H. SCHWEITZER.

PRESSURE TOOL FOR DENTAL CASTINGS.

APPLICATION FILED JAN. 17, 1912.

1,046,113.

Patented Dec. 3, 1912.

2 SHEETS—SHEET 1.

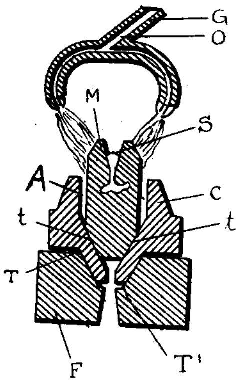

Fig. 1

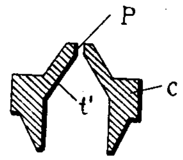

Fig. 2

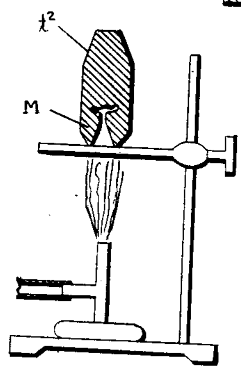

Fig. 3

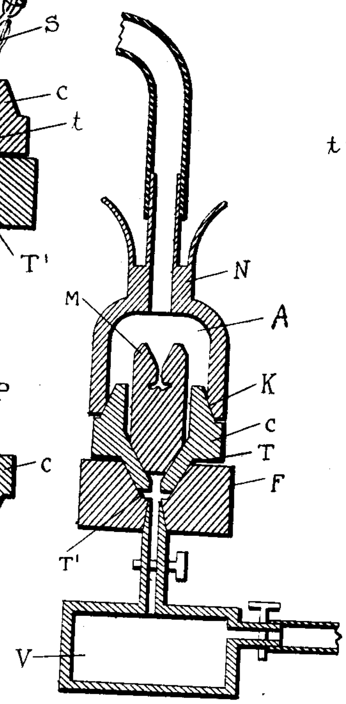

Fig. 4

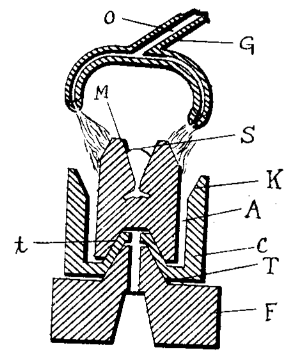

Fig. 5

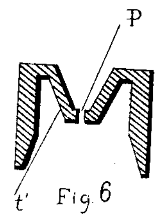

Fig. 6

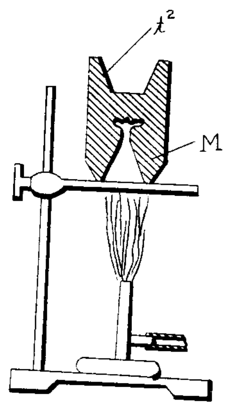

Fig. 7

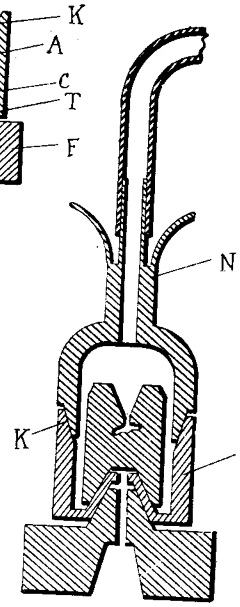

Fig. 8

WITNESSES

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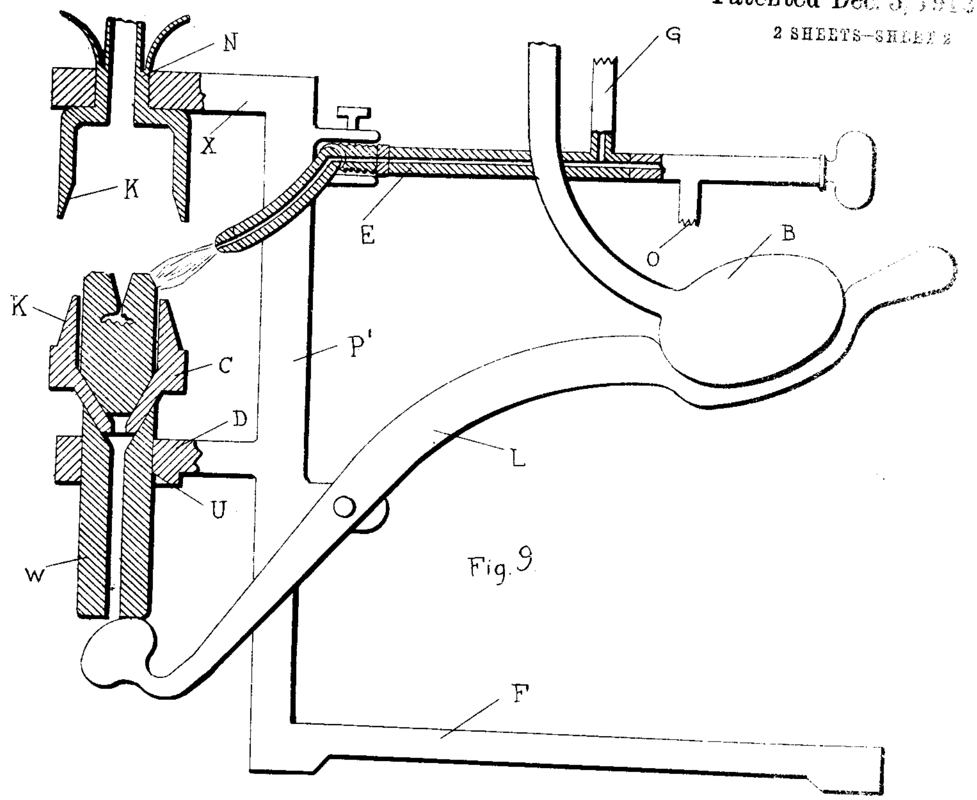

Fig. 9

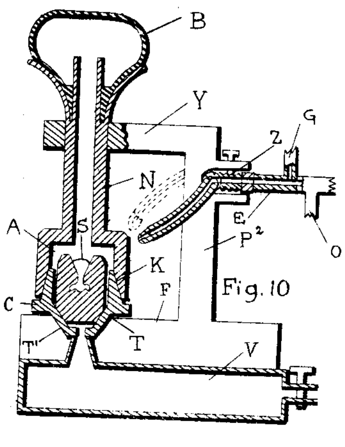

Fig. 10

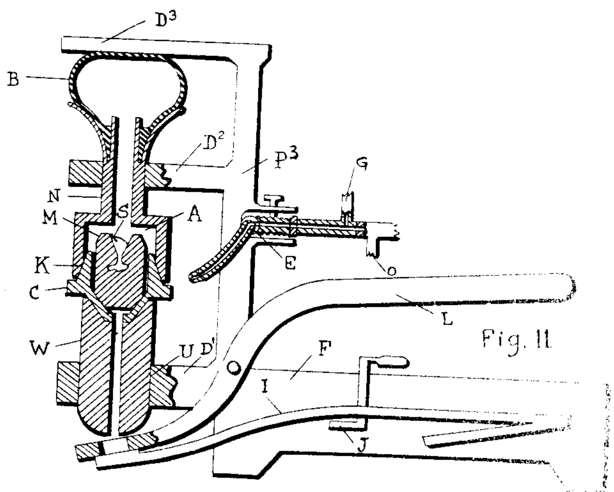

Fig. 11

WITNESSES

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PRESSURE-TOOL FOR DENTAL CASTINGS.

1,046,113. Specification of Letters Patent. Patented Dec. 3, 1912.

Application filed January 17, 1912. Serial No. 671,678.

To all whom it may concern:

Be it known that I, HEINRICH SCHWEITZER, a subject of the German Emperor, residing in the city, county, and State of New York, have invented new and useful Improvements in Pressure-Tools for Dental Castings, of which the following is a specification.

In machines used for dental castings up to the present the container holding the crucible for the metal to be melted or cast, was tightened against the top cover through which the pressure was transmitted by means of asbestos. Even the latest type of casting machines, such as the Taggart inlay apparatus, Patent 983580—Feb. 7, 1911, provides layers of asbestos for tightening the upper edge of the mold investment ring against the top cover. Asbestos fittings often become defective through use, so that a loss of pressure may occur at the moment of administration. A relatively high pressure was therefore necessary in order to be sure of forcing the molten metal into the mold. The crucible container placed into a flat receptacle or upon the mold flask was liable to cool down from the sides when the metal was heated in the crucible. Such a great loss of heat was often complained of, in the mold flask radiating from the open receptacle when the previously heated mold and crucible container was placed under the pressure plunger, that the cast metal crystallized before it could be forced through a small sprue opening in all parts of the mold.

Many methods of making dental castings were described heretofore and while the so-called inlay casting process usually provides to melt the metal over the mold and to force it at once through a small sprue opening into the mold cavity, I wish it to be understood that I do not consider any part of this method as my invention and also that the method of completing castings described hereafter in connection with my tools is independent from the processes that are protected by patents at the present time.

Contrary to other mehods I prefer to have metal introduced into the mold cavity without pressure as much as possible before the pressure is applied. The shape of the inlet funnels illustrated on the molds of my drawings explains that the molten metal will not be held above the mold cavity on account of surface extension or molecular attraction, but is rather compelled to flow into the cavity on account of its gravity.

My invention relates to the completion and perfection of castings by my tools and I point out as the main objects of my invention:—1. The insulation of the mold in a receptacle or flask in which the pressure is applied upon the cast metal. 2. The arrangement and position of the parts of the pressure flask on a support in combination with the mold.

Figure 1 of the accompanying drawing is a vertical section of the receptacle, mold and base. Fig. 2 is a sectional view of the receptacle turned upside down. Fig. 3 represents the mold upon a heating frame. Fig. 4 shows in section the pressure flask resting upon a base and the mold in the flask. Fig. 5 is a sectional view of the receptacle, mold and base. Fig. 6 shows the receptacle and Fig. 7 the mold turned upside down. Fig. 8 shows the mold in position in the pressure flask. Fig. 9 exhibits the mold in the pressure flask which is resting upon a movable support: the sections of the flask are shown opened. Fig. 10 indicates the pressure flask closed, the upper section of the flask being movable. Fig. 11 illustrates the flask with the two sections movable on brackets.

The pressure flask consists of an upper section, X, and a lower section, C, which are valve like ground and fitted to meet each other in the conical surfaces, K. The lower section is of cup shape and provided with a bottom from which a taper t^1 extends to the inside or outside of the cup as illustrated in Fig. 2 and Fig. 6. This taper is preferably made of conical shape. The exterior surface of this taper, T^1 is fitted onto the taper, T^1, of the base F. (Fig. 4). A conical shape of the taper is of great advantage in the quick and accurate adjustment of the cup on the antagonizing cone, T^1, of the base support, as the smaller end of the process cone will easily find the depth of the recess cone. The bottom of the cup, C, may have a perforation, P, as indicated in Fig. 2 and 6.

The mold preferably without metal surrounding is posted in the center of this insulating cup not touching the side walls of the pressure flask thus allowing for accumulation of heat and prevention of radiation. The investment of the mold having a funnel shaped inlet on top is centered in the pressure cup by a process or recess taper, t^2 (Figs. 3 and 7) fitting onto the taper, t^1, of the pressure cup. The mold, rather prepared from dental investment plaster compound only is a little higher than the cup; the mold itself is not sealed against a head part, cover or disk. An air cushion, A, is found between the walls of the mold and the inner wall of the cup, C; this air cushion insulates the mold, M, and heat applied from two sides is rather accumulated in the mold.

The upper section of the flask, the cylinder, N, does not touch the top part of the mold when the flask is closed. The cylinder, N, is centrally perforated and communicates on the lower end with the interior of the flask and on the other end with a source of air pressure generated either from a bulb or from the mouth or lungs of the operator.

Various means for supporting the flask sections and closing of the flask before the pressure is applied, may be used and although I do not limit myself to one or the other construction, I include the ones described in the following as part of my invention.

Fig. 4 of the drawing shows the simplest construction. A heavy metal base, F, receives the process, T, of the insulating cup, C, in the tapering recess, T^1, and tightens these meeting surfaces of cup, C, and base, F. The base, F, is mounted upon a vacuum chamber, V, and the freely removable cylinder, N, is provided with a rubber tube leading to a source of air pressure; for example the one generated from the mouth of a person by a heavy expiration.

Fig. 8 represents a similar device providing a receding conical surface extension in the lower end of the mold fitting upon a conical surface extension of the cup bottom that is projecting into the interior space of the cup, C.

The sections of the pressure flask may be positioned one movable toward the other as shown in the Figs. 9 and 10, or both may be movable toward each other as illustrated in Fig. 11. In either case provision is made to remove the lower flask section from the apparatus for the purpose of attaching the mold.

In the construction shown in Fig. 9, the lower section C, of the flask is movably positioned on top of a metal cylinder, W, that is moved up and down in a bore hole, U, of a bracket, D. The upper section, N, is stationarily attached to the bracket, X, and a double gas and oxygen blow pipe, E, is supported and adjusted to the vertical part, P^1, of the base F. The lever, L, raises the cylinder, W, tightens the cup, C, against the upper section of the flask, N, which is in communication with a bulb, B; hand pressure is exerted upon the rubber bulb, B, as soon as the lever, L, is lowered in its longer arm and therewith a seal of the flask sections is effected; by this action I generate pressure upon the molten metal whereby it is forced to completely fill the mold cavity. A movable position is given to the upper flask section, N, in the construction illustrated in Fig. 10. A vertical bore hole in the bracket, Y, allows for the raising and lowering of the upper section on top of which a rubber bulb is directly attached. The cup, C, is placed on the recess, T^1, which communicates with the vacuum chamber, V, by a small central perforation. A double end gas and oxygen blow pipe is adjusted in the slot, Z, of the vertical post, P^2. The metal, S, is heated while the upper flask section is held in an elevated position. As soon as the atmospheric pressure begins to act upon the molten metal, pushing it downward, I make the upper flask section come down by its own weight and immediately after the flask is closed I apply hand pressure on top of the rubber bulb, B.

Fig. 11 of the drawing explains a construction of a supporting base for the parts of the pressure flask, whereby the upper section, N, with a compressible air container, B, on top, and the lower section, C, are movably positioned on the brackets, D^1 and D^2. The cylinder W, carrying on top, the flask cup, C, can be forced upward by means of the lever, L, or spring, I, which is set and arrested by the lock bolt, J; the combined action of the lever and spring is of advantage as the lever controls the spring action as well as it may increase the same. The bracket, D^3, arrests the upward motion of the compressible air container, B, and renders resistance to the pressure applied from below.

The completion and perfection of a casting by means of my pressure tools in general is as follows:—After the metal, S, is poured by any ordinary means, into the mold filling out approximately the space of the same, it is heated from the outside of the mold by two converging flames of a double end gas and oxygen blow pipe. An oxygenic flame directed upon and in contact with the metal to be cast is of disadvantage as it oxidizes the metal readily. Side heating through the mold avoids the coming in contact of the oxygenic flame with the cast metal and prevents oxidation. The air cushion, A, is heated at the same time and the cylinder, N, is held over the flames collecting heat in its interior in order to be telescoped at the proper moment over the walls of the cup C, insulating the mold by a hot air cushion. The proper moment of closing the pressure flask has come as soon as the metal in the inlet funnel appears highly liquid. Pressure is now applied and as the valve of the conical surface X does not admit any escape of the hot air, it is hot air pressure that surrounds the liquid metal and the mold investment when the metal is pressed toward the interior of the mold. Such a perfection is obtained that the thinnest castings as base plates, clasps, etc., can be reproduced by using the insulating flask.

Having now fully described my invention I claim:

1. The combination of a detachable mold, for dental castings and the like, having an uncovered tapering surface extension on the lower end, a mold receptacle and a supporting base; said receptacle consisting of a metal cup having lateral walls and a bottom, the lateral walls freely surrounding and insulating the upper part of the mold, the bottom of the cup provided with a tapering surface extension on the inside for supporting and centering the mold in the lower end and a tapering surface extension on the outside; said base provided with a tapering surface extension fitting the outside of the bottom extension of the cup, therefore serving as a rest for said receptacle substantially as described and shown.

2. The combination of a detachable mold, for dental castings and the like, having an uncovered tapering surface extension on the lower end, a mold insulating pressure flask and a base; said flask embracing a removable, cup shaped lower section, and an upper section having the shape of a hood possessing on top a central perforation leading directly to a source of air pressure and fitting in its lower end against the upper end of the lower section of the flask; said lower section having a tapering surface extension on the inside of its bottom for centering and supporting the mold during pressure application, and a tapering surface extension on the outside of the bottom; said base having a tapering surface extension which fits to the outside surface extension of the lower section of the flask, therefore serving as a rest for said pressure flask substantially as described and shown.

HEINRICH SCHWEITZER.

Witnesses:

JOHN P. DAVIS,

PHILIP D. ROLLHAUS.