

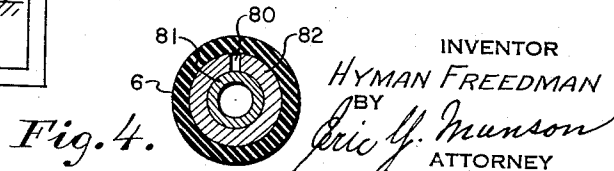
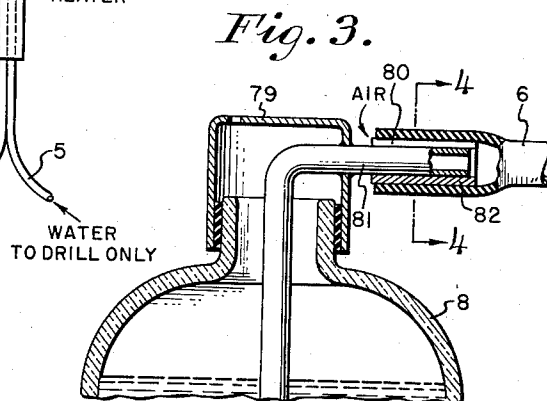
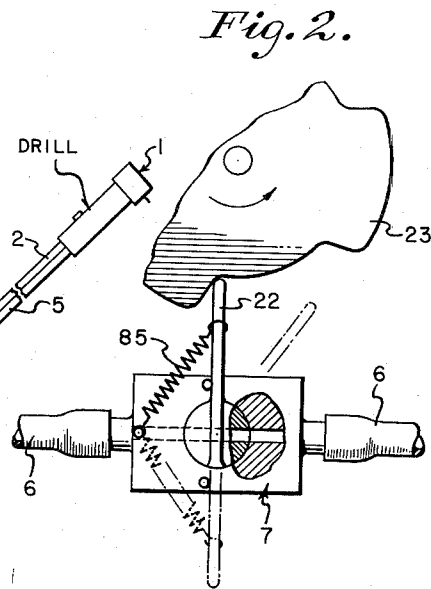
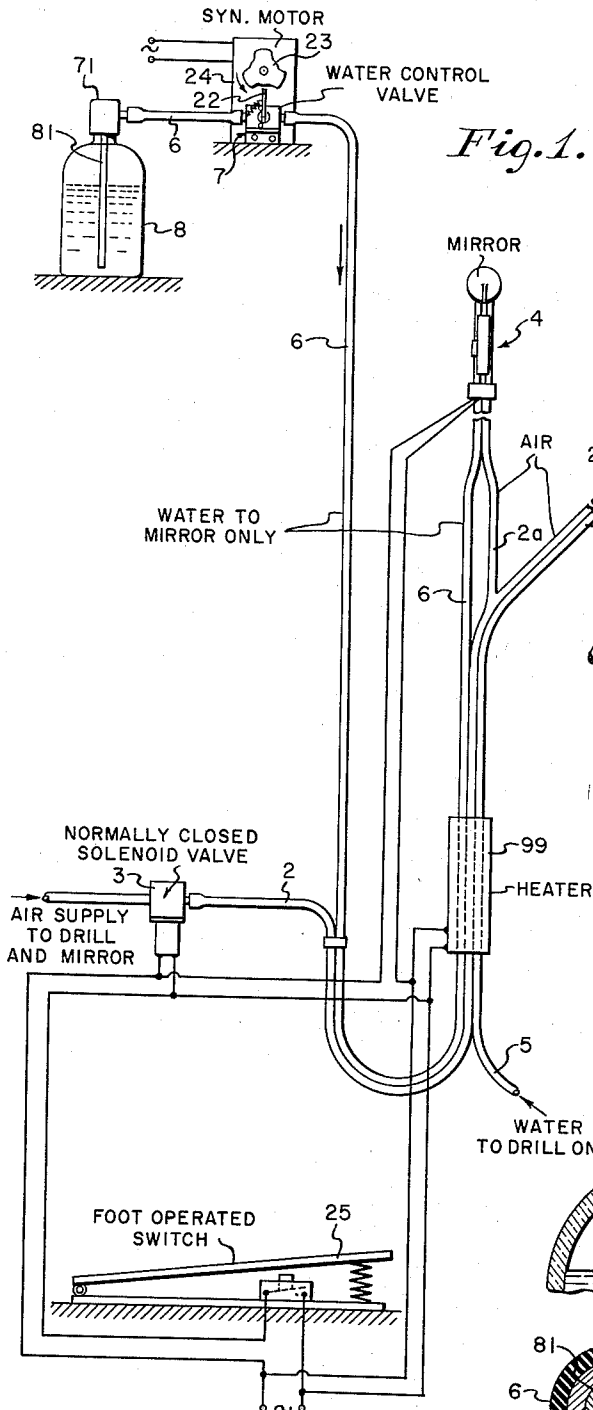
Sept. 26, 1961

H. FREEDMAN
DENTAL MIRROR

3,001,288

Filed June 17, 1958

3 Sheets-Sheet 1



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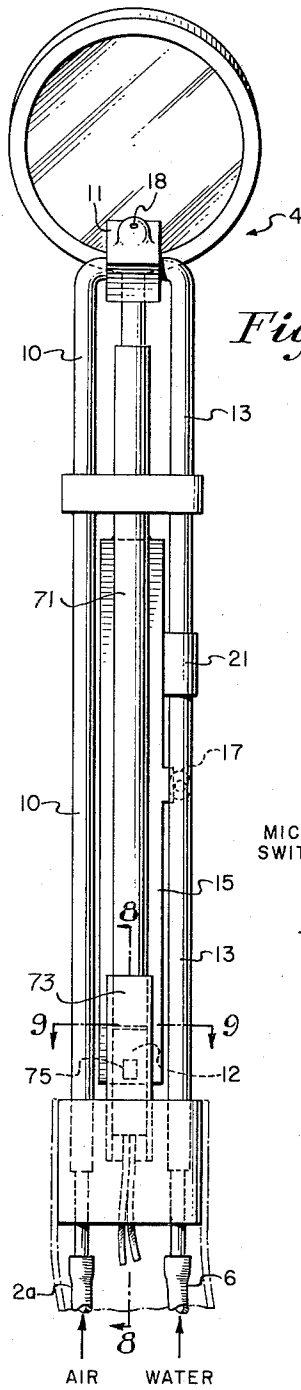


Fig. 5.

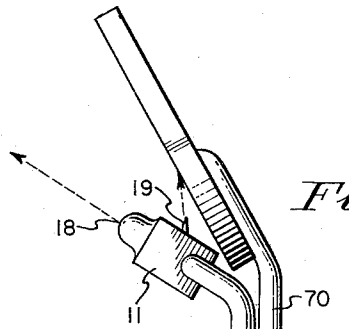


Fig. 6.

Fig. 8.

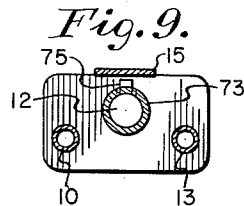
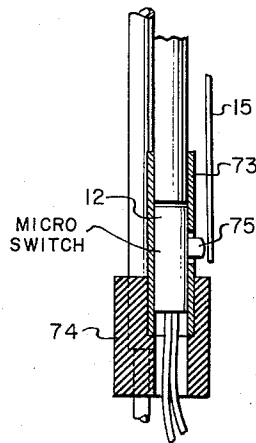


Fig. 9.

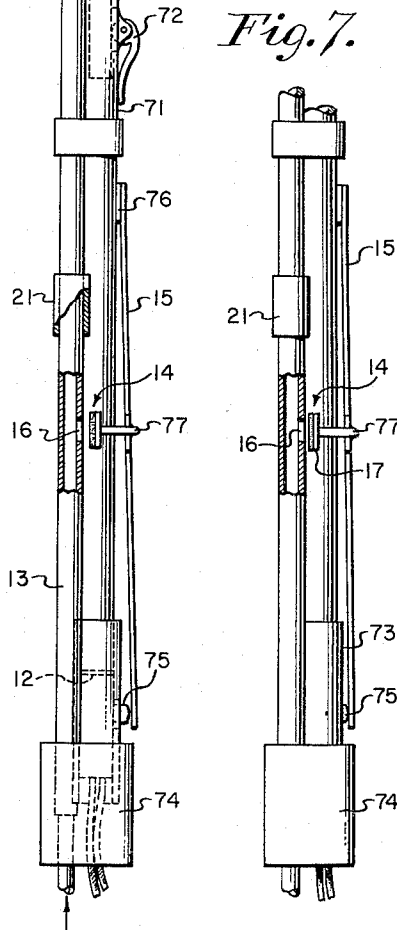


Fig. 7.

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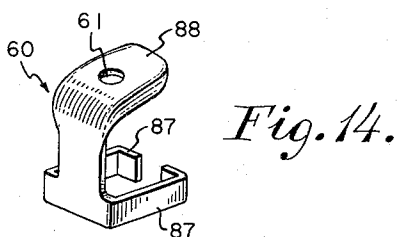
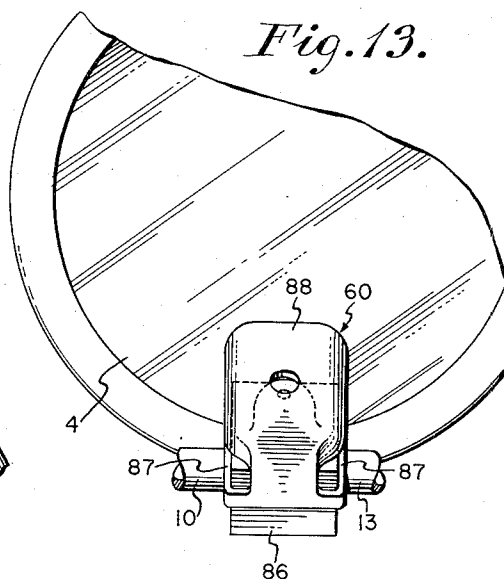
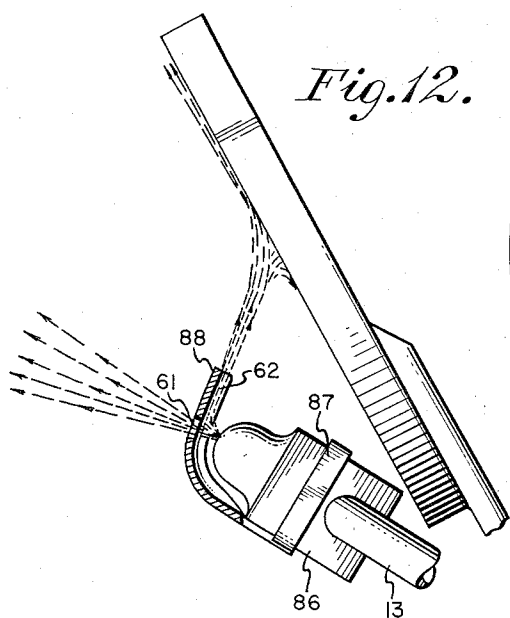
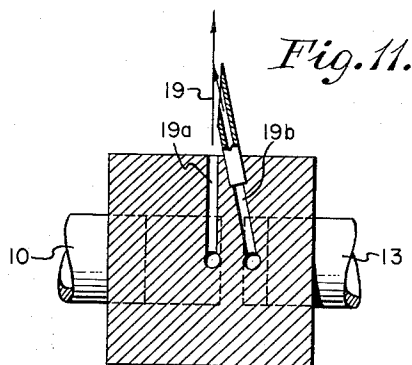
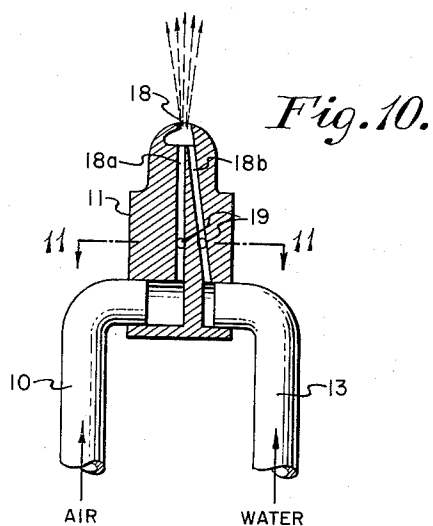
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DENTAL MIRROR

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1 Claim. (Cl. 32-69)

This invention relates to dental appliances and more particularly to an apparatus by which the mirror employed in dental work, as well as the area in which the work is being performed will be kept clear of residue dislodged by the drilling operation.

With modern high-speed drilling, a granular paste composed of tooth structure, enamel, dentine, decay and filling material is developed around the working area. This pasty residue so developed coats the mirror being used by the dentist so that while he is using the high-speed drill the visibility afforded by the mirror becomes very poor.

It is also of the utmost importance that the dentist should be able to perform this cleansing and cooling operation without having to relinquish the drill while doing so.

During the drilling operation the dentist's attention should not be diverted by irritating extraneous manipulations. It is important therefore, that the manipulation of the cleansing and cooling device be made as comfortable and easy for the dentist as possible so that he will not be called upon to perform any manipulations of the tool differing appreciably from those required by the conventional drill, it should be sensitive to the hand and rendered more or less automatic.

It is therefore among the objects of the present invention to provide an air and water spray apparatus for use in a dental drilling operation and by means of which the work area will be cooled and cleansed while the mirror will be kept free of dislodged material to thereby afford a maximum of visibility for the dentist.

Another object of the invention is to provide a device of the character indicated which will be highly responsive to the demands of the dentist so that the operation thereof will become practically reflexive and which will fit in the hand of the dentist so that it can be manipulated with only a slight movement of the hand or fingers.

A further object of the invention is to provide means for controlling the spray, or to have it intermittently operative for predetermined periods.

Another object is to provide heating means by which the mirror being used is preheated prior to insertion in the mouth of a patient.

Still another object of the invention is to provide directional control means for a plurality of sprays emanating from a nozzle whereby one spray reaches the mirror and another reaches the point of operation.

With these and other objects in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claim appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

FIG. 1 is a schematic view of the combination air and water system employed to keep the dental mirror and work area free of the drilling residue;

FIG. 2 is a detail view, partly in section, of a cut-off valve employed in the above system;

FIG. 3 is a detail sectional view of a water container and associated air control;

FIG. 4 is a sectional view, taken substantially on the line 4-4 of FIG. 3, looking in the direction of the arrows;

FIG. 5 is a front elevational view of the mirror and control device;

FIG. 6 is a side elevational view of the structure shown in FIG. 5;

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FIG. 7 is a view of a portion of the device of FIG. 6, but showing the control in its operative position;

FIG. 8 is a sectional view, taken substantially on the line 8-8 of FIG. 5, looking in the direction of the arrows;

FIG. 9 is a sectional view, taken substantially on the line 9-9 of FIG. 5, looking in the direction of the arrows;

FIG. 10 is a detail view of the mixing nozzle employed as part of the structure shown in FIG. 5;

FIG. 11 is a sectional view, taken substantially on the line 11-11 of FIG. 10, looking in the direction of the arrows;

FIG. 12 is a side elevational view, partly in section, of a modified form of nozzle;

FIG. 13 is a front elevational view of the same;

FIG. 14 is a detail view in perspective of a modified form of spray divider.

In FIG. 1 is shown the complete apparatus, and the same includes drill 1 of known type and which is air driven, receiving air under pressure from a source of compressed air (not shown) but supplying the same through piping or tubing 2 through a normally-closed solenoid valve indicated at 3. The valve 3 is electrically connected to a source of current and its operation may be controlled by the foot switch shown at 25 and by other switch means to be described. In addition to supplying air to the drill 1, the piping or tubing 2 also supplies an air flow to the mirror 4 through a branch pipe 2a. Water is supplied to the drill 1 only, the water being under pressure and being supplied through pipe 5 from a suitable source. A second water supply is piped to the mirror 4 only, through a pipe 6 and the flow there-through is controlled by a control valve 7 arranged in the pipe 6 between the mirror and a water-containing vessel or bottle 8.

The mirror 4 and its associated elements are shown in detail in FIGS. 5 to 9 inclusive, and it will be therein noted that a pipe 10 is connected at one of its ends to the air supply branch tube 2a and is connected at its opposite end to a mixing nozzle 11, shown in detail in FIGS. 10 and 11, and from which the sprays of air and water are ejected. The mirror 4 is supported at the end of a stem 70 which is longitudinally and telescopically adjustable in a supporting tube 71. A clamp 72 holds the mirror in the desired position of extension out of the tube 71.

At its end remote from the mirror 4, the tube 71 fits within the end of a sleeve 73 which is supported in a block 74, and said sleeve contains a micro switch 12 operative to control the solenoid valve 3 and thus regulate the air supply to the drill as well as to the mixing nozzle 11. Said switch 12 has a control button 75 adapted, for manual control, by depression of a lengthy flat spring 15 secured at one end, as indicated at 76, to the tube 71.

The water supply passing through the tube or pipe 6 reaches the mixing nozzle 11 through a tube 13 connected at one end to the tube or pipe 6, and having its other end connected to the mixing nozzle 11. Provided in the water pipe 13 is an air vent opening 16 which is adapted for closure when required by the head of a valve 17 having its stem 77 secured to the spring 15 so that when the spring 15 is manually pressed it will depress the switch button 75 and then seat the valve 17 over the opening 16. The tripping of the switch 12 and the seating of the valve 17 take place in sequence. That is to say, initial manual pressure on the spring 15 will first trip the switch 12, causing the solenoid valve 3 to function to allow air to flow, and increased pressure on the spring 15 will close the air vent 16 by valve 17, allowing air to flow to the nozzle 11 and pick up water at the nozzle.

The nozzle 11, shown in detail in FIGS. 10 and 11, is divided to form two jets, the jet shown at 18 receiving air from passage 18a and water from passage 18b, while the second jet shown at 19, receives air and water respectively through passages 19a and 19b. Jet 18 is directed toward the tooth being operated on and jet 19 is directed toward the mirror 4 to cleanse the same. The flow from the respective jets is indicated by the dotted lines and arrows in FIG. 6. The fluid drawn into the tube 13 by the air flow is a mixture of air and water caused by the admission of air through the vent 80 located around the tube 81, so that at no time is there a column of air in the tube 13 to cause a siphon action. The end of the tube 81 enters a longitudinally split metal sleeve 82 in the adjacent end of the tube 6, the split portion of the sleeve 82 providing the vent 80 above mentioned.

If it is desired to use the apparatus in such a manner that the air and water sprays will be intermittently ejected and for predetermined periods, a ferrule 21 provided for slidable movement on the tube 13, is slid to a position where it covers the opening 16, and an arm 22 provided on the valve 7, is moved from a normally in-operative position shown in dotted lines in FIG. 2 to that shown in full lines. This brings the arm 22, which is spring-biased by a spring 85, to a position where its outer end is engaged by a rotary cam 23 actuated by a synchronous motor 24. At this time the air valve 3 is under the control of the foot-operated switch 25.

As a substitute for the multi-jet nozzle 11, a single jet nozzle, such as shown at 86 in FIGS. 12 and 13 might be used. When such a nozzle is used, a deflector 60 is fitted on the nozzle. Said deflector, shown in detail in FIGS. 12, 13 and 14, has a pair of arms 87 which embrace the nozzle and removably mount the deflector on it. A curved deflector plate 88 forming a part of the

deflector, is formed with a hole 61 so positioned relatively to the spray outlet of the nozzle that it permits some of the spray to be directed through it toward the tooth being operated on, while the remainder of the spray will be deflected, as indicated at 62, toward the mirror to cleanse the same.

Having described an embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claim.

What I claim is:

In a dental appliance, a supporting block, air and water supply tubes extended through the block, a sleeve mounted in the block, a switch contained in the sleeve, a hollow post fitted at one end into the sleeve, a mirror adjustably mounted in said post, the ends of the air and water supply tubes being connected to a spray nozzle located adjacent to the mirror, said nozzle having means to divide the spray of air and water into two streams and to direct one stream toward the mirror and to direct a second stream toward the area of tooth-operation, the post being provided with a movable switch arm operative on the switch, the water supply tube having an opening and the switch arm carrying a valve for closing said opening after the said arm is moved to switch-actuating position, and an electrically-controlled valve for controlling the flow of air through the air supply tube, the operation of said valve being controlled by the switch.

References Cited in the file of this patent

UNITED STATES PATENTS

1,660,870	Fust	Feb. 28, 1928
2,731,722	Wlen	Jan. 24, 1956

FOREIGN PATENTS

257,846	Italy	Mar. 20, 1928
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