

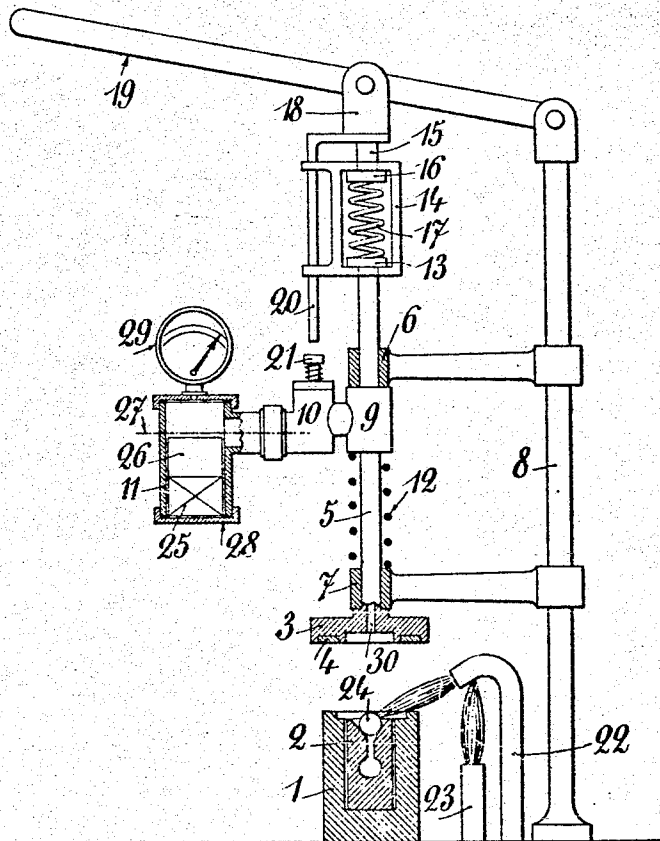
B. PLATSCHICK.
 APPARATUS FOR CASTING UNDER PRESSURE SMALL METAL PIECES.
 APPLICATION FILED NOV. 25, 1907.

970,949.

Patented Sept. 20, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
 C. H. Greubauer

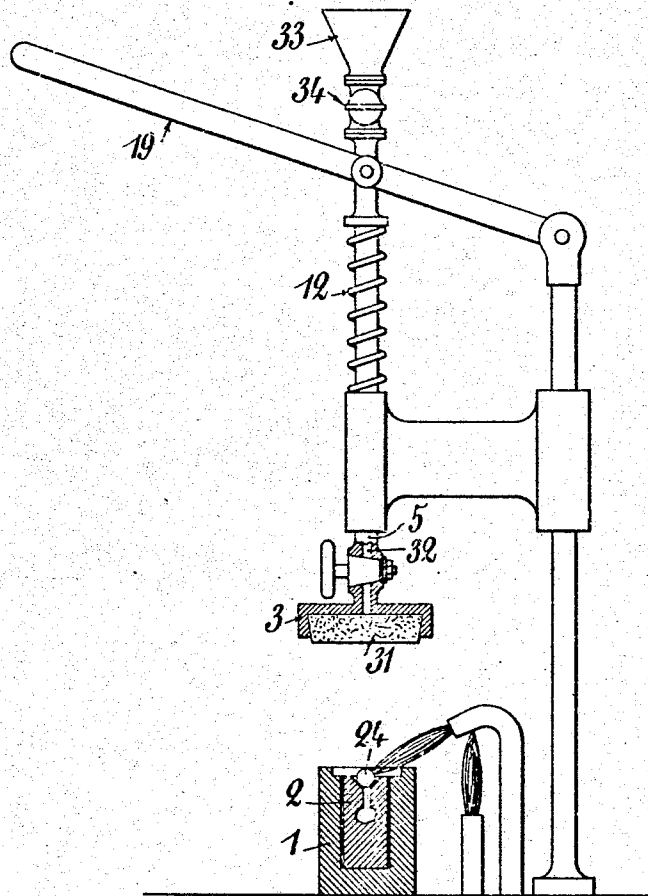
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 3 SHEETS-SHEET 2.

fig. 2.



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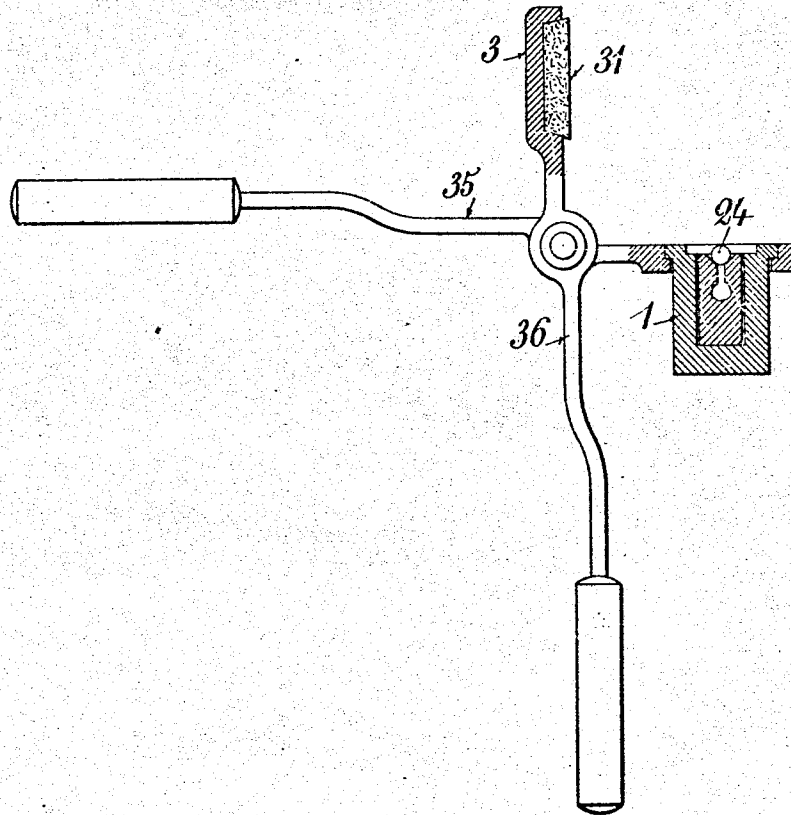
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3 SHEETS-SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

BENVENUTO PLATSCHICK, OF PARIS, FRANCE.

APPARATUS FOR CASTING UNDER PRESSURE SMALL METAL PIECES.

970,949.

Specification of Letters Patent. Patented Sept. 20, 1910.

Application filed November 25, 1907. Serial No. 403,761.

To all whom it may concern:

Be it known that I, BENVENUTO PLATSCHICK, an Italian subject, residing at Paris, 51^{bis} Rue Ste. Anne, in the Republic of France, manufacturer of surgical instruments, have invented certain new and useful Improvements in Apparatus for Casting Under Pressure Small Metal Pieces, of which the following is a specification.

In the manufacture of small cast metal pieces, such as is obtained by casting molten gold in a mold of refractory material, the penetration of the metal into the narrow or delicately hollowed out parts of the mold presents some difficulty on account of the physical properties of the gold or other molten metal. If suitable contrivances were not resorted to, the moldings obtained would be rough and of no use.

The contrivance the most often used in the dental art consists in providing the walls of the cavity of the mold with a sheet or leaf of platina; on account of the affinity of these metals, the molten gold takes exactly the shape of the platina lining and hence that of the mold.

In order to avoid the use of platina, endeavors have been made to apply the pressure of a gas to force the molten gold into the mold and cause the gold to take the shape of the mold in every detail. This method gives good results, but the apparatuses hitherto provided for carrying it out in the dental laboratories have drawbacks which prevent their use from becoming general. Some of them require the use of reservoirs of compressed oxygen, others the working of a pump before each operation, and others again can not operate without an electric current which produces a heating arc in a closed vessel, the latter being connected with a reservoir of compressed gas.

For the purpose of providing an apparatus more convenient than those just mentioned and which requires neither an electric current, nor compressed oxygen, nor a pump, nor pipes for gas under pressure, this invention consists in combining with the flask or investment cup containing the mold a small generator of gas or of vapors capable of giving off in a few moments, at each operation, the quantity of gas or of vapors required for forcing the molten metal into the mold. The construction of this generator may vary according as to whether the

gases or vapors under pressure are produced by a chemical reaction, by the explosion of an explosive material, by the expansion of a liquefied gas, by a vaporization of a liquid, or by other similar means. In any case, it will be comparatively small and arranged adjacent to the furnace, so that neither the generator, nor the conduit, if any which enables it to communicate with the furnace, will be cumbersome.

At the beginning of each operation, the generator will be enabled to produce the required pressure when the metal will be molten and sufficiently heated, the furnace will be hermetically closed as quickly as possible, and the generator will be put in communication with the furnace, in order that the pressure may act on the molten metal before the latter begins to stiffen. When gold is used, the rapidity with which this metal loses its heat again constitutes a difficulty in that it tends to thicken as soon as it is no longer heated, especially when the quantity is a small one, as in the present case; hitherto this difficulty has only been overcome by the use of heating hearths of very high temperatures, such as the electric arc or the oxyhydric blow-pipe; the use of such special hearths requires costly installations which cannot be afforded in all laboratories.

According to this invention, use may be made, as a heating hearth, of an ordinary gas blow-pipe suitably modified so as to give a sufficiently high temperature. For this purpose, the mixture of air and gas is caused to pass into a tube heated by a supplemental flame, so as to heat the gas and the air before reaching the inlet to the blow-pipe. The flame thus becomes much hotter; it quickly melts the gold and carries the same to a very high temperature, so that the metal does not run the risk of losing its fluidity during the comparatively short lapse of time required for closing the furnace and forcing the metal into the mold. The apparatus thus combined thus requires neither compressed oxygen, nor electricity for melting the gold and for casting the same under pressure, so that the said apparatus can be used in all laboratories; and it can be used in a simpler and easier manner than the similar apparatuses now in use.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of one

form of this improved apparatus; Fig. 2 is a similar view of another form; Fig. 3 is a similar view of still another form.

In Fig. 1, the numeral 1 designates a flask or investment cup comprising a hollow cylinder open at the top in which is placed a mold 2 of refractory material and the opening of which can be hermetically closed by a lid 3 provided with an asbestos pad 4. The said lid is secured to a vertically movable rod 5, guided in arms 6 and 7, which are secured to a rigid upright or post 8. On the rod 5 is fixed a socket 9 carrying a valve casing 10 which carries in its turn a gas generator 11.

A spring 12, interposed between the arm 7 and the socket 9, holds the rod and the lid normally raised. On the upper part of the rod 5, which terminates in a head 13, is a slidable frame 14, which is also enabled to slide on a rod 15 having a head 16, and which is arranged in the same axial line as the rod 5. A spring 17, interposed between the heads 13 and 16, tends to hold the rods 5 and 15 away from each other. The upper rod 15 is connected by a bifurcated part 18 with a lever 19 pivoted to the post 8; the bifurcated part 18 carries a finger 20, so arranged as to be able to bear on the rod 21 of the valve and to open the latter when the rod 15 is brought toward the rod 5.

On the support of the apparatus is secured a blow-pipe 22, the mixing tube of which is heated, at a certain distance from its outlet, by the flame of a Bunsen burner 23, so that the combustible mixture is carried to a high temperature already before bursting into a flame. The very highly heated flame of this blow-pipe is led to a piece of gold 24, located in the upper cavity of the mold 2.

At the beginning of the melting operation, the gas generator 11 is put under pressure. In the embodiment shown, the gas is produced by the decomposition of a mixture of tartaric acid and of a carbonate; the mixture of these materials is placed in a dry state in a small perforated box 25 and is dissolved at the proper time by the water contained in a cup 26. For that purpose, the generator 11 is mounted on the valve casing 10 in such a manner as to be enabled to swing around the horizontal spindle 27; to charge the generator, it is turned upside down, its lid 28 is taken off, its contents are emptied, and the cup 26 full of water is inserted in the generator, and then, above the cup, the box 25 full of the dry mixture of acid and of carbonate and, lastly, the lid 28 is put on again. At the proper time, all that need be done is to invert the generator 11 into the position shown in the drawing to cause the water to fall down onto the reagents and to produce carbonic acid. As the valve of the casing 10 then lies closed, the pressure rises

in the generator; it is indicated by a pressure gage 29.

When the gold becomes molten and is sufficiently heated, the lever 19 is quickly moved down. On being moved down, the lever 19 carries down with it the rod 5 and the members carried by the latter, for the spring 17 is stronger than the spring 12; the lid 3 is thus hermetically applied to the flask 1 before the spring 17 yields sufficiently to permit the rod 21 being moved down by the finger 20. On the further downward movement of the lever 19, the spring 17 yields and the finger 20 opens the valve, so that the generator is at once put in communication with the flask through the medium of a conduit 30 made in the rod 5. The pressure of the carbonic acid then acts on the drop of molten gold and forces the same into the mold 2, where it assumes exactly the shape of the walls of the latter. Immediately afterward the lever 19 is moved up and the mold is withdrawn from the flask.

It will be understood that the lever 19 has only to be moved quickly down to produce the closing of the flask and the opening of the valve almost simultaneously and in a very short time; therefore, the molten gold does not stiffen before being forced into the mold, and all the more so as the special blow-pipe hereinbefore described while being neither oxyhydric nor electric, carries the gold to a temperature very much above the melting point.

If desired, there may be easily combined with my apparatus a device which will permit of the gas being shut off at the same time that the lid 3 closes the furnace 1.

Instead of an upsetting generator, there may be used any other suitable gas generator, as, for instance, a receptacle inclosing what is called the "sparklet" ampulla charged with liquefied gas; the valve rod 21 will in this case, be replaced by a needle to puncture the said ampulla. The pressure may also be produced in the generator by the heating of a volatile liquid, or by any similar or equivalent means. The said generator may be combined, not with the movable lid of the furnace, but with a fixed part of the latter; such a modification does not prevent the valve or cock, or the puncturing needle, or the firing-pin of the explosive cartridge, or the like, from being controlled by the mechanism which operates the furnace lid in the same conditions as aforesaid or in any equivalent manner. The pressure generator may also be located within the lid; the heat radiated by the flask and the adjacent parts of the furnace may then be made use of to volatilize a suitable material placed in the generator, that is in the lid when the latter is being applied onto the flask. That will allow of the construction

of the apparatus being simplified. And indeed, the generator may now consist simply of a receptacle or of any suitable support enabled to maintain in the lid the liquid or solid material which is to be volatilized when the lid is applied onto the furnace. For instance, in Fig. 2, the lid 3 of the flask 1, carried by a rod 5 which can be moved by means of the lever 19, incloses a pad 31 of asbestos, or other absorbing material such as blotting paper, or the like, serving both to support by capilarity either water or another volatile liquid and to form a tight-joint between the lid and the mold. This rod is normally held in the raised position by a spring 12. When the mass of gold 24 placed on the mold 2 is molten and carried to the required temperature, the lid 3 is quickly moved down; the heat radiated by the mold, the gold, and the upper part of the furnace, produces instantaneously the vaporization of a small quantity of water and hence a steam pressure above the gold, so that the latter is immediately forced into the mold. All that need be done therefore is to wet the asbestos pad before each operation. For that purpose, use may be made of a rod 5, through which extends a conduit 32 and which is provided with a funnel 33 and also with a cock 34. The liquid to be vaporized being placed in the funnel 33, one has only to turn the cock for an instant to charge the asbestos with a suitable quantity of liquid. It will be understood that the asbestos may be moistened in any other way.

Fig. 3 shows a pair of tweezers, one branch 35 of which carries a flask 1, and the other branch 36 a lid 3, the said flask and the said lid being similar to those described with ref-

erence to Fig. 2. In this case, the tweezers are held in the hand to present the gold 24, placed in the mold to the flame of the blow-pipe, and the two branches are brought together when the gold is sufficiently heated so as to close the muffle; the asbestos 31 having been previously moistened, steam is instantaneously given off as hereinbefore mentioned, and which forces the gold into the mold.

Claims:

1. An apparatus for casting small metal pieces under pressure, comprising a flask, a flask lid, a mold in the flask, and a cushion of porous material on the inner face of the lid, designed to be impregnated by a volatile substance and used for the purpose of giving off the vapors produced by the said substance under the influence of heat.

2. An apparatus for casting small metal pieces under pressure, comprising a flask, a flask lid, a mold in the flask, a cushion of porous material in the lid, a lid rod, a support having a socket to guide the lid rod, a spring adapted to raise or lift the said rod, and a hand lever pivoted to said support and jointed to said rod.

3. An apparatus for casting small metal pieces under pressure comprising a flask, a flask lid, a mold in the flask, a cushion of porous material in the lid, a tubular lid rod, a funnel and a cock on said rod, and means whereby said rod may be raised and lowered.

In testimony that I claim the foregoing as my invention I have signed by name in presence of two subscribing witnesses.

BENVENUTO PLATSCHICK.

Witnesses:

MAURICE ROUX,

CHARLES JARDIVEL.