W. H. RICHARDS.

APPARATUS FOR CASTING FILLINGS FOR TEETH.

APPLICATION FILED DEC. 16, 1921.

1,421,988.

Patented July 4, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

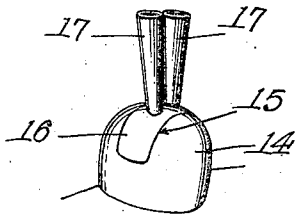


Fig. 3.

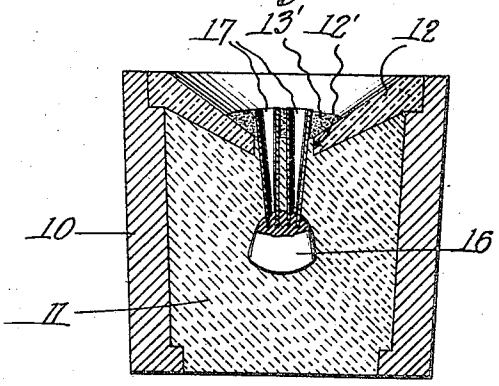
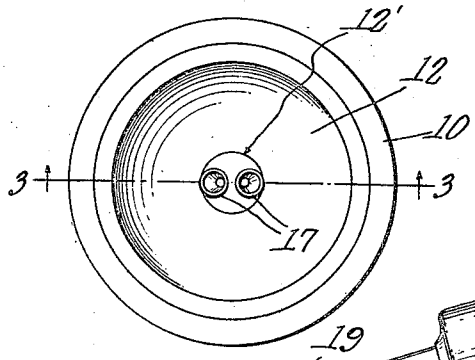


Fig. 2.



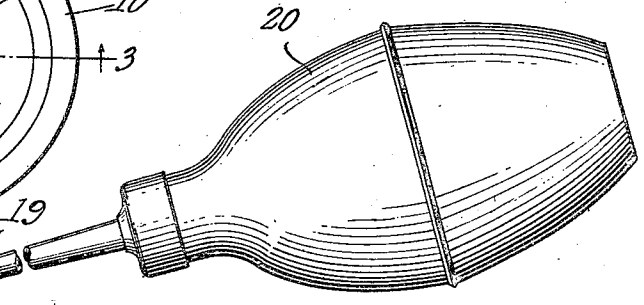


Fig. 4.

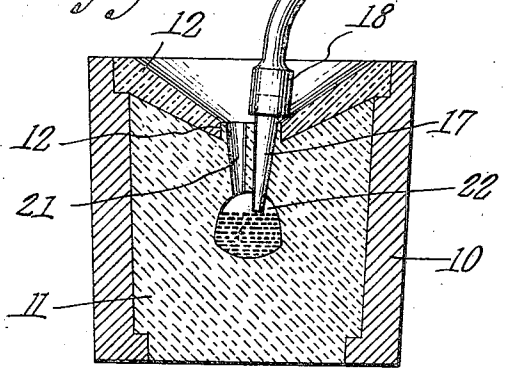
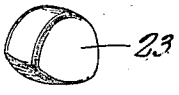


Fig. 5.



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2 SHEETS—SHEET 2.

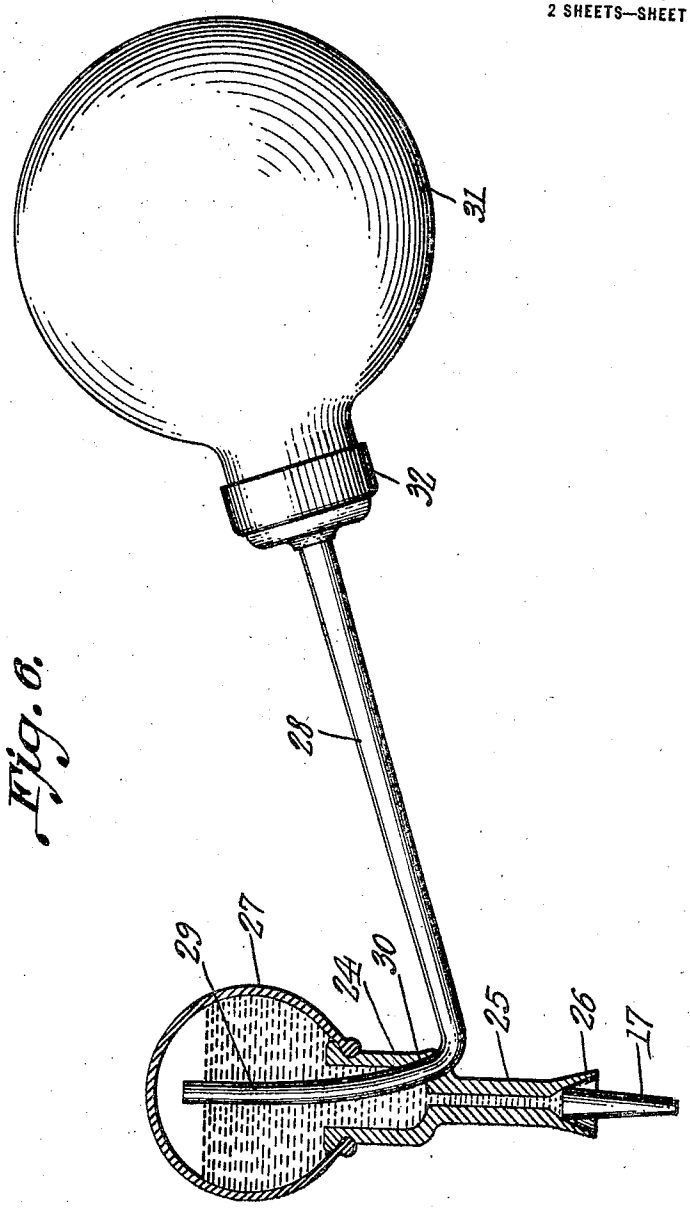


Fig. 6.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CASTING FILLINGS FOR TEETH.

1,421,988. Specification of Letters Patent. Patented July 4, 1922.

Application filed December 16, 1921. Serial No. 522,830.

To all whom it may concern:

Be it known that I, WILLIAM H. RICHARDS, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented certain new and useful Improvements in Apparatus for Casting Fillings for Teeth, of which the following is a specification.

My invention relates to a method of casting gold inlay crowns, bridges, and plates, in dental work, and to an apparatus for use in connection with such method.

It has heretofore been customary to cast a metal or gold filling for a tooth, such as a crown, by first boring or cleaning out the cavity in the tooth, and then filling the cavity with wax for producing an impression element, of accurate shape and size. While this impression element is held within the cavity in the mouth, it has been customary to secure sprues to the wax impression element. These sprues are short pieces of wire, the ends of which are heated and inserted into the impression element, and upon cooling are anchored therein. The impression element is now removed from the cavity and is introduced into the central portion of an iron ring, and a plaster Paris mold is formed about the impression element, which is accordingly embedded therein, with the sprues extending upwardly above the top of the plaster Paris mold. It has been customary to remove one or all of the sprue wires after the plaster Paris has hardened, thus providing a port or ports, leading to the impression element. In order that the wax of the impression element may be removed from the cavity formed in the plaster Paris mold by such impression element, it has been customary to support the ring and plaster Paris mold therein over a gas flame or in an oven. When the mold is heated, the wax is gradually absorbed in the porous plaster Paris mold. However, the mold is frequently damaged by overheating.

This practice of the prior art possesses disadvantages. The employment of the wire sprues which are circular in cross section, render it difficult to handle the sprues by a pair of tweezers, and the sprues frequently slip out of the tweezers and fall into the mouth or throat of the patient, causing burning. Further, by heating the wire sprues and introducing the same into the material of the wax impression element, the impression element is frequently distorted, as the wax must rise exteriorly of the sprue. Further, by heating the plaster Paris mold over a flame, to cause the molten wax to be absorbed in the plaster Paris, there is liability of the mold cracking, and the absorption process is very time consuming. Also, when boiling the mold in water to float the wax out of the cavity of the mold, the process is time consuming, with small chance of a clean mold.

In accordance with my invention, I provide one or more tubular sprues, which I have found possess marked advantages, and also enables the wax to be quickly removed from the cavity in a novel manner. When two tubular sprues are employed, the ends thereof are heated and are stuck into the wax impression element in the cavity of the tooth, the displaced wax entering the tubular sprues, preventing distortion of the impression element, and insuring a stronger attachment between the sprues and the same. The tubular sprue may be securely held by a pair of tweezers, one end of which enters the bore of the tubular sprue, and all liability of the sprue falling into the mouth or throat of the patient is overcome. The wax impression element is embedded in the plaster Paris mold, and the tubular sprues project to the top of the mold, and a hot fluid, such as boiling water, may be passed into the cavity of the mold through one tubular sprue and will discharge through the other tubular sprue, or the passage provided thereby, and the wax will thus be quickly forced from the cavity of the mold.

In the accompanying drawings, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a perspective view of a pair of tubular sprues embodying my invention, showing them embedded in a wax impression element,

Fig. 2 is a plan view of the apparatus embodying my invention,

Fig. 3 is a vertical section taken on line 3—3 of Fig. 2,

Fig. 4 is a similar view with one tubular sprue removed, and means connected with the other tubular sprue to force boiling water therethrough,

Fig. 5 is a perspective view of the gold filling cast by my method, and,

Fig. 6 is a side elevation of a different form of device for forcing a heating fluid

through the tubular sprue, parts being shown in central vertical section.

In the drawings, wherein for the purpose of illustration are shown preferred embodiments of my invention, the numeral 10 designates a mold retainer, preferably in the form of an iron ring, and this mold retainer is adapted to be filled with a mold 11, formed of plaster Paris or other like material. The numeral 12 designates a cap, which is removably mounted upon the upper end of the ring 10, this cap being formed of fire proof material. The cap is provided with a central opening 12′.

As shown in Fig. 1, the numeral 14 designates a tooth, having a cavity 15 to be filled, which has been bored or cleaned out. This cavity is now filled with a wax impression element 16.

The numeral 17 designates tubular sprues, which are preferably tapered, increasing in diameter rearwardly. The walls of the tubular sprues are thin, and the forward ends of the same are first heated and then inserted in the wax impression element 16, and become embedded therein. By having the elements 17 tubular, the wax when melted will rise slightly in the same, and there is no liability of the impression element being distorted by the insertion of the tubular sprues therein, as is the case by employing the ordinary wire sprue. In handling the tubular sprues 17, one end of the tweezers may be inserted in the upper large end of the tubular sprue, and thus a secure hold obtained, so that the sprue will not fall into the mouth or throat. When the tubular sprues have thus been anchored in the impression element 16, this impression element is removed from the cavity in the tooth, and is then introduced into the iron ring 10, as shown in Fig. 3. The material of the plaster Paris mold, which is wet or plastic, is now introduced into the iron ring and the impression element 14 and sprues 17 become embedded therein, with the sprues extending above the plaster Paris mold, as shown. The cap 12 is placed in position, and the upper ends of the sprues 17 may be temporarily anchored to this cap, by a mass of wax 13′, which is removed after the plaster Paris has set. After the plaster Paris mold 11 has set or hardened, I prefer to remove one tubular sprue and introduce the ring and its contents into cold water, until the dried plaster Paris becomes wet, which is readily accomplished. The ring and its contents are now held over a gas flame, with the sprue pointing up, for a few minutes, until the plaster Paris mold becomes heated, which is exhibited by the water sweating from the plaster Paris. This heating serves to soften or melt the wax. During this heating, or while the plaster Paris mold remains heated, I pass the end or coupling 18 of a tube 19, of a syringe, over the end of the tubular sprue 17. The syringe embodies a bulb 20 connected to the tube, this bulb containing boiling water, or other heated fluid, which is forced into and through the tubular sprue, and in turn forces the molten wax up through the bore or opening formed by removing the other tubular sprue. The wax is thus quickly and completely removed from the cavity 22, which is thereby thoroughly cleaned. After the wax has been thus removed, the remaining tubular sprue is removed, providing two openings or ports, for the molten gold to pass to the cavity.

The molten gold is now cast in the cavity by the well known methods. The plaster Paris mold 11 is next removed from the iron ring 10, and the plaster Paris mold is split or cut so that the casting or filling 23 is removed and polished.

In Fig. 6, I have shown a modified form of device to supply the boiling water or heated fluid to and through the sprue. Such device comprises a shell 24, preferably metallic, and this shell carries a tubular extension 25, provided with a flaring mouth 26, having a conical bore, adapted to fit over the upper end of the tubular sprue 17, as shown. At its upper end, the shell 24 has a bulb 27 secured thereto, preferably formed of rubber or other suitable material.

The numeral 28 designates a tubular stem, having an upwardly bent forward portion 29, passing through an opening 30 in the shell 24, and anchored therein to form a gas tight joint. The extension 29 projects into the bulb 27, and above the ordinary maximum level of the liquid therein. The numeral 31 designates a bulb, formed of rubber or the like, and preferably twice the capacity as the bulb 27, while this size may be varied. The bulb 31 is connected with a tubular stem 28, by a coupling 32.

The advantage of this device is that the bulb 31 is employed to create the suction in the bulb 27, and the boiling water is retained entirely within the bulb 27, and hence does not burn the hand of the operator. Further, all of the water may be discharged from the bulb 27, in a downwardly direction, by compressing the bulb 31 sufficiently.

It is to be understood, that the forms of my invention herewith shown and described, are to be taken as preferred examples of the same, and that various changes may be resorted to in the order of the steps of the method, and that changes in the shape, size, and arrangement of parts of the apparatus may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In apparatus of the character described,

a mold having a cavity formed therein receiving the impression element, a pair of tubular sprues extending through the material of the mold and leading into the cavity, and means for passing a heated fluid through one tubular sprue.

2. In apparatus of the character described, a mold having a cavity formed therein receiving the impression element, a pair of tubular sprues extending through the material of the mold and leading to the cavity, and a bulb for holding a heating fluid and having a tubular outlet adapted for connection with the end of one tubular sprue.

3. In apparatus of the character described, a mold having a cavity formed therein, a tubular sprue leading into the cavity, and means for supplying a heating fluid to and through the tubular sprue.

4. In apparatus of the character described, a mold having a cavity formed therein, a tubular sprue leading into the cavity, a bulb having a tube to engage the tubular sprue, a tubular stem leading into the bulb, and a second bulb connected with the tubular stem.

5. In apparatus of the character described, a mold having a cavity formed therein, a tubular sprue leading into the cavity, a bulb having a tube to engage the tubular sprue, a tubular stem leading into the bulb, and a second bulb connected with the tubular stem, said second bulb having a substantially greater capacity than the first bulb.

6. In apparatus of the character described, a mold having a cavity formed therein, a tubular sprue leading into the cavity, a shell having a tubular extension for connection with the tubular sprue, a bulb connected with the shell, a tubular stem leading into the shell and discharging into the bulb, and a second bulb connected with said tubular stem.

7. In apparatus of the character described, a tubular sprue which is longitudinally tapered and increases in diameter rearwardly, the bore of the sprue being also tapered and increasing in diameter rearwardly, the forward reduced end of the tubular sprue being adapted to be heated and embedded in the material of the wax impression element, the molten wax being capable of passing into the forward end of said bore, the enlarged rear end of said bore being of a sufficient size to receive therein one end of a pair of tweezers.

In testimony whereof I affix my signature.

WILLIAM H. RICHARDS.