Aug. 16, 1927. 1,639,253

L. W. AYERS

CENTRIFUGAL CASTING APPLIANCE

Filed Jan. 29. 1924

Fig. 1.

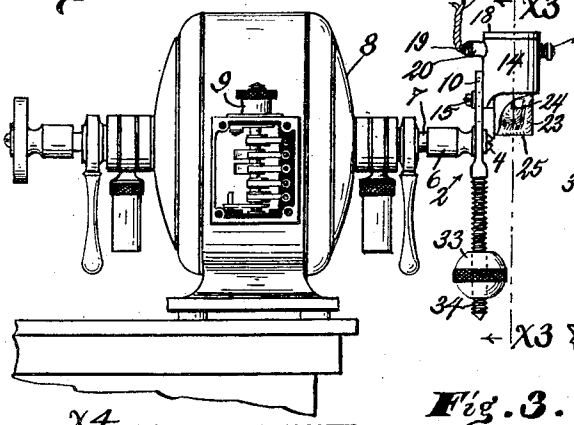


Fig. 2.

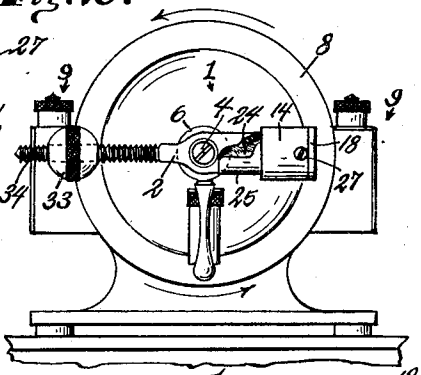


Fig. 3.

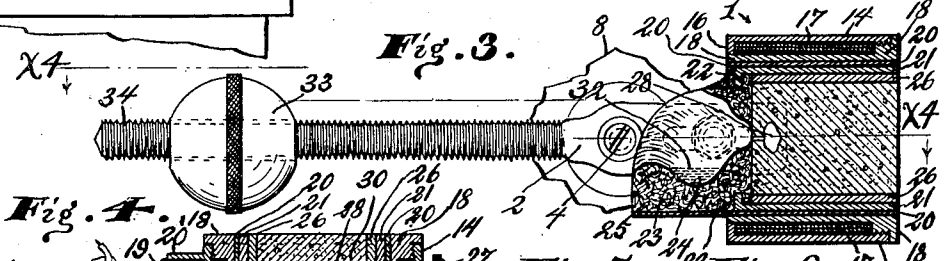


Fig. 4.

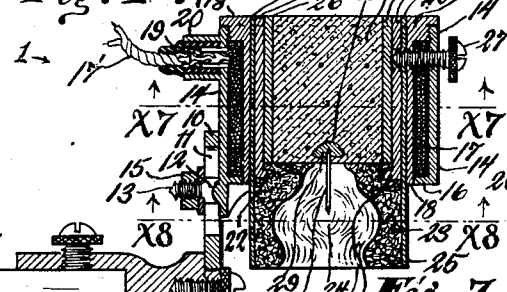


Fig. 5.

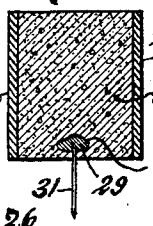


Fig. 6.

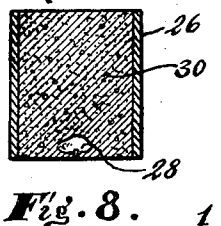


Fig. 7.

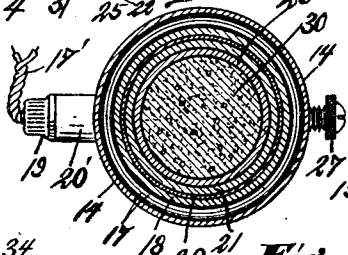


Fig. 8.

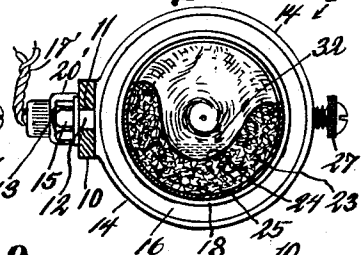


Fig. 10.

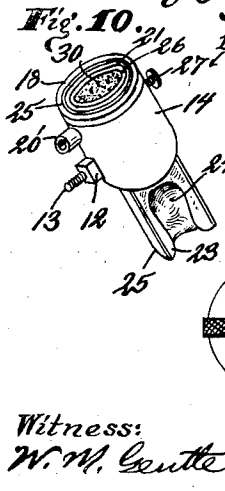
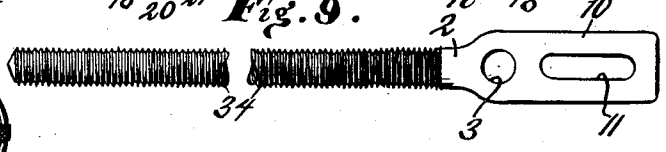


Fig. 9.



Witness:
W. M. Gantt.

Inventor.
Loren William Ayers
by
James R. Townsend
his atty

Patented Aug. 16, 1927. 1,639,253

UNITED STATES PATENT OFFICE.

LOREN WILLIAM AYERS, OF SAN BERNARDINO, CALIFORNIA.

CENTRIFUGAL CASTING APPLIANCE.

Application filed January 29, 1924. Serial No. 689,270.

This invention relates to appliances for producing metal casts in which great accuracy as to structural conformation is required; and an object of the invention is to provide a means for producing delicate casts that are substantially true to the conformation of the mold.

To that end I provide an appliance with a speed control that will discharge the metal from its crucible into the mold by a centrifugal force the intensity of which is predetermined; and which force is maintained at a uniform intensity until the metal cast has hardened and cooled; thereby preventing the cast from shrinking away from the mold wall as it is cooled. In other words, I rotate the appliance at a predetermined and uniform speed so that the metal from the crucible will be driven into the mold and held there by centrifugal force until it is thoroughly cooled; and the uniform centrifugal force applied to the metal will tend to hold it in contact with the mold wall while cooling so that shrinkage away from the wall is minimized.

Heretofore centrifugal appliances of this class have been devised that at the first moment of casting have been actuated at a high speed that quickly loses its momentum and decreases in speed to a stop; and usually the stop occurs just at the critical time when the metal is starting to cool and ofttimes in a position in which the cast will shrink away sufficiently from the wall to make it undesirable and ill shaped; and an object of my invention is to provide a means for maintaining centrifugal force on the cast until it has thoroughly hardened and cooled.

An object of the invention is to provide a centrifugal appliance that can be detachably connected to the shaft of a speed controlled motor such as are commonly used by dentists, jewelers and fine metal workers; so that by regulating the motor speed the casting appliance can be operated at a known and uniform speed.

Another object is to provide an appliance that is easily adjusted to a position for melting and discharging the impression forming pigment such as wax from the mold; and also adjusting it to a position for charging and heating the metal in the crucible, which adjustments to the two positions are accomplished by quarter rotations of the motor shaft.

Another object of the invention is to provide a centrifugal casting appliance with an electrical heater connected thereto that is adapted to melt the impression forming pigment such as wax from the mold; and to dry the mold and harden the composition of which the mold is formed, and also to heat the mold so that the casting metal will more readily enter therein and contact with the wall thereof.

Another object of the invention is to provide an appliance that is easy to construct, assemble and operate; and which is also strong and durable in construction, and which can be made and sold cheaply.

Features of the invention are shown in the construction, combination and arrangement of the parts whereby an appliance that is easily adjusted, operated and of great utility is provided.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detail description and the appended claim.

The accompanying drawing illustrates the invention.

Figure 1 is a side view of a motor with a centrifugal casting appliance that is constructed in accordance with this invention attached to the motor shaft, and showing the appliance in a position to heat and dry the mold; and also showing a side plate removed from the motor casing to disclose one member of the motor speed control.

Fig. 2 is a right end view of the motor shown in Fig. 1, showing the appliance turned on the shaft to a position to receive the molding metal.

Fig. 3 is an enlarged fragmental section

on line x^3, Fig. 1, showing the appliance turned on the shaft to the position shown in Fig. 2.

Fig. 4 is an enlarged fragmental section on line x^4, Fig. 3, with the appliance turned on the shaft to the position shown in Fig. 1.

Fig. 5 is a central section through the mold casing showing a fusible inlay embedded in the mold forming material with a bore forming pin attached thereto.

Fig. 6 is a view analogous to Fig. 5, with the bore forming pin detached; and showing the fusible inlay melted out of the mold.

Fig. 7 is a cross section on line x^7, Fig. 4.

Fig. 8 is a cross section on line x^8, Fig. 4.

Fig. 9 is a broken detached side view of the centrifugal arm.

Fig. 10 is a perspective view of the housing and associated parts detached from the centrifugal bar.

The centrifugal casting appliance 1 comprises a bar 2 that is provided with an orifice 3 that is adapted to be fitted over and secured by a screw 4 to a shank 5 on a chuck 6, that is adapted to be connected to a shaft 7 on the motor 8.

The motor 8 is of well known construction preferably having a speed range of about 1000 to 3600 revolutions per minute with a control switch 9 of usual construction for regulating the speed.

The speed control and operation of the motor are well known and are therefore not shown and described in detail, except to state that the speed of the motor can be controlled in operating the casting appliance 1, so that any speed intermediate of high and low can be obtained.

The bar 2 has a flattened end 10 provided with a slot 11 in which is slidably fitted the squared portion 12 of a stud 13 that has one end integral with a cylindrical housing 14, and the other end threaded for the nut 15, by which means the housing 14 is adjustably secured to the end 10 of the bar 2.

The housing 14 is provided with an integral annular spacing ring 16 that extends inwardly toward the axis of the housing 14; and this ring forms a seat for an insulated cylindrical heating coil 17 that is fitted into the housing 14 and secured therein by an inner cylindrical housing 18 that at one end is threaded to fit the threaded end of the housing 14, and which has its other end fitting flush within the inner surfaces of the annular ring 16.

The heating coil 17 is adapted to be placed in circuit with a source of electricity, not shown, by means of the lead wires 17′ and detachable plug 19 adapted to be fitted to a socket in the boss 20′ extending from the housing 14.

A crucible casing 20 is shrunk in the inner housing 18; and this casing is provided with a cylindrical metal lining shell 21 which at one end is provided with an inner annular ring 22 that forms a retainer for the noncombustible material 23 of which the crucible 24 is formed. That is, the material 23 is packed on both sides of the ring 22 so that the crucible 24 is held securely in the semi-cylindrical end 25 of the casing 20 when the appliance is rotated in the direction of the arrows shown in Fig. 2.

A mold cylinder 26 is slidably mounted in the lining cylinder 21 and detachably held therein by a set screw 27 that extends through all of the other cylinders, see Figs. 1, 2 and 4, and engages the mold cylinder 26.

A mold 28 is formed by embedding a body 29 that fuses at a low temperature in investment 30 that is poured into the cylinder 26 around the body that is supported on a pin 31 that when withdrawn from the investment 30 forms a small lead hole to the mold 28.

Preferably the body 29 is formed of wax and the pin 31 is set therein as shown in the drawing so that when the casing 26 is seated and secured in the shell 21 and the appliance turned to the positions shown in Figs. 1, 4 the heating coil 17 can be energized to melt the wax in the mold 28 so that both the wax and pin 31 will fall by gravity to empty the mold and clear the lead hole thereto; and the heater 17 can be continued in operation until the mold 28 and cement are dried and hardened.

After the mold 28 is in a condition for casting, the plug 19 is detached from the heating coil 17 and the appliance turned to the position shown in Figs. 2, 3.

Then metal 32 can be placed in and fused in the crucible 24 after which the motor 8 can be actuated in the direction of the arrows shown in Fig. 2 at a predetermined speed to drive the molten metal 32 by centrifugal force into the mold 28; and the predetermined speed of the motor can be uniformly maintained until the metal has cooled in the mold.

A ball 33 is threaded so it is adjusted on the threaded end 34 of the bar 2 so that a balance can be established between the ball and the casting appliance at the other end of said bar.

In practice, the appliance is operated as stated to heat the mold so that the metal will more readily enter therein and contact to the mold wall, and by centrifugal means the metal is forced and held against the mold wall until both the metal and mold have cooled, thereby forming a cast of superior conformation.

I claim:

A centrifugal casting appliance set forth comprising a bar having one of its end portions flattened and the other end rounded and threaded, a balance ball threaded on

said threaded end, said flattened end having a slot formed therein, a housing adjustably mounted in said slot; an inner housing within said housing and spaced therefrom; electrical coils between said inner and outer housings, a detachable electrical connection to said coils, a crucible casing in said inner housing, a crucible in one end of said crucible casing, a mold cylinder removably mounted in said crucible casing, and means to rotate said bar around an axis.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 23rd day of January, 1924.

LOREN WILLIAM AYERS.