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DEVICE FOR MIXING DENTAL AMALGAMS

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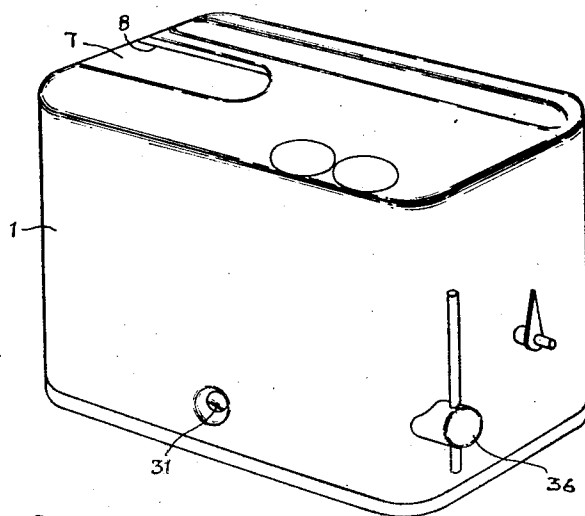


Fig. 1.

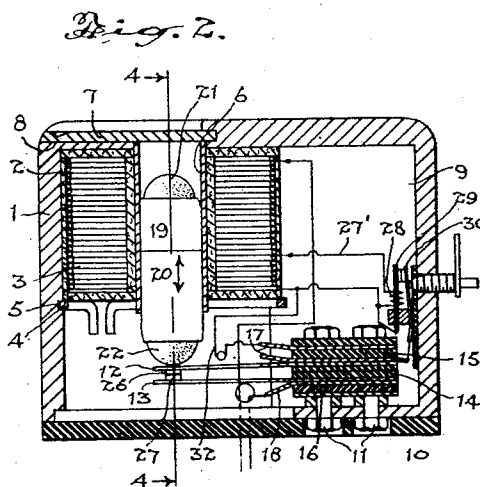


Fig. 2.

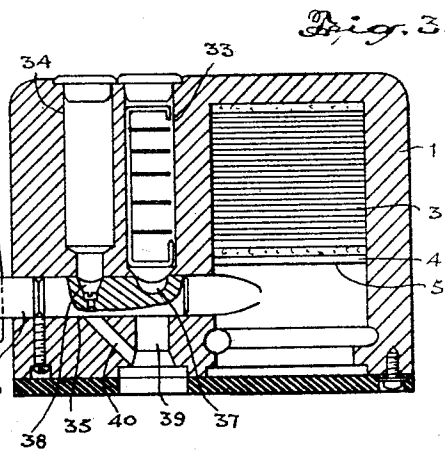


Fig. 3.

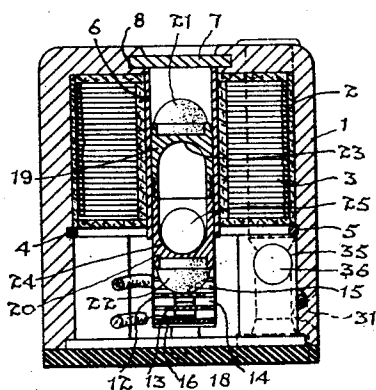


Fig. 4.

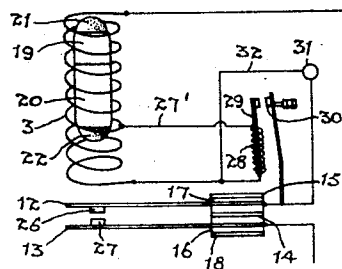


Fig. 5.

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DEVICE FOR MIXING DENTAL AMALGAMS

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4 Claims. (Cl. 259—92)

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In the practice of dentistry the preparation of an amalgam is required to be effected at a critical period in the operations of the dental surgeon and many difficult conditions have to be met to have the amalgam ready for insertion into a cavity at the proper period.

The principal object of this invention is to provide an instrument which will prepare the amalgam while the dental operation is proceeding thereby eliminating the loss of time of the surgeon and saving the patient from much inconvenience and discomfort.

A further object is to provide a small, neat and effective instrument which will be electrically operated and may be handled with the least possible interruption of the surgical work.

The principal feature of the invention consists in arranging an amalgam mixing chamber within the reciprocable core of a solenoid magnet and enclosing therein a loose impact member and providing a switch mechanism to effect an intermittent flow of current through the magnet through the reciprocal movement of the hollow core.

A further important feature consists in the arrangement of an adjustable thermostatic cut-off to automatically stop the operation of the mixing device.

In the accompanying drawings

Figure 1 is a perspective view of my improved amalgam mixing instrument.

Figure 2 is a longitudinal vertical section taken through the solenoid and its operating mechanism.

Figure 3 is a longitudinal vertical section taken through the means for measuring and dispensing the ingredients for the amalgam.

Figure 4 is a vertical cross section taken through the line 4—4 of Figure 2.

Figure 5 is a wiring diagram.

In the structure illustrated in the drawings the main casing 1 here shown of rectangular form is provided with a cylindrical chamber 2 at one end in which is located the solenoid coil 3 which is shown held in place by a split spring ring 4 embedded in an annular groove 5 in the chamber wall.

The coil 3 is wound upon a central tube 6 which is open at both bottom and top ends and a slidable cover 7 mounted in parallel grooves 8 in the casing 1 extends over the upper end of the coil tube.

A recess 9 extends from the chamber 2 in which the coil is located and secured in the bottom wall 10 of said recess is a pair of bolts 11 extending upwardly.

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A pair of spring contact arms 12 and 13 are mounted on the bolts 11 and are separated by an insulating block 14. Insulating blocks 15 and 16 are arranged above and below the arms 12 and 13 and connector plates 17 and 18 are arranged in contact with the arms 12 and 13 respectively. The free ends of the arms 12 and 13 extend beneath the lower end of the coil tube 6.

Loosely and reciprocably mounted within the tube 6 of the solenoid coil 3 is a cylindrical member formed of two parts 19 and 20 threaded together and having secured in their outer recessed ends rubber buffers 21 and 22 which are preferably part-spherical in form.

The interior of the telescoping members 19 and 20 is formed with hemispherical ends 23 and 24 and a steel ball 25 is loosely arranged within said hollow member.

The lower buffer end 22 of the reciprocable member normally rests upon the upper contact arm 12 and the weight of said member presses the contact point 26 of said arm into engagement with the contact point 27 to close an electric circuit through the solenoid coil 3.

The magnetic attraction of the coil 3 lifts the reciprocable member thus permitting the spring contact arms and their contact points to separate, thereupon the weighted member falls back and striking the upper spring arm 12 causing it to again make contact to effect a flow of current through the coil.

The upward movement of the hollow member is arrested by the upper rubber buffer 21 engaging the slide cover 7 which extends over the opening in the coil at a period immediately following the breaking of the electric circuit to the coil 3 and gravity and the rebound of the impact of the rubber buffer causes a very rapid action.

When the upward movement of the hollow member is arrested the ball 25 continues upward until it strikes the upper hemispherical end of the casing. It then moves downwardly with the casing and when the casing strikes the upper contact arm 12 the casing is arrested but the ball continues to move downwardly until it strikes the bottom hemispherical surface.

It will be readily understood that any materials placed within the hollow ball container casing will be subjected to the intensive hammering action and if a finely powdered substance and a fluid mixing medium, such as silver and mercury, are placed therein the rapid hammering action of the ball quickly produces an amalgam ready for instant use, it being merely necessary to remove the hollow wall casing, break it apart,

remove the ball and then remove the amalgam.

It is important that such an instrument should be effectively controlled so that it will not operate indefinitely if not manually controlled and to achieve this end I arrange a tap circuit 27' in the coil 3 which includes a heater coil 28 arranged adjacent to or surrounding a bi-metallic contact arm 29. The arm 29 co-operates with an adjustable contact 30 arranged in the electric circuit to the main contact arm 12. When the temperature of the coil 28 rises through the flow of current therethrough for a predetermined period the heat generated will flex the arm 29 to disengage from the contact 30, thus breaking the flow of current to the coil 3 and stopping the operation of the mixer.

A suitable signal lamp 31 is shown arranged in a circuit 32 which will be energized when the main circuit is broken, thus giving a visible indication that the device has ceased operation.

A device such as described requires to have associated therewith a simple means for measuring and dispensing the ingredients for the amalgam and in one side wall of the main casing I provide vertical cylindrical chambers 33 and 34 each intersecting a horizontal chamber 35.

A plug valve 36 is rotatable in the chamber 35 and has recesses 37 and 38 registering respectively with the chambers 33 and 34. The recesses are formed of the required capacity to measure the material to be discharged from each chamber. Passages 39 and 40 extending downwardly from the valve chamber opposite the dispensing openings and on the turning of the valve, said valve cuts off a measured quantity of material and discharges same into the lower passages. These passages converge and join together.

The operator holds one of the half sections of the ball casing below the converging orifices then turns the valve. The ball is then inserted and the two half casings are screwed or joined together.

The ball casing is then inserted in the coil tube 6 and said tube is closed by the slidable cover 26.

When the current is thus turned on the coil commences to operate and the casing enclosing the amalgam materials is reciprocated rapidly so that the mercury and metal are quickly and thoroughly mixed.

The operation of measuring and placing the materials may be accomplished with very simple movements and the mixing proceeds while the surgeon continues the preparation of his work on the patient.

When the patient is ready the amalgam is readily available and the work is concluded rapidly and efficiently.

An instrument such as described is simple and compact and may be placed in any convenient position for the surgeon to manipulate while working on a patient.

What I claim as my invention is:

1. A device for preparing amalgams, comprising a solenoid magnet having a central opening, a core reciprocally arranged in the central opening of said magnet and having an amalgam mixing chamber therein, a loose impact member enclosed within said mixing chamber means extending across said magnet opening to check upward movement of said core, and a spring opening switch arranged below said magnet opening and closed by said reciprocable core under movement of said core to its lowermost position into engagement therewith to direct electric current intermittently through said coil to effect the reciprocation of said core.

2. A device for preparing amalgams, comprising a solenoid magnet having a central opening, a core formed of a pair of telescoped tubes having hemispherically shaped inner ends, a heavy ball loosely enclosed within said telescoped tubes, means extending across said magnet opening to check upward movement of said core, and a spring opening switch arranged below said magnet opening and closed by said core under movement of said core to its lowermost position into engagement therewith to direct electric current intermittently through said coil to effect the reciprocation of said core.

3. A device as claimed in claim 1 having a thermostatic switch arranged in the circuit connected with the intermittently operating switch to limit the period of movement of said reciprocating core, and means to indicate when reciprocation of said core has ceased.

4. A device for preparing amalgams, comprising a solenoid magnet having a central opening, an electric current supply, a pair of metallic spring contact blades insulated from each other and included in the electric circuit from the current supply to the said magnet and extending beneath the central opening of said magnet, a hollow core reciprocally arranged in said magnet and adapted to move downwardly under gravity to engage the upper of said spring contact blades to close same against the lower blade to energize the circuit to the magnet, a ball enclosed loosely in said hollow core, and means to check upward movement of said core upon energization of said magnet.

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