May 28, 1940. A. P. VICKERS 2,202,473

DENTAL CASTING MACHINE

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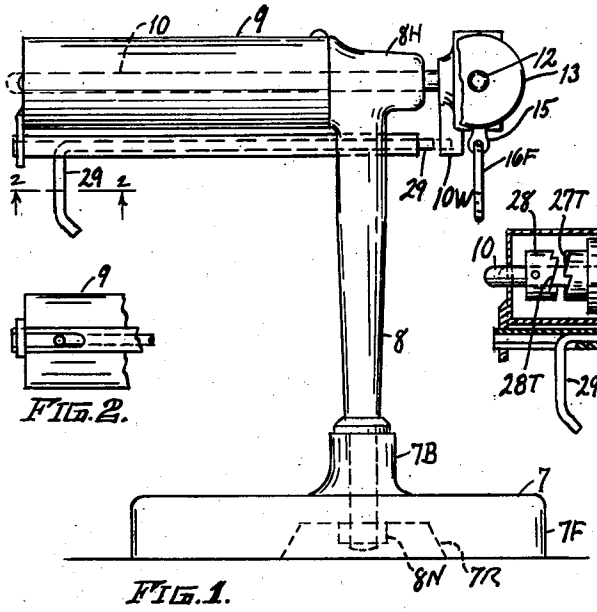
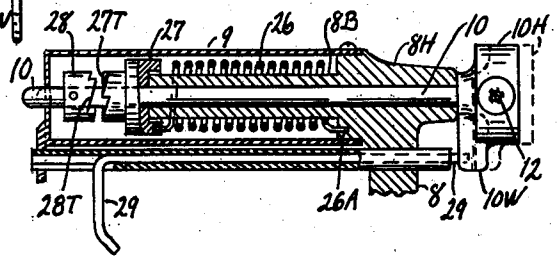


FIG. 1.

FIG. 2.

FIG. 3.



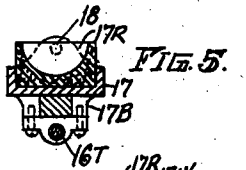
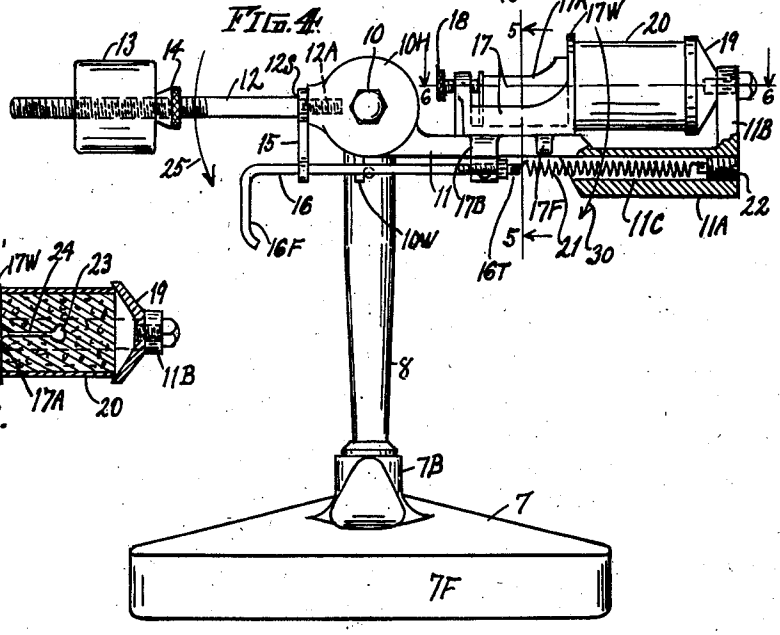


FIG. 5.

FIG. 4.



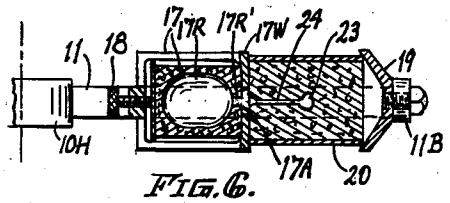


FIG. 6.

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DENTAL CASTING MACHINE

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3 Claims. (Cl. 22—65.1)

My invention relates to centrifugal casting machines of the type used in the dental profession for casting inlays.

The main object is to provide a casting machine of compact and highly efficient construction and the use of which provides for quick and compact casting of molten metal, or alloys, the device being portable and self contained including a coil spring motor.

The invention consists in certain novel combinations and construction of parts wherein the above object is attained and as hereinafter fully set forth reference being had to the accompanying drawing, in which:

Fig. 1 is a side elevation of my improved dental casting machine.

Fig. 2 is a bottom view of the rear end part of the motor housing of my device.

Fig. 3 is a longitudinal sectional elevation of the motor housing and adjacent head part of the device.

Fig. 4 is a front view, showing the base 7 slightly in perspective and the release spring housing 11A in longitudinal section.

Fig. 5 is a cross sectional detail view of the crucible carrying arm of my device as on line 5—5 in Fig. 4 and Fig. 6 is a longitudinal sectional view of the same parts as on line 6—6 in Fig. 4.

Referring to the drawing by reference numerals, like parts being designated by corresponding characters in the several views, 7 designates a flat, triangular base preferably a casting having an integral, central, upright boss 7B bored vertically to receive the reduced and threaded lower end of an upright or column 8 the lowermost end of which is within a central pocket or recess 7R in the under side of the base and where a nut 8N is threaded on. One side of the base designated 7F is the front and in a plane at right angles thereto the upper part of the column carries a rearwardly directed and elongated motor housing designated 9.

Said upper part of the column comprises a horizontal hub 8H projecting forwardly and bored centrally and concentric of housing 9 to rotatably and slidably retain a rotor shaft 10 the slidable or reciprocating action of which is limited. Forward of the said hub the shaft 10 is formed with a hub 10H carrying a pair of oppositely directed integral arms 11 and 12, rotatable in a vertical plane and over the front face 7F of the base, said arms carrying the casting means and a counterbalance therefor and rotation of which is accomplished by the spring motor means within housing 9 and actuating the rotor which comprises said shaft 10 and its arms 11—12.

Of said arms 11—12, the latter is preferably a round bar threaded to carry a correspondingly threaded counterweight 13 which is securely held in any position on the rod by a jamb nut 14. The fixed end of arm 12 may be threaded into the hub 10H as shown at 12A (Fig. 4) a shoulder being formed in the bar at 12S to securely clamp a downwardly directed hanger 15 bored at its lower terminus to slidably receive a reciprocable crucible release bar 16 extending horizontally under bars 11—12 and parallel to them and being close to the under side of arm 11. The outer end of said release rod 16 is formed with a finger catch 16F in vicinity of the normal position of the counterweight and remote from the crucible on arm 11 said crucible oscillated by direct manipulation of said rod 16.

The arm 11 is preferably integral of hub 10H and its inner half comprises a straight rail on which the crucible 17 is reciprocally guided on a bearing 17B at the under side of the crucible. There is also a pair of downwardly directed fingers 17F, on the crucible, and slidably engaging opposite sides of the rail.

Obviously the crucible 17 is thus firmly guided on top of the rail 11, the crucible being open upwardly and of box-like form.

The inner or receptacle part 17R of the crucible is hollow and has an outer end outlet 17R' concentric of an aperture 17A in the outer end wall 17W of the crucible. 18 is a thumb screw threaded in the opposite or inner wall of the crucible to clamp the receptacle part of the crucible in place rigidly.

The outer part of arm 11, designated 11A is offset downwardly and its free end comprises an upright arm 11B at the inner and upper part of which is fixed an inwardly flared disc 19 concentric of and in horizontally registering spaced relation to the outer end wall 17W of the crucible. 20 is a cylindrical mold clamped by spring means between the crucible and the disc 19 and concentrically of both. The flared disc 19 automatically centers the end of the mold in it and it is obvious that various sizes of cylindrical molds are likewise centered.

The means for clamping the mold consists of a tension coil spring 21 pocketed in a longitudinal bore 11C in the outer part 11A of the arm 11 and being in continuous tension between a threaded plug 22 in the outer part of said bore and the threaded end part 16T of the trigger rod 16, said latter threaded end being retained in a

correspondingly threaded bore in the lower central part of bearing 17B and under bar 11 (see Figs. 4 and 5). Thus the crucible reciprocating bar 16 is rigidly connected with the crucible, is slidably guided at 15 and a pull on the finger hold part 16F (as to the left in Fig. 4) moves the crucible toward the hub and a mold 20 may be inserted or taken out of the space between parts 17W and 19. The material in mold 20 is provided with the usual cavity 23 and a central passage 24 leading into the cavity from the end of the mold contacted by wall 17W and registering with the aperture therein. Gold or any other metal or alloy is melted in the hollow part of the crucible and is forced into cavity 23, through outlet 17R', aperture 17A and passage 24, by centrifugal force when the rotor is set in motion in anticlockwise motion as indicated by arrow 25.

Shaft 19, hub 10H and arms 11—12 are one integral structure and comprise the rotor being set in rotary motion by a coil spring 26 surrounding a rearwardly directed reduced part of the standard 8 and which comprises an elongated bearing for shaft 19 the forward part of the spring 26 being fixed in part 8H as at 26A, the rear end of the spring retained in a clutch member 27 freely rotatable on shaft 19 and adjacent the rear end of part 8B. The rearwardly reduced part of said clutch member has a number of circularly arranged clutch teeth 27T engageable selectively by corresponding teeth 28T of a clutch member 28 fixed on shaft 19 rearward of member 27. From the latter clutch member the shaft 19 extends to and through the end wall of the cylindrical shell 9 comprising the motor housing.

It will be readily understood that the entire rotor thus has a limited end play or reciprocating movement.

Assuming now that melted metal is in the crucible and ready for casting, the rotary arms 11—12 being in horizontal position, and that spring 26 is coiled for action, the rotor is released from said position by a reciprocable rod 29 mounted parallel to and under housing 9 the front end of said rod projecting into the path of an integrally formed radial wing 10W of the hub 10 (latter position shown in Fig. 3, released position in Fig. 1). The clutch members 27—28 at this time are in contact and spring 26 unwinds, member 27 spinning member 28 which of course spins shaft 19 and entire rotor, the molten metal being forced by centrifugal action into the pocket 23.

The motor spring is wound up first by pressing forward the exposed rear end of shaft 16, thus connecting the clutch members. This same forward pressure causes hub 10H to move forward as to dotted line position and provides a space between said hub and the forward end of the stationary hub 8H. The spring is wound up by merely turning the rotor in clockwise direction as indicated by arrow 30 (Fig. 4) and rotor is retained in position with arms 11—12 horizontal by merely moving rod 29 forward to contact position with wing 10W.

In construction of this device it is necessary that arm 11, the crucible and mold be of heat retaining material and yet of as light weight as possible. Hitherto this has made it difficult to recast rapidly because of hot exposed areas. In this device the crucible is moved away from the mold to release the latter by the finger hold 16F which is remote from the hot crucible and mold, in fact an operator can place a hand with palm against the outer end of arm 12 and the counterweight and with one finger extended forward contact and pull the release rod at 16F about in the way a hand is used for a pistol grip. The inward movement of the crucible frees the mold and the latter may be allowed to drop out of the device.

The trigger rod hanger 15 and rod 16 may be of heat resistant material to eliminate any possibility of burns by contact of the operator's hand.

The crucible arm 11 is necessarily slightly offset from the center of hub 10H but arm 12 extends directly radially therefrom, the crucible, mold and entire crucible arm being designed and positioned so as to be of about equal weight above and below a line drawn diametrically and concentrically from the weight arm 12, thus providing a finer balance and reducing or practically eliminating vibration when the rotor is spinning. The features set forth in this and the preceding two paragraphs are particularly stressed.

The entire casting machine is readily moved from one place to another by using the motor housing as a hand hold or grasping the upright 8.

The triangular, heavy base positioned with one face at the front in a plane corresponding to the plane of the rotating arms 11—12 further provides for stability during the rotary casting process.

After each rotary casting operation as above described the rotor is again manipulated to wind up the motor spring and the rotor arms are set in the horizontal position shown in Fig. 4 preparatory to making the next inlay.

Modifications within the scope of the above description and the structure illustrated may be made without departing from the scope and spirit of the invention.

I claim:

1. In a portable casting machine of the class described comprising a base with an integral upright standard, an elongated horizontal housing extending rearwardly from the upper part of the standard and comprising a hand-hold and in part a rotor shaft journal; a rotor shaft capable of limited longitudinal movement, the rear end of said housing being closed and bored to slidably retain the rear end of the rotor shaft projecting therethrough, a pair of diametrically opposite arms integral of the front end of said shaft, one arm a mold and crucible retainer and the other arm a counterweight therefor, a helical coil spring about said rotor shaft and having its forward end fixed in the housing, a clutch member rotatably mounted on said shaft and engaging the rear end of said spring, a clutch member keyed on the shaft and close to said first described clutch, said clutch means adapted to be engaged by forward movement of the rotor shaft to wind the rotor and its arms and coil the spring member as described.

2. The structure specified in claim 1, and a reciprocable rod mounted parallel to the motor housing and formed with a finger hold accessible at the rear end of said housing, the other end of said rod adapted to be positioned selectively in the path of the rotor arms or out of said path.

3. The structure specified in claim 1 in which the protruding rear end of said rotor shaft comprises a contact member remote from the crucible arm and adapted to be pushed forward and engage the clutch members.

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