F. C. MONTUORI.

DENTAL CASTING MACHINE.

APPLICATION FILED JUNE 24, 1920.

1,352,080.

Patented Sept. 7, 1920.

3 SHEETS—SHEET 1.

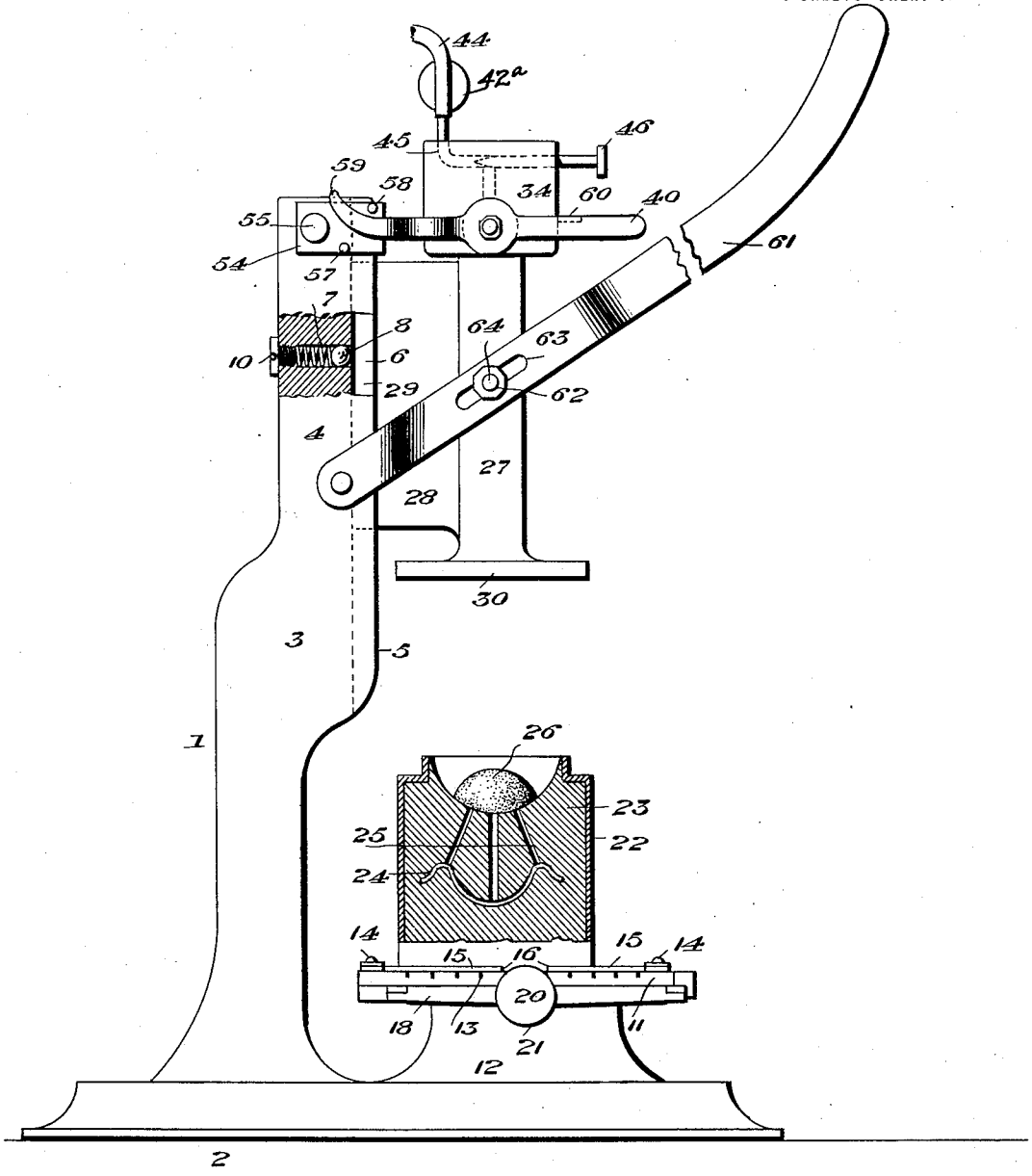


Fig. 1.

Witness

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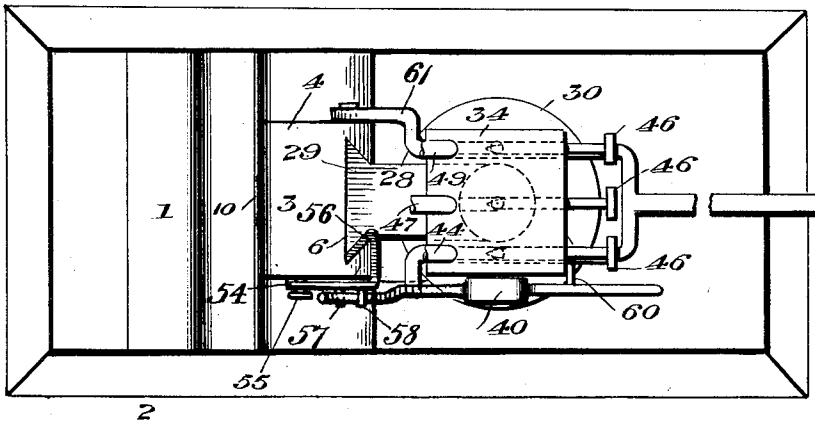
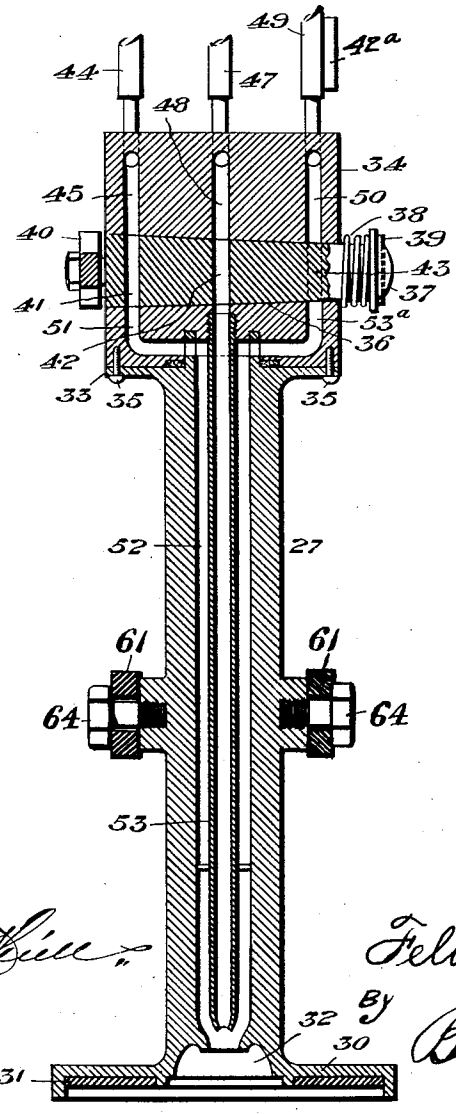


Fig. 2.

Fig. 3.



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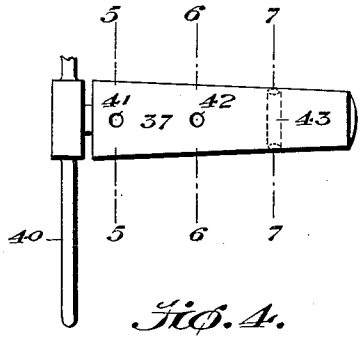


Fig. 4.

Fig. 6.

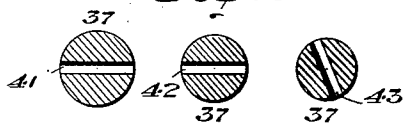


Fig. 5. Fig. 7.

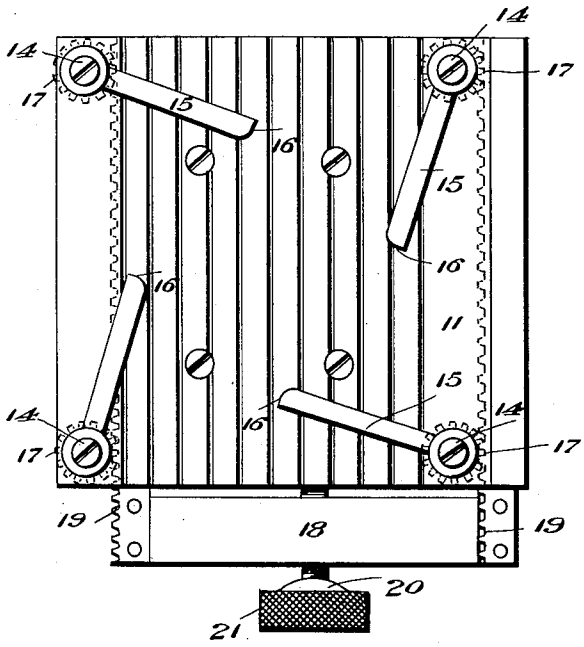


Fig. 8.

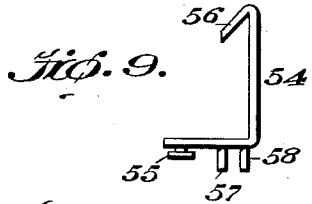


Fig. 9.

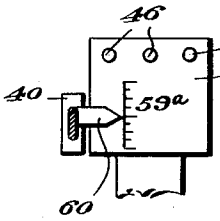


Fig. 10.

Witness

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UNITED STATES PATENT OFFICE.

FELIX C. MONTUORI, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-HALF TO CLYDE M. GEARHART, OF WASHINGTON, DISTRICT OF COLUMBIA.

DENTAL CASTING-MACHINE.

1,352,080. Specification of Letters Patent. Patented Sept. 7, 1920.

Application filed June 24, 1920. Serial No. 391,275.

To all whom it may concern:

Be it known that I, FELIX C. MONTUORI, residing at Washington, in the District of Columbia, a citizen of the United States, have invented certain new and useful Improvements in Dental Casting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in dental casting machines and more especially for use in the casting or form of inlays, plates, crowns, bridgework etc., for the dental profession.

The object of the invention is to provide a casting machine which will cast or form an inlay for a tooth which will be free from all indentations, irregularities or other imperfections commonly caused by air bubbles forming between the mold formed in the investment and the molten gold or other material used for the inlay.

A further object is to provide a casting machine in which a continuous, uninterrupted pressure of compressed air is maintained or exerted on the molten gold or other material forming the inlay to such a degree that all the interstices which may be in the mold will be intimately filled with the inlay material, the casting solidified and set, and a perfect casting thereby produced.

A further object is to provide a casting machine which will on the operation of the machine automatically control the feeding and cutting off of gas and compressed air used to operate the blow pipe, and also the feeding of compressed air from the gage.

A further object is to provide a casting machine with means for solidly supporting or mounting the crucible and means for allowing any excess or surplus compressed air which may pass through the pores of the investment material in the crucible to escape into the outer air and yet at the same time preventing the inlay material from escaping.

A further object is to provide a casting machine in which the blow-pipe is contained or mounted within the plunger and the air and gas fed through the plunger.

A further object is to provide a casting machine which is simple, inexpensive, compact and durable in construction, exceedingly easy to operate and which is attractive in appearance and design.

A further object is to provide a casting machine in which the plunger is capable of being freely moved and automatically held at any desired point or elevation.

A still further object is to provide a casting machine with means for controlling the movement of the plunger in order to accommodate crucibles of varying size.

A final object is to provide a casting machine with means for centering the crucible on its support, in order that it may be kept in alinement with the plunger.

The invention consists in the several features and in the construction and combination of such features as more fully hereinafter described and claimed.

Referring to the drawings:—

Figure 1 is a side elevation of my invention, partly in section.

Fig. 2 is a top plan view.

Fig. 3 is a central vertical section through the plunger, on an enlarged scale.

Fig. 4 is a top plan view of the valve.

Fig. 5 is a cross-section of the valve taken on the line 5—5 of Fig. 5.

Fig. 6 is a cross-section of the valve taken on the line 6—6 of Fig. 5.

Fig. 7 is a cross-section of the valve taken on the line 7—7 of Fig. 5.

Fig. 8 is a top plan view, partly in section, of the crucible support and its operative mechanism.

Fig. 9 is an edge view of the adjustable bracket.

Fig. 10 is a face view of the valve casing.

In the drawings in which similar reference characters denote similar parts throughout the several views, 1 represents the supporting frame of the machine which comprises a base 2, a vertical portion or standard 3 provided on the upper portion 4 of its front face 5 with a dovetail groove 6, a laterally extending hole 7 extending through the portion 4 of the standard, from the dovetail groove to the rear face of the standard, and a friction ball 8 with a spiral spring behind it is mounted in the hole 7 and is held therein by means of a screw plug 10 by the adjustment of which the degree of tension of the spring on the ball is regulated.

The crucible support for the machine comprises a plate 11 mounted on an upwardly

extending projection 12 rising from the base 2, the upper face of the plate being provided with a plurality of grooves 13 extending across the same, preferably one sixteenth of an inch in width and depth, which serve to provide means for the outlet or escape of any excess air from the bottom of the crucible which may be forced through the pores of the investment material in the operation of casting.

The great difficulty experienced with casting machines heretofore used in which holes, extending entirely through the crucible support, are used to provide means for the escape of excess air is that the air as it travels through the investment material carries a portion of the gold or other inlay material with it and thereby causes the object being cast to be deformed or cast out of the shape desired and renders the casting useless which not only wastes valuable time but material as well.

A plurality of short shafts 14, preferably four, are mounted on and pass through the plate 11, one at each corner thereof, the upper end of each shaft being provided with a centering arm 15 having beveled outer ends 16 and the lower end of each of the shafts 11 is provided with a cog 17.

The cogs 17 and centering arms 15 are operated by means of a laterally movable or slidable frame 18 having rack bars 19 secured to its under surface which engage the cogs 17, and the frame 18 is moved or slid back and forth by means of a screw 20 having a milled head 21 which is adapted to be grasped and turned by means of the thumb and finger.

When the slidable frame is operated it will cause motion to be communicated through the cogs 17 and short shafts 14 to the arms 15 and cause them all to move simultaneously over the surface of the plate 11 and center varying sizes of crucible which may be placed thereon.

The crucible 22 is provided with investment material 23 and a mold 24, previously formed in any well known manner, having a plurality of sprues 25 and a metal gold or other inlay 26.

A vertically slidable hollow plunger 27 is provided having a rearwardly projecting bracket 28 with a dovetail tongue 29 of a size and shape to fit and slide freely in the dovetail groove 6 of the standard and the friction ball 8 is adapted to frictionally engage the rear of the tongue and thereby hold the plunger at different points to which it may be adjusted.

The lower end of the plunger 27 is provided with an integral hollow disk 30 having a pad 31 therein, preferably made of asbestos to withstand the heat and flame from the blow-pipe and a chamber 32 in which the air and gas mix and the gas is ignited and burns.

The upper end of the plunger is provided with an annular flange 33 on which is mounted a valve casing 34 which is secured to the flange by means of screws 35. The valve casing 34 is provided with a tapering horizontally extended valve chamber 36 in which a rotatable tapering cylindrical valve 37 is mounted which is provided at one end with a spring 38 and pin 39 for the purpose of taking up any wear that may take place and provide a tight joint. The opposite end of the valve is provided with an arm or lever 40 the purpose of which is to rotate the valve to the desired points and feed or cut off the feed of air and gas.

The valve is provided with three channels or ducts 41, 42 and 43 therethrough, the channels 41 and 42 extending parallel to each other while the channel 43 extends at an angle to the other channels. The channel 41 receives the gas, the channel 42 the compressed air and the channel 43 the compressed air which has passed through the air gage 42^a. The gas is introduced into and through the valve 37 from any suitable source by means of a flexible pipe 44 and pipe or channel 45 and the quantity admitted is regulated or governed by means of a needle valve 46, and the compressed air is introduced into and through the channel 42 of the valve 37 from any suitable source, by means of a flexible pipe 47 and pipe or channel 48 while the compressed air is fed to the gage from any suitable source by means of a flexible pipe 49 and from thence through the pipe or channel 50 to the channel 43. The gas passes downward from the channel 41 of the valve through a duct 51 to the interior hollow portion 52 of the plunger to the mixing chamber 32, the compressed air passes downward from the channel 42 of the valve through a small blow pipe 53, disposed centrally of the hollow portion 52 of the plunger and screwed into the valve casing at its upper end, to the mixing chamber 32. The air from the gage passes from the channel 43 of the valve downward through channel 53^a into the hollow portion 52 of the plunger. In order to vary the length of stroke of the plunger 27 a vertically adjustable bracket 54 is provided adapted to be adjusted on the standard and fixed at the desired point by means of a set screw 55.

The bracket comprises a lug 56 which fits the dovetail groove 6 of the standard and 57 and 58 are pins projecting laterally from the bracket.

The arm or lever 40 is provided with an upwardly curved end 59 which when in engagement with the pin 58 as shown, causes the valve to be in its neutral or cut off posi-

tion, but on the movement of the plunger upward, the curved end still being in engagement with the pin 58 causes the valve to turn sufficiently to open the channels 41 and 42 of the valve and allows the feeding of the gas and air to the plunger and when the plunger is moved downward the curved end of the arm 40 engages the pin 58 which causes the valve to turn sufficiently to open the channel 43 of the valve and allows the air from the gage to feed to the plunger and simultaneously cuts off the feed of air and gas through the channels 41 and 42 of the valve.

The face of the valve casing is provided with a scale 59[a] and 60 is a pointer mounted on the arm 40 which is adapted to travel over said scale and indicate the position of the valve. A hand operated bifurcated lever 61 is pivoted on the standard at 62 and is provided with an elongated slot 63 in which a screw bolt 64 projecting from the plunger is adapted to slide.

Although I have described the invention particularly for use by dentists, it may be used equally as well by jewelers and others if desired.

The operation is as follows: Turn on the gas and compressed air and feed to blow pipe and plunger, ignite the gas in the mixing chamber when the flame will melt the gold inlay and after it has been reduced to a molten state, operate or move the plunger downward until it makes an air tight joint with the crucible which movement will cut off automatically the feed of air and gas and cause the air from the gage to feed which will keep the inlay under pressure until all parts of the same are in intimate contact with all portions of the mold, and then after the inlay has set and cooled move the plunger upward and remove the completed inlay.

I do not wish to be understood as limiting myself to the specific details of construction and arrangement as herein described and illustrated, as it is manifest that variations and modifications may be made in the features of construction and arrangement, in the adaptation of the device to various conditions of use, without departing from the spirit and scope of my invention and improvements. I therefore reserve the right to all such variations and modifications as properly fall within the scope of my invention and the terms of the following claims.

What I claim is:

1. In a dental casting machine, a hollow plunger having a blow pipe therein, means for supplying gas and air to said blow pipe and plunger and a valve casing mounted on the top of the plunger having a single valve for supplying and cutting off the feed of both gas and air to said plunger.

2. In a dental casting machine a hollow plunger having a blow pipe therein, a valve casing mounted on said plunger provided with channels or ducts, communicating with the blow pipe and plunger, a valve rotatably mounted in said casing and provided with channels or ducts adapted to register with the channels or ducts of the casing, and means for operating said valve.

3. In a dental casting machine, a standard, a blow pipe, a hollow plunger, means for supplying gas and air to said blow pipe and plunger, a valve casing mounted on said plunger, a valve within the said casing, an arm connected to said valve and means on said standard for engaging said arm and rotating said valve and means for operating said plunger.

4. In a dental casting machine, a standard, a hollow plunger slidable on said standard, a blow pipe within said plunger, a valve at the top of said plunger provided with channels or ducts, means for supplying gas and air to said valve and from thence to the said blow pipe and plunger, an arm mounted on the end of said valve adjustable means on the said standard adapted to be engaged by said arm and rotate said valve, and means for operating said plunger.

5. In a dental casting machine, a support for a crucible provided with a plurality of grooves open to the air and designed for the escape of air from the crucible.

6. In a dental casting machine, a support for a crucible provided with a plurality of grooves open to the air and designed for the escape of air from the crucible and means for centering the crucible thereon.

7. In a dental casting machine, a supporting plate for a crucible provided with a plurality of grooves designed for the escape of air from the crucible, a plurality of fingers slidable on the supporting plate adapted to center the crucible thereon, a slidable frame and means operatively connecting said fingers and slidable frame.

8. In a dental casting machine, a standard provided with a groove, a hollow plunger provided with means for engaging and sliding in said groove, a blow pipe in said plunger, a valve at the top of said plunger provided with an arm, a bracket on said standard provided with pins adapted to be engaged by said arm and rotate the valve, means for supplying gas and air to said valve, plunger and blow pipe and means for operating said plunger.

9. In a dental casting machine, a standard having a groove, a plunger having a projection slidable in said groove, a valve on said plunger having an arm movable therewith, an adjustable bracket mounted in the groove of the standard and provided with projections, said projections adapted

to be engaged by the arm of the valve for the purpose of rotating said valve and means for operating said plunger.

10. In a dental casting machine, a standard provided with a groove, a plunger provided with a projection to engage and slide in said groove, means for operating said plunger, a spring controlled ball mounted in said standard and bearing against the projection on the plunger for the purpose of frictionally holding the plunger at different adjusted positions.

11. In a dental casting machine, a crucible support provided with a plurality of grooves, a plurality of shafts, a centering finger on one end of each of said shafts, a cog on the opposite end of each of said shafts, a slidable frame provided with cogged racks engaging said cogs and means for adjusting said frame.

12. In a dental casting machine, a crucible support provided with a plurality of grooves in its face, a plurality of centering fingers, a slidable frame, means operatively connecting said centering fingers and slidable frame, a plunger having a blow pipe and means for operating said plunger.

In testimony whereof I have affixed my signature.

FELIX C. MONTUORI.