

Oct. 18, 1955

H. FREEDMAN
DENTAL DEVICE

2,720,702

Filed April 19, 1954

2 Sheets-Sheet 1

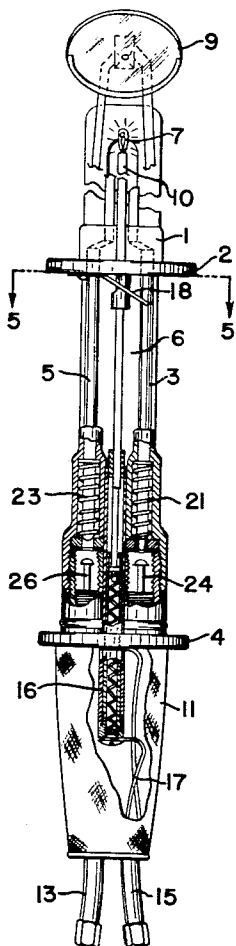


FIG. 1

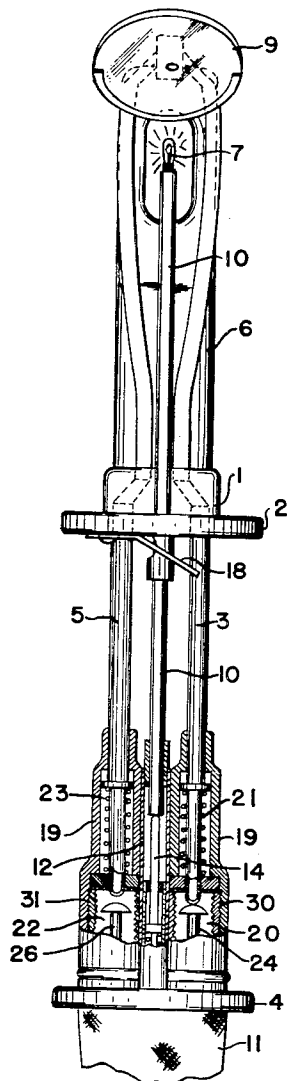


FIG. 2

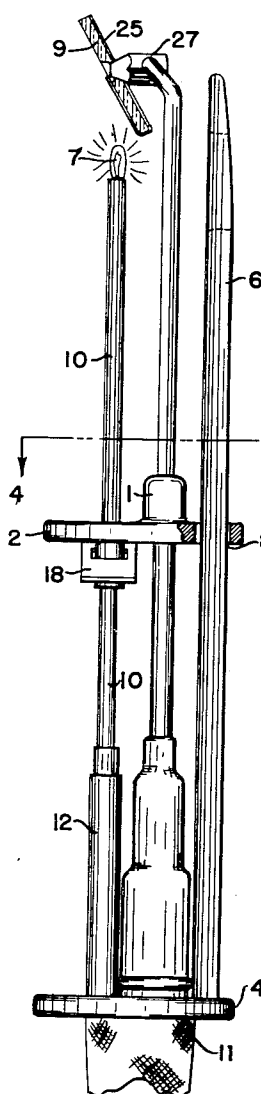


FIG. 3

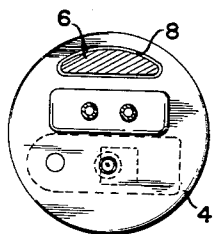


FIG. 4

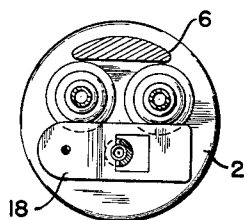


FIG. 5

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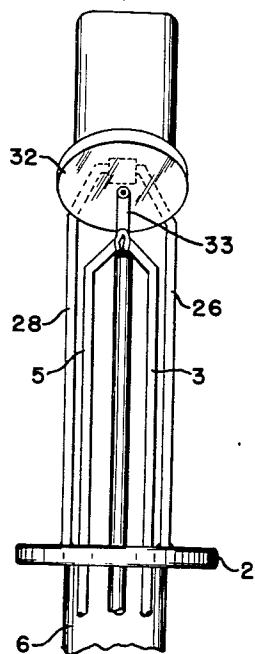


FIG. 6

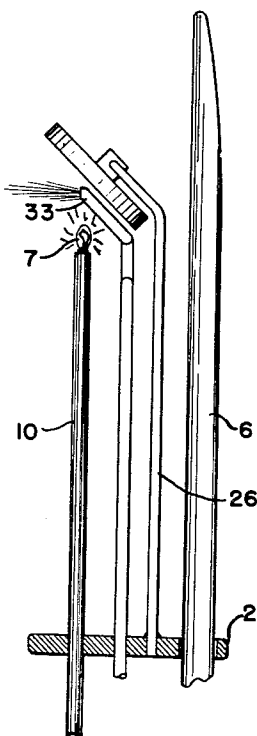


FIG. 7

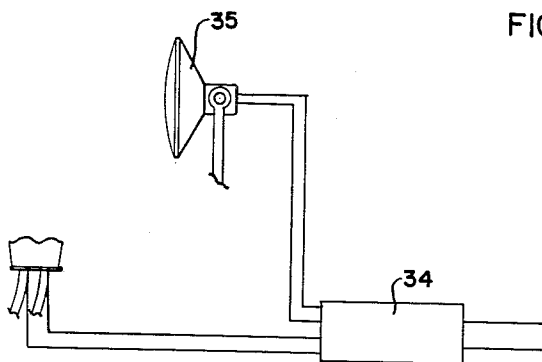


FIG. 8

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2,720,702

DENTAL DEVICE

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10 Claims. (Cl. 32—69)

This invention relates to improvements in a dental device of the general character described in two of my earlier Patents No. 2,393,319 dated January 22, 1946 and No. 2,571,856 dated October 16, 1951.

In my Patent No. 2,393,319 I show a dental mirror combined in one unit with a water injector, an air injector and a lamp for illuminating the patient's mouth. The advantages of such a device are obvious as it allows for the cleaning and examination of the patient's mouth to be made with one instrument and thus does not necessitate frequent insertions and withdrawals of many instruments as in the case when they are separated. Such a device further allows the dentist to perform the cleaning and exploratory functions with one hand while leaving the other free to hold other instruments such as drills and the like.

In my Patent No. 2,571,856 I disclose a method of attachment of a combined mirror, water and air injector device to air and water pipes wherein there are separate mechanisms for operating each injector tube. While such a mechanism is sufficient when there are only two tubes to operate, it becomes more difficult to operate when there are two tubes plus a light as set forth in my Patent No. 2,393,319. It is therefore an object of my present invention to provide a simple yet effective means for operating an air injector tube, a water injector tube and a lamp, all of which are combined in one dental device along with an examining mirror.

It is proposed to accomplish this by providing an assembly in which by a shrinking or a hypodermic syringe-like manipulation of the device, the light, air injector and water injector become operative in that order. Thus when the water injector is operating, the air injector and lamp are also operating. This is advantageous because when the dentist wants to use air, he naturally would desire light for illumination and whenever he used water for cleaning, he would also desire air at the same time in order to give a more vigorous cleaning action. If only the light is desired, then the assembly is shrunk just slightly.

Still another object of the invention is to provide for a coupling between the combination air, water and light dental device and corresponding sources of air, water and electricity so that the device can be easily detached for sterilization.

In the drawings:

Fig. 1 is a sectional view of the dental device constructed in accordance with the invention;

Fig. 2 is an enlarged view of Fig. 1 showing the coupling assembly in detail but with the air valve open;

Fig. 3 is a side view of Fig. 2;

Fig. 4 is a plan view of Fig. 3 taken along line 4—4;

Fig. 5 is a plan view of Fig. 1 taken along line 5—5;

Fig. 6 is a view of a slightly modified form of the invention;

Fig. 7 is a side view of Fig. 6; and

Fig. 8 is a view of my dental device shown connected to a relay for operating a spot light.

Referring to the drawings in detail, in which like numerals are used for like parts, 1 denotes generally a head portion of a dental device comprising an air injector tube 3, a water injector tube 5, a lamp 7 and mirror 9, while 11 denotes a base portion comprising a water supply pipe 13, an air supply pipe 15 and a source of electricity 17. The air injector and water injector tubes are connected to air pipe bushing 30 and the water pipe bushing 31 by means of stainless steel couplings 19. The bushings in turn are connected to the supply pipes. Water injector tube 5 and air injector tube 3 are held together by means of an annular stainless steel disc 2 while water pipe 13 and air pipe 15 are held together by a stainless steel annular disc 4. Annular discs 2 and 4 are large enough so that they can easily be gripped by the fingers in the same general manner as one grasps a hypodermic syringe. 6 denotes a stainless steel retractor or back plate which serves to depress the sides of the mouth and to protect the relatively frail mirror and tube assembly from undue bending. The retractor 6 is attached rigidly to annular disc 4 by welding or other means and slides freely through slot 8 of the annular disc 2.

7 denotes a lamp for illumination of the oral cavity connected to a source of electricity 17. The lamp is screwed into stem 10 which in turn is telescopically received in tube 12. The electrical circuit is completed when stem 10 comes in contact with plunger 14 which is forced out of the tube 12 by spring 16. The spring 16 and plunger 14 are so positioned that when annular discs 2 and 4 are in their free and normal position, that is, when no force is exerted on the discs to bring them together, the electrical circuit is broken. Stem 10 is so made that it can be completely slid out of the tube 12 and disc 2 in order that the bulb 7 may be more easily changed. Stem 10 is normally held fixed to disc 2 by means of a spring lock 18. Spring 16 and plunger 14 are insulated from tube 12 and are a part of the positive electrical wire. Plunger 14 connects to an insulated wire in stem 10 and so on to the lamp where the circuit is completed by grounding to the stem.

20 and 22 denote generally an air valve and a water valve which are of the same type as that found in automobile tires. The valves are normally held closed by valve springs (not shown) and are only open when air tube 3 and water tube 5 depress the valve opening stems 24 and 26. The water and air tubes are normally held off of valve stems 24 and 26 by springs 21 and 23. In order to depress the springs 21 and 23 and allow the tubes in turn to open the air and water valves, it is necessary to bring discs 2 and 4 together in a syringe-like manipulation. That is, disc 2 is grasped by the index and middle fingers of the hand while disc 4 rests in the notch of the hand between the thumb and index finger. By making the air injector tube longer than the water injector tube, it is possible then to have the air valve open before the water valve. Thus, it is seen that by a steady sequential movement, first the lamp will be illuminated, then the air valve will open and last the water valve will open. The total force tending to spread the discs apart when the water valve, air valve and lamp are all operating, is the sum of the compression forces of springs 16, 21, 23 and the two valve springs (not shown). It is therefore necessary in order to operate the device without undue effort, that the springs be as light as possible but still strong enough to perform their several functions.

In Figs. 1, 2 and 3, mirror 9 is carried by plate 25 which is welded to jet nozzle 27. Jet nozzle 27 in turn is rotatably clamped to the air and water tubes so that it and the mirror are free to be rotated about the lateral axis of the device. The mirror has an orifice in its

center in which to receive the opening of the jet nozzle. This opening is placed 45° to the mirror so that the air and water streams are projected also 45° to the mirror. The mirror is of the front surface type, that is the reflecting surface is applied to the face of the mirror, so that there is as much reflecting surface as possible immediately surrounding the area where the jet nozzle protrudes.

In Figs. 6 and 7, a slightly different mirror 32 and method for attachment to the dental device is shown. There the mirror is of the conventional type and is attached to disc 2 by means of two legs 26 and 28. The mirror can be removed completely from the assembly by merely spreading the legs. In this modification, the air and water tubes join into one common tube 33 which is bent 45° to the retractor and is positioned adjacent the mirror. The opening of the nozzle is the same as in the prior embodiment, that is 45° to the plane of the mirror.

It is seen in both embodiments of the invention that by unscrewing the couplings 19 from the air and water pipes 15 and 13, that the device can easily be disconnected for sterilization and cleaning. With this in mind, the insulation for the lamp and the gaskets for the air and water valves are made from materials, such as neoprene, which can be placed in boiling water without damage.

In both forms of the invention, the retractor plate 6 is provided with a cut opposite the light so that the bulb may illuminate the complete oral cavity.

Many dental chairs are provided with large spot lights connected to the regular 110 volt source of electricity and are usually directed so that their spots will illuminate the patient's mouth. However, if the patient moves slightly, he then has the spot shining in his eyes. By means of my novel dental device as shown in Fig. 8, I can turn the spot light on and off so that it will be on only when the dentist is actually working on the patient's mouth. I do this by making the current which flows when small lamp 7 is illuminated, operate a relay switch 34 which in turn controls the current from the conventional 110 volt source of electricity to the spot light 35. For clarity, I call the circuit containing the small lamp 7, a secondary circuit, and the circuit containing the spot light 35, a primary circuit. It is thus seen that by the same slight unilateral movement bringing the head and base portions of the device together, that the large spot light can be operated in the same manner and sequence as the small lamp 7.

I claim:

1. In a dental device: a base portion; a head portion movable longitudinally of the device toward and away from said base portion; a mirror, an illumination lamp, a water injector tube, and an air injector tube all in said head portion; and a source of electricity, a water supply pipe and an air supply pipe all in said base portion; said lamp, said water tube, and said air tube being telescopically mechanically associated with said source, said water pipe and said air pipe, respectively; said lamp, said water tube and said air tube being operatively connectible to said source, said water pipe, and said air pipe, respectively, as said head portion is moved toward said base portion.

2. A device according to claim 1 wherein the lamp and the source are operatively connected before the air tube and the air pipe are so connected and said air tube and said air pipe are in turn operatively connected before the water tube and the water pipe are so connected.

3. In a dental device having a head portion and base portion, said head portion including water and air injector tubes, a mirror and a lamp, and said base portion including water and air supply pipes and a source of electricity; air and water valves placed between said air and water tubes and said air and water pipes, respectively, said valves having valve opening stems adapted to be engaged by said tubes; couplings through which said tubes are slidable connecting said tubes and pipes and containing said valve stems; said tubes engaging the stems and opening the valves as the head portion and base portion are brought together in a unilateral sequential movement; and springs operatively placed between said base and head portions to force said portions apart.

4. A dental device according to claim 3 wherein the lamp is carried on a stem which is adapted to engage a spring actuated plunger fixed to the base portion and operatively placed between said source of electricity and stem; said stem engaging the plunger and completing the electrical circuit as the base and head portions are brought together.

5. A dental device according to claim 4 wherein, as the head and body portions are brought together in a unilateral movement, the lamp stem engages the plunger before the air tube engages the air valve stem, and said air tube engages said air valve stem before the water tube engages the water valve stem.

6. A dental device according to claim 3 wherein said water and air injector tubes join in a jet, said jet protruding through the center of the mirror and forming a point of attachment for the mirror to the head portion.

7. A dental device according to claim 3 wherein the water and air injector tubes join in a common tube inclined to the longitudinal axis of the dental device and adjacent the mirror, said mirror being attached to the head portion by two metal brackets.

8. A dental device according to claim 3 wherein the water and air tubes and lamp in the head portion are held together by a first annular disc, and the water and air pipes and source of electricity in the base portion are held together by a second annular disc, said annular discs affording hypodermic-syringe-like grips by which the head and base portions are brought together.

9. A dental device according to claim 8 wherein a retractor plate for protecting the tubes, lamp and mirror is rigidly attached to said second annular disc and slides freely through a slot in said first annular disc.

10. In combination, a dental device operatively positioned in a secondary circuit and having a head portion and a base portion with said head portion movable longitudinally of the device toward and away from said base portion to make and break said secondary circuit, a spot light operatively positioned in a primary circuit, and a relay switch connected to a source of electricity and operatively positioned in said secondary circuit and in said primary circuit; said relay switch being moved to make said primary circuit when said head portion and said base portion are brought together to make said secondary circuit.

References Cited in the file of this patent

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