This invention relates to a flush bowl, and particularly to that type which has its flushing means directly connected to a water main or supply pipe, without the intervention of a water storage compartment or gravity feed tank, there being only a valve interposed between the flushing means of the bowl and the source of water supply. Reference is made to my copending applications, Serial 756,491, filed Dec. 7, 1934 and Serial 75,336, filed April 20, 1936, the broader claims to the invention being set forth in said application, Serial 756,491. The instant application is concerned with specific improvements made over the disclosures in said copending application Serial 756,491.

An object of the present invention is to provide a flush bowl arrangement of the character above referred to, in which there is obviated all possibility of contamination of the fresh water supply by reason of a so-called "back-siphonage" action.

Another object of the invention is to accomplish the above object by the use of simple means which are non-mechanical, positive in action, and require no maintenance.

Further objects are to provide means for the purpose stated, which do not wear out, require no adjustments or periodic testing to determine the working order thereof, require no changes in existing equipment when installed, and which safeguard health and promote sanitation.

Still another object of the invention is to provide a structure of the character stated, wherein the various ducts and ports are so related and proportioned that as much as a thirty inch vacuum in the water supply line will not suck polluted water or mist back into said supply line, and in which the amount of water fed into the flushing rim is not so large as to interfere with the proper functioning of the jet stream.

Another object of the invention is to accomplish the above improvements without materially changing the design of the bowl and without increasing the height of the rear portion thereof, so that existing plumbing arrangements need not be altered upon installation of the improved device.

A further object of the invention is to provide means in a flush bowl whereby a relatively high pressure of water is directed forcefully and squarely to the jet of the bowl, while the rim flushing means receives an indirect low pressure supply of water resulting from restricting the carrying capacity of the jet passage. This construction permits safe and unrestricted communication between the spud interior and the atmosphere outside the bowl, to the end that back-siphonage and resultant pollution of the fresh water supply are rendered impossible.

The foregoing and other objects are attained by the means described herein and disclosed in the accompanying drawings, in which:

Fig. 1 is a central longitudinal cross-sectional view of a flush bowl embodying the present invention.

Fig. 2 is an enlarged fragmental cross-sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a view showing the rear or right hand end of the Fig. 1 device, modified by the inclusion of a removable spud element or nozzle.

Fig. 4 is a fragmental cross-sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a fragmental longitudinal cross-sectional view of a wall-supported type of flush bowl embodying the invention.

Fig. 6 is a fragmental cross-sectional view taken on line 6—6 of Fig. 5.

The present application is a continuation in part of my copending application Serial No. 756,491, filed December 7, 1934, wherefore reference properly may be made herein to certain explanations of custom and practice in the plumbing art as more fully set forth in said copending application. As explained in said copending application, it is common practice to connect flush bowls with a water supply pipe or riser for supplying fresh flushing water under pressure to a suitable hand-operated valve located conveniently relative to the bowl. In such installations, a shut-off valve ordinarily is included in the supply pipe and located in the basement of the building. The fresh water supply pipe or riser supplies fresh water also to fixtures such as drinking fountains, wash bowls and other flush bowls located on floors intermediate the basement and the floor upon which the flush bowl illustrated herein is located.

Prior to the present invention, flush bowl constructions permitted back-siphonage from the rim and/or trap upon application of a vacuum to the fresh water inlet, whether the waste pipe was clogged or not due to detreating air swiftly passing the jet supply passage and carrying with it foul water from the bowl itself. The occurrence of stoppage in the sewer connection or waste discharging outlet aggravated the condition, as the flush rim carried the fresh water supply and there was established, at the time of overflow, a definite cross-communication between the fresh water supply and the waste pipe by way of the flushing rim passages. In the event that
the pressure of the fresh water supply failed or diminished for any reason, or in the event of an emergency shut-off under the condition of stoppage referred to, then a back-siphonage of the fresh water into the fresh water supply would occur. Under the conditions above set forth, a person drawing water from a drinking fountain or the like which may be connected to the supply line or a branch pipe thereof, would drink the polluted water from the clogged flush bowl. The condition which has been described has actually occurred at various times and has resulted in the pollution of the fresh water supply of large buildings, such as hotels, hospitals and office buildings, and on such occasions persons drinking such polluted water contracted various diseases. It is accordingly made one of the objects of the present invention to eliminate all possibility of cross-connections between the sewer or waste pipe and the fresh water supply which might result from back-siphonage occurring in flush bowls or other plumbing fixtures wherein such conditions may occur.

Prior to the present invention the problem was attacked by inserting mechanical means, such as check valves and the like, but those means were open to the objection that they required frequent inspection, testing and maintenance, possibly by capable or unskilled workmen, with the result that at least a few fixtures were not in perfect working order at all times, thereby constituting a potential menace to the health of users of the fixtures. The means of the present invention to be termed "non-mechanical", as it includes no moving or adjustable parts and its proper operation is not dependent upon proper maintenance or periodic inspection.

To avoid the possibility of conditions of filth and fresh water contamination as referred to above, the present flush bowl has been designed in the following manner:

The bowl element 7 is constituted of the customary base part 9, the waste discharge outlet or sewer connection 10, a water trap 12, preferably of the goose neck variety, the jet 13, and a peripheral flushing rim 14 which in accordance with common practice provides a seat or a support for a seat or cover.

At one or both sides of the bowl element is provided a relief port or overflow 15 which is so located as to conduct excess water from the bowl element before the water level therein can reach the apertures 16 which supply fresh water to the bowl by way of the hollow peripheral rim.

The upper edge 17 of the relief port or overflow is below the plane of the apertures of the flushing rim, so that a siphon break is provided in the event of stoppage in the waste pipe. Any overflow of the polluted water through the port or ports 15 is directed onto the floor or perhaps into a container located outside of the bowl element. The height of the partition 18 of the water trap is so related to the other parts of the bowl as to maintain always a pre-determined normal level of water in the bowl element, said normal level being considerably below the top of each overflow port 15. Normally, the water level in the bowl stands several inches below the top edge 17 of the overflow port or ports. The opening 19 is the fresh water intake port which is customarily connected with a hand-operated valve (not shown) and said port may be of cup shape and provided with a single constricted fresh water outlet opening or nozzle element 20. The opening 20 is quite definitely aligned with an intermediate port 21 which is formed in a transverse wall 22 of the bowl structure. The opening 21 preferably is slightly larger than the fresh water outlet 20, so that a stream of water under pressure leaving the compartment 19 by way of the opening 20, will pass through the opening 21. A third opening indicated at 23, is or constitutes the mouth of a jet supply passage 24—25, which latter conveys fresh flushing water to the relatively small jet 13 that initiates flow of the bowl elements from the bowl to the sewer or waste pipe. The fresh water supply passage formed by the elements 20, 21, 23, 24, 25, 26 and 13, constitutes a high pressure flushing means whereby a swift and copious stream of flushing water is directed forcefully from the jet into the sewer passage 12. To secure the high pressure stream, I may make the opening 23 large enough to receive substantially all of the water from the nozzle 29, the opening 23 being preferably tapered to preclude spreading of the stream at 23; and the jet 13 preferably would be reduced in size or otherwise constricted so as to insure a stream directed forcefully into the waste pipe. By so constricting the jet opening at 13, the jet supply passage 23—24—25—26 is rendered incapable of receiving and transmitting the entire stream of water directed thereto through the passages 20 and 21, so that a certain amount of excess flushing water flows into the low pressure rim chamber 20 or passage 21, which latter is in fluid communication with the series of rim apertures 16. Thus, it will be understood that the rim flushing means receives an indirect low pressure supply of water which results from inability of the jet passage to transmit fully the high pressure stream projected through the aperture 20. The compartment 27 and its continuation 28, together with the series of apertures 16, are made sufficiently large to preclude the building up of water pressure within the rim flushing means, so that a spacious and unobstructed air intake chamber 29 may, without the danger of overflowing, be placed in direct and complete communication with the atmosphere through the series of air intake ports 30. Thus it will be understood that a solid stream of water, in passing from port 20 to port 22, will traverse or span the air intake chamber 29 without flushing said chamber. The air intake chamber, as best shown in Fig. 2 is quite large and fully open to the atmosphere, and the various intake ports 30 thereof are located at the back and sides of the device so as to be incapable of fouling by reason of proximity thereof to the bowl.

With further reference to the spacious air intake chamber 29, it is to be noted that said chamber definitely is not a flushing means, because the passage of flushing water from port 20 through port 21 and into jet mouth and rim supply ports 23 and 24, respectively, is a divided stream and as such it spans the space 52 (Fig. 2) between the ports 20 and 21. From the disclosure of Fig. 2, it should be evident that a reversal of fluid flow through the fresh water intake port 19, for any reason, results in drawing atmospheric air mainly through the air intake member 29 by way of the series of large openings 30 thereof, rather than through the small opening 21 which communicates with the jet and rim supply passages. By thus drawing the atmospheric air through the spacious, clean and unobstructed air intake chamber 29, the resulting flow of air resulting from a vacuum in the fresh water supply line cannot possibly agitate or carry any filth which may be standing in the vertical
jet supply passage 26—25, and such return flow of air therefore will not be contaminated by any mist or drops of water emanating from filthy portions of the structure. It should readily be evident that, were the openings 35 plugged, thereby to eliminate the water or take feature a very strong rush of air from 15 through the passages 28, 27, 31, 21 and 20 would agitate any filthy water in the jet supply passage and thereby contaminate the fresh water supply line to the fixture and perhaps numerous branches thereof as explained above. With the amplified openings 30, however, a suction through the opening 29 (Fig. 2) will effect a maximum flow of air through the intake chamber 25, and very little, if any, flow will occur through the comparatively small opening 21 and the ports in communication therewith. It will be noted that except for the comparatively small opening 21 the parts of the fixture which might possibly become filthy are, in effect, closed off from the air intake chamber 25 by means of the wall or partition 22.

As disclosed in Fig. 4, the series of air intake apertures 30 are partly covered by depending flanges 33 formed on the top panel or slab 34 of the fixture. The flanges are spaced from the sides 35 so that any drippings or the like from the slab will not enter the air intake ports. The lower wall 36 of each port 30, is inclined inwardly and downwardly toward the air intake chamber. The transverse wall 37 separates the air intake chamber from the void or space 38. It may be here noted that the large space 39 ahead of the sewer passage also is a void, the voids performing no function in the operation of the device. It may be mentioned also that the ports 30 are located above the wall or partition 37, so that any possible slight splashing of water in the port 23 will not find its way to the outside of the fixture.

The modification disclosed by Fig. 3 is the same as the illustration of Figs. 1, 2 and 4, except that the fresh water supply is brought into the fixture through a nozzle 40 of metal or the like, instead of through an opening such as 20 of Fig. 1. The nozzle element 41 carries a key 42 adapted to cooperate with a depression or a keyway 43 formed in the material of the fixture, and so adapted as to align the nozzle 40 with the opening 21. The element 41 has a seat 44 encircled by a washer or gasket 45 which makes a cushioned connection with the flange 46 of the fixture, the fixed relationship of the seat being maintained by means of a nut 47 and washer 48. It will be understood that the upper end 49 of the nozzle element 41 is adapted for attachment to a fresh water supply pipe. The remainder of the Fig. 3 device is identical with the Fig. 1 disclosure.

The illustration of Figs. 5 and 6 discloses a type of flush bowl different from that of Figs. 1—4 inclusive, in that it is adapted to be supported by a vertical wall, instead of being supported by the floor. Any suitable means such as a screw or the like 50 may be provided for attaching the wall-hanging fixture of Fig. 5, and 51 and 52 indicate, respectively, the fresh water inlet pipe and the sewer outlet pipe for the fixture. This type of fixture is known as a blowout type, as the high pressure jet 53 functions to blow out the bowl content without the aid of a trap or siphon action as described herein. In the modification of Figs. 5 and 6, the nozzle element 141 corresponds to the element 41 of Fig. 3, and it may be supported by the flange 145 in any suitable manner. The apertures 121 and 123 correspond with the apertures 21 and 23 respectively of the Fig. 1 device, and the aperture 123 has connection with a jet supply passage 124—125, as in the relationship as disclosed in Fig. 1. From the foregoing it should be understood that flushing water under pressure enters the fixture through the pipe 51, discharges from the nozzle 140 as a solid stream which unrestrainedly passes through the apertures 121 and thereafter strikes the opening of opening 123 so as to furnish a high pressure of flushing water in the passages 124, 125 and 126, which water pressure is ejected from the jet 53 in the general direction of the sewer outlet 54. As in the Fig. 1 device, the solid stream of water which passes through the opening 121 is too great in volume to pass through the opening 123, so that there results a low pressure overflow of flushing water into the rim supply passage 127, which passage feeds the series of rim flushing apertures 160.

Attention is now directed to the walls or partitions indicated at 55 of Figs. 5 and 6. These walls determine an air intake chamber 129 into which a free flow of atmospheric air may be directed as indicated by the arrows 56 of Fig. 6. The air intake ports 130 correspond to the ports 30 of Fig. 1, and they perform the same function, for a desirable, limited and properly proportioned flow of flushing water from the flushing rim supply passage 127, which passage feeds the series of rim flushing apertures 160.

B briefly stated, a reverse flow of air through the nozzle 140 will tend to effect the formation of a vacuum in the chamber 129, and because of the spacious air passages at 130, the reverse flow of air will be taken from the atmosphere outside the bowl rather than through the comparatively small opening 121 which communicates with filthy parts of the fixture. As will be understood the partition 57 defines the sewer passage, and a level of water is maintained in the bowl at approximately the height of the point 58. The portion 59 of the Fig. 5 fixture may be either an integral seat or a support for a seat, as desired. The characters 65 indicate voids which perform no operative function.

It is to be understood that the nozzle element of the Fig. 5 device may be made integral with the fixture as disclosed in Fig. 1, if desired, and that the passages 121 and 124—125—126 are the low pressure and high pressure channels which correspond to the chambers 21—28 and 24—25—26 of the Fig. 1 device. The Fig. 5 device may include a dome or cover 61 adapted to preclude entry of foreign substances or the like into the spacious air intake chamber 129 and its associated passages 130.

Under a severe test with a 30 inch vacuum at the fresh water intake, and with the bowl clogged to abnormally raise the water level therein, there was found no evidence of foul water or mist from the bowl or its jet supply passage at an inspection point in the water supply pipe. Inasmuch as a 30 inch vacuum is nearly a complete vacuum which would probably never be encountered in actual service, it may be said that the improved device of this invention is insured against back-siphonage and cross-connection between the waste portion of the bowl element and the fresh water supply line. It should be observed, that the structures illustrated and described herein provide for a desirable, limited and properly proportioned flow of flushing water from the flushing rim so that the jets may func-
tion properly with the passage therethrough of the necessary quantity and pressure of water to initiate discharge of the bowl content. The spacious air intakes are always clear and un-
5 obstructed due to the fact that the dynamic pressure of water which spans the intake chambers in passing to the jet and rim supply passages insures a low loss of pressure so that the full force and volume of the flushing water is rendered effec-
10 tive for flushing the bowl without diversion of water into the air intake chambers.

In the foregoing description I have taught that the opening 23 of Fig. 1, (or opening 123 of Fig. 5), may be made sufficiently large to receive squarely and fully the high pressure stream of flushing water ejected from the nozzle of the fresh water inlet chamber, in which case the jet opening of the waste pipe is reduced to cause a high pres-
15 sure jet stream, and also a low-pressure overflow at 23 (or 123) for the flushing rim. However, I wish it to be understood that the present invention is to embrace also a construction wherein the low pressure supply of flushing water for the rim is secured by limiting or sufficiently reducing the cross-sectional area of the opening 23 (or 123), to at once divert into the rim flushing passage a portion of the stream from 23, regardless of the size of the jet opening 13, (or 53). In fact, any other suitable means may be employed for obtaining the high pressure jet discharge and the low pressure rim supply, cooperating with means to eliminate back-siphonage and cross-communication between the fresh water supply and the bowl or sewer passages, so long as such other means is embraced in the language of the claims. It is to be understood that various other modifications and changes in the structural details of the device may be made, within the scope of the appended claims, without departing from the spirit of the invention.

It is to be understood that there are two separate and distinct problems presented and both of which are solved by the disclosures herein. The one problem, universally presented by all types of flush bowls having direct connection with a water supply line, is avoidance of any and all back siphonage when the conditions in the flush bowl are normal. By normal conditions in the flush bowl is meant that the connection to the sewer is unobstructed and that the bowl contains the normal charge or supply of water, determined by the normal overflow level established by the waste passage, for example the surface 58 in Fig. 5 or the upper portion of partition 18 in Fig. 1. The normal charge of water may be polluted by reason of any number of circumstances, so that it would be possible, due to decrease in pressure in the fresh water supply line, for some of such polluted charge to be drawn into the fresh water supply line. This is a common condition that should be guarded against. Tests have demonstrated that practically every type of jet siphon flush bowl, that preceded the invention disclosed herein and in applicant's copending applications, is subject to back-siphonage of fluid or mist from the jet chamber, or passages, when the water level is normal as explained herein, provided a high vacuum is maintained for several seconds and provided that the fresh water nozzle or discharge port is large enough to ration the air in the chamber about the fresh water nozzle, to a high degree. This occurs because of the tortuous and restricted passages that are provided in such prior devices for assuring proper flows of flushing water to the flushing rim and other parts of such devices, and yet providing an adequate flow of water to the jet for initiating siphonic action for evacuating the bowl contents to and through the sewer connection.

The second problem, which incidentally is comparably rare, is concerned with situations wherein an obstruction in the water passage therethrough for example as shown at 9 in Douglas Patent 1,904,213, causes the level of the contents of the flush bowl to rise above the normal level, so the polluted fluid either overflows the rim or overflows the relief ports such as are indicated at 12 in said Douglas patent, or as indicated and shown in the drawings of the instant disclosure. Under such conditions, a much less rationalization or vacuum of lesser degree will, in ordinary type flush bowls, be adequate for effecting back siphonage of polluted substance into the water supply line.

The structures disclosed herein protect the water supply pipe or line from possible contamination under either or both of the related conditions.

By reference to Figs. 1 and 2, and in view of the foregoing explanation of the structure there shown, it is obvious that in the event of any opening of the water supply pipe, or the creation of a vacuum in such pipe, the structure shown herein effects what may properly be termed three separate and distinct stages of vacuum or reduced air pressure, in advance of the port 23, and in advance of the water in the siphon jet passage 24—26, whereby to guard against any and all back siphonage. By three stage vacuum condition is meant that upon creation of a vacuum in the water supply pipe, the highest degree or state of vacuum is created in the compartment 19 or within the spud nozzle 41 (Fig. 3). A second stage vacuum of much lower degree is created in the air intake chamber 29. A third stage vacuum might be created in the passage or chamber 27. It should be obvious that the vacuum that might be created in the chamber 27 must be of comparatively high degree, in order for any of the contents of the siphon jet passage 24—26, to be drawn back through port 23. The disclosure herein therefore shows multiple air relief chambers disposed between the water supply outlet into the fixture and the water entrance port into the siphon jet passage 24—26. What is claimed is:

1. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a normally submerged jet located to direct flushing-water upwardly into the waste discharge outlet, a passage for conveying flushing water to the jet, a flush-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the jet passage whereby to produce a high-pressure jet stream in the waste discharge outlet, a passage for receiving low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof.

2. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flush-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the jet passage whereby to produce a high-pressure jet stream in the waste discharge outlet, a passage for receiving low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof.
stream in the waste discharge outlet, a portion of the jet passage being constricted to convey only part of the high-pressure stream, a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and a spacious fresh air intake chamber communicating freely with the atmosphere at a location remote from the bowl element, said chamber having a portion thereof disposed intermediate the nozzle and the jet passage so as to be spanned by the high-pressure water stream as it leaves the nozzle and enters the jet passage.

3. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the jet passage whereby to produce a high-pressure jet stream in the waste discharge outlet substantially axially of the passage, a passage being constricted to convey only part of the high-pressure stream, a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and a spacious fresh air intake chamber communicating freely with the atmosphere at a location remote from the bowl element, said chamber having a portion thereof disposed intermediate the nozzle and the jet passage so as to be spanned by the high-pressure water stream as it leaves the nozzle and enters the jet passage.

4. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the mouth of the jet supply passage, the passage being constricted to convey only part of the high-pressure stream, and a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and means associated with the bowl element for precluding the bowl element from reaching the level of the flushing rim.

5. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the mouth of the jet supply passage, the passage being constricted to convey only part of the high-pressure stream, and a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and means associated with the bowl element for precluding the bowl element from reaching the level of the flushing rim.

6. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the mouth of the jet supply passage, the passage being constricted to convey only part of the high-pressure stream, and a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and means associated with the bowl element for precluding the bowl element from reaching the level of the flushing rim.

7. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere at a location remote from the bowl element, said chamber having a portion thereof disposed intermediate the nozzle and the jet passage so as to be spanned by the high-pressure water stream as it leaves the nozzle and enters the jet passage.

8. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the mouth of the jet supply passage, the passage being constricted to convey only part of the high-pressure stream, and a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and means associated with the bowl element for precluding the bowl element from reaching the level of the flushing rim.

9. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the mouth of the jet supply passage, the passage being constricted to convey only part of the high-pressure stream, and a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and means associated with the bowl element for precluding the bowl element from reaching the level of the flushing rim.

10. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the mouth of the jet supply passage, the passage being constricted to convey only part of the high-pressure stream, and a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and means associated with the bowl element for precluding the bowl element from reaching the level of the flushing rim.

11. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the mouth of the jet supply passage, the passage being constricted to convey only part of the high-pressure stream, and a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and means associated with the bowl element for precluding the bowl element from reaching the level of the flushing rim.

12. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the mouth of the jet supply passage, the passage being constricted to convey only part of the high-pressure stream, and a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and means associated with the bowl element for precluding the bowl element from reaching the level of the flushing rim.

13. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flushing rim supply passage for supplying flushing-water to the rim whence the flushing-water is directed into the bowl element to cleanse the side walls thereof, the mouth formed by said second terminus of the jet feeding passage being disposed within the rim supply passage, a spacious fresh air intake chamber communicating freely with the atmosphere, a flushing-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the mouth of the jet supply passage, the passage being constricted to convey only part of the high-pressure stream, and a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and means associated with the bowl element for precluding the bowl element from reaching the level of the flushing rim.
the nozzle and the jet passage so as to be spanned by the high-pressure water stream as it leaves the nozzle and enters the jet passage, and means for precluding the level of contents of the bowl element from reaching the level of the flushing rim.

8. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet in communication therewith, a flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flush-water inlet having a small nozzle for high-pressure ejection of a solid stream directly into the jet passage whereby to produce a high-pressure jet stream in the waste discharge outlet, a portion of the jet passage being constricted to convey only part of the high-pressure stream, a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the interior of the bowl element to cleanse the side walls thereof and a spacious fresh air intake chamber communicating freely with the atmosphere at a location remote from the bowl element, said chamber having a portion thereof disposed intermediate the nozzle and the jet passage so as to be spanned by the high-pressure water stream as it leaves the nozzle and enters the jet passage, and a partition between the nozzle and the jet passage, said partition having a slightly enlarged aperture aligned with the nozzle and the jet passage to allow unrestrained transmission of the high-pressure stream while at the same time substantially isolating the fresh air intake chamber from said partition, and means for precluding the level of bowl element contents from exceeding a predetermined level below the flushing rim.

9. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet passage in communication therewith, an apertured flushing rim, and a high-pressure jet located to direct a stream of flushing-water into the waste discharge outlet passage substantially axially of said outlet passage, a passage for conveying flushing-water to the jet, a flush-water inlet, a detachable nozzle element having a flush-water outlet considerably smaller than the flush-water inlet whereby to cause forceful ejection of a solid stream therefrom, cooperative means on the nozzle element and bowl structure to maintain a substantially axial alignment of the nozzle outlet with the mouth of the jet supply passage so as to enforce a high-pressure stream of water in said passage, a portion of the jet supply passage being constricted to reject part of said stream, and means for conveying the rejected portion of the stream to the bowl element by way of the apertures of the flushing rim.

10. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet passage in communication therewith, an apertured flushing rim, and a high-pressure jet located to direct a stream of flushing-water into the waste discharge outlet passage substantially axially of said outlet passage, a passage for conveying flushing-water to the jet, a flush-water inlet, a detachable nozzle element having a flush-water outlet considerably smaller than the flush-water inlet whereby to cause forceful ejection of a solid stream therefrom, cooperative means on the nozzle element and bowl structure to maintain a substantially axial alignment of the nozzle outlet with the mouth of the jet supply passage so as to enforce a high-pressure stream of water in said passage, a portion of the jet supply passage being constricted to reject part of said stream, and means for conveying the rejected portion of the stream to the bowl element by way of the apertures of the flushing rim.

11. A flush bowl structure comprising in combination a bowl element including a waste discharge outlet passage in communication therewith, an apertured flushing rim, and a jet located to direct flushing-water into the waste discharge outlet, a passage for conveying flushing-water to the jet, a flush-water inlet having a small nozzle for high-pressure ejection of a solid stream axially into the jet passage whereby to produce a high-pressure jet stream in the waste discharge outlet, the mouth of the jet passage being spaced from the nozzle, said passage being of such relative size to receive only part of the high-pressure stream, a flushing rim supply passage for receiving the low-pressure overflow from the jet passage and for delivering said overflow to the apertures of the flushing rim, a spacious fresh air intake chamber communicating freely with the atmosphere at a location remote from the bowl element, said chamber having a portion thereof disposed intermediate the nozzle and the jet passage so as to be spanned by the high-pressure water stream as the stream leaves the nozzle and enters the jet passage, and a partition between the nozzle and the jet passage, said partition having a slightly enlarged aperture aligned with the nozzle and the jet passage to allow unrestrained transmission of the high-pressure stream while at the same time substantially isolating the fresh air intake chamber from the interior of the bowl structure.

12. In a vacuum breaker comprising in combination a fixture, a plurality of ports in axial alignment, the latter ports constituting flushing means for the said fixture, venting means positioned above highest attainable water level within said fixture, and having communication with said ports, the said fixture having means for simultaneously providing a primary and a secondary flush, the lower port having a lesser area than the upper port whereby such simultaneous primary and secondary flush is obtained.

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