

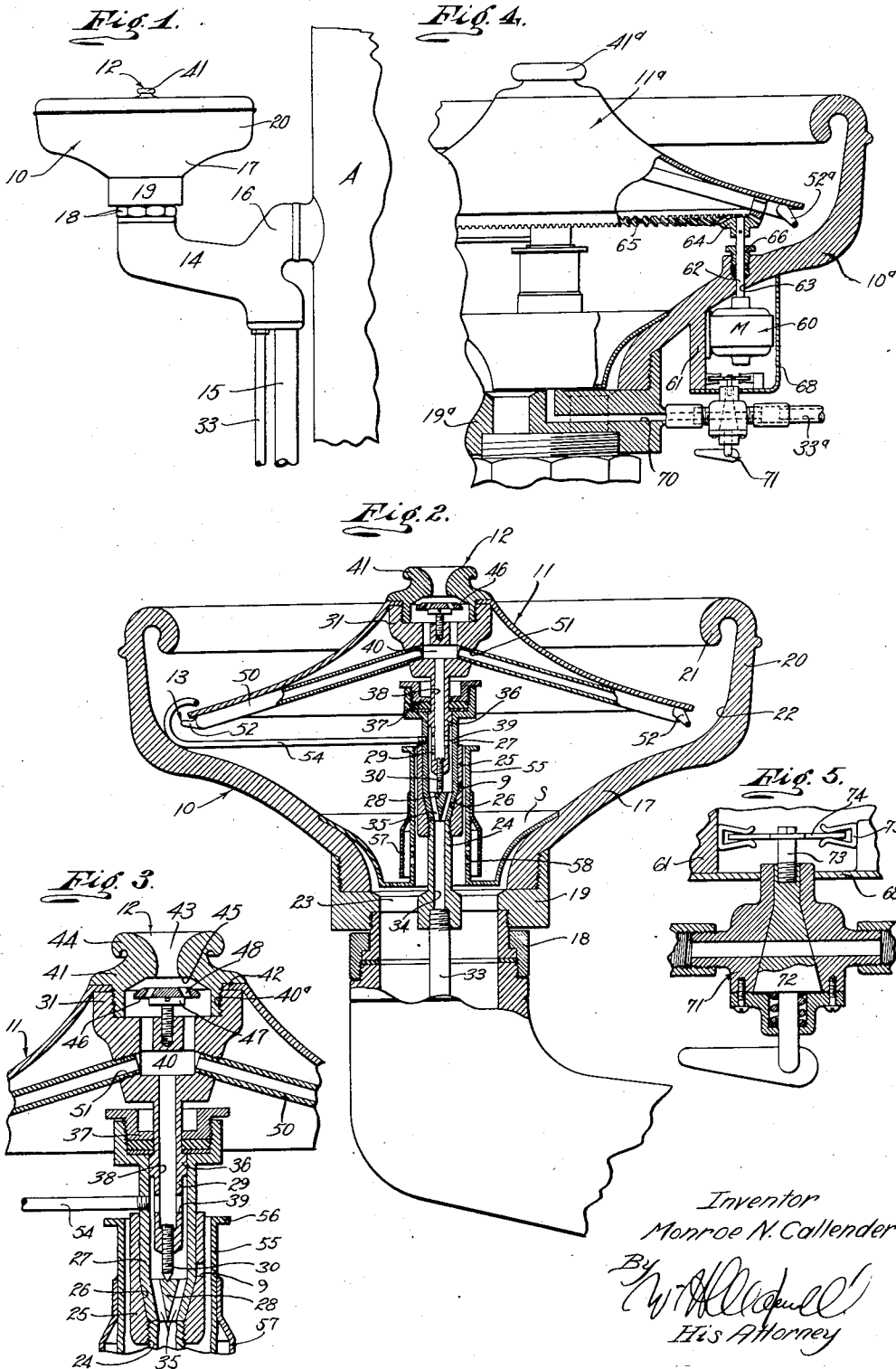
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CUSPIDOR

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CUSPIDOR

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This invention relates to a cuspidor, and relates more particularly to a cuspidor particularly useful in connection with dental apparatus and the like.

A general object of the present invention is to provide a simple, attractive and particularly effective and sanitary dental cuspidor.

The types of dental cuspidors in general use are usually flushed inwardly with one or more streams of water discharged at the rim or periphery of the bowl and directed downwardly and tangentially or angularly across the bottom of the cuspidor bowl to finally discharge at the center of the bowl. The water discharged in this manner has a swirling motion in the bowl, and the centrifugal force and rotary motion thus developed causes the expectorations and other foreign matter to be held up and carried around the surface of the bowl before being discharged. This action is undesirable and is often very unsightly. Further, the traps or strainers of the common forms of dental cuspidors are very unsightly, and are usually arranged in the center and lower portion of the cuspidor bowl where they are readily visible.

An object of the present invention is to provide a dental cuspidor in which the exposed interior surfaces are at all times maintained clean and free of unsightly matter.

Another object of the invention is to provide a dental cuspidor in which the strainer or trap is entirely hidden from view.

It is an object of my invention to provide a cuspidor which operates so that matter or material deposited in it is effectively and rapidly carried out of sight.

It is another object of the invention to provide a dental cuspidor that includes a rotor in the cuspidor bowl that extends over the major portion of the interior of the bowl and is continuously flushed with water.

It is another object of the invention to provide a cuspidor of the character mentioned in which the flushing water is continuously discharged from the center and uppermost part of the rotor to flow out and down over the upper surface of the rotor and be acted upon by centrifugal force caused by rotation of the rotor to carry all foreign matter from the upper surface of the rotor rapidly and in a most efficient manner.

It is another object of the invention to provide a dental cuspidor of the character mentioned in which the rotor is concentric with a discharge fitting and extends outwardly and downwardly from the fitting so that water discharging from

the fitting flows downwardly over the inclined surface of the rotor to effectively keep it clean by a flushing action and through the action of centrifugal force.

It is another object of the invention to provide a dental cuspidor of the character mentioned in which the rotor is automatically rotated by the reaction of jets of water discharged from the rotor which acts also to effectively flush the inner walls of the cuspidor bowl.

It is another object of the invention to provide a dental cuspidor of the character mentioned in which the rotor and the parts associated therewith, and the strainer, may be easily and quickly removed for cleaning, etc.

It is a further object of the present invention to provide a cuspidor of the character mentioned that is entirely automatic in its operation and that requires little or no regulation or adjustment.

Further objects and features of the invention will be best and more fully understood from the following detailed description of typical forms and applications of the invention, throughout which detailed description reference is had to the accompanying drawing, in which:

Fig. 1 is a side elevation of one embodiment of the present invention showing it attached to the side or pedestal of a typical dental apparatus. Fig. 2 is an enlarged vertical detailed sectional view of the embodiment illustrated in Fig. 1 of the drawing. Fig. 3 is an enlarged vertical fragmentary sectional view of the central portion of the cuspidor. Fig. 4 is a fragmentary sectional view of another embodiment of the invention showing certain parts in vertical section, and Fig. 5 is an enlarged central detailed sectional view of the valve and switch of the embodiment illustrated in Fig. 4.

The form of the present invention illustrated in Figs. 1, 2, and 3 of the drawing includes generally, a bowl 10, a rotor 11 mounted in the bowl, means 12 for flushing the rotor 11, and means 13 for driving the rotor.

The bowl 10 is an open topped member adapted to be mounted on a suitable pedestal, waste pipe, or the like. In the particular case illustrated in the drawing, the bowl 10 is mounted on the end of an arm or neck 14. The neck 14 is in the nature of a waste fitting and is connected with a waste pipe 15. The neck 14 is tubular to convey waste from the bowl 10 to the waste pipe 15. In the particular application of the invention illustrated in Fig. 1 of the drawing, the neck or fitting 14 has an upwardly extending branch

connected with the dental apparatus A with which the cuspidor is associated.

The bowl 10 may be formed of porcelain, glass, enamel, or other suitable material, and may be of any desired color or colors. The bowl 10 is preferably round in plan configuration and its lower end portion or bottom 17 tapers or converges downwardly or inwardly. A connection may be made between the bowl and neck 14 through coupling 18 provided on the outer end of the neck 14 and a socket member 19 threaded onto the coupling 18. The extreme lower end or bottom of the bowl 10 is reduced and threaded into the upper end of the coupling member 19 as illustrated in Fig. 2 of the drawing. A substantially vertical annular flange 20 extends upwardly from the upper edge or periphery of the tapered bowl portion 17. An inwardly and downwardly curved annular splash lip 21 is provided on the upper edge of the flange 20 to prevent the flushing water from splashing out of the bowl. The features of the present invention may be embodied in cuspidors in which the bowl varies considerably in construction and design, and it is to be understood that the invention is not to be considered as restricted or limited to the specific bowl and mounting just described.

The rotor 11 is rotatably mounted within the bowl 10. The rotor 11 is preferably centrally disposed in the upper portion of the bowl 10 and is rotatable about a vertical axis. In accordance with the invention, the rotor 11 is a substantially frusto-conical shaped disk disposed so that its upper end is near the plane of the upper edge of the bowl 10 and so that its base or periphery is spaced a short distance from the interior corner 22 of the bowl 10 where the portions 17 and 20 join. The wall or walls of the rotor 11 may be made concave or curved downwardly and outwardly as illustrated throughout the drawing.

In accordance with the invention the rotor 11 is removably mounted within the bowl 10. The means for mounting the rotor 11 may include a web 23 on the socket member 19 extending across the lower end of the bowl 10. The web 23 has a central upwardly projecting stem 24 provided at its upper end with a stationary socket 25. The socket 25 is provided adjacent its lower end with a downwardly and inwardly tapering seat 26. A removable bushing 27 extends into the socket 25 and has a tapered lower end to cooperate with the seat 26. A transverse wall 28 is provided in the lower end portion of the removable bushing 27 and seats against the upper end of the stem 24. A vertical shaft 29 extends into the bushing 27 and is provided at its lower end with a pointed pin 30 which supports the shaft on the wall 28 for free rotation about a vertical axis. The shaft 29 projects from the upper end of the bushing 27 and carries at its upper end a hub 31. The upper end of the conical rotor 11 is supported on the upper end of the hub 31, and is connected with the hub in a manner to be subsequently described.

The means 12 for flushing the rotor 11 operates to continuously discharge water from the upper end of the rotor 11 to flow downwardly and outwardly over its upper side or face. The flushing means includes a water supply pipe 33. The water supply pipe 33 may be connected with the cuspidor supports or fittings in any suitable or practical manner. In the particular case illustrated in the drawing, the supply pipe 33 extends through the neck and connects into the lower end of the stem 24. A vertical opening 34 is pro-

vided in the web 23 and stem 24 to receive fluid from the supply pipe 33. Openings 35 are provided in the bushing wall 28 to pass the fluid from the stem opening 34 into the interior of the bushing 27. The rotor shaft 29 fits the bushing 27 with considerable clearance so that the interior of the bushing forms a fluid chamber. A collar or shoulder 36 is provided on the shaft 29 to rotatably fit the upper portion of the bushing 27 and to close the upper end of the bushing fluid chamber. A packing gland 37 is provided on the upper end of the bushing 27 to seal about the shaft and to maintain the shaft and bushing in their proper relation.

In accordance with the invention, the rotor shaft 29 is tubular, having a central longitudinal opening 38. Lateral openings 39 are provided in the shaft to connect the interior of the bushing 27 with the shaft opening 38. A chamber 40 is provided in the hub 31 and is in communication with the upper end of the shaft opening 38. A discharge fitting 41 has its lower end screw-threaded into a socket 40'. The discharge fitting 41 operates to attach the rotor 11 to the hub 31. An inwardly projecting lip 42 is provided on the upper end of the rotor 11 and is clamped between the upper end of the hub 31 and the body portion of the fitting 41. The fitting 41 is provided with a central upwardly and outwardly flared opening 43 for discharging the flushing water. The fitting 41 is preferably shaped and proportioned so that the water will flow evenly over its upper end to effectively flow down onto the rotor 11 and entirely cover its upper surface. The upper discharge fitting illustrated in the drawing has a rounded outwardly extending flange 44 on its upper end to distribute the out-flowing water.

The invention includes means for automatically controlling or regulating the extent or rate of discharge of water from the fitting 41. The interior of the fitting 41 is enlarged and provided with a downwardly facing shoulder 45 at the lower end of the discharge opening 43. A disk or flutter valve 46 is arranged within the lower portion of the fitting 41, and is adapted to move vertically under the action of an excess flow of water, to cooperate with the shoulder 45 and thus govern the amount of water discharged from the opening 43. The flutter disc 46 is proportioned and made of such weight that it is normally supported on an adjustable seat or screw 47. When the flushing water is initially turned on or when the pressure on the water is excessive, the flutter disc 46 is forced upwardly against the shoulder 45 to limit or restrict the flow of the flushing fluid from the opening 43. The disc 46 may be provided with perforations or openings 48 so that the flow is not entirely cut off when the disc is in cooperation with the seat 45, but a sufficient quantity of water is discharged from the opening 43 at the desired rate. It will be apparent how the flutter disc 46 operates to automatically govern the discharge from the fitting 41 on the upper end of the rotor 11 and to prevent the discharge of an excessive upwardly projected stream from the upper end of the rotor.

A by-pass opening or relief opening 9 is provided in the socket member 25. The opening 9 is located immediately above the tapered seat 26 and is normally closed by the bushing 27. In the event that the water is initially turned on under excessive pressure or in excessive volume it may raise the bushing 27, the rotor 11 and the parts connected therewith. When this occurs the tapered end of the bushing 27 comes opposite

the opening 9 so the opening is uncovered and bypasses the water directly into the bowl 10. The provision of the relief opening 9 prevents the bushing 27 from being forced upwardly out of the socket by the inflowing water. The bushing 27 returns to its position on the seat 26 when the discharge of water through the device is properly regulated.

The means 13 for driving the rotor 11 operates to continuously and automatically turn the rotor during the discharge of the flushing water. In the embodiment of the invention being described, the means 13 is in the nature of a hydraulic means and provides for the rotation of the rotor 11 through the reaction of water discharged from it. In this form of the invention, the rotor operating means 13 includes one or more branch pipes or conduits 50 on the under side of the rotor 11. The conduits 50 extend radially outward from the hub 31 to the periphery of the rotor. The inner ends of the conduits 50 are screw threaded into openings 51 communicating with the chamber 40 in the hub. Discharge nozzles or jets 52 are provided on the outer ends of the conduits 50. The jets 52 are provided with comparatively small discharge orifices so that the water is discharged from them in small streams and at a comparatively high velocity.

In accordance with the invention the jets 52 are pointed or directed substantially tangentially to a circle concentric with the axis of rotation of the rotor 11 and are all directed or pointed in the same direction relative to the periphery of the rotor so that the reaction of the water discharging from them causes rotation of the rotor 11. Further, the jets 52 may be pointed or directed to provide for effective flushing of the inner walls of the bowl 10. In the particular case illustrated in Fig. 2 of the drawing, one of the jets 52 is pointed somewhat upwardly while the other jet 52 is inclined downwardly and outwardly. The jets 52 thus act to cause rotation of the rotor 11 and discharge water in a manner to effectively wash and flush the interior of the bowl 11. As the rotor 11 is rotating through the action of the discharging water, the water from the jets 52 is effectively distributed over the inner surfaces of the upper portion of the bowl 10 and keeps the bowl clean.

The invention may include means in addition to the jets 52 for turning the rotor 11. In the form of the invention being described, the supplementary means for rotating the rotor 11 is in the nature of a fluid pressure or hydraulic means including a substantially horizontal and stationary pipe 54 having its inner end in communication with the interior of the bushing 27. The pipe 54 extends radially outward from the bushing 27 to a point at or adjacent the curved wall portion 22 of the bowl. The pipe 54 is provided to discharge water against the rotor and may be arranged to discharge against any part of either the upper or lower sides of the rotor. In the particular case illustrated the outer end part of the pipe 54 is curved upwardly and inwardly and is pointed in the direction of rotation of the rotor 11. Water discharging from the pipe 54 strikes the upper surface of the rotor 11 and aids the jets 52 in rotating the rotor. Further, water discharging from the pipe 54 aids in flushing the peripheral portions of the rotor and distributes the flushing water over the upper surface of the rotor.

The invention includes a strainer or traps in the lower end or bottom of the bowl 10 to catch

solid matter or other foreign material. In accordance with the invention, the strainer S is readily removable and is normally entirely concealed by the rotor 11. The strainer S is an open topped member shaped to effectively fit within the lower portion of the bowl 10 and has a central tubular flange or sleeve 55 freely passing the socket part 25. The lower end of the sleeve 55 is open to the neck 14 and waste pipe 15. The sleeve 55 is adapted to be passed over the socket 25 when the parts are being assembled, and an outwardly projecting flange 56 may be provided on its upper end to facilitate handling of the strainer. A depending flange or apron 57 surrounds the lower end portion of the sleeve 55 and has its lower end spaced from the closed lower end of the strainer. Openings 58 are provided in the sleeve 55 within the apron 57 to pass the water from the interior of the bowl to the neck 14. The apron 57 forms a trap in the strainer S.

Fig. 4 of the drawing illustrates an embodiment of the invention in which the rotor 11^a is operated or turned by a power means 60. In this embodiment of the invention the bowl 10^a, the rotor 11^a, the mounting for the rotor and the various other parts may be similar to or identical with the corresponding parts just described. Flushing water is discharged from a fitting 41^a on the upper end of the rotor 11^a and flows downwardly over the conical rotor. Reaction nozzles or jets 52^a discharge water under pressure from the periphery of the rotor to aid in rotating the rotor and to flush the inner walls of the bowl 10^a.

The power means 60 provides for the positive rotation of the rotor 11^a at a definite rate of speed. The rotor operating means 60 includes a comparatively small electric motor M of suitable design mounted by a flange or lip 61 on the exterior of the bowl 10^a. In the particular case illustrated, the motor M is vertically disposed with its shaft 62 extending upwardly through a vertical opening 63 in the wall of the bowl 10^a. A bevelled pinion 64 on the upper end of the motor shaft 62 to mesh with a bevelled ring gear 65 on the under side of the rotor 11^a. A packing gland 66 may be provided to pack around the motor shaft 62 where it passes through the opening 63. The motor M may be enclosed in a case or housing 68.

The form of the invention illustrated in Figs. 4 and 5 of the drawing includes a control for the flushing and rotor actuating means 60 whereby the discharge of the flushing regulator and the energizing of the motor M may be controlled simultaneously. A fluid passage 70 is provided in the socket fitting 19^a to pass water from the supply pipe 33^a to the flushing means. A valve 71 is interposed between the pipe 33^a and the passage 70. The valve 71 may be in the form of a cock having a rotatable plug 72 for controlling the flow of water. The end of the valve extends into the case 68 and a stem 73 of insulating material is attached to the end of the plug 72. A double switch blade 74 is provided on the stem 73 and is adapted to cooperate with stationary contact clips 75. A line or conductor of the energizing circuit of the motor M is connected to the contacts 75. It will be apparent how the plug 72 of the valve is operable to simultaneously control the motor M and the discharge of the flushing water. It will be apparent how the motor M operates to rotate the rotor 11 and how the flushing water discharged from the fitting 41^a is acted upon by centrifugal force and effectively flushes and cleans the upper surface of the rotor. The form of the invention illustrated in Fig. 4 of the draw-

ing is particularly adapted for use in situations where the water pressure is insufficient to cause rotation of the rotor at the proper speed through the action or reaction jets or water nozzles above.

5 It is believed that the operation of the device provided by the present invention will be readily apparent from the foregoing detailed description. The flushing water passed through the rotatable mounting of the rotor 11 discharges from the fitting 41 to flow downwardly over the upper surface of the rotor. As the rotor 11 is continuously rotated when the device is in operation, the flushing water discharging from the fitting 41 is acted upon by centrifugal force and is evenly distributed over the surface of the rotor and acts through this centrifugal force and its own flow to effectively carry all matter from the rotor.

The outflowing flushing water from the rotor 11 falls from the base or periphery of the rotor into the bowl 10 and thus passes from the cuspidor. The jets or reaction nozzles 52 act to rotate the rotor 11 at a suitable rate of speed and also act to effectively wash or flush the inner walls of the bowl 10. The speed of rotation of the rotor 11 and the amount of flushing water discharged, of course may be readily governed by controlling the admission of water under pressure to the supply pipe 33. The secondary flushing and rotor operating pipe 53, when embodied in the cuspidor, acts to aid the reaction jets 52 in turning the rotor, and also provides for the further flushing of the upper surface of the rotor. The flushing water is prevented from projecting or fountaining from the top of the rotor by the flutter valve 46, which automatically controls or restricts the rate of discharge of the flushing water. When it is desired to clean the device, the rotor 11 may be easily lifted upward and carries the bushing 27 with it. After the rotor 11 has been removed, the strainer S is readily accessible for removal from the socket member 25. The parts are all simple, and are readily accessible when the rotor and strainer are removed as described above. In the embodiment of the invention described in Fig. 4 of the drawing, the rotor 11^a is positively turned at a predetermined rate of speed and this together with water discharging from the fitting 41^a provides for the effective flushing of its upper surface.

50 While I have referred to the device provided by the present invention as a dental cuspidor, it is not to be considered that the device is to be limited to this specific use or application, as it may be employed in various situations and for various purposes.

Having described only typical preferred forms of my invention, I do not wish to limit myself to the specific details set forth, but wish to reserve to myself any changes or variations that may appear to those skilled in the art or fall within the scope of the following claims.

Having described my invention, I claim:

1. A cuspidor of the character described including, a bowl, a rotor in the bowl, means for discharging flushing water on the upper surface of the rotor, and means for rotating the rotor, said means including reaction jets on the under side of the rotor discharging flushing water from the periphery of the rotor into the bowl.
2. A cuspidor of the character described including a bowl, a substantially frusto-conical rotor in the bowl, means for discharging flushing water from the upper end of the rotor to flow over the upper surface of the rotor, and a reaction jet for discharging water under pressure from

the under side of the peripheral portion of the rotor to rotate the rotor.

3. A cuspidor of the character described including, a bowl, a rotor mounted in the bowl for rotation, means flushing the upper side of the rotor with water, and means rotating the rotor and flushing the interior of the bowl, the last mentioned means including means conducting water under pressure to the rotor, and a reaction jet discharging water from under the periphery of the rotor to rotate the same and to flush the inner walls of the bowl.

4. A cuspidor of the character described including, a bowl, a substantially frusto-conical rotor, means mounting the rotor in the bowl to rotate about a vertical axis, a discharge fitting on the upper end of the rotor, means conducting water under pressure to the fitting to discharge therefrom and flow over the upper surface of the rotor, and a flutter valve automatically controlling the discharge from said fitting.

5. A cuspidor of the character described including a bowl, a substantially frusto-conical rotor, means mounting the rotor in the bowl to rotate about a vertical axis, a discharge fitting on the upper end of the rotor, means conducting water under pressure to the fitting to discharge therefrom and flow over the upper surface of the rotor, and means for rotating the rotor, the last mentioned means including a conduit on the under side of the rotor receiving water under pressure from the said water conducting means, and a jet on the conduit discharging from the periphery of the rotor in a direction to cause rotation of the rotor.

6. A device of the character described including a bowl, a rotor in the bowl rotatable about a vertical axis, and means for rotating the rotor including an electric power means removed from the bowl and lateral of the vertical axis of the rotor, and a drive between the power means and the rotor.

7. A device of the character described including a bowl, a rotor in the bowl rotatable about a vertical axis, means flushing the upper surface of the rotor with water, means for rotating the rotor including an electric power means removed from the bowl and lateral of the vertical axis of the rotor, and a drive between the power means and the rotor, and means for simultaneously controlling the two first mentioned means.

8. A device of the character described including a bowl, a rotor in the bowl, means supporting the rotor for rotation about a vertical axis including a central socket in the bowl, a shaft carrying the rotor and fitting the socket for rotation, the shaft having a longitudinal opening, means passing water through the socket and shaft to discharge from the upper end of the rotor, and means for rotating the rotor including a conduit receiving water under pressure from the socket opening and discharging against the upper surface of the rotor.

9. A device of the character described including a bowl, a rotor, means removably mounting the rotor in the bowl for rotation about a vertical axis and with its periphery spaced from the interior of the bowl, means discharging flushing water on the upper surface of the rotor, and a reaction jet discharging from under the periphery of the rotor for rotating the rotor and flushing the interior of the bowl.

10. A cuspidor of the character described including a bowl, a rotor mounted in the bowl for rotation, means flushing the upper side of the

rotor with water, and means rotating the rotor and flushing the interior of the bowl, the last mentioned means including reaction jets discharging from under the periphery of the rotor.

5 11. A cuspidor of the character described including a bowl, a rotor in the bowl rotatable about a vertical axis, and means for rotating the rotor including reaction jets on the rotor discharging flushing water from a point under and adjacent the peripheral portion of the rotor into the bowl.

10 12. A device of the character described including a bowl, a rotor in the bowl, means supporting the rotor for rotation about a vertical axis including a central socket in the bowl, a shaft 15 carrying the rotor and fitting the socket for rotation, the shaft having a longitudinal opening, means passing water through the socket and shaft to discharge from the upper end of the

rotor, and means for rotating the rotor including a conduit projecting radially from the shaft to discharge water against the inner surface of the bowl.

13. A device of the character described including a bowl, a rotor in the bowl, means supporting the rotor for rotation about a vertical axis including a central socket in the bowl, a shaft carrying the rotor and fitting the socket for rotation, the shaft having a longitudinal opening, means passing water through the socket and shaft to discharge from the upper end of the rotor, and means for rotating the rotor including a conduit projecting radially from the shaft to discharge water against the inner surface of the bowl, and another conduit projecting radially from the socket to discharge water against the upper surface of the rotor.

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