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DENTAL ENGINE FOR COMPRESSED AIR

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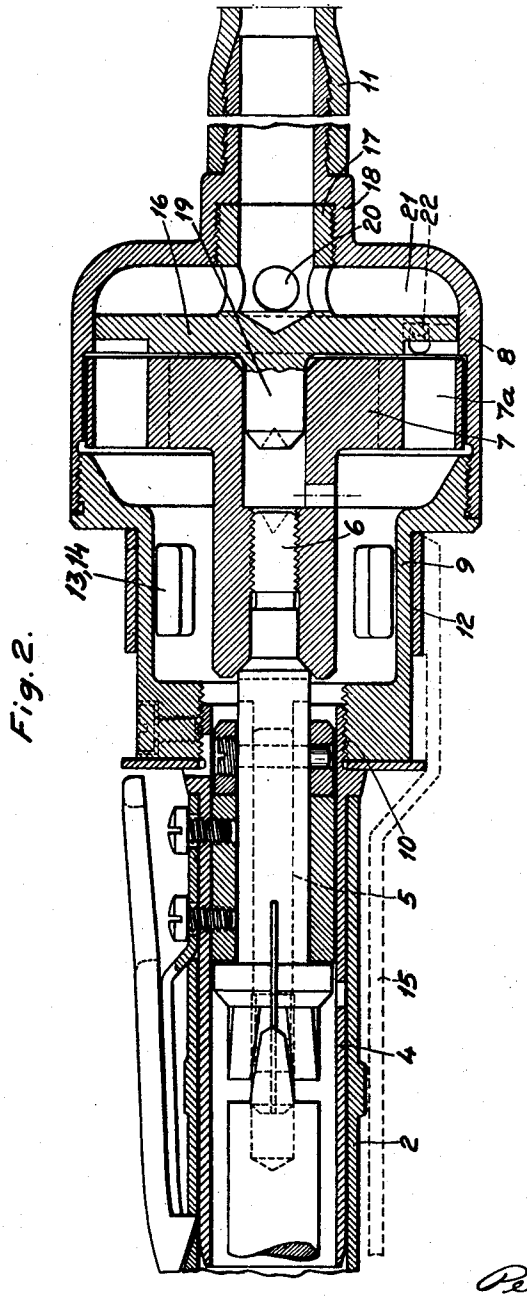


Fig. 2.

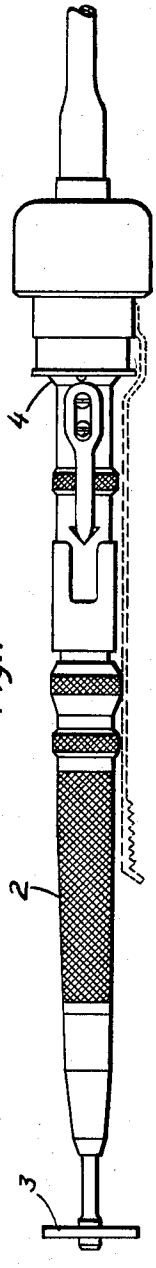


Fig. 1

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DENTAL ENGINE FOR COMPRESSED AIR

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4 Claims. (Cl. 32—26)

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The commonly known dental engines are driven by an electric motor from which the movement is transmitted to the burr via a cord device running on eight small wheels which are fixed on four interconnected, mutually movable arms, the speed being regulated by means of a foot rheostat.

These machines suffer from many inconveniences. The transmission device with cords, wheels and arms is very little adapted to the purpose. It may get locked in certain positions. Furthermore, the hair of the dentist, or of the patient, may get caught therein. It is very bulky. From the view point of psychology the sight of the always running cord will have no favourable effect upon the patient before and during the treatment. As the dentist regulates the speed with one foot via a foot rheostat, the weight of the body will be carried substantially by the other leg, which thus often becomes overstrained.

The above-mentioned inconveniences are eliminated by the dental engine according to the invention which is substantially characterized in that a turbine is connected to an elongation of the shaft of a slipjoint which may be of known construction, and that a compressor by means of a flexible hose is connected to the turbine casing in such a manner that the turbine with the slipjoint shaft and consequently also a burr, wheel or the like secured in a hand piece or an angle piece are driven by compressed air, the air exhaust of the turbine casing being, in the vicinity of the slipjoint, provided with a manually controllable operating member, adapted to be actuated between the turbine and the burr, for regulating the area of the exhaust ports for the compressed air and thus also the speed of the turbine.

According to the invention the turbine casing is provided on the exhaust part with an elongated, cylindrical portion in which the exhaust ports are arranged. A cylinder provided with ports corresponding to the ports in the elongated cylindrical portion may be movably arranged on or in said cylindrical portion.

An embodiment of the dental engine according to the invention is illustrated in the accompanying drawing.

Fig. 1 shows, on a natural scale, a side view of the dental engine.

Fig. 2 is an axial section of a part of the engine on a larger scale.

Numeral 2 designates a known hand piece of usual construction in which a burr 3 is secured, and numeral 4 designates a slipjoint which is also known in itself.

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According to the invention the shaft 5 of the slipjoint has an elongated portion 6 on which a turbine wheel 7 is fixed, by means of a threaded connection, said elongated portion being provided with screw threads and the wheel with corresponding threads. The turbine wheel is surrounded by a casing 8 having an elongated, cylindrical portion 9 screwed on to the slipjoint which is provided with threads 10 for this purpose. Numeral 11 designates a rubber hose which is adapted to be connected to a compressor, not shown, and which may be of the kind occurring in any dental clinic. The turbine wheel has, for example, inclined, slightly shovel-shaped blades 7a. The cylindrical portion 9 located between the slipjoint and the turbine casing is surrounded by a snugly fitting cylinder 12 so that the cylinder is hermetically movable on the portion 9. The portion 9 and the cylinder 12 are provided with holes 13 and 14 respectively which register with each other in the position shown in Fig. 2 and which, upon change of position of the cylinder in one direction, may be made to successively communicate completely with each other. Movement of the cylinder 12 in the other direction more and more closes the holes 13 until, in a certain position of the cylinder, they are completely shut. By more or less increasing the area letting out compressed air from the cylinder and the turbine casing respectively, the speed of the turbine is increased or decreased. Numeral 15 designates an arm or the like shown arranged on the outside of the hand piece. Said arm extends from the cylinder and is connected with the same in such a manner that, by actuation of the arm, the cylinder can be moved relatively to the portion 9. This movement takes place against the action of a spring or the like tending to move the cylinder back to the initial position in which the holes 13 are closed. Numeral 16 denotes a partition arranged in the turbine casing 8 and having a central cylindrical portion 17 which is partially threaded and screwed into the rear cylindrical portion 18 of the turbine casing, said portion 18 being adapted to receive the rubber hose. On the other side of the partition is provided a pin 19 arranged in the centreline of the shaft of the slipjoint, the turbine being mounted on said pin 19. Numeral 20 designates air intake to a chamber 21 formed by the partition and by the rear wall of the turbine casing. Numeral 22 designates air nozzles by which the air from

the space 21 is directed towards the blades 7a.

The device functions in the following manner:

By actuation of the arm 15 the air exhaust ports 13 and 14 are opened for escape of the compressed air from the turbine. By increasing or decreasing the outflow area of said parts, the speed of the turbine wheel is increased or decreased, said speed being imparted directly to the slipjoint and transmitted to the hand piece and to the burr, wheel or the like secured therein.

It is clear that all the above-mentioned inconveniences of the known dental engines for compressed air are eliminated by this construction. Furthermore, several advantages are obtained. For example, it is very small and lies well in the hand. It is absolutely freely movable in all positions, and all desired speeds can be obtained. Furthermore, it is more advantageous to regulate the speed by the hand than by the foot for the reasons already mentioned above but also because the hand reacts more quickly than the foot to impulses from the brain. Since the engine takes very little space and is inexpensive, any dentist may have two such engines in his clinic, and thus the often occurring exchange of the straight hand piece for an angular piece can be avoided. The burr is stopped automatically if, for some reason or other, the hand piece or the angle piece is let loose. The maximum speed in known dental engines is only about 7000 revol./min. In an engine according to the invention the maximum speed is preferably 10,000 to 15,000 revol./min.

The invention is not restricted to the embodiment shown. The details may be varied in many ways without going beyond the scope of the invention. By using a hand piece or an angle piece or a part thereof of special construction the movement may be changed from one direction to another. Any device for controlling the air from the turbine may be used. The cylinder may be arranged in the cylindrical portion. If desired, several turbine wheels with guide members for the compressed air may be arranged one behind the other.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A dental engine comprising a hand piece including a shaft, a turbine casing connected to said hand piece, a turbine rotor in said casing, a driving connection between said turbine rotor and said shaft, said casing having a connection for the supply of compressed air to drive said rotor and an air outlet portion having exhaust ports for venting air from said rotor, and an adjustable control member for opening and closing and regulating the venting of air through said exhaust ports including a manually actuated operator for the control member positioned adjacent said hand piece.

2. A dental engine according to claim 1 in which the air outlet portion of said turbine casing is cylindrical with the exhaust ports in the wall thereof and the adjustable control member is a sleeve on the cylindrical outlet portion movable thereon to uncover or cover said exhaust ports in greater or lesser amount to thereby regulate the speed of the turbine.

3. A dental engine according to claim 1 in which the outlet portion of said turbine casing is cylindrical and has the exhaust ports spaced circumferentially thereof and the adjustable control member is a sleeve on the cylindrical outlet portion and provided with spaced ports adapted to be moved into and out of registry with said exhaust ports.

4. A dental engine according to claim 1 in which the manually actuated operator for the control member comprises a finger piece extending alongside the hand piece in position to be adjusted by a finger of the hand holding the same.

PER IVAR NORLÉN.

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