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CENTRIFUGAL CASTING MACHINE

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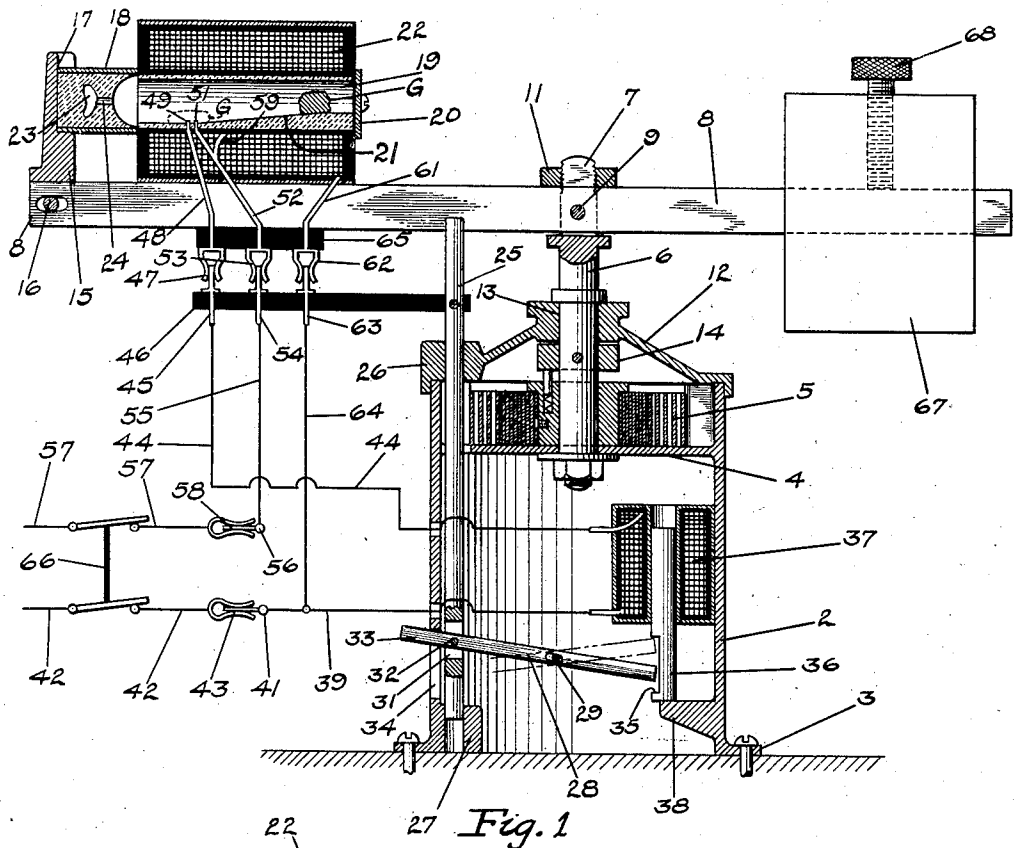


Fig. 1

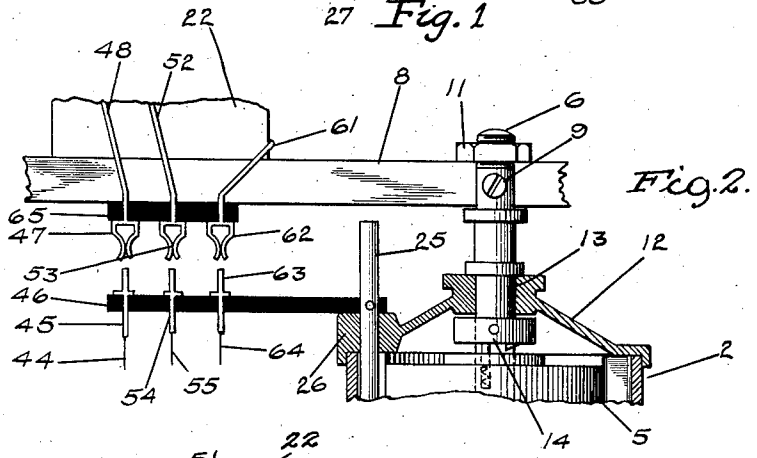


Fig. 2.

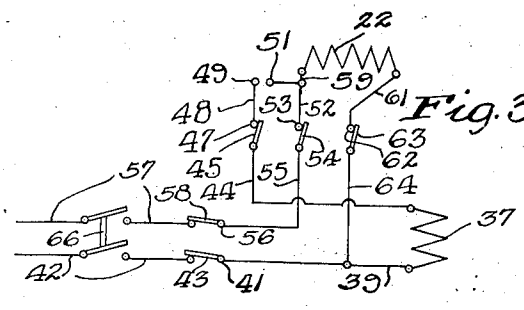


Fig. 3.

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UNITED STATES PATENT OFFICE

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CENTRIFUGAL CASTING MACHINE

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This invention relates to new and useful improvements in centrifugal casting machines adapted for use in dental laboratories.

An object of the invention is to provide a casting machine comprising a bar having an electrically heated chamber mounted thereon adjacent to a mold, and the bar normally being retained in inoperative position until the nugget of gold or metal placed in the heating chamber is melted, whereupon the molten metal in the heating chamber will effect the closing of a circuit, whereby certain mechanism will be caused to operate to release said bar, thus permitting the bar to be actuated and cause the molten metal to be delivered, into the mold positioned adjacent to the heating chamber.

A further object is to provide a centrifugal casting machine comprising a casing having a spring motor mounted therein and connected with a shaft having a bar secured to the upper end thereof and adapted for rotation with the shaft, when the latter is actuated; and a heating chamber being secured to said bar adjacent to a mold and communicating with the interior thereof, and the bottom of the heating chamber being inclined and having a pair of spaced contacts disposed therein and electrically connected with a solenoid, operatively connected with a locking member normally positioned to prevent rotation of the bar, and the inclination of the bottom of the heating chamber being such that when the gold is heated to a predetermined temperature, the molten metal will flow downwardly over the inclined bottom and into contact with the two contacts therein, resulting in the closing of the solenoid circuit, whereupon the solenoid will be actuated to cause the locking member to be automatically moved out of engagement with the locking bar, whereupon the motor will rotate the bar and cause the molten metal to be delivered into the mold cavity by centrifugal force.

A further object is to provide a centrifugal casting machine comprising a rotatable bar having a heating chamber mounted adjacent one end thereof and communicating with the interior of a mold, demountably secured to the bar, and an electric heating coil encircling the heating chamber and adapted to be energized by the closing of a switch, whereupon the metal or gold nugget placed in the heating chamber will be melted, and a pair of contacts being disposed within said heating chamber and connected with a solenoid coil having an armature adapted to operate a member normally engaged with the rotatable bar, to prevent rotation of the latter, and the heating chamber having an inclined bottom whereon the metal or gold nugget is initially placed, so that when the metal is melted, it will flow downwardly over the inclined bottom and bridge the two contacts, thereby closing the circuit to the solenoid coil, causing the locking member to be moved out of engagement with the rotatable bar, and permitting the latter to rotate, and, at the same time, automatically opening the relay and heating coil circuits.

The particular object of the invention, therefore, is to provide a centrifugal casting machine having means for electrically heating the gold to a predetermined temperature, whereupon the gold, when melted, will effect the closing of a circuit, whereby mechanism is actuated to permit the machine to rotate, and at the same time, the heating coil circuit will be opened to interrupt further heating of the chamber, thus assuring that each casting will be of the same consistency, because the metal or gold will be heated to the proper temperature to produce a perfect casting, before the machine is initially started.

Other objects of the invention will appear from the following description and accom-

panying drawings and will be pointed out in the annexed claims.

In the accompanying drawings, there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claims which follow.

In the accompanying drawings forming part of this specification;

Figure 1 is a diagrammatic sectional view illustrating the invention as applied to a dental casting machine, the heating circuit being closed;

Figure 2 is a detail sectional view showing the position of some of the parts when the machine is being operated, during which time the heating and solenoid circuits are open; and

Figure 3 is a wiring diagram.

The novel centrifugal casting machine featured in this invention comprises a housing 2 having a flanged bottom 3 adapted to be secured to a table or work bench, as shown. A partition 4 is provided in the upper portion of the casing 2, above which is mounted a spring motor 5, of ordinary construction, connected to an upright shaft 6. The upper end of the shaft has a slot 7 adapted to receive a bar 8, secured to the shaft by means of a pin 9 and lock nut 11. A cap 12 is secured to the upper end of the casing 2 and has a bearing 13 for the shaft 6, the lower end of which is supported in the partition 4. A suitable ratchet device 14 is provided upon the shaft 6 so that when the spring motor 5 has spent its energy, the shaft 6 may continue to rotate in the same direction, or over-run, because of the momentum of the bar 8 and the parts carried thereby.

A mold support 15 is adjustably secured to one end of the bar 8 by means of a screw or bolt 16. This support is provided with a seat 17 adapted demountably to receive a mold 18, as shown in Figure 1.

A heating chamber 19, preferably having a closure 20 and an inclined bottom wall 21, is mounted within a heating coil 22, the latter being secured to the bar 8 by suitable means, not shown in the drawings. The heating coil 22 and other electrical connections associated therewith, are suitably insulated from the bar 8. The heating chamber 19 is disposed substantially in axial alinement with the mold 18 and communicates with a cavity 23, formed in the mold, through the usual sprue hole 24.

The spring motor 5, when wound up, constantly tends to rotate the bar 8 in one direction, but is prevented from doing so by means of a rod or stop member 25 having its upper end normally positioned in the path of the bar, as shown in Figure 1. The bar 25 is mounted for vertical movement in guides 26 and 27, and its lower end is connected to a lever 28 pivoted at 29 to the casing 2. One end of the lever 28 preferably passes through a slot 31 in the rod 25 and may be pivotally secured thereto by means of a pivot pin 32. The end portion 33 of the lever 28 projects through a slot 34 in the wall of the housing to permit manual operation of the lever 28, and therefore the stop member 25.

The opposite end of the lever 28 is adapted to be engaged by a shoulder 35, provided upon an armature 36 movably mounted in a solenoid coil 37, preferably disposed within the casing 2 and secured thereto. In Figure 1, the parts are shown in normal positions, and it will be noted the armature has dropped downwardly and is supported upon a lug 38, and the stop member or rod 25 has been moved upwardly so that its upper end is engaged by the bar 8, thereby preventing rotation of the latter. The member 35 may be moved upwardly by means of the projecting end 33 of the lever 28.

A wire 39 connects one side of the solenoid with a terminal 41, electrically connected to a feed wire 42 by means of a plug and receptacle 43. The other side of the solenoid coil 37 has a wire 44 connecting it with a contact 45, carried in an insulating bar 46 secured to and movable with the stop member or rod 25. The contact 45 extends upwardly through the block 46 and when the machine is at rest, is engaged with a pair of contact fingers 47, to which one end of a wire 48 is connected. The other end of the wire is connected to a contact 49 located within the heating chamber. A second contact 51 is provided within the chamber 19 adjacent to the contact 49, and a wire 52 connects this contact with a pair of contact fingers 53 normally engaged with a contact 54 having a wire 55 connecting it with a post 56, which in turn is connected to the other feed wire 57 by means of a plug and receptacle 58. A wire 59 connects the wire 52 with one side of the heating coil 22, and the other end of this coil is connected by a wire 61 to contact fingers 62, which normally are engaged with a contact 63 having a wire 64 connecting it with the wire 39. The contact fingers 47, 53, and 62 are mounted upon an insulating block 65, suitably secured to the bar 8. A main operating switch 66 is interposed in the feed wires 42 and 57 to control the operation of the casting machine.

A suitable counter-weight 67 is adjustably secured to the opposite end of the bar 8 by means of a thumb screw 68, shown in Figure 1.

In the operation of this novel casting machine, the mold 18, after having been properly prepared, is clamped in position between the end of the heating chamber 19 and the

support 15 by means of the adjusting screw 16. When the machine is in normal position, the switch 66 is open, so that the coils 22 and 37 will be de-energized. The gold nugget or metal to be cast, indicated at G in Figure 1, is then placed upon the inclined bottom wall 21 of the heating chamber 19, as shown, after which the switch 66 is closed. The heating coil is then energized, the heating circuit being as follows; wire 57, receptacle 58, contact 56, wire 55, contacts 54, fingers 53, wires 52 and 59, through the heating coil 22, thence, through the wire 61 to the fingers 62, contact 63, wire 64, terminal post 41, receptacle 43, and back to the feed wire 42. (See Figure 3.) It is to be understood, of course, that during the heating of the metal in the heating chamber, the stop member 25 will be positioned in the path of the bar 8, as shown in Figure 1, thereby retaining the contact fingers 45—54—63 in electrical connection with their respective fingers 47—53—62.

When the gold has been heated or melted to a predetermined temperature, the molten metal will flow downwardly over the inclined bottom wall 21 of the heating chamber until it bridges the contacts 49 and 51, thereby closing the circuit to the solenoid coil 37. This circuit is as follows; from the contact 49, through the wire 48, finger 47, contact 45, wire 44, coil 37, wires 39 and 64, contact 63, fingers 62, wire 61, through the heating coil 22; thence through the wire 59 to the wire 52, and back to the molten metal bridging the contacts 49 and 51, indicated in dotted lines in Figure 1. Closing of the above described circuit by the molten metal, will cause the solenoid coil to be energized, causing the armature 36 to be moved upwardly and the shoulder or detent 35 thereof to engage the lever 28 and move it upwardly to the dotted line position shown in Figure 1.

Such movement of the lever 28 will cause the stop member 25 to be moved out of engagement with the bar 8, whereupon the latter will commence to rotate by the action of the spring motor 5. Downward movement of the stop member 25 will also move the contacts 45—54—63 out of electrical connection with their respective fingers 47—53—63, as shown in Figure 2, thus automatically opening the circuits to the heating coil 22 and solenoid coil 37, whereupon the functioning of the two coils will cease and the bar will continue to rotate until the motor has spent its energy.

From the foregoing, it will readily be seen that this novel casting machine is adapted for automatic operation, after the gold has initially been placed in the heating chamber 19 and the switch 66 is closed. It will also be seen that as soon as the gold or metal has been melted to a consistency which will permit it to flow in the form of a globule downwardly over the inclined bottom wall of the heating chamber, it will electrically close the gap between the contacts 49 and 61, closing the solenoid circuit and thereby automatically causing the release of the bar 8. Rotation of the bar 8 will automatically open the circuits to the solenoid and heating coil 22, because the contacts carried by the insulating bar 46 will be moved out of electrical connection with their respective contact fingers, as shown in Figure 2. The inclination of the bottom wall 21 of the heating chamber is such that before the metal will flow downwardly thereover, it will be melted to the desired consistency or temperature to produce a perfect casting, when delivered into the cavity 23 of the mold, by the centrifugal action of the rotatable bar 8.

We claim as our invention:

1. In a centrifugal casting machine, the combination of a heating chamber adapted to receive the metal to be cast, a heating circuit therefor, a switch for closing said circuit to effect heating of said chamber, and means in said chamber adapted to be engaged by the molten metal to effect the opening of said heating circuit.

2. In a casting machine, the combination of a movable heating chamber adapted to receive the metal to be cast, a heating circuit for said chamber, a switch for closing said circuit to effect heating of the chamber, and means in said chamber adapted to be engaged by the molten metal whereby said circuit is opened, and means for operating said heating chamber when said heating circuit is opened.

3. In a centrifugal casting machine, the combination of a rotary heating chamber adapted to receive the metal to be cast, a heating circuit for said chamber, locking means normally preventing rotation of said chamber, a solenoid circuit associated with said means and said heating circuit, and means in said heating chamber adapted to be engaged by the molten metal to effect energization of the solenoid, whereby said locking means will be actuated to permit rotation of said heating chamber.

4. In a centrifugal casting machine, the combination of a rotary heating chamber adapted to receive the metal to be cast, a heating circuit for said chamber, locking means normally preventing rotation of said chamber, a solenoid having a circuit associated with said means and said heating circuit, and means in said heating chamber adapted to be engaged by the molten metal to effect energization of the solenoid, whereby said locking means will be actuated to permit rotation of said heating chamber, actuation of said locking means also causing said heating and solenoid circuits to be opened.

5. In a casting machine, the combination

of a heating chamber adapted to receive the metal to be cast, a heating circuit for said chamber, locking means normally preventing movement of said chamber, a solenoid having a circuit associated with said means and said heating circuit, and spaced contacts in said heating chamber adapted to be bridged by the molten metal whereby the solenoid circuit is closed and said locking means actuated to permit operation of said heating chamber, actuation of said locking means also causing said heating and solenoid circuits to be opened.

6. In a casting machine, the combination of a bar, a driving means therefor, means for arresting movement of said bar, a mold demountably secured to said bar, a heating chamber also secured to said bar and having an inclined bottom whereon the metal to be cast is placed, and means in said heating chamber adapted to be engaged by the metal, when in a molten state, and to cause the actuation of said locking means said bar is released.

7. In a centrifugal casting machine, the combination of a rotatable bar, a motor connected therewith and constantly tending to rotate the bar, means for locking the bar against rotation, a mold secured to the bar, a heating chamber also secured thereto and having an inclined bottom adapted to receive the metal to be cast, a mechanism adapted to release said lock, and means in said heating chamber adapted to be engaged by the metal, when in a molten state, to cause the actuation of said lock-releasing mechanism and to effect the release of said bar.

8. In a centrifugal casting machine, the combination of a rotatable bar, a driving means therefor, means for arresting movement of said bar, a mold demountably secured to said bar, an electric heating chamber also secured to said bar and having an inclined bottom whereon the metal to be cast is initially placed, an electric circuit, and contacts in said heating chamber adapted to be engaged by the molten metal and to cause said circuit to be closed, whereby said locking means will be operated to release said bar.

9. In a centrifugal casting machine, the combination of a rotatable bar, a motor connected therewith and constantly tending to rotate the bar, means for locking the bar against rotation, a mold secured to the bar, an electric heating chamber also secured thereto and having an inclined bottom whereon the metal to be cast is initially placed, an electric circuit for said chamber, a mechanism adapted to release said lock, contacts in said heating chamber associated with said circuit and adapted to be engaged by the metal, when in a molten state, whereby said lock-releasing mechanism will be operated to release said bar, and means for opening said circuit when said bar is started.

10. In a casting machine, the combination of a movable bar, a motor connected therewith, a locking member normally positioned in the path of said bar to prevent movement thereof, a mold secured to the bar, an electric heating chamber also secured thereto and communicating with said mold, an electrically operated device associated with said locking member and operable to release the latter, and a pair of contacts in said heating chamber electrically connected with said device and adapted to be bridged by the metal, when in a molten state, whereby said electric device will be operated to move said locking member out of engagement with said bar.

11. In a casting machine, the combination of a casing having a motor therein, a shaft connected with the motor and projecting from the upper end of the casing, a bar secured to said shaft and adapted to be operated by said motor, a mold secured to said bar, a heating chamber also secured to said bar and adapted to communicate with said mold, a member normally engaged with said bar to prevent movement thereof, a solenoid associated with said member, and a pair of contacts within said heating chamber normally connected with said solenoid and adapted to be bridged by the metal, when in a molten state, whereby the solenoid circuit will be closed to cause the solenoid to effect the release of said bar from said locking member.

12. In a casting machine, the combination of a movable bar, a motor connected therewith, a locking member normally positioned in the path of said bar to prevent movement thereof, a mold secured to the bar, an electric heating chamber also secured thereto and communicating with said mold, and having an inclined bottom whereon the metal to be cast is placed, an electrically operated device associated with said locking member and operable to release the latter, an electric circuit for said device, and a pair of spaced contacts in said circuit located within the heating chamber and adapted to be bridged by the metal, when in a molten state, whereby said electric device will be operated to move said locking member out of engagement with said bar.

13. In a centrifugal casting machine, the combination of a casing having a motor therein, a shaft connected with the motor and projecting from the upper end of the casing, a bar secured to said shaft and adapted to be rotated by said motor, a mold secured to said bar, a heating chamber also secured to said bar and communicating with said mold, a member normally engaged with said bar to prevent rotation thereof, a latch connected with said member and pivotally mounted in said casing, a solenoid associated

with said latch and connected with a source of electrical energy, and a pair of contacts within said heating chamber, one of which is connected with the solenoid and the other with a source of electrical energy, said contacts being positioned to be bridged by the metal to be cast, when said metal is in a molten state, whereby the solenoid circuit will be closed to cause the solenoid to actuate said latch and move it out of engagement with said bar to permit rotation of the latter.

In witness whereof, we have hereunto set our hands this 24th day of Sept., 1928.

GEORGE B. THOMAS.
HENRY A. COONS.