W. A. ADAMS.

DENTAL CASTING APPARATUS.

APPLICATION FILED FEB. 17, 1914.

1,124,099. Patented Jan. 5, 1915.

Fig. 1.

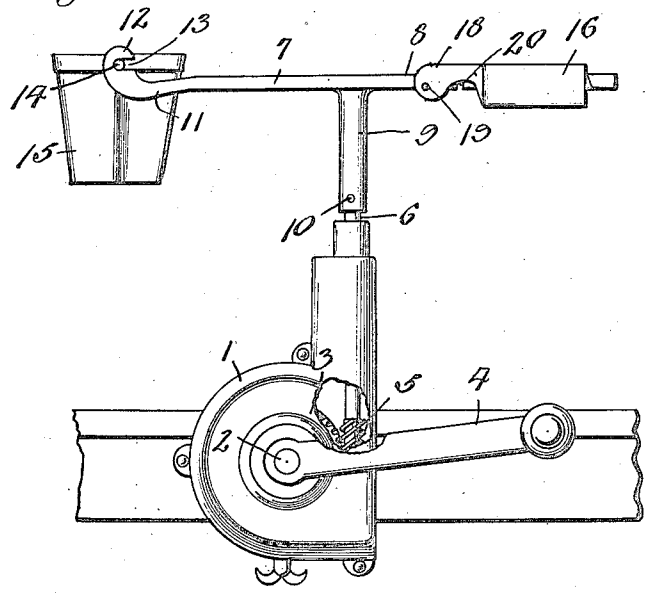



Fig. 2.

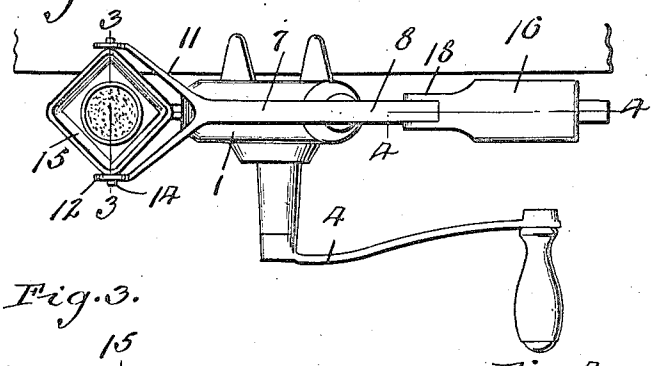



Fig. 3.

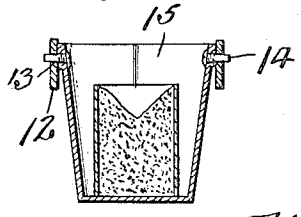



Fig. 4.

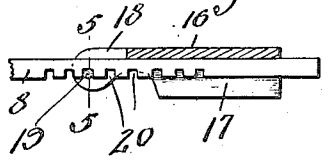
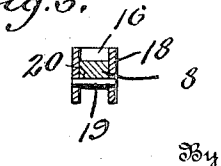



Fig. 5.




Witnesses

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# UNITED STATES PATENT OFFICE.

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## DENTAL CASTING APPARATUS.

1,124,099. Specification of Letters Patent. Patented Jan. 5, 1915.

Application filed February 17, 1914. Serial No. 819,280.

*To all whom it may concern:*

Be it known that I, WILLIAM A. ADAMS, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Dental Casting Apparatus, of which the following is a specification.

This invention relates to a dental casting apparatus of the centrifugal type, employed in the casting of inlays, crowns, bridges, plates, etc., and particularly to centrifugal casting devices of the character stated in which the mold is revolved in a horizontal plane.

In casting devices of the particular character set forth, the crucible is mounted in a stationary manner upon the mold supporting arm of the machine, requiring the metal to be melted separate from the mold and to be shot by centrifugal force from the crucible into the mold, such process requiring a considerable amount of time and careful work in order to secure good results.

One object of my invention is to provide a casting apparatus in which the crucible or mold may be directly set is pivoted to normally hang vertically on the supporting arm, and is adapted in the rotation of the arm to be thrown out by centrifugal force to a horizontal position, so that the molten metal will be injected by great force into the mold cavity, allowing the metal to be melted directly in the crucible or mold and avoiding the loss of time, care and trouble experienced in prior processes of the character referred to, while also enabling superior castings to be made.

A still further object of the invention is to provide a casting apparatus which is adapted to receive holders of different sizes and types for the production of different sizes and kinds of castings, and which will be operated in the manner described in order to enable accurate castings to be easily, quickly and economically made.

A still further object of the invention is to provide novel and improved means for adjustably mounting the counterweight upon the counterweight arm of the casting machine.

The invention consists of the features of construction, combination and arrangement of parts herein fully described and claimed, reference being had to the accompanying drawing in which:—

Figure 1 is a side elevation of a dental casting apparatus embodying my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical transverse section on the line 3—3 of Fig. 2. Fig. 4 is a vertical longitudinal section on the line 4—4 of Fig. 2. Fig. 5 is a detail transverse section on the line 5—5 of Fig. 4.

In carrying my invention into practice, I provide a suitable supporting bracket or casing 1, adapted to be fastened to a work bench or table in any suitable manner, and which is provided with bearings for a shaft 2 carrying a drive gear 3 and a crank handle or other operating element 4.

The gear 3 meshes with a gear 5 on a vertically disposed spindle 6, journaled in the frame or casing, and which carries at its upper end the rotating mold support, shown as comprising oppositely extending radial mold supporting and counterbalancing arms 7 and 8, which may be secured to the spindle for rotation therewith in any suitable manner. As illustrated in the present instance, the support is provided with a depending sleeve 9 which fits over the upper end of the spindle and is secured thereto for rotation therewith by a pin, key or bolt 10, or any other suitable fastening means. The arm 7 has a bifurcated outer end providing fork arms 11 formed with upwardly bent or curved extremities 12, disposed substantially in a vertical position and provided at their inner edges with inwardly extending horizontal bearing slots 13. These slots 13 are designed to receive laterally projecting trunnions 14 at the opposite sides of the upper portion of a holder 15, in which the crucible or mold is placed, the arrangement being such that different sizes and kinds of holders may be interchangeably used and applied by sliding the trunnions into and out of engagement with the bearing slots.

The counterbalancing arm 8 is provided with an adjustable weight 16 to counterbalance the weight of the holder 15 and the crucible or mold disposed therein so as to maintain the spindle in a vertical position and insure accuracy of rotation of the supporting member on its axis during the molding process. The weight 16 herein shown consists of a body having in its underside a groove or slot 17 to receive the arm 8 and adapt it to lie flatwise and longitudinally upon said arm to be held against lateral displacement. At its inner end the weight is provided with a bifurcated or

forked portion 18, the arms of which are bent or curved downwardly and connected by a locking pin 19 adapted to engage any one of a series of notches or recesses 20 formed in the underside of the arm 8. By tilting the weight 16 upwardly at an angle the pin 19 may be moved out of engagement with the notch and in which it is seated and the weight then adjusted along the arm to bring the pin in line with any other notch, whereupon by moving the weight downward to a horizontal position again the pin will be projected into the notch with which it registers to lock the weight against longitudinal movement on the arm. The notches 20 may be arranged to serve additionally as indications, to determine the point of adjustment of the weight to counterbalance any weight or size of crucible or mold holder, as will be readily understood. It will be evident that this construction of the weight insures compactness, simplicity, and great convenience in ease and certainty of adjustment in the operation of the apparatus in making various castings.

In the use of the device, the crucible or mold containing the metal from which the cast is to be made is placed in the holder 15, it being understood that the primarily unfused metal is placed in a cavity in the crucible or mold communicating by a sprue or passage with the molding chamber, the cavity, sprue and chamber being formed in a body of investment material in the usual manner or in any suitable way. The counterbalance is then adjusted, if necessary, to counterbalance the weight of the holder and crucible or mold arranged therein, after which by means of a blow torch, the flame of which is brought to play directly upon the unfused metal in the cavity, the metal is melted and when completely melted the apparatus is set in operation by rotating the crank to make the casting. The rotation of the crank 4 imparts rotary motion to the spindle 6, the mold support being thereby rotated in a horizontal plane. As soon as the speed of rotation of the support reaches a certain degree, the holder 15 tilts outwardly upon its trunnions 13 to a substantially horizontal position through the action of centrifugal force, by which a preliminary throw is established to force the molten metal from the cavity and through the sprue into the mold. This forcing action of the metal is continued centrifugally during the rotation of the support, whereby all the metal is caused to feed from the cavity into the molding chamber, and to form the desired casting. Owing to the fact that in the rotation of the support the holder is thrown by force from a vertical to a horizontal position, it is evident that the metal is forced by air pressure as well as centrifugal action through the sprue or passage into the mold cavity, resulting in the production of a casting which is absolutely accurate and at the same time much denser than can be produced by any ordinary type of casting machine of the general character specified. Furthermore, by the use of a tilting holder a crucible or mold for making any size or kind of casting may be applied and the metal melted directly therein by means of a blow torch, obviating the necessity of melting the metal separately and thereafter injecting it by centrifugal force into the mold, as well as the inconveniences, amount of labor and other objections incidental to the employment of such process.

I claim:—

1. In a dental casting apparatus, a vertical spindle, a radial support carried by the spindle, fork arms upon said support having upwardly and outwardly curved portions provided with slots opening through their inner sides in a direction toward the spindle, and a holder adapted to fit between said fork arms and provided with trunnions to slidably and pivotally engage said slots, and means for rotating the spindle.

2. In a dental casting apparatus, a vertical spindle, a radial support carried by the spindle, said support having fork arms provided with upturned portions having bearing slots therein, a holder adapted to fit between said fork arms and provided with trunnions to slidably, pivotally and detachably engage said slots, and means for rotating the spindle.

3. In a dental casting apparatus, a rotatable support provided with a radial counterbalancing arm having a series of notches, and a counterbalancing weight adjustable on said arm, said weight being provided with a forked portion having its arms connected by a cross pin, adapted by tilting adjustments of the weight to be moved into and out of engagement with any of said notches.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM A. ADAMS.

Witnesses:
WILBER E. ADAMS,
FRANK C. FLUMERFELT.