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W. J. HOOPER
DENTAL CLEANING SPRAY
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2,208,032

Fig. 1.

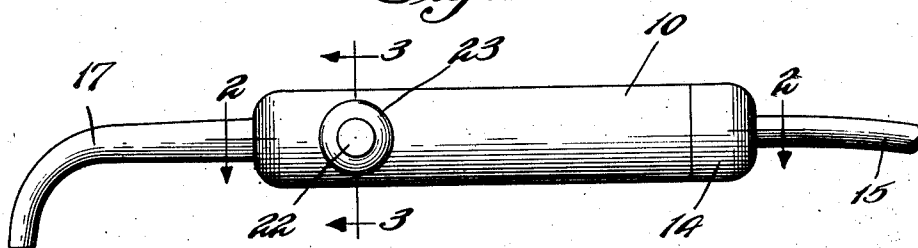


Fig. 2.

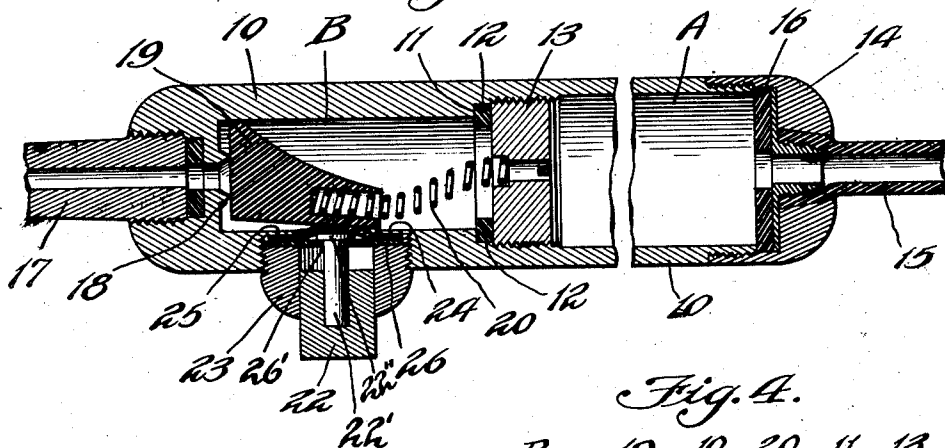


Fig. 4.

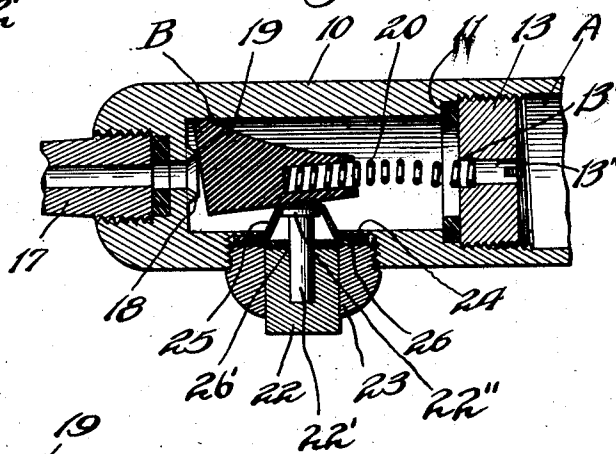


Fig. 3.

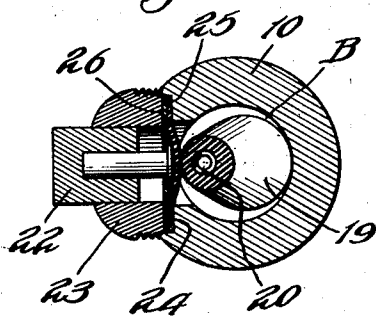
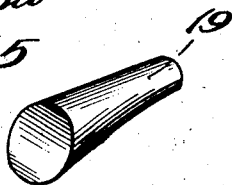


Fig. 5.



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DENTAL CLEANING SPRAY

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3 Claims. (Cl. 128-229)

The present invention relates to a novel cleaning spray and more particularly to a dental spray device for individual home use. The device is adapted to be readily and easily utilized and operated with but one hand by the user for cleaning his teeth by the application of a relatively fine spray or jet of water under pressure to forcibly dislodge particles which collect on or in the interspaces between the teeth.

It is, therefore, an object of the present invention to provide a dental cleaning spray adapted to be readily connected to a liquid supply faucet and provided with a positive, quick acting and highly sensitive valve construction adapted to be operated by the application of a slight thumb pressure by the user. It thus requires the use of but one hand.

A further object of the invention is the provision of a dental cleaning spray having a novel and simplified valve construction comprising a minimum number of operating parts. The valve is quick and positive in operation and the spray can be accurately and positively controlled by the user.

Another object of the invention is to provide a novel dental spray so constructed and arranged that the parts may be quickly assembled, disassembled and/or replaced and thus permitting quick and easy access to the interior. With this device may be utilized several nozzles, so that the dental spray may be used by different members of the household merely by replacing the nozzle, and without danger of contracting any contagious mouth infections.

Another object is to provide a novel spray device having a readily accessible chamber for receiving medications or antiseptics, with the chamber located for most efficient operation.

In the drawing:

Fig. 1 is a side elevational view of a dental cleaning spray embodying my invention showing attached to one end a portion of a flexible liquid supply tube which leads to and, in practice, is connected with the usual water supply faucet in the bathroom or elsewhere.

Fig. 2 is a cross sectional view of the spray showing my improved construction and particularly my improved touch operated valve mechanism in closed position.

Fig. 3 is a transverse sectional view taken on line 3-3 of Fig. 1.

Fig. 4 is a longitudinal cross sectional view showing my improved valve mechanism in open position.

Fig. 5 is a detached perspective view of the rubber valve member illustrated in section in Figs. 2 and 3.

Referring more particularly to the disclosure shown in the drawing, my novel dental spray, as

illustrated in the preferred form, consists of a tubular operating handle 10, preferably constructed of lucite or material having similar properties, provided with a medication chamber A and a valve chamber B, the valve chamber B being of a diameter less than the chamber A and provided with an annular shoulder 11. Mounted against this shoulder 11 is a circular rubber washer 12, which washer is secured in place by a screw threaded plug 13. This plug is provided with a spring receiving socket 13' terminating in a central duct 13''. The intake end of the medication chamber A is provided with a readily removable screw threaded cap 14 of lucite or other material having similar properties. Attached to the cap and removable therewith is a rubber or flexible hose 15 of relatively small diameter, which cap carries a rubber washer 16. When the cap is screwed home, it clamps the washer between the outer end of the medication chamber and the cap to form an efficient liquid-tight connection. The discharge end of the valve chamber is provided with a screw threaded nozzle 17 which may be readily and quickly attached and detached to and from the operating handle 10. The removable nozzle 17 is provided with a central duct which registers with a duct in the discharge end of the handle 10. Surrounding the duct at its discharge end is an annular, inwardly tapered flange 18 forming a line contact seat for one end of the elongated valve member 19 formed of rubber or rubber-like material, the opposite end of which is provided with an internal socket in which one end of the coil compression spring 20 is mounted, the opposite end of this spring being mounted in the socket 13' formed in the screw threaded plug or partition 13. The valve member 19 is preferably biased or beveled at its forward end and circular in cross section but straight on one side and tapering on its other side so that the end contacting the seat 18 is relatively large and the other end relatively small so that sufficient water may enter the chamber B and when the valve is actuated, a sufficient opening is provided for the liquid to pass through the duct leading to the nozzle. This construction also permits a portion of the forward end of the member 19 to be maintained in position against part of the seat 18 at all times and, together with the line contact between the valve and seat, makes possible exceedingly rapid opening and closing of the valve as well as making the valve absolutely leak-proof.

In order to actuate the valve 19 against the force of the compression spring 20 and pressure of the liquid supply, I provide a thumb actuated plunger or push button 22 which is readily and quickly operated by a slight touch of the thumb. This plunger 22 is slidably mounted in a bushing 23 threaded into one side of the valve chamber B.

The bore in the side of the valve chamber in which the bushing 23 is mounted is provided with an annular shoulder or flange 24. Mounted between the annular shoulder 24 and the bushing 23 is a rubber self-lubricating diaphragm 25 which is tightly held in position near its annular edge by interposing resilient washer 26 between the bushing 23 and the diaphragm 25 to form a liquid-tight seal. The plunger 22 is preferably a solid cylindrical member of metal or plastic material and provided with a well or depression in its inner end and in which is suitably anchored or fixed a projection 22' extending through a central opening 26' in the washer 26 and having an enlargement 22'' at its outer end. The opening 26' in the washer is sufficiently large to receive and guide the projection 22' therethrough but is of less diameter than the enlargement 22'' whereby to prevent withdrawal or displacement of the plunger 22 from the bushing but permitting free movement thereof for the length of the projection 22'. The enlargement 22'' normally seats against the diaphragm 25, which diaphragm is at all times in direct engagement with the straight side of the rubber valve member 19 as shown in Figs. 2 and 3. By slightly touching the plunger 22 with the thumb, the enlargement 22'' forces the self-lubricating dam or diaphragm 25 inwardly to unseat the valve 19, as best shown in Fig. 4, thus permitting the liquid to pass to the discharge nozzle 17. Instantly upon release of the thumb pressure from the plunger 22 the coil spring 20 pushes the plunger and associated parts outwardly to re-seat the valve, as shown in Fig. 3, and closes the liquid supply passage to the nozzle 17. Throughout the entire operation the diaphragm is always in direct contact with the valve member 19 which is relatively narrow at the point of contact to permit a longer stroke of the plunger and to permit more flexibility in arching the rubber valve and maintaining it against the diaphragm.

It will be noted from examination of Fig. 2 that the end of the valve member 19 which closes the discharge duct is bevelled and that the compression spring 20 is so arranged as to exert a pressure on the valve member 19 so as to maintain its opposite end at an angle to the valve chamber and in direct contact with the diaphragm 25 in order that the valve will act instantaneously upon the slightest movement of the thumb actuated plunger 22.

In order to provide a successful dental cleaning spray of this type for home use, I have found after long experimentation it is essential to provide means whereby the liquid supply can be instantaneously broken and re-established to set up rapidly, successive, forceful jets in order to do the work intended and at the same time pass a relatively small amount of liquid to the mouth of the user. As the valve must, therefore, be necessarily manipulated in rapid succession an untold number of times even during a short period of use, it is highly important that the valve mechanism be such as it will not only instantaneously respond and act, but it must be such as to stand up under such usage and automatically compensate for the wear and tear and throughout afford a positive, quick acting operation and making and breaking of the jet or stream.

It will be readily seen from the foregoing description in connection with the drawing that I have provided a valve which affords all these

advantages and carries out completely the objects set forth in this specification.

Having thus described my invention, I claim:

1. A dental cleaning liquid spray for individual home use adapted to be readily connected to a liquid supply faucet and easily and quickly utilized and operated with one hand by the user, consisting in a hollow handle, a body part and a nozzle, all detachably connected for ready assembly or disassembly, a valve seat and a valve member in the body part, said valve member being of resilient material and having a flat seating face, and having a fulcrum portion at its lower edge, and a rearwardly extending elongated portion adjacent its upper edge, said body member having a seat for pivotally supporting said fulcrum portion of said valve member, means for normally retaining the valve member in seating engagement with the valve seat to prevent the discharge of liquid, discharge passages about the periphery of the valve member, and a thumb-operated, valve-actuating member adapted to engage the elongated portion of the valve member to tilt this member and permit the discharge of liquid in an amount determined by the pressure applied by the user to the thumb-operated member.

2. A spray for individual home use and adapted to be operated with one hand by the user, comprising a handle part, a nozzle and a body part interposed between the nozzle and handle part, all arranged for ready detachment, a valve assembly within the body part and comprising a valve seat and a valve member, said valve member being of resilient material and having a flat seating face, and having a fulcrum portion at its lower edge, and a rearwardly extending elongated portion adjacent its upper edge, said body member having a seat for pivotally supporting said fulcrum portion of said valve member, means for actuating the valve member to open the valve for discharge of the fluid, and adjustable means between the valve assembly and nozzle for controlling the pressure of the fluid issuing from the valve assembly, and a rubber diaphragm interposed between the valve elongated member and the valve actuating member.

3. A dental cleaning liquid spray for individual home use adapted to be readily connected to a liquid supply faucet and easily and quickly utilized and operated with one hand by the user, consisting in a hollow handle, a body part and a nozzle, all detachably connected for ready assembly or disassembly, a rigid valve seat and a valve member constructed of resilient material having a flat seating face and located in the body part, said valve member having a fulcrum portion at its one edge, and a rearwardly extending elongated portion adjacent its opposite edge, said body member having a seat for pivotally supporting said fulcrum portion of said valve member, means for normally retaining the valve member in seating engagement with the valve seat to prevent the discharge of liquid, and a thumb-operated, valve-actuated member adapted to engage the elongated portion of the valve member to tilt this member and permit the discharge of liquid in an amount determined by the pressure applied by the user of the thumb-operated member.

WILLIAM J. HOOPER.