July 1, 1969 M. LORY 3,452,438

DENTAL HANDPIECE

Filed Sept. 6, 1966 Sheet 1 of 2

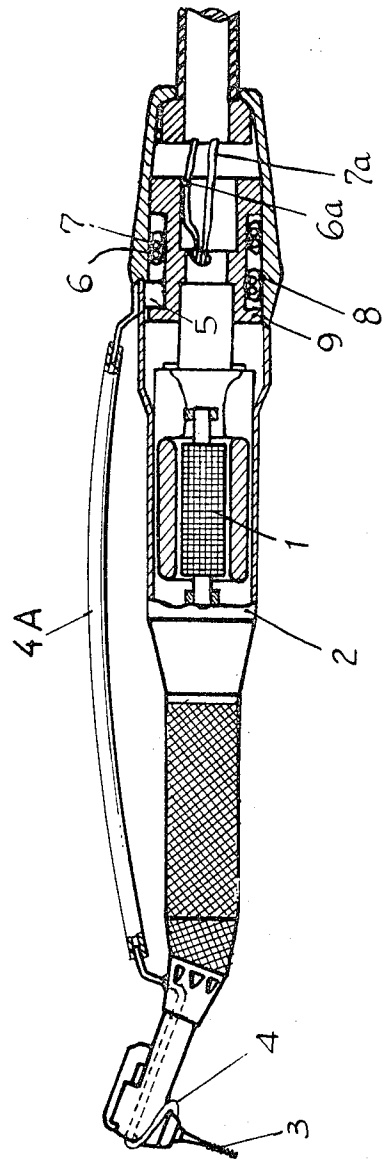


Fig: 1

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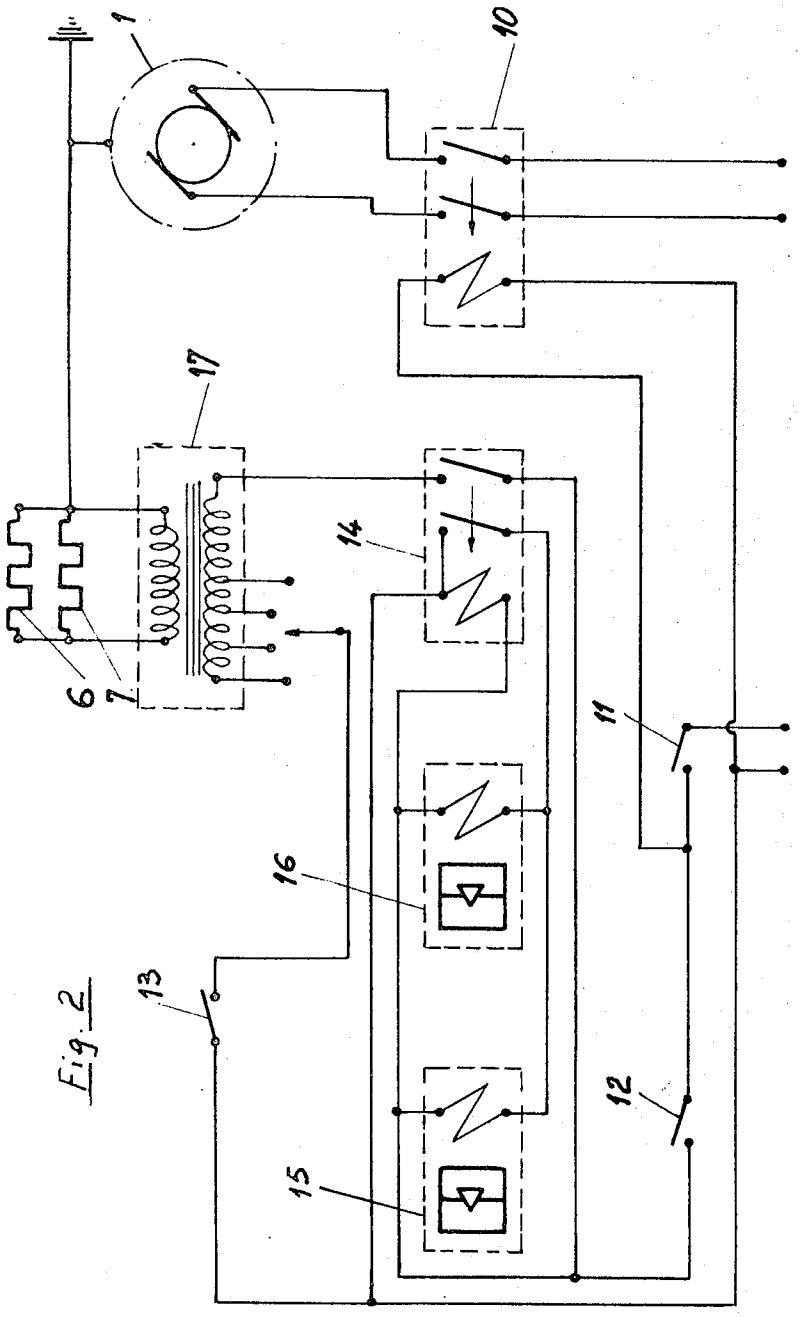


Fig. 2

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DENTAL HANDPIECE

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U.S. Cl. 32—28
1 Claim

ABSTRACT OF THE DISCLOSURE

A dental drill comprised of a spray conditioning means arranged within the motor casing and including a mixing chamber having one outlet and at least two inlets. Each of these inlets is connected to a source of fluid by a self-heating tube incorporated in the casing. The self-heating tube is under an insulating sheet in a cable wound around a support member of said motor.

The present invention refers to portable dentist drills of the kind comprising a motor incorporated within a portable casing for cooperating at the choice of the practitioner with any one of a plurality of toolholders.

Portable drills are usually fitted with a spray equipment adapted to produce on the operating field a jet or spray of atomized cooling fluid, normally constituted by a mixture of water and air, but which also may include other fluids as disinfectants, anesthetics or others.

One of the problems encountered in such apparatuses is to heat the spray to an appropriate temperature, generally 37° C. To this effect one already proposed a heating system comprising a self-heating tube inserted on the flowpath of each of the fluids to be atomized, said tube consisting of an electrically resistant tubular section.

Such a heating equipment is usually disposed upstream of the drilling apparatus, with the resulting disadvantage of placing it in a remote position from the operating field and increasing thereby the thermic inertia of the system. According to another more recent proposal the heating is arranged within the toolholder, but this arrangement involves an alteration of all the toolholders, requiring the electric current to be supplied within the toolholder itself, which may cause difficulties in certain types of toolholders.

The present invention has for object to avoid all these difficulties and essentially consists in arranging the conditioning means of the spray within the portable casing of the driving motor.

According to the invention there is provided an arrangement whereby the spray conditioning means are arranged within the motor casing and include a mixing chamber having one outlet and at least two inlets, each of said inlets being connected to a source of fluid by a self-heating tube incorporated into said casing.

This arrangement provides several advantages such as:

Low thermic inertia;

Regularity of the mixture realized in the mixing chamber;

Utilizing of heat eventually generated in the driving motor particularly when this one is an electric motor;

Possibility of working with any existing toolholders.

According to a preferred embodiment of the invention the self-heating tubes are grouped under an insulating sheathing in a cable wound around a support member of the driving motor. This arrangement offers the additional advantage of a particularly compact construction, the whole heating system being integrated within the motor unit without increasing the overall dimension thereof.

One form of embodiment of the invention will be described hereafter with reference to the attached drawings wherein:

FIG. 1 shows a portable drilling apparatus according to the invention, partly in section;

FIG. 2 is a diagram of an electric control equipment.

Referring to FIG. 1, there is shown, in its portable casing, an electric motor **1**, and interchangeable toolholder **2** and the tool **3**, as well as spraying nozzle **4**, connected by a flexible piping **4A** to the outlet of a mixing chamber **5**, this latter itself having two inlets respectively connected to heating tubes **6** and **7**, which are arranged in this particular case to warm up flows of air and water, arriving as in **6***a* and **7***a* together with the electric current wiring (not shown in FIG. 1).

These electrically resistant tubes are covered with a heat resistant insulating sheath **8**, and the assembly is wound around support member **9** which is also used for supporting motor **1**.

This particular arrangement made possible by the very small volume taken by the tubes and their sheath allows for leading the fluids to mixing chamber **5**, bringing them to the suitable temperature in a very short time owing to the very low thermic inertia of the system.

The self-heating tubes **6** and **7** are constituted for example each by a section of a length of about twenty centimeters of a tubular resistance with an inner diameter of $\frac{4}{10}$ millimeter and an external diameter of $\frac{9}{10}$ millimeter.

FIG. 2 shows an associated electric control equipment. Motor **1** is fed by its own source of energy through a relay **10**, in case of an electric motor, or through an electrovalve in case of a hydraulic or pneumatic motor.

This relay **10** (or this electrovalve) is controlled by the operator by means of switch **11**.

The heating tubes **6** and **7** form two resistances connected in parallel across secondary winding of a reducing transformer **17** with multiple tappings at the primary.

By means of switches **12** and **13** and of the relay **14** the operator can at will cut off simultaneously the spray system (switch **12**) and the heating system (switch **13**) the electrovalves **15** and **16**, respectively controlling the admission of the fluids in heating tubes **6** and **7**.

The regulation of the temperature is effected either by the selection of the transforming ratio of the transformer, or by any other equivalent means.

The voltage provided by the secondary of the transformer being only of a few volts and the circuit of the tubes **6** and **7** of course being connected to earth, all risk of incident or accident by electric shock for the patient or the operator is eliminated.

What I claim is:

1. Dentist drill apparatus comprising:
a portable casing,
a driving motor incorporated within said casing,
a toolholder interchangeably adaptable to said casing,
a spray nozzle on said toolholder,
a mixing chamber for mixing air and water within said casing having an outlet and at least two inlets, one for air and the other for water,

an external conduit connecting said nozzle to said outlet for supplying mixed air and water to said outlet,

for each of said inlets, a self-heating conduit consisting of an electrically resistant tube section incorporated within said casing and connecting said inlet to a source of fluid,

and an electric control equipment comprising, from an electric source, a motor control circuit and a spray control circuit, a common switch for both circuits, the second of which comprising the grouping in parallel of electrovalves each controlling a flow of

fluid and of a reducing transformer feeding the heating resistances constituted by said self-heating conduits.

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ROBERT PESHOCK, *Primary Examiner.*