

No. 619,847.

Patented Feb. 21, 1899.

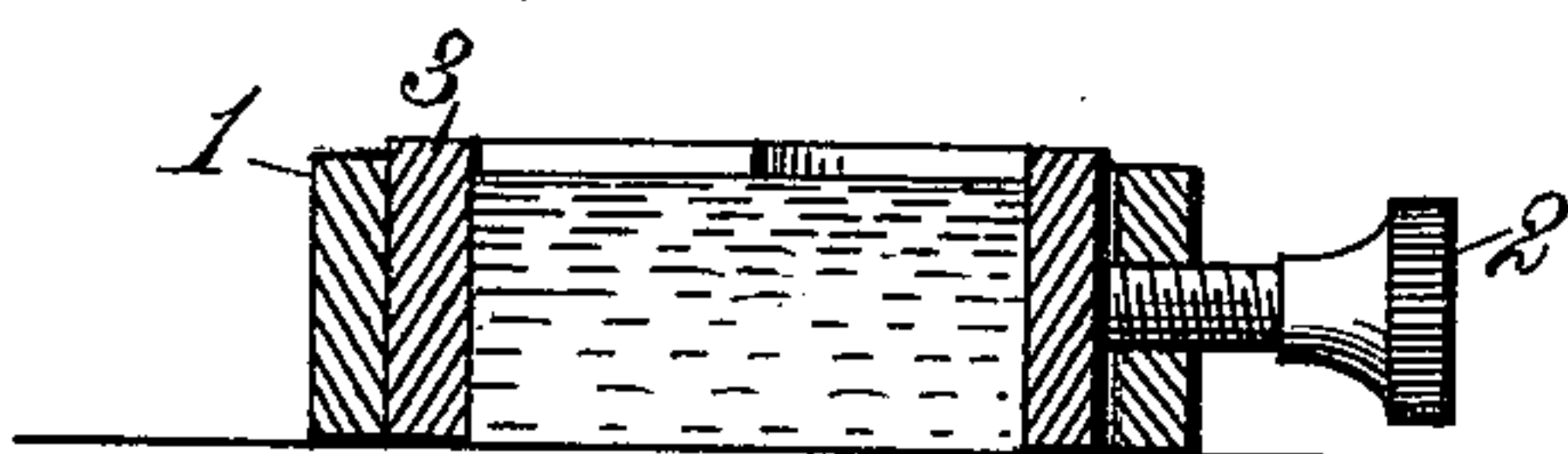
J. H. SLINKMAN.

APPARATUS FOR CASTING SPLIT DIES FOR ARTIFICIAL TOOTH CROWNS.

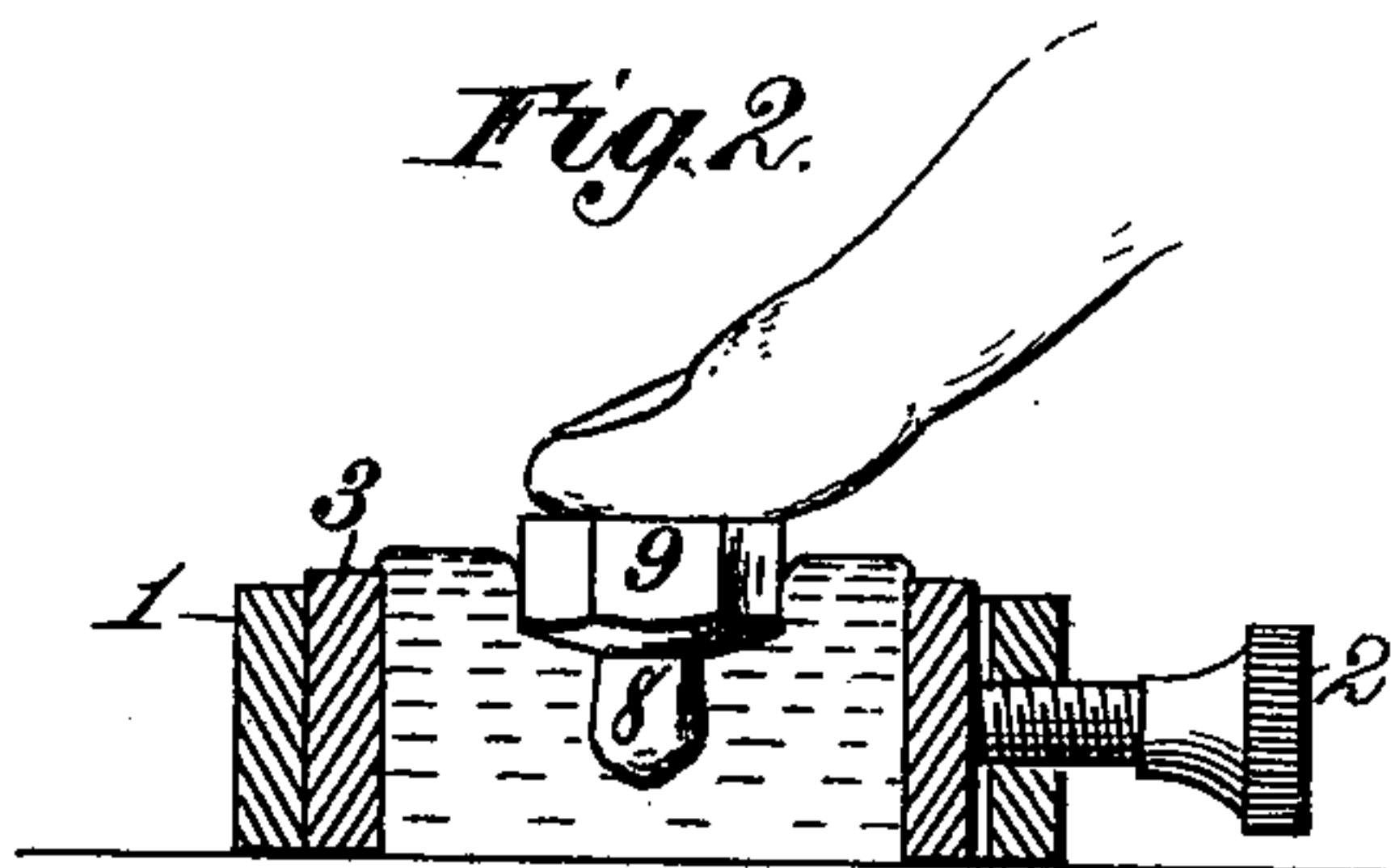
(Application filed Mar. 23, 1898.)

(No Model.)

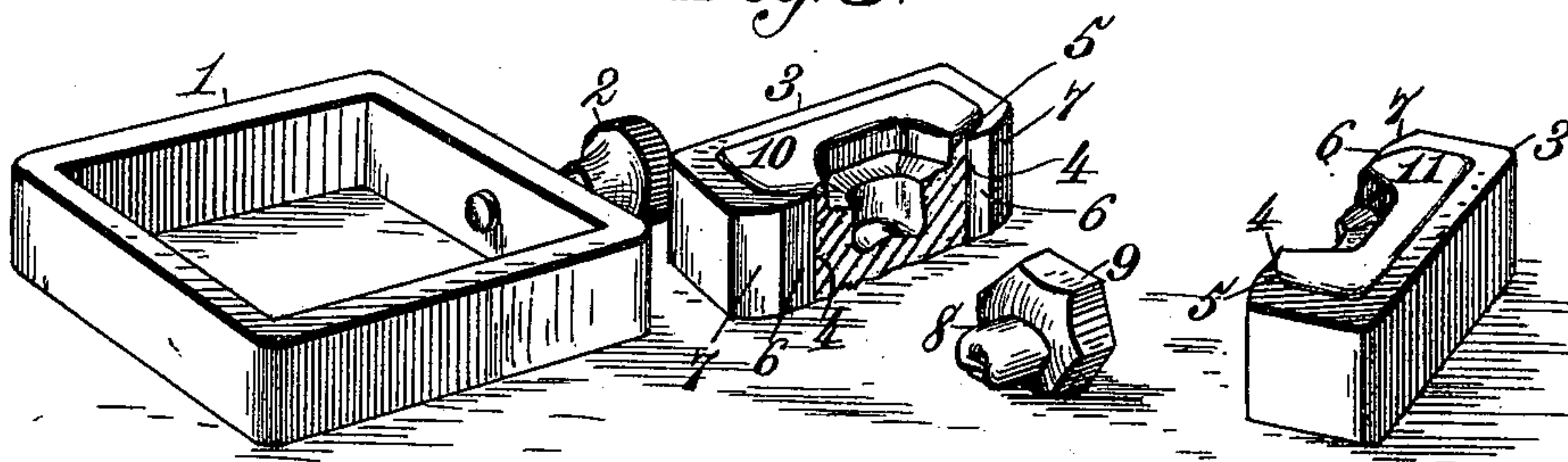
*Fig. 1.*



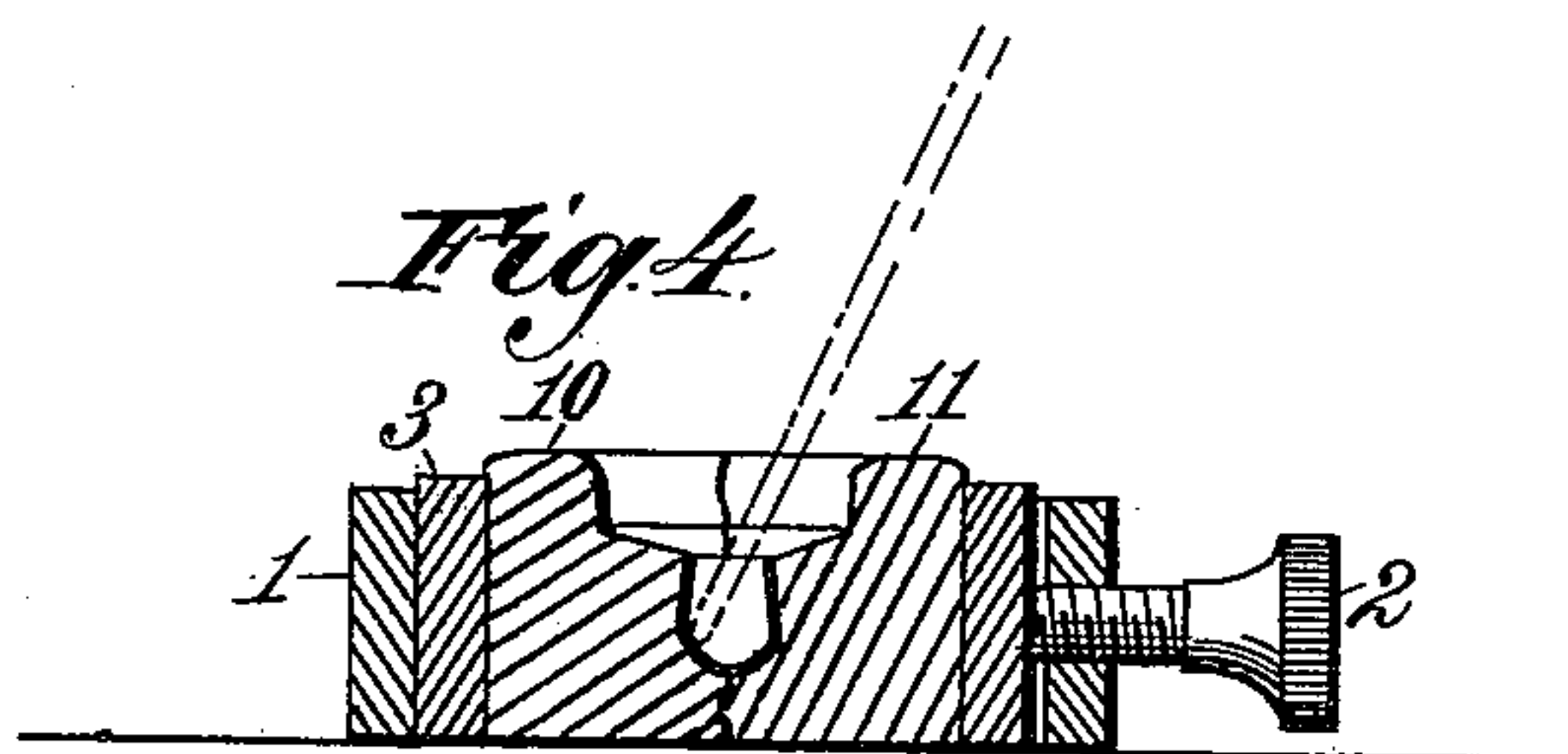
*Fig. 2.*



*Fig. 3.*



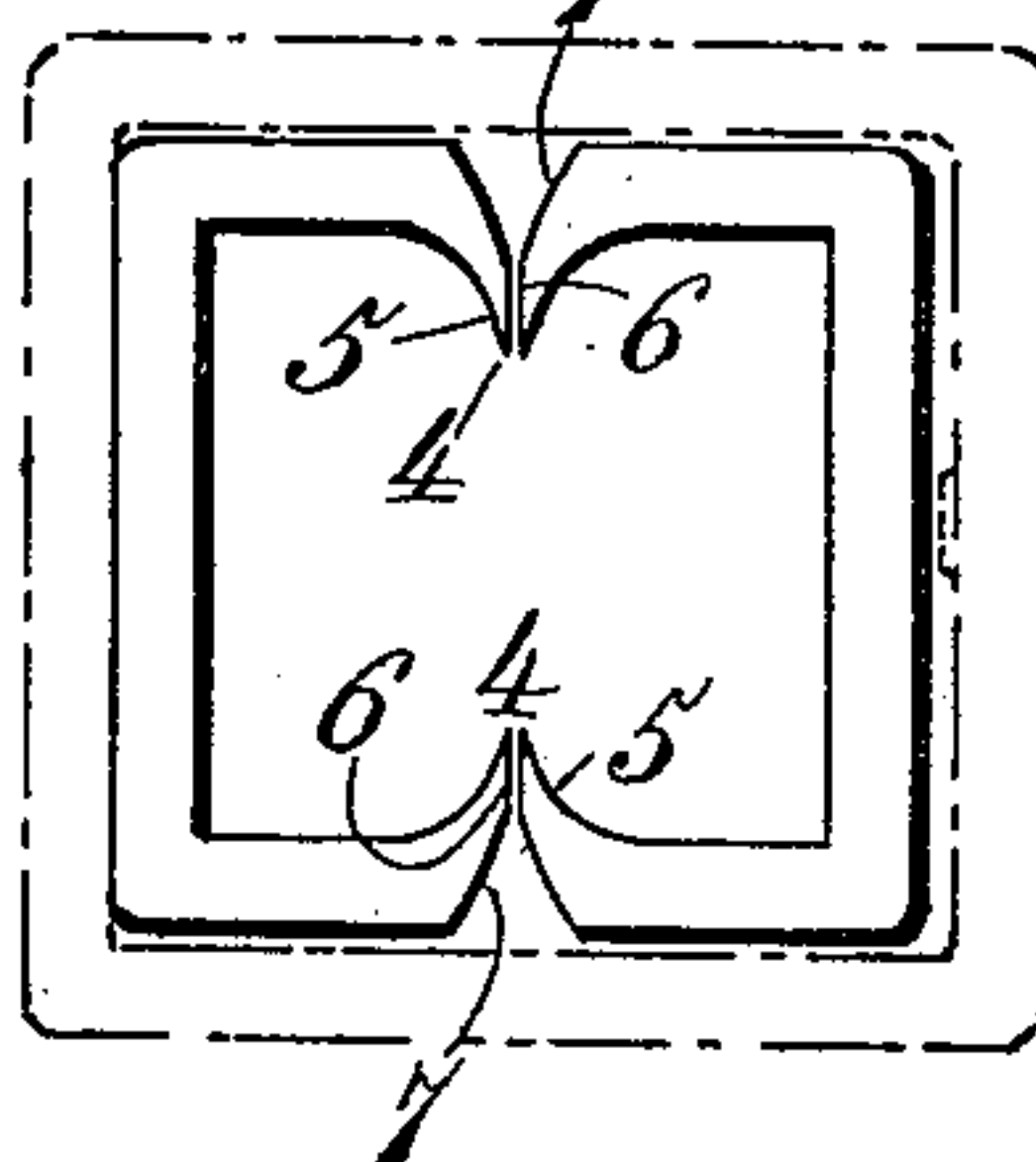
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOHN H. SLINKMAN, OF MARTINSBURG, WEST VIRGINIA, ASSIGNOR OF  
ONE-HALF TO CHARLES OWENS SPILLMAN, OF SAME PLACE.

## APPARATUS FOR CASTING SPLIT DIES FOR ARTIFICIAL TOOTH-CROWNS.

SPECIFICATION forming part of Letters Patent No. 619,847, dated February 21, 1899.

Application filed March 23, 1898. Serial No. 674,913. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. SLINKMAN, a citizen of the United States, residing at Martinsburg, in the county of Berkeley and State of West Virginia, have invented new and useful Improvements in Apparatus for Casting Split Dies for Seamless Artificial Tooth-Crowns, of which the following is a specification.

10 This invention relates to apparatus for casting split dies for seamless artificial tooth-crowns, and has for its object to provide simple and inexpensive apparatus for forming the die in which the metallic artificial crown is afterward shaped and formed and to construct said die in such manner that the exact contour of the tooth to be crowned shall be imparted to the finished crown with accuracy and fidelity.

20 To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a vertical sectional view showing the mold placed in the clamp and filled with molten metal preparatory to inserting the core. Fig. 2 is a similar view showing the core inserted in the molten metal. Fig. 3 is a perspective view showing the parts detached after the metal die has been split and divided. Fig. 4 is a view of the two sections of the die reunited, illustrating the manner of shaping the crown therein. Fig. 5 is a perspective view of the finished crown; and Fig. 6 is a top plan view of the sectional mold in place in the clamp, the latter being shown by dotted lines.

Referring to the drawings, the numeral 1 indicates a clamp, preferably consisting of a hollow rectangular frame having a threaded aperture formed in one of its sides, in which is inserted the threaded end of a set-screw 2. Adapted to loosely fit within the clamp or frame 1 is a sectional mold consisting of two approximately U-shaped metallic sections 3, which when placed end to end form a rectangular shell or casing approximately corresponding in outside size and contour to the inner face of the clamp. The meeting ends of the sections 3 are turned or bent inward

and terminate in knife-edges 4, the opposite faces of said knife-edges being beveled, as at 5, as most clearly shown in Figs. 3 and 6, while their adjacent edges or faces 6 are straight and parallel to permit the two sections of the mold being closely fitted together. The outer edges of the meeting ends of the two sections of the mold are oppositely inclined, as shown at 7, to form V-shaped recesses in the sides of the mold between the ends of the sections to facilitate the insertion of a wedge-shaped tool, such as a chisel, to facilitate the separation of the sections of the mold and the die cast therein, as will hereinafter be explained.

In making artificial tooth-crowns by means of my improved apparatus I proceed as follows: A facsimile of the tooth to be crowned is first produced in the following manner: An accurate impression of the contour of the tooth is taken by pressing plastic material—such as plaster-of-paris, for example—about the tooth and then dividing the material into two sections to remove it from about the tooth, each section retaining a cast in intaglio of that portion of the tooth which it previously surrounded. The two sections after being removed from the tooth are then matched or caused to register with each other to form a mold and in this mold is cast a plastic facsimile of the tooth to be crowned. Any plastic material suitable for the purpose may be employed—such, for example, as plaster-of-paris. The facsimile thus produced serves as a core from which by means of my improved apparatus the die is formed in which the crown is subsequently shaped. The core is preferably cast with a base 9, as shown in Figs. 2 and 3, to facilitate the insertion of the core in the molten metal in the mold. The core having been obtained in the above-described or in any other suitable or preferred manner, the two sections of the mold are placed end to end in the clamp 1 and are firmly forced together and held in the clamp by the set-screw 2, after which the mold is placed on a flat surface and then filled with molten metal. For this purpose I prefer to use an alloy consisting of bismuth, lead, antimony, and cadmium, as I have found by experiment that such an alloy produces the best results, as it gives to the molded die sharply-defined edges of exceeding strength. The constituents forming the



alloy may obviously be altered in many ways. For example, zinc may be substituted for the lead, or the nature of the alloy may be entirely changed, or an unalloyed metal may be employed, without departing from the spirit of my invention; it being preferable, however, to employ an alloy similar to that described having great edge strength and giving sharp definition to the die. After the mold has been filled with the molten alloy the core is forced down into the alloy, as shown in Fig. 2, and the molten alloy permitted to cool to set and harden. The mold containing the hardened alloy, with the core, is then removed from the clamp and a wedge-shaped tool—such as a chisel, for example—is then inserted in one of the V-shaped recesses between the ends of the sections and given a blow, which will cause the sections to be separated and the die to be divided into two parts 10 and 11, each part containing a mold or cast of one-half of the core. The inwardly-projecting knife-edges form in the die when the latter is cast two sharp V-shaped grooves or incisions, whereby when the sections of the mold are separated in the manner described the die will be split or divided accurately on the line of said incisions, or in a vertical plane passing through the core, as most clearly shown in Fig. 3, each section of the die remaining firmly held in its mold-section, while the core drops out or may be removed. After the die has been split in the manner above described the sections of the mold, still containing the die-sections, are again placed end to end in the clamp and forced together tightly therein by the set-screw. A cartridge or shell, or a sheet or thin blank of gold, platinum, or other malleable metal or metal alloy suitable for the purpose, is then placed in the sectional die formed as above described and is pressed, tamped, forced, or spun in any suitable manner or by any suitable tool into every part of the molded cavity in the die to form a thin shell that will conform accurately to the shape or contour thereof. A convenient tool for the purpose is supplied by the rotary burnisher commonly used in dental work, by means of which the gold or other metal employed may be pressed, spun, or forced into every part of the cavity in the die, thus forming a thin hollow shell which will exactly conform to the shape of the cavity molded in the die by the core, and hence will be a facsimile in shape or contour of the tooth to be crowned. During the operation of making or shaping the crown in the die the cartridge or shell should be removed from the die several times and annealed before finishing for the purpose of preventing the cartridge or partly-finished crown from splitting, as would be the case if it should be attempted to shape the crown entirely without annealing. One of the important features of my invention resides in the feasibility with which my divided die may be separated to remove the cartridge for annealing and then

assembled again with the crown accurately replaced therein. The mold is finally taken out of the clamp and separated and the finished crown removed, after which the metallic sections of the die may be removed from the mold-sections and melted and again used.

Having described my invention, what I claim is—

1. A mold for casting dies for seamless artificial tooth-crowns, comprising a plurality of independent and unattached sections adapted, when placed end to end, to form the complete mold, the meeting ends of said sections having inwardly-projecting knife-edges arranged to indent the outer surface of the die cast in the mold and constructed to split the die and retain the split portions in the mold-sections when the latter are separated, substantially as described.

2. A mold for casting dies for seamless artificial tooth-crowns, comprising a plurality of independent and unattached sections adapted, when placed end to end, to form the complete mold, the meeting ends of said sections having inwardly-projecting flanges arranged to indent the outer surface of the die cast in the mold and constructed to split the die and retain the split portions in the mold-sections when the latter are separated, substantially as described.

3. A mold for casting dies for seamless artificial tooth-crowns comprising a plurality of sections adapted, when placed end to end, to form the complete mold, the meeting ends of said sections having inwardly-projecting flanges arranged when the sections are separated to divide the die previously cast therein, and having the outer edges of said ends beveled or inclined to form grooves or recesses for the reception of a tool to separate the mold-sections, substantially as described.

4. A mold for casting dies for seamless artificial tooth-crowns comprising a plurality of sections adapted, when placed end to end, to form the complete mold in which an integral die is adapted to be cast, the meeting ends of said sections being provided with inwardly-projecting flanges arranged to form incisions or grooves in the opposite edges of the die when cast in the mold, the outer edges of said ends of the mold-sections being beveled or inclined to form grooves or recesses for the reception of a tool to separate the mold-sections and thus divide the die, said inwardly-turned flanges operating to retain the sections of the divided die in the mold-sections when the latter are separated, and a clamp for forcing together and holding the said sections, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN H. SLINKMAN.

Witnesses:

GEO. S. HILL,  
WM. W. HILL.