Dec. 26, 1961 A. FOSDAL 3,014,279

DENTAL MIRROR

Filed Nov. 23, 1959

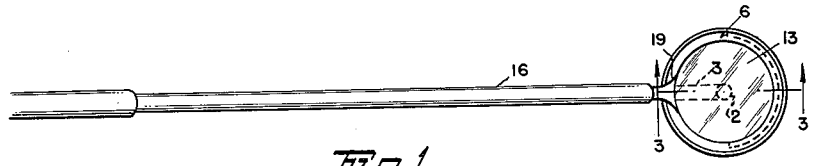


Fig. 1

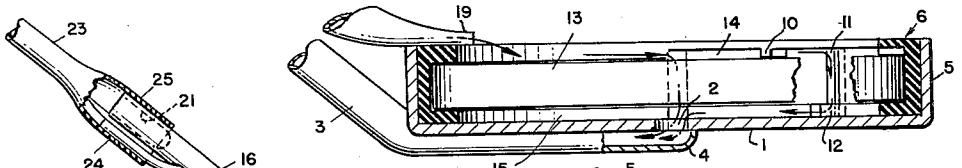


Fig. 3

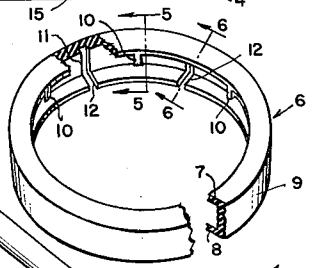


Fig. 4

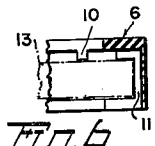


Fig. 6

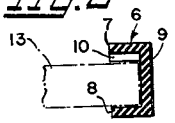


Fig. 5

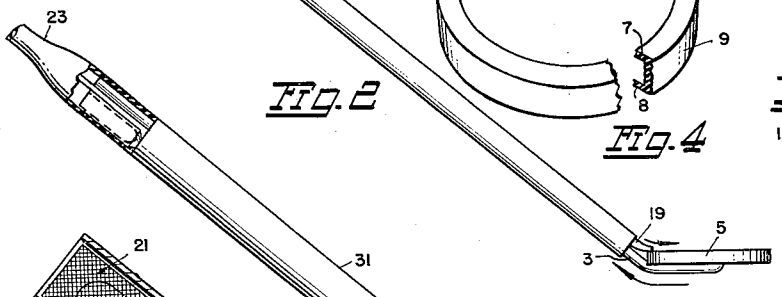


Fig. 2

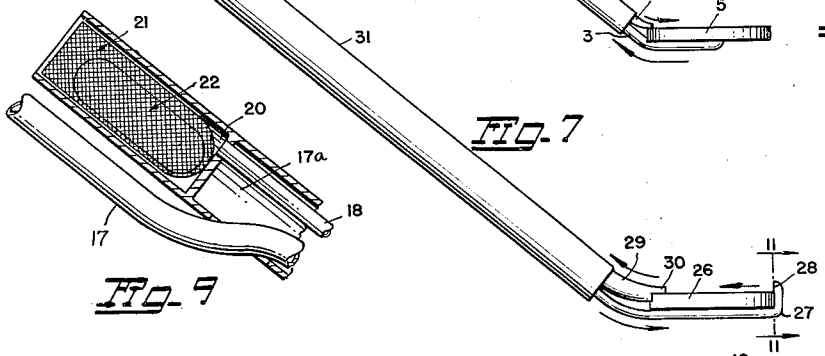


Fig. 7

Fig. 9

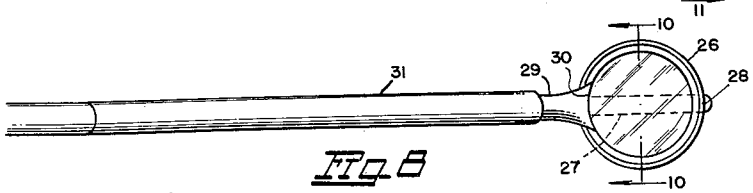


Fig. 8

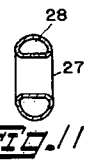


Fig. 11

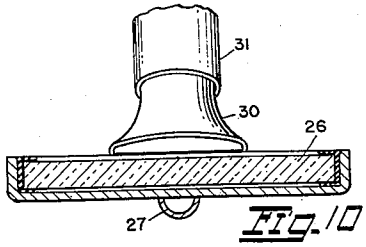


Fig. 10

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DENTAL MIRROR

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Broadly considered the invention relates and is directed to improvements in dental mirrors for use by dentists in connection with oral surgery and the treatment of teeth. It particularly relates to dental mirrors having structural characteristics which attempt to maintain the reflecting surface clear and free from foreign matter.

Dental mirrors, generally constructed of a relatively small circular piece of glass held in a metal frame, to which a handle is fixed at a predetermined angle, have been used by the dental profession for a considerable period of time. Such an instrument has been quite satisfactory to a degree for the purpose of permitting the dentist to see portions of the patient's mouth which ordinarily would be invisible. However, the efficaciousness is frequently destroyed by the condensation of moisture on the surface greatly decreasing or even eliminating visibility.

The problem of maintaining the reflecting surface of a dental mirror free from moisture condensation and debris when in use has long been recognized. In attempting to eliminate these objections, various devices have heretofore been proposed for keeping dental mirrors clear and free from debris while in use, but such devices have proved to be either ineffective, inconvenient, or their use has been objectionable for other reasons. These objectionable problems have become accentuated and more aggravated with the advent of high speed drilling which requires some kind of coolant and lubricant being direct at the point of drilling to cool the tooth surface and lubricate the high speed dental drill. The coolant may be either a continuous or intermittent stream of water or compressed air blown at the area being drilled, but the preferred coolant is water rather than air.

The necessity of directing a water vapor spray or a blast of air at the area being drilled to cool and lubricate the high speed dental drill and to keep the tooth cool has materially aggravated the well known disadvantage of moisture condensation on the reflecting surface of the mirror by introducing a surplusage of water thereon, the minute droplets of which impair clear vision or entirely eliminates it.

Many attempts have been made to solve this problem, including the direction of a fine spray of water or compressed air over the reflecting surface, but without clear cut success since no satisfactory method was apparent for removing from the reflecting surface the droplets of water emanating from the coolant used on the working surfaces. A temporary solution to this problem is found by dipping the dental mirror into any well known wetting agent or a detergent containing a wetting agent for the purpose of reducing the surface tension of the water used as a coolant as it strikes the reflecting surface of the mirror. However, this solution has been found to be unsatisfactory since the wetting agent into which the mirror is dipped is quickly washed away by the water, the surface tension of which it seeks to reduce.

The quintessence of my invention is to provide a dental mirror for use in oral surgery or tooth repair having means therein for continuously insuring clear vision during its use by a dentist in the performance of his customary duties in the oral cavity of a patient.

The primary object of my invention is to provide a dental mirror having means therein for continuously or intermittently flushing the reflecting surface of the mirror with a stream of water containing a wetting agent of sufficient strength to materially reduce, if not entirely eliminate, the surface tension of the water used as a coolant for the high speed drill and oral area being worked upon by the dentist, and also having means for simultaneously removing from the reflecting surface of the mirror, the excess liquids and debris caused by the high speed drill, thereby cleaning the reflecting surface, eliminating any distortion of the reflected image and insuring clear vision to the dentist.

A still further object of my invention is to provide a dental mirror which has therein any desirable chemical, other substance or combinations thereof which becomes a wetting agent in solution and which is adapted to direct this pretreated solution over the reflecting surface of the mirror in order to act upon the water used as a coolant for the high speed drill and tooth area being worked upon as the same falls upon said reflecting surface and substantially reduce its normal surface tension.

A further object and complementary to the above adjoining object of my invention is to provide a mirror having means therein whereby any excess of such solution and water and any debris formed during drilling operations will be continuously removed from the reflecting surface.

Still another object of my invention is to provide a dental mirror having substantially the same physical appearance as the present type of dental mirror, but, nevertheless, having means therein for maintaining a sharp image on the reflecting surface without unduly increasing its size, shape and weight.

Other objects and advantages will undoubtedly reveal themselves from the following detailed description which is to be read in connection with the accompanying drawings in which:

FIG. 1 is a top plan view of the dental mirror showing the preferred embodiment of my invention;

FIG. 2 is a side elevation, partially in section, of the preferred embodiment of my invention;

FIG. 3 is a sectional elevation taken on line 3—3 of FIG. 1 and substantially enlarged to show the structural features embodied in the preferred embodiment of my invention;

FIG. 4 is a perspective view, partially in section and partially broken away, of a gasket employed in the preferred embodiment of my invention showing its structural characteristics.

FIG. 5 is an enlarged, detailed sectional view taken on line 5—5 of FIG. 4;

FIG. 6 is an enlarged, detailed sectional view taken on line 6—6 of FIG. 4;

FIG. 7 is a side elevation, partially in section, of another embodiment of my invention;

FIG. 8 is a top plan view of the dental mirror shown in FIG. 7;

FIG. 9 is an enlarged fragmentary side elevation, partially in section, of some of the structural features in the preferred embodiment of my invention;

FIG. 10 is a sectional view taken on line 10—10 of FIG. 8; and

FIG. 11 is a sectional elevation taken on line 11—11 of FIG. 7.

Referring to the invention shown in FIGS. 1 through 6 and 9, the dental mirror embodying the preferred form of my invention consists of a circular base 1 having an orifice 2 disposed centrally therethrough. A tubular member 3 is secured to the underside of base 1 and has one of its ends 4 in direct and sealed communication with orifice 2. Tubular member 3 is angularly disposed in relation to base 1 and assumes substantially the same appearance as any of the present type of dental mirrors. An annular flange 5 extends upwardly from the periphery of base 1 and is an integral part thereof.

A gasket 6, made of any flexible material preferably rubber, the height and diameter of which is identical to the height and diameter of flange 5, is U-shaped in cross section. The top and bottom sections 7 and 8 are parallelly disposed in relation to each other and are integrally joined at right angles to wall 9 as clearly shown in FIG. 4. A plurality of narrow ledges 10 project downwardly from the underside of and transversely to section 7 and are positioned in spaced relationship equidistant from each other. A plurality of grooves 11 are formed transversely of wall 9 and are positioned between ledges 10 equidistant from each other. Cut-outs 12 join and extend from the bottom of each groove 11 to form L-shaped channelways in gasket 6.

A circular disc 13, preferably made of glass silvered on one face to provide a reflecting surface on the other face to form a mirror is mounted snugly into the gasket 6 between the top and bottom sections 7 and 8 as shown in FIG. 3. Ledges 10 are seated upon the mirror face of disc 13 and consequently such portions of the top section 7 between these ledges are held therefrom creating passageways 14 which are in direct communication with the tops of grooves 11. Furthermore, a space 15 is provided between the underside of disc 13 and base 1, when the disc is seated on bottom section 8 of gasket 6 as clearly shown in FIG. 1. Thus in this manner unobstructed communication exists between the passageways 14 and orifice 2 by means of grooves 11, cut-outs 12 and space 15.

Tubular member 3 is securely encased in an elongated cylindrical jacket 16 for the greater portion of its length. Offset portion 17 of member 3 extends from and is positioned in spaced relation alongside jacket 16 as shown in FIG. 2. Sealed connections are provided between jacket 16 and the portions of member 3, which are not covered by the jacket. The diameter of jacket 16 is substantially greater than the diameter of member 3. Thus a hollow bore 17*a* is available throughout its length.

A second tubular member 18 extends throughout bore 17*a* and terminates in a fan-shaped neck or nozzle 19 which abuts the annular flange 5 and lies in the plane of the reflecting surface of disc 13 diametrically opposite passageways 14 leading to suction or vacuum creating apparatus for the purpose shortly to be explained. Adequate seals are provided between bore 17*a* and member 18 to prevent leakage therebetween. A pocket 20, in communication with member 18, is formed in the top portion of jacket 16 as shown in FIG. 9 and a reticulated metallic basket 21 is removably fitted into pocket 20. A detergent having a wetting agent therein or any other type of wetting agent for reducing the surface tension of water droplets adapted for slow disintegration by water flow and herein represented as a capsule 22, is placed into the basket which insures against minute particles of the detergent or other wetting agent entering member 18 as it is subjected to the action of the water. The essential function of such detergent or wetting agent as stated before is to substantially reduce or eliminate the surface tension of the liquid passing around it and through member 18 onto the reflecting surface of disc 13. Capsule 22 may be treated with any color, mouthwash, astringent or other suitable substance in order to please the olfactory, sight or taste organs of the patient being treated.

A flexible tubing 23, having a pair of separate axial bores extending from end to end therein is bifurcated at each of its ends, one furcation being fitted over tubular member 3, as shown at 24, and its other furcation being fitted over the top of basket 20, as shown at 25. One bore of flexible tubing leads to a source of water under pressure and the other bore to an aspirating apparatus of any well known type.

The flow of the water and its removal from the reflecting face of disc 13 is best illustrated by the arrows supplied in the drawings. Water under pressure emanating from nozzle 19 after being treated by a wetting agent such as capsule 22 flows over the face of disc 13 as shown by the arrows, and contemporaneously therewith, an aspirating action is created by the suction pump attached to one of the bores in flexible member 23 resulting in the withdrawal of the water and any debris on the mirror face into passageways 14, down grooves 11, cut-outs 12, space 15, orifice 2 and tubular member 3, as shown by the various arrows showing the direction of flow. While the flow of the water and its removal is shown as continuous, it should be obvious that various types of control may be interjected into the two lines to provide intermittent flow, control its rate and cut off one or the other of the lines leading to the water or the aspirating apparatus or both.

The structural features of the modified form of my invention shown in FIGS. 7, 8 and 10 is substantially different from the preferred form although the results desired can be obtained by its use as well. The modified form consists of a mirror assembly 26 commonly employed in the dental profession. Tubular member 27, carrying water under pressure is secured to the underside of mirror assembly 26 and is bent transversely over the end thereof so that one of its terminal ends 28 is positioned to permit water to flow over the reflecting face of the mirror assembly. The other terminal end of member 27 terminates at a pocket identical in structure heretofore described. Tubular member 29 terminates in a nozzle 30 seated diametrically opposite end 28 of member 27 and its other end is connected by well known means to aspirating apparatus. Both of the members 27 and 29 are confined in a jacket 31. The modified embodiment functions substantially like the preferred emobiment except that the flow of the water and its removal is reversed as clearly indicated by the arrows shown in the various views of the drawings.

As the invention is susceptible to various changes in the features of construction, combination of elements and arrangements of the parts of the embodiments above set forth, without departing from its general principles, it is to be understood that all matter herein set forth and described and shown in the accompanying drawing, is to be interpreted as illustrative and not in a limiting sense, and I claim all variations falling within the purview of the appended claims.

I claim:

1. A mirror for dental use comprising, a flanged base having an orifice disposed centrally therethrough, an annular gasket, U-shaped in cross-section, removably disposed within said base, said gasket having a plurality of downwardly depending narrow ledges and a plurality of L-shaped narrow channelways disposed between said ledges formed therein, a mirror member snugly mounted in said gasket in spaced relation to said flanged base and positioned therein so that the ledges are seated upon the top surface of the mirror member to thereby provide passageways for communication with the L-shaped channelways in said gasket, a water carrying tubular member joined to the mirror supporting base, a fan shaped nozzle formed at one end of said tubular member disposed in relation to said base, so that said nozzle abuts and lies in the plane of the top surface of the mirror member to thereby permit the water to pass over its surface, a reticulated basket removably disposed in said tubular member, a wetting agent deposited in said basket for treating the water passing through the tubular member and thereby reducing the surface tension on any water contacting the top surface of the mirror member, and a second tubular member secured to the flanged base in communication with the orifice for removing by aspiration any excess water and debris from the top surface of the mirror member.

2. A mirror for dental use comprising, a flanged base having an orifice disposed centrally therethrough, an annular gasket, U-shaped in cross-section, removably disposed within said base, a plurality of downwardly de-

pending narrow ledges and a plurality of L-shaped narrow channelways disposed therebetween formed within said gasket, a mirror member snugly mounted in said gasket in spaced relation to said flanged base and positioned therein so that the ledges are seated upon the top surface of the mirror member to thereby provide passageways for communication with the L-shaped channelways in said gasket, a water carrying member joined to the mirror supporting base, a fan shaped nozzle formed at one end of the tubular member disposed in relation to said base so that said nozzle abuts and lies in the plane of the top surface of the mirror member to thereby permit the water to pass over its surface, means disposed within the water carrying hollow member for reducing the surface tension on any water contacting the top surface of the mirror member, and a hollow member secured to the flanged base in communication with its orifice for removing by suction any excess water and debris from the top surface of the mirror member.

3. A dental mirror comprising a flanged base having an orifice disposed centrally therethrough, an annular gasket removably disposed within said base, a mirror member snugly mounted in said gasket in spaced relation to said flanged base, means formed within said gasket to permit communication between the top surface of the mirror member and the space formed between the flanged base and said mirror member, a water carrying member joined to the mirror supporting base and disposed in relation to said flanged base so that one of its ends abuts and lies in the plane of the top surface of the reflecting member to thereby permit water emanating therefrom to pass over said top surface of the mirror member, means disposed within the water carrying hollow member for reducing the surface tension on any water contacting the top surface of the mirror member, and a hollow member secured to the flanged base in communication with its orifice for removing by suction any excess water from the top surface of the mirror member.

4. A dental mirror of the class described comprising, a flanged base having an orifice disposed centrally therethrough, an annular gasket removably disposed within said base, a mirror member mounted in said gasket in spaced relation to said flanged base, means formed within said gasekt for permitting communication between the top surface of said mirror member and the space between the flanged base and mirror member, a water carrying member joined to said flanged base, a nozzle secured to one end of the water carrying member and positioned in relation to said base to flush water over the top surface of the mirror member, and a hollow member secured to the flanged base in communication with its orifice adapted to simultaneously remove by suction excess water and debris from the top surface of the mirror member.

5. A dental mirror of the class described comprising, a base having an orifice disposed centrally therethrough, an annular gasket removably disposed in said base, a mirror member mounted within said gasket and positioned therein in spaced relation to said base; means formed in said gasket adapted to provide communication between the top surface of the mirror member and the space provided between such base and said mirror member, means associated with said base for bringing water to and spreading water over the top surface of said mirror member, means disposed within said mentioned means for pretreating the water to substantially reduce its surface tension, and means secured to said base in communication with its orifice for simultaneously removing excess water and debris from the top surface of the mirror member.

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