

O. J. SAYERS.
 MEANS FOR MAKING CASTINGS BY AIR PRESSURE.
 APPLICATION FILED JULY 16, 1907.

937,964.

Patented Oct. 26, 1909.
 2 SHEETS—SHEET 1.

Fig. 1.

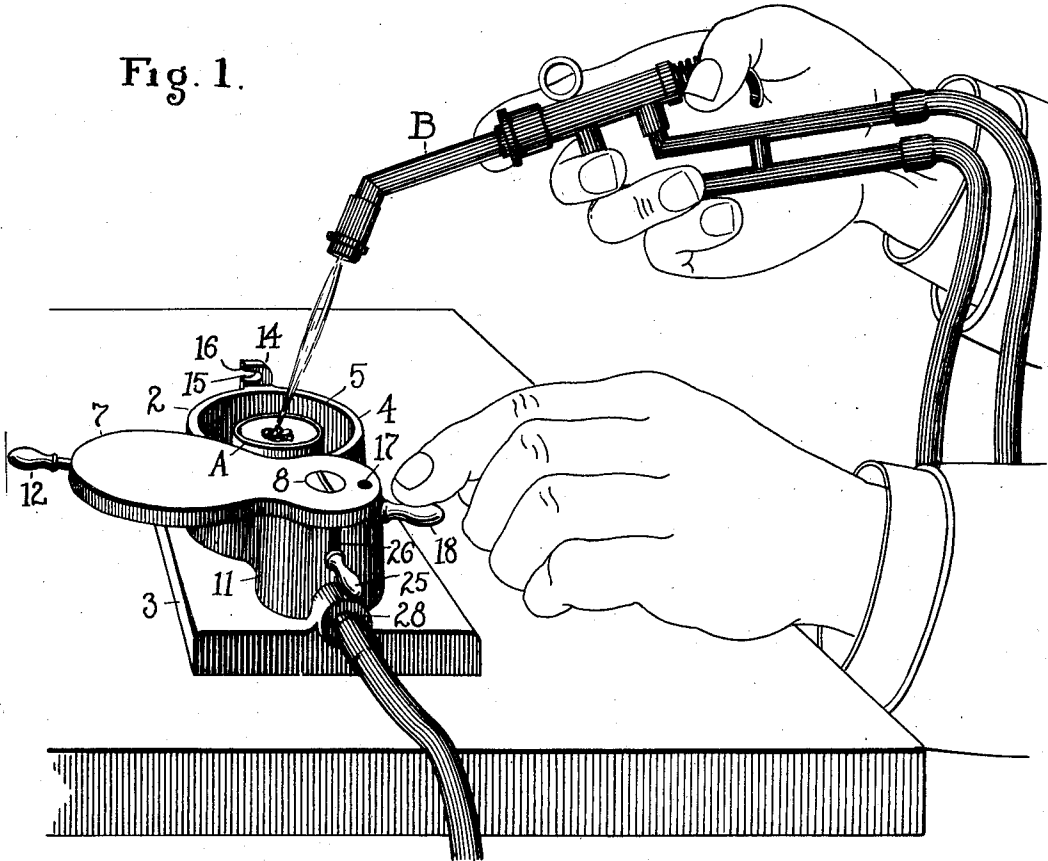


Fig. 2.

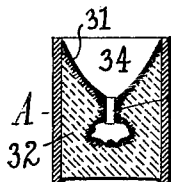


Fig. 4.

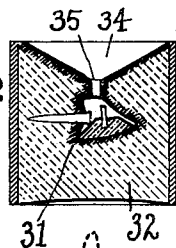


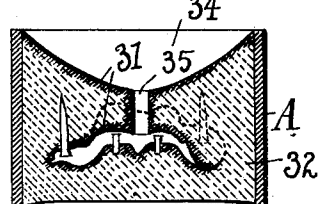
Fig. 3.



Fig. 5.



Fig. 6.



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Fig. 7.



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2 SHEETS—SHEET 2.

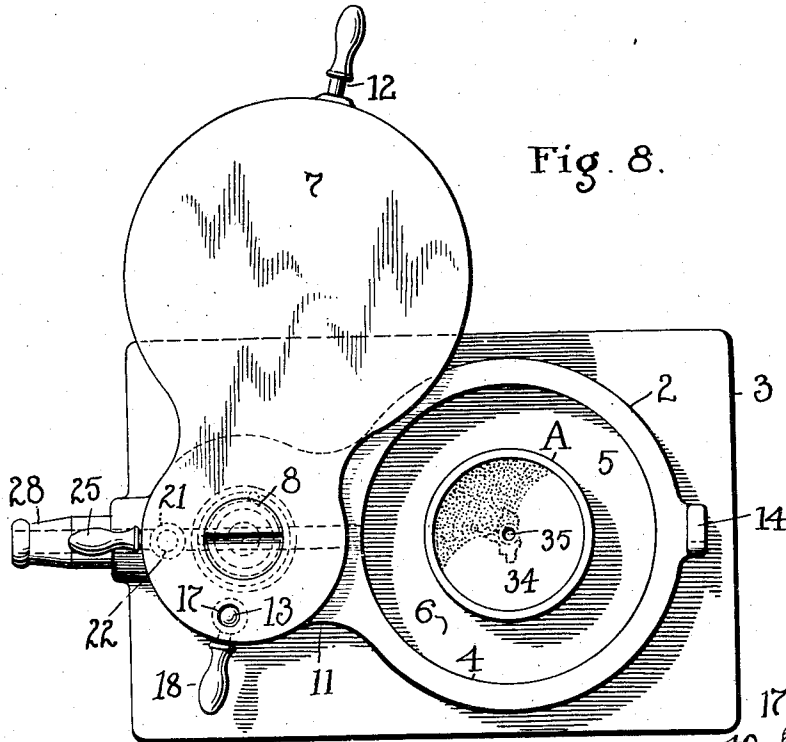


Fig. 8.

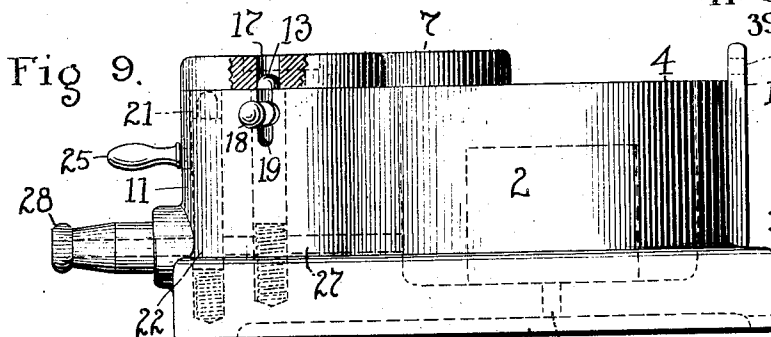


Fig. 9.

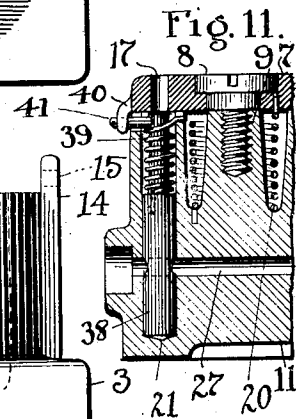


Fig. 11.

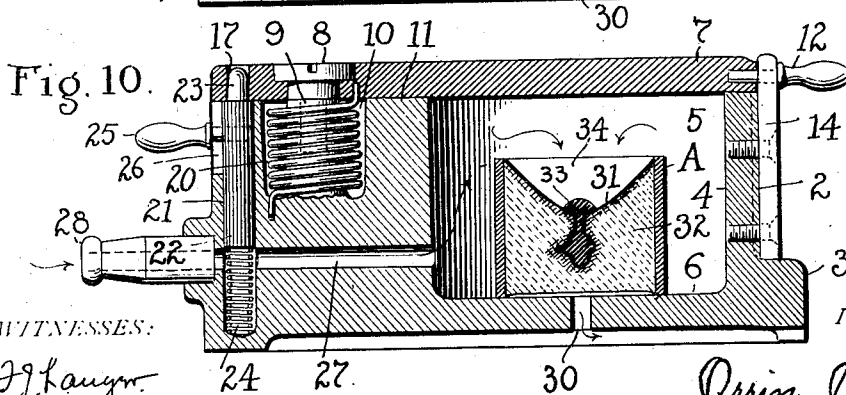


Fig. 10.

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MEANS FOR MAKING CASTINGS BY AIR-PRESSURE.

937,964.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed July 16, 1907. Serial No. 384,016.

To all whom it may concern:

Be it known that I, ORRIN J. SAYERS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Means for Making Castings by Air-Pressure, of which the following is a specification.

My invention relates to means for making castings by air pressure, and the invention comprises the means substantially as herein shown and described and more particularly pointed out in the claims.

As shown, my invention is especially adapted for making relatively small castings of gold, silver and like metals by air pressure and particularly for dental purposes, such for instance as fillings for teeth, or for crowns, floors, backings, plates or bridges for teeth. The invention is not necessarily limited to this class of work, but is preferably described therewith to more clearly define its chief object, and because such castings must be exceptionally perfect to be of practical use and value. Obviously, other objects enter into the make up of the device to simplify the casting operation and to make a substantially self-operative machine easy to control and handle, and all as hereinafter more specifically set forth.

In the accompanying drawings, Figure 1 is a perspective view of my invention with a blow-pipe in operation, and showing both under hand control. Fig. 2 is a sectional view of a flask with a mold therein for casting a tooth filling such for example as shown in Fig. 3, said Fig. 3 being a perspective view of the casting as it comes from the mold, gate and all, and showing its relative place in a molar (dotted lines). Fig. 4 is a sectional view of a larger flask prepared for casting a backing to a porcelain facing, and Fig. 5 is a perspective view of the tooth thus built up and ready to be attached to the root, except that the gate left by the casting operation has not been removed. Fig. 6 is a sectional view of a still larger flask having an investing or mold for a bridge casting. Fig. 7 is an edge elevation of a porcelain tooth having a floor and pin cast thereto, the root of the tooth being shown in dotted lines. Fig. 8 is a plan view of my device with its cover open and showing a flask

seated therein, and Fig. 9 is a side elevation thereof with the cover partly sectioned away to show the locking bolt which holds it open. Fig. 10 is a longitudinal section centrally of the device with the cover closed and air valve open, but showing the air valve, intake nipple, and various other parts in plain elevation to more clearly bring out their individual conformation and also their relation to the body of the device and cover. In this view, a sectional view of a flask and mold is also shown as seated above the vent opening in the bottom of the device and with a casting therein as it appears when completed. Fig. 11 is a sectional view of the rear portion of the device showing a modified form of valve and means to automatically open and close the same.

In detail, the invention consists of a flask confining receptacle —2— of any desired shape or form, but preferably constructed as shown with a flat rectangular base —3— and walled body —4— of circular outline containing a relatively large chamber —5— open at its top and having a smoothly finished flat bottom —6— upon which various sized ring-shaped flasks —A— may be removably seated. A horizontally swinging cover or cap —7— is pivotally secured to the top and at one side of body —4— by screw —8— mounted within stud —9— centrally within circular recess —10— of the smaller circular portion —11— of the body. The contacting surfaces of the cover and the body are smoothly finished to make an air tight fit, and moreover, said cover is provided with a pin or handle —12— at its front edge which is adapted to enter open slot —15— in the upper end of stop plate —14— secured to the front of body —4— and to engage its upper beveled edge —16— to press pin or handle —12— down and thereby force cover —7— to its seat, and serving also to hold the cover seated as against air pressure from below. The foregoing clamping means is simple and effective for a small device such as shown, but in a larger device suitable adjustable means for taking up wear may be employed therewith, as is obvious.

Cover —7— is opened by means of handle —12— and when fully open as seen in Figs. —9— and —10—, a spring-pressed bolt —13— mounted on end within a vertical

bore in body portion —11— is free to enter round opening —17— in the smaller or pivot end of the cover and thereby lock the same in this position until released by the finger 5 of the operator. To this latter end, a short stem or handle —18— projects laterally from bolt —13— through side slot —19— in body portion —11—, and when thus released cover —7— will close automatically under 10 tension of coiled spring —20— located within recess —10— and which spring has right angled ends engaged with the cover and the body, respectively. The closure of the cover is practically instantaneous and should be 15 quick and responsive and without undue effort on the part of the operator because his attention and time is mainly occupied at this period in directing the flame from blow-pipe —B, see Fig. 1, upon the metal 20 to be melted, and in watching the metal come to a boiling or molten condition. As soon as this occurs prompt measures must be taken to force the metal while molten into the mold, and this result is brought 25 about by the release of the cover and its automatic closure by spring —20—. Thus, as cover —7— swings over chamber —5—, bolt opening —17— comes to rest directly over a second vertical bore —21— in the 30 rear end of body portion —11— and wherein a sliding valve —22— of bolt shape is seated. This valve has an elongated and reduced upper end —23— adapted to bear against the bottom face of cover —7— during its 35 movement and whereby the valve is held in closed position and prevented from springing up under the pressure of coiled spring —24— in the bottom of bore —21— until opening —17— is reached. Lifting of the 40 valve by the spring opens air passage —27— leading from intake nipple —28— to chamber —5— and allows air under pressure to discharge into chamber —5— the moment cover —7— is closed and tightly locked. 45 The sudden inrush of air into closed chamber —5— will force the molten metal into the mold cavity, more or less, but in order that the same may occur completely and a perfect casting be obtained, I find that both 50 the device and the mold must be constructed with particular reference to a vent or relief for the mold cavity. To this end and for operative purposes, flask —A— is placed within chamber —5— directly over vent passage —30— centrally located within bottom 55 —6— and this passage may open into a supplementary air chamber in the device, or communicate with the outer atmosphere from and beneath base —3— as shown. Receiving chamber —5— is relatively large enough 60 to hold different sized flasks for different kinds of work, and for several reasons, I prefer to use individual flasks of different sizes and removably confine them within an 65 air compressing chamber or receptacle of

predetermined size. In part, these reasons are convenience in handling the flasks, economy in the use of investing material, adaptability in drying or baking of the mold, and in removing the wax impression or pattern 70 and also the casting from the mold.

Now referring to the construction of the mold in particular, the best castings are obtained by using at least two different kinds of investing material for the mold; namely, 75 a finely ground or comparatively dense material, and a coarse or comparatively porous material, the object being to provide a smooth outer coating —31— for the mold top and mold cavity, and a more or less porous back- 80 ing or open body —32— for coating —31—. A thin layer of relatively dense and fine investing material for coating —31— contributes to the making of a smooth and delicate finish for the casting and is sufficiently 85 porous as a thin body to allow the trapped air and gases in the mold cavity to escape during casting operations, and the coarser and more porous body —32— sustains the said finer wall or coating under pressure 90 and obviously gives greater freedom for the escape of said air and gases to and through vent passage —30—.

However, I disclaim any novelty as to the use of different mold materials for the 95 purposes set forth, as the same is very common in foundry practice, nor do I lay claim to any special form of mold or flask or method of making the mold, because various forms and kinds of molds and flasks may 100 be used with my invention. But for a better understanding of the operation of my device, I will briefly describe the making of a mold for single casts, and follow with the making of the casting. Thus, taking a wax 105 model of the object to be cast, the same is supported in the center of the box or flask, such as a round flask A, by means of a needle or wire, one sufficiently large enough to form an ingate —35—. The fine molding 110 material is then adhered carefully to all parts of the model and its support, and when dry, a coarser mold-material is thrown in until the box is filled. The needle or ingate 115 wire is then withdrawn and the mold is burned and the wax model dissolved and removed. The mouth —34— of the ingate in the mold is also formed into a funnel or cup shape by the use of a founder's spool, 120 such as is ordinarily used for this purpose.

Now having the flask and mold finished, the next step is to bring the same to the air compressing chamber of my device, the cover —7— of which has presumably been 125 opened. Here it may be noted that before cover —7— can be opened, the operator must first depress valve —22— by means of its handle —25— which projects through slot —26— in body portion —11—, and thereby close air passage —27— before re- 130

moving locking end —23— from opening —17— in the cover. This accomplished, the flask is seated upon bottom —6— and over vent passage —30— and the operator places his gold or silver or other metal within the cup of the flask and directs a small pointed flame thereon, such as obtained by gas and oxygen from a hand controlled blow-pipe B, as shown. During this operation, the operator should be prepared with his left hand to depress handle —18— of releasing bolt —13—. Then, at the critical moment when the metal becomes molten and before burning thereof occurs, instant release of the cover is brought about by a slight down pressure of his finger and the cover closes automatically and locks tightly and at the end of its movement permits valve —22— to open air passage —27— allowing air under pressure to fill chamber —5— and thereby force the molten metal into the mold cavity, the trapped air or gases in said cavity being forced through the porous body of the mold and the vent or relief passage —30—.

25 Either a rotary or puppet-valve may be used in place of slide valve —22—, and said valve or valves may be caused to close automatically by the opening movement of the cover. Such an arrangement is shown in Fig. 11, wherein a rotary valve —38— limited to a quarter-turn or less, is adapted to be closed by a coiled spring —39— when disengagement occurs between projection —40— or its equivalent on the cover and pin —41— or its equivalent on the valve. The primary opening movement of the cover cuts off the air before chamber —5— is opened, and again, when cover —7— closes, said closing movement at its end will open the valve against the tension of spring —39— and by the positive engagement between projection —40— and pin —41—.

What I claim is:—

1. In means for making castings by air pressure, an open receptacle adapted to hold a flask and having compressed air connections, and automatic means adapted to close said receptacle.

2. In means for making castings by air pressure, an air compressor device having a chamber adapted to confine a flask and self-closing means for said chamber.

3. In means for making castings by air pressure, a flask receptacle having compressed air connections, and means to close the said receptacle constructed to control the air supply in combination with a flask adapted to be seated and air-confined within said receptacle.

4. In means for making castings by air pressure, a flask receptacle having compressed air connections, and automatic means to close the receptacle and confine the flask therein and also to control the air supply thereto.

5. In means for making castings by air pressure, a flask receptacle having a vent opening for the flask and compressed air connections, and automatic means to close said receptacle to confine the flask.

6. In means for making castings by air pressure, a flask receptacle having a vent opening for the flask and compressed air connections, and automatic means to close said receptacle and also to control the air supply thereto.

7. In means for making castings by air pressure, a flask receptacle having compressed air connections and a movable member to close the same, and a valve for said air connections controlled by said member in combination with a flask adapted to be seated and air-confined within said receptacle.

8. In means for making castings by air pressure, a flask receptacle having an automatically operated member adapted to close the same, and a valved air intake controlled by said member.

9. In means for making castings by air pressure, a flask receptacle having a movable cover and means to hold said cover open, and said cover being constructed to close automatically when released from its open position.

10. In means for making castings by air pressure, a flask receptacle having a self closing cover and means to hold the same open, and a valved air intake for said receptacle operatively arranged to open when said cover is closed.

11. In means for making castings by air pressure, a flask receptacle having a pivoted cover and a spring to close the same and means to hold said cover open against the tension of said spring, and compressed air connections for said receptacle.

12. In means for making castings by air pressure, a flask receptacle having compressed air connections, a pivoted cover and a spring to close the same, a detaining lock for said cover, and an air intake valve engaged with said cover and adapted to open when the said cover is closed.

13. In means for making castings by air pressure, a flask receptacle having a spring controlled cover and a detaining lock therefor, an air intake for said receptacle and a valve operatively engaged with said cover, and a vent open to the flask when confined within said receptacle.

14. In means for making castings by air pressure, an open receptacle adapted to hold various sized flasks and having a vent opening in its bottom, a self closing cover for said receptacle, and an automatically operative air intake valve adapted to open when the cover is closed.

15. In means for making castings by air pressure, an open receptacle adapted to hold mold flasks, a self closing cover for said re-

ceptacle, clamping means to hold said cover tightly shut, and a valve air intake for said receptacle.

5 16. In means for making castings by air pressure, an open receptacle adapted to hold mold flasks, a self closing cover for said receptacle and means to lock the same in closed position against air pressure from within; a
10 17. In means for making castings by air pressure, a flask receptacle having an air chamber adapted to seat and confine a re-
15 movable flask and having compressed air connections, and means to automatically cut off the air supply thereto after casting operations.

20 18. In means for making castings by air pressure, a flask receptacle having an air chamber adapted to seat and confine a removable flask and having compressed air connections, and means to open and close
25 said air connections automatically.

19. In means for making castings by air pressure, a flask receptacle having an air

chamber adapted to seat and confine a removable flask and having a cover and valved air connections, and automatic means adapted to close the said valved connections upon opening the cover. 30

20. In means for making castings by air pressure, a flask receptacle having a cover and valved air connections, means to automatically close said cover and open said
35 valved air connections, and means to automatically close said valved air connections upon opening the cover.

21. In a pressure casting apparatus, the combination with the receiver for the flask
40 embodying separable sections and a pressure supply duct and valve controlled by the closing of the sections to admit pressure to the receiver, of a catch for holding the receiver closed against the internal pressure
45 tending to open the same.

In testimony whereof I sign this specification in the presence of two witnesses this 9th day of July, 1907.

ORRIN J. SAYERS.

Witnesses:

F. J. LAUGER,
B. E. MOSER.