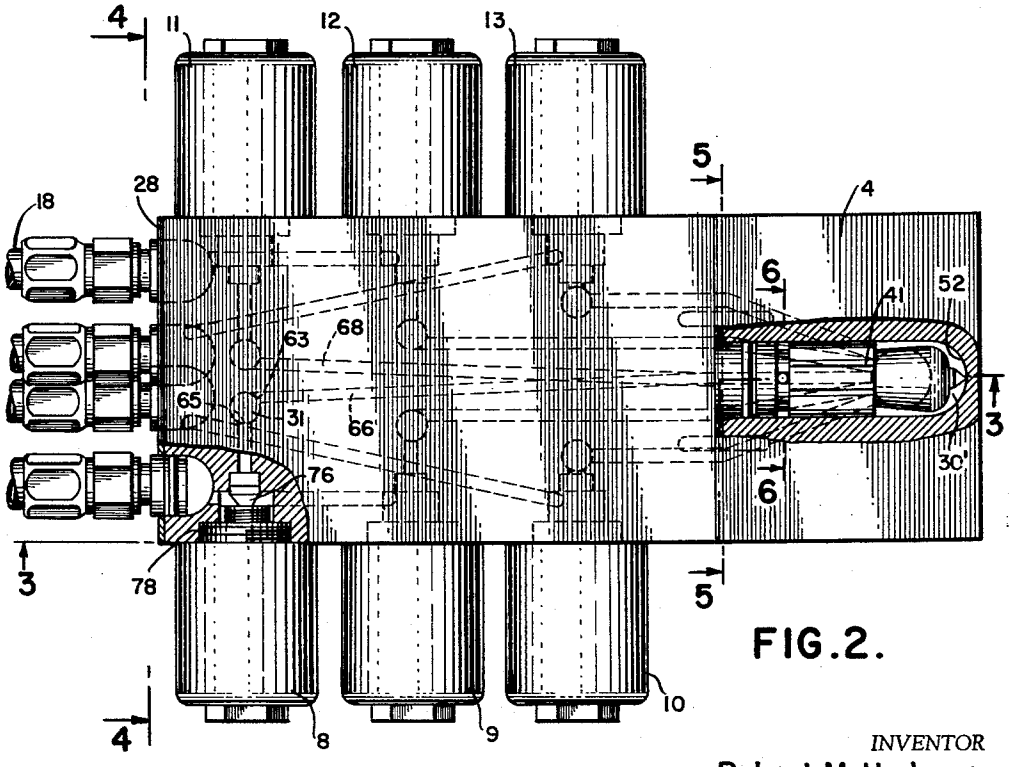

FIG. 2.

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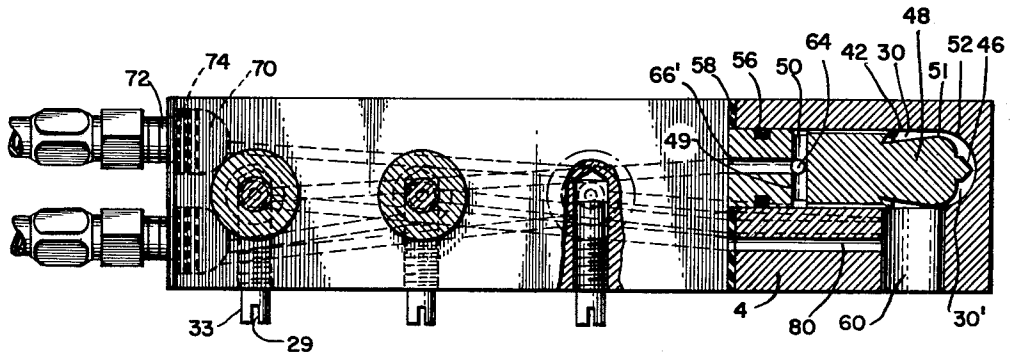

FIG. 3.

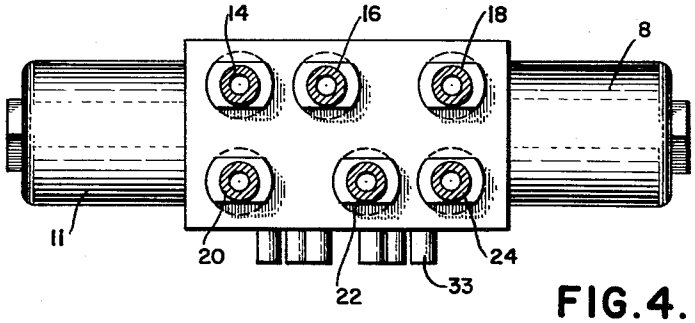

FIG. 4.

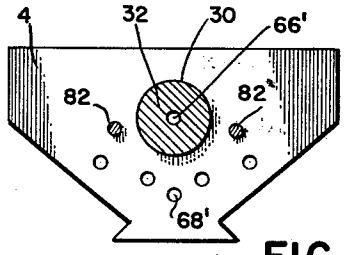

FIG. 5.

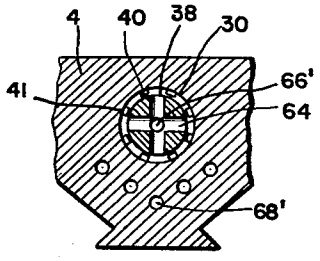

FIG. 6.

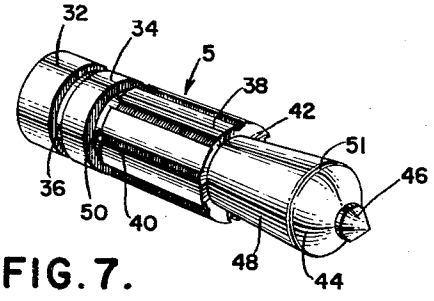

FIG. 7.

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MULTI-FLAVOR DRINK DISPENSER

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7 Claims. (Cl. 239—434)

This invention relates in general to beverage vending machines and in particular to a selective machine capable of dispensing any one of a plurality of beverages depending upon the choice of the purchaser. The invention further relates more particularly to a selective beverage vending machine capable of vending five different drinks, each a mixture of flavoring syrup and carbonated water, and a sixth drink consisting of carbonated water alone. In accordance with the invention, a system is incorporated to provide independent delivery of each of five flavors together with a draft of an appropriate amount of carbonated water. A single delivery exit nozzle is employed for the delivery of a predetermined portion of any one of the five flavors plus carbonated water.

Carbonated fluids under pressure presently being used in the carbonization of soft drinks require careful treatment, particularly with respect to controlling their flow attitudes during the period involving the combination thereof with syrups or other flavoring liquids. Specifically, in order to obtain a satisfactory result, the pressurized fluid must be released properly, that is, slowly and without undue agitation thereby precluding loss of the effervescent characteristics desired in the beverage. Attempts at obviating undue gas releasing agitation, spurting and splashing have been multiplicious as evidenced by the prior art. Resolution of the stated problem has been sought through the prevention of any abrupt or excessive changes in velocity of the pressurized carbonated fluid, and further through keeping this fluid in substantially calm liquid condition to effectuate retention of the activating gases therein, in order that the ultimately formed beverage, containing the added flavoring liquid, may be dispensed from a nozzle and into a receptacle with little loss of carbonation.

Essentially the present invention is directed to providing improvements in the exit nozzle of a beverage dispensing machine and in addition, to the conduit, metering, and control valve components adjacent the said exit nozzle. Positive measuring means for the syrup and carbonated water ingredients of the drink is provided, the combination thereof being accomplished in a novel mixing zone developed for minimization of any agitation which would cause a loss of carbonation during the brief time in which the effective pressure on the water is being reduced to atmospheric pressure.

According to the present invention, carbonated water, which has been educted along a path subject to refrigeration which preferably includes a water cooler, is dispensed from an exit nozzle wherein the flow of the pressurized carbonated fluid is tortuously extruded, a symmetrical, high velocity flow thereof being effectuated immediately above a vertically orientated and downwardly depending exit orifice. Once in a high velocity attitude, the carbonated fluid is reversed in direction thereby creating a supremely desirable and unexpected hydrodynamic effect which has been recognized to materially reduce the ultimate pressure and velocity of the beverage at precisely the moment at which it commences it's downward egress through the said vertical orifice depending from within the exit nozzle.

Consonant with the foregoing, the instant invention has for an object the provision of a dispenser wherein measured quantities of water and syrup are novelly directed

within a mixing chamber to thoroughly intersperse the products as they are discharged from the dispenser.

Another object of the present invention is to provide mixing means wherein the carbonated water is hydrodynamically treated prior to the combination thereof with a flavoring syrup to produce a thoroughly mixed beverage which requires no further stirring after being dispensed.

A further object of the present invention is the provision of an improved exit nozzle adapted to hydrodynamically treat a laterally directed stream of carbonated water in such manner as to overcome the tendencies toward turbulence thereby effecting a calm gravity inspired downward flow and subsequent intimate intermingling with flavor syrup with little loss of carbonation.

A still further object of the instant invention is the provision of a new and useful exit nozzle configuration in combination with an also novel unitary conduit block, both elements of the combination being constructed of transparent materials for the purpose of visual observation, the fluid zones of both elements being bereft of threads for sanitary purposes.

Still another object of the present invention is to provide simplified metering means integral with a novel unitary conduit block whereby the volume of flow of flavoring fluids and carbonated water may be individually and readily regulated.

A further object of this invention is to provide a system of electrical timing and selective valve control means in combination with simplified metering means whereby fluids under pressure may be selectively dispensed with accuracy while the volume of said fluids may be readily varied.

Another general object of the present invention is the provision of improved means for mixing and delivering mixed beverages, avoiding loss of carbonation during the mixing period; foaming in the receiving receptacle, preventing contamination of one flavor by another, and insuring maximum cleanliness, purity of flavor, and reliability over prolonged periods of use.

Other objects and advantages of the invention will become apparent upon reading the following description taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view of the beverage dispensing assembly embodying the present invention;

FIGURE 2 is a plan view of certain assembled elements comprising the invention; fluid metering valves, solenoid operated control valves, conduit block with various conduit connections and inter-connections thereto;

FIGURE 3 is a side elevational view of the assembled elements shown in FIGURE 2 taken on line **3—3** of FIGURE 2;

FIGURE 4 is a back elevational view taken along line **4—4** of FIGURE 2;

FIGURE 5 is a rear view of the exit nozzle assembly taken along line **5—5** of FIGURE 2;

FIGURE 6 is a vertical section taken on line **6—6** of FIGURE 2; and

FIGURE 7 is a perspective view of the exit nozzle core shown cross sectionally in FIGURES 5 and 6;

A general understanding of the arrangement and location of some of the parts of the novel apparatus may be had by reference to FIGURES 1 and 2 wherein the metering and dispensing assembly in general is indicated by the numeral **1** and includes a main conduit block **2** in contiguous relation with delivery exit nozzle assembly **4**. Positioned above said exit nozzle assembly, supported thereby and in direct contact therewith is a drink selection control panel **6** comprised of six buttons, five for flavor selection and one for a portion of carbonated water. Solenoid actuated valves **8–13** project sideways

of conduit block 2 as shown in FIGURES 1 and 2, the flow of fluids through passageways integral within said conduit block being regulated thereby. Product conduit lines 26, partially shown in FIGURE 1, are removably connected to conduit block 2 through back plate 28 and provide the source of syrup and water to delivery exit nozzle 4 wherein syrup and water are ultimately mixed. Metering valves 33 adapted to be received by openings 31 in conduit block 2 provide additional means for regulating fluid flow to the said exit nozzle. While conduit block 2 is illustrated as accommodating six fluid passageways in alignment with six corresponding passageways within delivery exit nozzle 4, it will be understood that many of the features of the invention will be applicable to use and dispensing of a single flavor and is not to be considered as being limited to any particular number of flavors.

FIGURE 7, an isolated perspective view of the unique exit nozzle core which essentially comprises the heart of the instant invention, is designated generally therein as numeral 5. As can be readily observed by reference to FIGURES 2 and 3 of the drawings, exit nozzle core 5 is snugly and slidably received within annular boring 30 extending substantially the length of the upper portion of said exit nozzle 4. Sealed within said annular boring 30 by means of O-ring 56, core 5, by virtue of its physical configuration, provides a novel and valuable hydrodynamic pretreatment of the carbonated water prior to the admixture thereof with any one of a plurality of flavor syrups. This configuration, to be explained in greater detail hereinbelow, tends to establish an attitude within the carbonated water which causes a gentle nonturbulent downward egress through vertical orifice 60, there being no sudden pressure release to cause foaming or loss of carbonation in the drink.

Connector 18, as shown in the rear vertical elevation view of FIGURE 4, is coupled with the product conduit line carrying carbonated water under pressure. Connectors 14, 16, 20, 22 and 24 are respectively coupled with product conduit lines communicating with five separate tanks, each containing, under pressure, flavor syrups according to the flavors designated upon push-buttons illustrated in FIGURE 1 as A, B, C, D and E. Conduit block 2, being provided with bores or passages constituting conduits through which the several fluids move from their sources, compactly functions as a network through which flavor fluids and carbonated water flow to the exit nozzle 4 whereat ultimate discharge is realized. In the course of travel from said connectors through said conduit block and through said exit nozzle, said fluids are affected by several instrumentalities.

Fluids A, B, C, D, E and W, under pressure, enter passages, e.g., 66 and 68, within conduit block 2, said passages having their origin at countersunk cavities 70, said cavities also serving as retaining wells or sockets for terminal nipples 72. Each of said six passages, extending from said cavities 70, is twice controllably obstructed. First by one of six solenoid actuated valves 8–13, and subsequent thereto by metering valves 33, best illustrated in FIGURE 3 of the drawings. Solenoid valve 8, being of similar construction as the remaining solenoid valves 9–13, is shown partially sectionalized, valve seat 76 thereby being observable. Flanged shoulder 78 of each respective valve is threadedly connected to a female boring positioned symmetrically three on a side of said conduit block as shown in FIGURE 2. A cylindrical casing mounted upon said flanged shoulder, surrounds the coil of the solenoid, which also comprises the armature (not shown). Suitable leads 80 are provided for energizing the coil as hereinafter described, and the armature is biased downwardly by the action of a plunger spring which is seated between a shoulder of the armature and a cylindrical element positioned within the solenoid coil and integral with the flanged shoulder 78. Said valve seat element 76 which serves as a fluid communication passage is removably positioned as shown, within the conduit block 2 to cooperate with a resilient seating element positioned in the lower end of the said armature. Communication is established through the valve seat and the obstructed duct by retraction of the lower end of the armature therefrom upon energization of the said coil. Carbonated water and/or flavor fluid, under pressure and under control of said solenoid operated valves, is thus conducted to the dispensing nozzle.

The solenoid valves just described and the functions attending the same represent one of the instrumentalities interjected for regulatory obstruction of the fluid passageways internal of the said conduit block and extending transversely thereof. Inasmuch as these valves are intended to either permit or curtail fluid flow depending upon the energization or not of the coil within each of said valves, quantitative flow of water and/or syrup would be a function of the period of energization, the capacity of the said passages otherwise remaining constant.

As a further control of the flow of fluid per unit time, however, metering means 33 are provided immediately following said valve seats 76 thereby occupying positions within conduit block 2 and intermediate of said solenoid valves and said exit nozzles. Each of the metering means 33 is essentially a valve member threadedly received within bore 31 and annularly sealed therein by virtue of an O-ring (not shown). Kerf 29 facilitates inward or outward movement of said valve member in the ordinary manner of a machine screw. In performing its regulatory function, the inner end of said metering means is adapted for adjustably reducing flow through ports 63 and 65 of bore 31. Thus, it is seen that notwithstanding a predetermined time cycle during which selected fluids are permitted to by-pass respectively energized solenoid valves, the quantitative flow of said selected fluids may be additionally regulated, the predetermined time cycle remaining constant.

Delivery exit nozzle core 5, illustrated perspectively in FIGURE 7 of the drawings, contains an axial conduit 66′ as shown in FIGURE 6, said conduit being in registration with conduit block passage 66 and a continuation thereof. Said passage and conduit, combined, function to channel carbonated water, under pressure, into the unique hydrodynamic system heretofore referred.

Core 5 illustrated cross sectionally in FIGURE 3 of the drawings is shown positioned within delivery exit nozzle 4, O-ring 56 within peripheral groove 36 being provided at the back end as a restraint against pressures contained within said carbonated water and exerted thereby after passage thereof through said exit nozzle core in a manner to be described.

Carbonated water channelled from product line 18 through passage 66 within conduit block 2 and into conduit 66′ beginning at end 32 of the exit nozzle core 5, flows relatively unobstructedly along the path described, a first abrupt change in direction and flow attitude occurring at the end section 34 of exit core conduit 66′. At said end section 34, conduit 66′ communicates with radial symmetrical passages 64 each of said passages being right angled with respect to conduit 66′, and positioned between end section 34 and core body 38, said core body having a first end at groove 50 and a second end at collar 42. It will be appreciated that the combined cross-sectional area of said radial passages provide a capacity substantially the equivalent of the said conduit 66′. Upon emission from said radial passages 64, the said carbonated water, which prior to the aforesaid expansion flowed through a single passage, is reunited in its flow within peripheral groove 50. Longitudinal flutes 40 extending along the outside body portion of said core 5, are snugly abounded by the upper horizontal receiving bore 30 of

the said delivery exit nozzle 4, thereby forming closed passages 41 uniformly positioned around said outside body portion, said passages being substantially of equivalent combined flow capacity as the combined capacity of aforedescribed passages 64. Singularly, however, each passage acts as an extrusion aperture having the effect of increasing the flow velocity of the stream emitted therefrom.

Closed longitudinal passages 41 therefore, provide uniformly orientated and dispersed downstream flow means for said pressurized carbonated water. Emission of said pressurized water from within the plurality of said passages 41 is accomplished simultaneously and at increased velocity from each of said passages from outlet regions situated around the narrow portion of tapered core nose 48 located within concave collar 42, core nose 48 being concentric therewith. Concurrent with said emission of said carbonated water is the expected expansion thereof, an effect realized due to the reduction of the internal pressure thereof to that of atmospheric, the pressure ambient within cavity 30', surrounding said core nose 48.

Thus, it is observed that core nose 48 is disposed in extended relation to core body 38 and in spaced relation to said cavity 30'. End 52 of said cavity being concave, complements concavity 42, otherwise designated collar 42, in establishing cavity 30' of oval configuration. That is, the radius of curvature of end 52 is substantially equal in curvature to the radius of curvature of collar 42, a structural embodiment believed extremely critical in achieving several of the objects heretofore disclosed.

In achieving the hydrodynamic effect manifested by the exit nozzle according to this invention, the passages 41 created by said flutes 40 and said bore 30 are believed, in large part, responsible. That is, upon leaving passages 41, the carbonated water, although already somewhat reduced in velocity, nevertheless retains sufficient velocity to carry it in individual streams, above the widest end extremity 51 of said core nose 48 without departing from the somewhat tangential trajectory spaced above said extremity. Subsequent to the spaced flow with respect to said extremity 51, said streams of carbonated water impinge upon bore concavity 52, and become integrated, whereupon the flow direction of the newly formed consolidated stream is reversed and directed against core nose projection 46. From said core nose projection, said consolidated stream is dispersed uniformly upon convex end portion 44 of said core nose wherefrom continued flow in this reverse direction carries said stream along the contour of said core nose and into the aforementioned concavity of collar 42, whereupon another and final fluid flow reversal is effectuated. The kinetic energy within the water reflected from concavity 42 being substantially dissipated, velocity sufficient to carry said reflected water across and beyond said extremity 51 is no longer present, whereupon the carbonated water, after the abovedescribed tortuous treatment, begins its calm gravity responsive descent through vertical passage 60.

Vertical passage 60 depending from within exit nozzle 4, in addition to channelling non-turbulent pretreated carbonated water toward and into a drinking receptacle, further functions as a mixing zone for the combination of water and flavoring syrup.

Loss of carbonation having been substantially minimized by virtue of the hydrodynamic pretreatment taught hereinabove, the frothing and foaming difficulty also normally encountered in carbonated drink dispensing is greatly obviated in view of the manner in which water and syrup are mixed according to this invention. The foaming propensity of a liquid, characterized as the ability to support and contain gases entrained and dispersed therein and to be expanded by said gases, is a quality unfortunately possessed by flavoring syrups of the character used in the preparation of carbonated beverages. Agitation, therefore, of such syrups during the combination thereof with carbonated water, should preferably be avoided lest the formation of air entraining voids destroy the character of the drink. To that end, substantially horizontal conduits, e.g., 80 are provided within exit nozzle assembly 4 as illustrated in FIGURE 3 of the drawings, the function of said conduits being to calmly introduce flavoring syrups, according to selection, into said vertical orifice 60 for intimate intermingling with calmly descending pretreated carbonated water.

Carbonated water, in the course of its descent through downwardly directed passage 60, substantially occupies the cross sectional area of said passage, and consequently has the effect of reducing to below atmospheric, the pressure exerted against the openings of the horizontal conduits 80, said openings being adjacent said vertical passage 60. Therefore, in lieu of collision mixing of syrup and water, the syrup is calmly carried into the downstream of water, gentle but complete dispersion being accomplished therewith, carbonization of the drink having been held to a maximum, and frothing and foaming having been minimized.

Operation

The functions of the respective units of the present invention will be understandable from the description already given. However, the operation of the apparatus in its entirety will herein be described.

Depression of one of the buttons A, B, C, D, or E on control panel 6 illustrated in FIGURE 1 of the drawings will activate a cycle whereby a predetermined portion of a drink according to selection, will be dispensed. Depression of button C corresponding to a Coca-Cola drink, for example, will establish communication among flavor tank, carbonated water tank and exit nozzle, syrup and water being automatically regulated and dispensed with respect to predetermined quantities and proportions thereof.

Activation of the Coca-Cola dispensing cycle effectuates energization of electrical solenoid valve 8 intermediate of the carbonated water flow path and of electrical solenoid valve 11 which is assumed by way of example, to be intermediate of the Coca-Cola syrup flow path.

Accordingly, depression of button C permits carbonated water contained within a tank under pressures of approximately 30–100 p.s.i. to flow through product line 18 through conduit block 2 and into mixing zone 60 of exit nozzle 4. Similarly contained under pressure, but of a substantially lesser pressure than the carbonated water, Coca-Cola syrup is released for flow through its corresponding product line, through the energized opened port of solenoid valve 11 and calmly and gradually into mixing zone 60 of exit nozzle 4.

While the time cycle function responsible for the volumetric content of a drink may be widely varied, a most frequently desired drink quantity has been found to be 6 ounces. The metering means having been adjusted for flow rates of 2 ounces per second, a 6 ounce drink could be dispensed in 3 seconds, the proportionate ratio of water to syrup being 5 to 1.

In the event a drink consisting of only carbonated water be desired, depression of the button designated W would singly energize solenoid 8 for a 3 second period, the resulting dispensed drink being carbonated water only, as desired.

Both the structural and operational characteristics of the invention having been described, it will be understood that the delivery exit nozzle assembly according to the invention may be adapted to beverage dispensing machines of private as well as of commercial nature, specific applications thereof including, but not being limited to amusement park concessions (both coin and non-coin operated embodiments thereof), automated food and drink vending installations, and to home utilization, e.g., den, recreation room and the like applications.

Changes may be made in the form, construction and

arrangement of parts from that disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes fall within the scope of the claims appended hereto.

What is claimed is:

1. In a selective beverage vending machine, a delivery exit nozzle comprised of an horizontal bore, a concave cavity endwise of said bore, a vertical passage depending from said bore adjacently of said concave cavity, a nozzle core positioned concentrically within said horizontal bore, said nozzle core being integrally comprised of an end section having an axial conduit therethrough, a body having a first end and a second end, said body having a longitudinally fluted surface, a plurality of radial passages in said body connecting said axial conduit with said longitudinally fluted surface, a concave collar disposed on said second end of said body, a core nose of tapering longitudinal cross-section disposed on and in extended relation with respect to said core body, said core nose being comprised of a narrow end and a wide end, said concave collar being annularly disposed with respect to said narrow end, said core nose being located directly above said vertical passage and at least one substantially horizontal conduit positioned below said horizontal bore, said at least one horizontal conduit being in communicative relation with said vertical passage.

2. In a selective beverage vending machine, a delivery exit nozzle comprised of an horizontal bore, a concave cavity endwise of said bore, a vertical passage depending from said bore adjacently of said concave cavity, a nozzle core positioned concentrically within said horizontal bore, said nozzle core being integrally comprised of an end section having an axial conduit therethrough, a body having a first end and a second end, said body having a longitudinally fluted surface, a plurality of radial passages in said body connecting said axial conduit with said longitudinally fluted surface, a concave collar disposed on said second end of said body, said concave collar having a radius of curvature substantially equal to the radius of curvature of said concave cavity, and a core nose of tapering longitudinal cross-section disposed on and in extended relation with respect to said core body, said core nose being comprised of a narrow end and a wide end, said concave collar being annularly disposed with respect to said narrow end, said core nose being located directly above said vertical passage and at least one substantially horizontal conduit positioned below said horizontal bore, said at least one horizontal conduit being in communicative relation with said vertical passage.

3. In a selective beverage vending machine, a delivery exit nozzle comprised of an horizontal bore, a concave cavity endwise of said bore, a vertical passage depending from said bore adjacently of said concave cavity, a nozzle core positioned concentrically within said horizontal bore, said nozzle core being integrally comprised of an end section having an axial conduit therethrough, a body having a first end and a second end, said body having a longitudinally fluted surface, a plurality of radial passages in said body connecting said axial conduit with said longitudinally fluted surface, a concave collar disposed on said second end of said body, said concave collar having a radius of curvature substantially equal to the radius of curvature of said concave cavity and a core nose of tapering longitudinal cross-section disposed on and in extended relation with respect to said core body, said core nose being comprised of a narrow end and a wide end, said concave collar being annularly disposed with respect to said narrow end, said wide end being convex and having a projection extending centrally therefrom, said core nose being located directly above said vertical passage and at least one substantially horizontal conduit positioned below said horizontal bore, said at least one horizontal conduit being in communicative relation with said vertical passage.

4. In a selective beverage vending machine, a delivery exit nozzle comprised of an horizontal bore, a concave cavity endwise of said bore, a vertical passage depending from said bore adjacently of said concave cavity, a nozzle core positioned concentrically within said horizontal bore, said nozzle core being integrally comprised of an end section having an axial conduit therethrough, a body having a first end and a second end, said body having a longitudinally fluted surface, a plurality of radial passages in said body connecting said axial conduit with said longitudinally fluted surface, said radial passages being normally disposed with respect to said axial conduit, a concave collar disposed on said second end of said body, said concave collar having a radius of curvature substantially equal to the radius of curvature of said concave cavity, a core nose of tapering longitudinal cross-section disposed on and in extended relation with respect to said core body, said core nose being comprised of a narrow end and a wide end, said concave collar being annularly disposed with respect to said narrow end, said wide end being convex and having a projection extending centrally therefrom, said core nose being located directly above said vertical passage and at least one substantially horizontal conduit positioned below said horizontal bore, said at least one horizontal conduit being in communicative relation with said vertical passage.

5. In a selective beverage vending machine, a delivery exit nozzle comprised of an horizontal bore, a concave cavity endwise of said bore, a vertical passage depending from said bore adjacently of said concave cavity, a nozzle core positioned concentrically within said horizontal bore, said nozzle core being integrally comprised of an end section having an axial conduit therethrough, a body having a first end and a second end, said body having a longitudinally fluted surface, a plurality of radial passages in said body connecting said axial conduit with said longitudinally fluted surface, the combined normal cross-sectional area of said radial passages being substantially equal to the normal cross sectional area of said axial conduit, a concave collar disposed on said second end of said body, said concave collar having a radius of curvature substantially equal to the radius of curvature of said concave cavity, a core nose of tapering longitudinal cross-section disposed on and in extended relation with respect to said core body, said core nose being comprised of a narrow end and a wide end, said concave collar being annularly disposed with respect to said narrow end, said wide end being convex and having a projection extending centrally therefrom, said core nose being located directly above said vertical passage, and at least one substantially horizontal conduit positioned below said horizontal bore, said at least one horizontal conduit being in communicative relation with said vertical passage.

6. In a selective beverage vending machine, a delivery exit nozzle comprised of an horizontal bore, a concave cavity endwise of said bore, a vertical passage depending from said bore adjacently of said concave cavity, a nozzle core positioned concentrically within said horizontal bore, said nozzle core being integrally comprised of an end section, said end section having an axial conduit therethrough, a body having a first end and a second end, said body having a longitudinally fluted surface, a plurality of radial passages in said body connecting said axial conduit with said longitudinally fluted surface, said radial passages being normally disposed with respect to said axial conduit, the combined normal cross-sectional area of said radial passages being substantially equal to the normal cross-sectional area of said axial conduit, a concave collar disposed on said second end of said body, said concave collar having a radius of curvature substantially equal to the radius of curvature of said concave cavity, a core nose of tapering longitudinal cross-section disposed on and in extended relation with respect to said core body, said core nose being comprised of a narrow end and a wide end, said concave collar being annularly disposed with respect

to said narrow end, said wide end being convex and having a projection extending centrally therefrom, said core nose being located directly above said vertical passage and at least one substantially horizontal conduit positioned below said horizontal bore, said at least one horizontal conduit being in communicative relation with said vertical passage.

7. In a selective beverage vending machine, a delivery exit nozzle comprised of an horizontal bore, a concave cavity endwise of said bore, a vertical passage depending from said bore adjacently of said concave cavity, a nozzle core positioned concentrically within said horizontal bore, said nozzle core being integrally comprised of an end section, said end section having an axial conduit therethrough, a body having a first end and a second end, said body having a longitudinally fluted surface, a peripheral groove positioned adjacent said first end of said body, a plurality of radial passages in said body connecting said axial conduit with said longitudinally fluted surface, said radial passages being in communication with said peripheral groove, a concave collar disposed on said second

end of said body, said concave collar having a radius of curvature substantially equal to the radius of curvature of said concave cavity, a core nose of tapering longitudinal cross section disposed in extended relation with respect to said core body, said core nose being comprised of a narrow end and a wide end, said concave collar being annularly disposed with respect to said narrow end, said wide end being convex and having a projection extending centrally therefrom, said core nose being located directly above said vertical passage, and at least one substantially horizontal conduit positioned below said horizontal bore, said at least one horizontal conduit being in communicative relation with said vertical passage.

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