DEVICE FOR OPERATING DENTAL DRILLING MACHINES

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ABSTRACT

A device used for operating dental drilling machines has a manually operated setter with an electrical actuator, for example, a potentiometer, for setting the desired driving revolutions and a rearwardly connected regulating device which adjusts the drive to the speed provided by the setter, particularly an electronic drive. The regulating device can be selectively driven electrically or by a turbine. The machine operating device is particularly characterized by the provision of a switch by means of which the outlet of the regulating device is switched to an electromotor or to an electric valve regulating the amount of compressed air supplied to the turbine depending as to which of the two types of drives is being used.

4 Claims, 1 Drawing Figure
DEVELOPE FOR OPERATING DENTAL DRILLING MACHINES

This invention relates to a device used for operating dental drilling machines and having a manually operated set her with an electrical actuating member, for exam ple, a potentiometer, for setting the desired driving speed and a rear regulating device which sets the drive to the number of revolutions supplied by the set her, more particularly, an actuating device.

Dentists are now required to use for the treatment of teeth drills with so many different rotational speeds, that such requirements cannot be taken care of by a single drilling machine. Consequently dental units have been provided which have electrical drives as well as compressed air turbine drives. The dentist decides depending upon the required treatment whether to switch on the turbine with a very high number of revolutions or the electrical drive. It is already known to provide such apparatus with actuating devices operated preferably by foot, by means of which it is possible to open selectively either the actuating electronic means for the electrical drive or the valve introducing compressed air into the turbine. Often when the electric motor is switched on, a second compressed air conduit is opened to provide a flow of cooling air for the electric motor. Although in known constructions it is possible to vary within wide limits the speed of the electric drive by electronic actuating devices, this is not possible for turbine operation, since the foot operated actuating device provides for compressed air only the so-called black-white operation, namely, the magnetic valve located in the conduit for compressed air is either fully opened or closed.

An object of the present invention is to eliminate this drawback of existing constructions.

Another object is to provide a device having the largest possible number of uniform parts which can be used to operate the electric motor as well as the turbine within a wide range as far as their number of revolutions is concerned.

Other objects of the present invention will become apparent in the course of the following specification.

In the accomplishment of the objectives of the present invention it was found desirable to supply the regulating device for the electric motor with a switch which is preferably operated from the support of the machine and which switches on the outlet of the regulating device, depending as to whether the one or the other of the drives is to be used, either to the electric motor or to an electric valve which regulates the amount of compressed air supplied to the turbine. The electronic actuating means for the electric motor are thus doubly utilized.

It is advantageous to lock the electric operating circuits of the two drilling machines relatively to each other by a switch in such a manner that when one drive is used the supply of current to the other drive, or to its actuating valve, is interrupted. Then the dentist does not have to give any consideration to the operation of drive being used, since he actuates the same set her and is assured by the electronic means that both drives change their rotary speeds depending upon their manner of being actuated.

Since magnetic valves often have a responding voltage, particularly as far as valves are concerned the opening of which is proportional to the applied voltage, the present invention also provides that an additional voltage be applied to the outlet of the regulating device, which corresponds to the lower responding voltage of the magnetic valve and is switched on when the turbine is lifted.

When there are difficult operational requirements, or when high demands are placed on the speed proportionality of the turbine, it is advantageous to insert a pressure or flow gauge in the inflow of the compressed air conduit, the measured value of which is transmitted to the regulating device, for example, an electronic device as an actual value, so that it can carry out an adjustment of the valve opening corresponding to the required size set by the dentist.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawing the sole FIGURE of which is a diagrammatic representation of the device of the present invention.

The device shown in the drawing includes an actuating device which, for example, can be operated by foot and which includes a switch 1 for switching on and off a set her 2, consisting, for example, of a potentiometer, for supplying the number of revolutions of the drill drive. The actuating device operates with an electronic device 3 having outlet conduits 4 and 5 extending to the motor 7 and an outlet conduit 6 connected to the magnetic valve 8. A switching device 9 having switches 10 and 11 is used for actuating the motor 7 or the magnetic valve 8. When one of the drill drives is selected the corresponding switch 10 for the magnetic valve 8 and the switch 11 for the motor 7 are switched on and thus the outgoing voltage of the electronic device is provided for the corresponding drive. At the same time provision is made that the second drive cannot be switched on. The magnetic valve 8 is guided through the conduit 6 to the electronic device which provides an additional voltage potential, to compensate for the swell value of the valve. The valve itself can be provided with a controlling spring of corresponding size, or it can be provided with a piston actuated by compressed air which acts as control against the pulling force provided by the magnet. Pressure or flow speed in conduit 13 toward the turbine can be measured by a pressure gauge 12 and the value is transmitted through conduits 14 to the electronic device, which adjusts its outgoing voltage relatively to the required value provided by the potentiometer.

An important feature of the present invention consists in that the electronic regulating device 3 which serves for regulating the r.p.m. of the electrically operated motor, is also used for regulating the r.p.m. of the turbine in that the outlet of the regulating device is connected by a switch with an electric valve which depending upon the provided voltage supplied by the regulating device, regulates the amount of compressed air supplied to the turbine and thus its r.p.m. Consequently the regulating device for the electric motor is used for two purposes. The advantage is that the speed of the turbine can be regulated as well, which up to now was possible only within comparatively small limits, and that a substantial number of pneumatic and electrical devices can be eliminated since a single foot contact 1, 2 and a single regulating device 3 are used to change the speeds of two drives with different driving systems, namely, electrical and mechanical ones. The connection of the two circuits to the two drives in such manner that when one drive is actuated the other will be
switched off, has the advantage that the operating doctor need not concern himself at all with the operation of his device. He operates the same operating device, namely, the potentiometer with the same operational settings for the turbine, as well as for the drive of the electric motor.

We claim:

1. A device for operating a dental drill with an electric motor and a dental drill with a turbine drive, said device having a control element including a potentiometer controlling said dental drills, an electronic actuating device connected with said potentiometer, an electric valve for varying the amount of compressed air supplied to the turbine drive, and a switch device connected with said electronic actuating device and connecting selectively said electric motor and said electric valve with the electronic actuating device.

2. A device in accordance with claim 1, wherein said switch device when providing connection to either the electric motor drive or the turbine drive interrupts the supply of electrical current to the drive with which it is not connected.

3. A device in accordance with claim 2, wherein said electric valve is connected with said electronic actuating device to provide additional voltage corresponding to the lowest actuating voltage of the valve.

4. A device in accordance with claim 2, comprising a pressure gauge connected to said turbine drive and said electronic actuating device to supply an existing value for regulating purposes.

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