

UNITED STATES PATENT OFFICE.

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DENTAL CASTING APPLIANCE.

948,711.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ELZA R. STEALY, a citizen of the United States, residing at Dunlap, in the county of Harrison and State of Iowa, have invented certain new and useful Improvements in Dental Casting Appliances, of which the following is a specification.

The object of my invention is to provide an appliance wherein a form or pattern may be accurately reproduced in gold or other metal, and is more particularly adapted for use in casting inlays, backings and crowns, etc., or any artificial dentures of metal commonly used in dentistry.

The invention further consists in the novel construction and arrangement of the several parts essentially comprising means for creating a vacuum, or introducing air under pressure within a reservoir adapted to be connected with an investment cup constituting a suction or air chamber for the reception of molds to be reproduced in metal.

In casting certain metals into artificial dentures I find it expedient to employ a vacuum while in others compressed air would probably be more advantageously used. With this object in view and to make the method optional, I have provided a reservoir common to both and by means of such an arrangement the appliance, with certain modifications may be used in various arts wherein the casting of metal is a feature.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of the appliance partly in section. Fig. 2 is a side elevation of a modified form of appliance partly in section. Fig. 3 is an enlarged detail view of the investment cup. Fig. 4 is an enlarged detail view of a cup preferably used for investing and in some instances used for casting by compressed air. Fig. 5 is a longitudinal section showing the investment ring in position within the investment cup when casting with a vacuum; Fig. 6 is a longitudinal section showing the use of the investment ring when casting with compressed air.

Corresponding and like parts are referred

to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawings, the numeral 1 designates a vacuum or compressed air reservoir of any desired construction or formation preferably supported upon legs 2 secured to a base 3 in any suitable manner, and provided with a gage 4 adapted to furnish readings of the pressure consequent upon the creation of a vacuum in said reservoir or upon the introduction of compressed air.

The numeral 5 designates a tube connected with the reservoir and provided with a threaded opening 6 at its opposite end arranged to receive and form an air tight joint for a pump 7 having a check valve on its lower end, located within the tube, and 8 designates a globe valve of ordinary construction by means of which the tube is closed when the pump is not in operation. The said pump 7 is illustrated as adapted to operate by hand and detachably secured within the end of the tube 5 to provide a simple means of substituting a suction for a force pump or vice versa, and as will be obvious any suitable means may be employed whereby a vacuum may be created within the reservoir or air introduced into said reservoir when desired.

A tube 9 connects with the reservoir and opens therein and is provided with a transversely enlarged bore, as shown at 10, which is preferably ground to form an air tight joint with the slightly tapering stem 11 of an investment cup 12, and 13 designates a globe valve in said tube designed to regulate the outward influence of the pressure upon the contents of the cup 12 when casting by vacuum or compressed air.

The flasks or investment cups 12 are of various sizes and of any desired formation, preferably oval, provided with a tumbler shaped body portion 12' the sides of which are ground or otherwise provided with a surface adapted to form an air tight joint when in contact with a similarly formed inner surface of a cup 14 of the same general construction as the cup 12, and designed to fit over and form a cover or cap for the said cup 12 when casting by compressed air. The stem 11 of the cup 12 is hollow as shown at 15 and when placed in position within the end of the tube 9 forms a continuation of

said tube for the purpose of exerting the force of the pressure upon the contents of the cup when casting by vacuum.

The numeral 16 designates a block provided with openings 17 designed to receive the stem 11 of the cup 12 when the investment 18 is being formed and also when casting with compressed air, the said openings communicating with a longitudinal opening or recess 19 arranged for the escape of air from the stem of the cups.

20 designates a tube preferably composed of flexible material such as rubber, one end of which is attached to the tubular stem 21 of the cup 14 and the opposite end attached to the tube 9. At the option of the operator the inlays etc., may be invested in a ring 22 (see Fig. 4) provided with openings 23 near the bottom for the escape of air, and the cup 14 is placed over the end of said ring when casting with compressed air, as shown in Fig. 6. If it is desired to cast by vacuum the ring 22 is placed within the cup 12 as shown in Fig. 5, the operation in both instances being the same as if the investments had been formed in said cup. The internal formation of the investing cup is preferably round or oval with a flat bottom or base, the interior side surface being ground to form an air tight joint with the ground exterior surface of the ring 22 when said ring is placed within the cup.

For casting dentures from low fusing metals a cup 24 of the same general formation as the cup 12 is preferably used, (Fig. 3) and said cup 12 is placed within the larger cup containing the investment material. The wax or metal sprue 25 is attached to the form 26 and extends within the opening in the stem of the cup 12.

In the practical operation of the appliance when casting metals by vacuum, the investment composed of silax and plaster of paris mixed in water is placed within the cup 12 and while soft the wax inlay or pattern 26 attached to a wax or metal sprue 25 is forced into the investment material to form a mold. The investment is then allowed to dry and harden and the metal sprue is removed or the wax sprue (if wax is used instead of metal) and inlay melted out to form an opening and cavity for the introduction of molten metal. Before the sprue and wax inlay have been removed a slight depression in the investment is made around said sprue for the purpose of holding the molten metal, when ready to proceed with the casting operation. The stem of the cup 12 is placed in the tube 9 and the pressure consequent upon the vacuum within the reservoir created by the suction pump 7, is exerted simultaneously with the introduction of the molten metal within the opening left by the wax wire, and regulated by the valve 13. The investment being porous, the metal

is drawn into the cavity left by the wax inlay through the sprue opening and an accurate reproduction in metal is obtained.

When casting dentures from low fusing metals the cup 12 is placed in the investment material in the cup 24, (see Fig. 3) and the wax inlay and sprue removed in the usual manner. The investment in this instance is preferably composed of two layers of material differing in density, the lower or bottom layer in which the mold is formed being more porous and thereby offering less resistance to the influence of the pressure within the reservoir. The cup 12 is permitted to remain within the cup 24 and is used as a crucible for the metal, the character of pressure being optional, and the cup 12 preferably omitted when casting with compressed air.

The formation of the investment and the preliminary steps taken to secure the mold or pattern when casting with compressed air are the same as before described. The suction pump 7 is replaced by a force pump and the reservoir filled with compressed air. The flexible tube 20 is connected to the tube 9 and the cup 14 is placed over the cup 12 when placed in the support block 16. The air pressure is regulated by the valve 13 and molten metal introduced into the opening left by the wax or metal sprue is driven into the cavity or mold with sufficient force to reproduce the inlay or pattern in metal, the air penetrating the porous investment material and escaping through the stem into the opening in the block 16 (see Fig. 2) or through the opening 23 when the investing ring 22 is used.

The pressure in the reservoir when using compressed air or vacuum is ascertained by the gage 4 and the operator is thereby enabled to accurately regulate the outward influence of pressure exerted upon the investment or mold within the cup.

Having thus described the invention, what is claimed as new is:

1. An apparatus for use in casting metal dentures, including a chamber, a tube entering the same, means for exhausting air or compressing air into said chamber, a pressure gage connected to the chamber, a pipe extending from said chamber having therein a regulating valve, the exterior and interior faces of the end of said pipe being ground to form a joint, and an investment cup having a connection to said chamber through said joint.

2. An apparatus for use in casting metal dentures, including a chamber, an inlet tube entering the chamber, an air pump fitting within said tube, a pressure gage connected to the chamber, a pipe extending from said chamber having therein a controlling valve, the exterior and interior faces of the end of said pipe being ground to form a joint, and an investment cup having a connection to

said chamber through said joint, said investment cup comprising a bowl-shaped body having a ground exterior face and a tubular tapering stem having a ground face.

5 3. An investment cup for casting metal dentures, consisting of a bowl-shaped body having a tapering stem, said body being ground upon its periphery, and the stem being ground upon its face.

10 4. An investment cup for casting metal dentures comprising a bowl shaped body having the circumference thereof ground, and a tubular tapering stem whose exterior face is ground, in combination with an air
15 chamber wherein the pressure of the contained air may be varied, a tube extending from said chamber, and a flexible pipe having expanded ends internally ground, the external face of the end of the first named
20 tube being ground to fit the expanded end of said flexible pipe, and the interior face of the end of the tube being ground to fit the ground face of the stem on said investment cup.

25 5. The combination with an investment cup comprising a bowl-shaped body having an exterior ground face at its upper end and a tapering tubular stem also having a ground face, of an investment ring comprising a
30 hollow metallic cylinder fitting within the bowl-shaped body of the investment cup but removable therefrom, said cylinder having openings for the escape of air at one end, and the exterior face of the other end of the
35 cylinder being ground to form a ground joint with said bowl-shaped body.

6. In an apparatus for use in casting metal dentures, a cylindrical chamber, an inlet

tube leading into the same and connected with an air pump for exhausting or compressing air within the cylinder, a controlling valve for said inlet tube, an outlet pipe, a controlling valve therefor, the end of said outlet pipe being exteriorly and interiorly
40 ground, an investment cup having a bowl-shaped body and a tubular tapered stem, the exterior and interior faces of the bowl-shaped body being ground, and the exterior
45 face of the stem being ground, a cap adapted to fit over the bowl-shaped body and having an interior ground face, and a tube connected with the cap and having at one end
50 an enlargement adapted to fit over the end of the tube leading from the air chamber.

7. In an apparatus for use in casting
55 metal dentures, an outer investment cup comprising a bowl shaped body having a tapering stem, and an inner cup adapted to be contained within the outer cup and to form a crucible for the metal to be cast in
60 said outer cup, said inner cup having a bowl shaped body and a tubular tapering stem, in combination with a chamber, an inlet tube entering the chamber, an air pump connected to said tube and a pipe extending
65 from said chamber having therein a controlling valve, the extremity of such pipe being adapted to fit over the end of the investment cup.

In testimony whereof I affix my signature 70
in presence of two witnesses.

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Witnesses:

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