J. B. Bean,

Dental Mold.

No. 69,614. Patented Oct. 8, 1867.

Fig. 2.

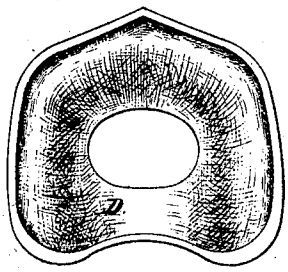


Fig. 1.

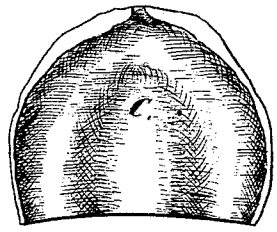


Fig. 3.

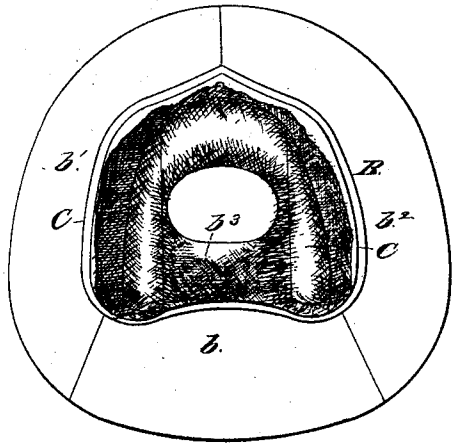


Fig. 4.

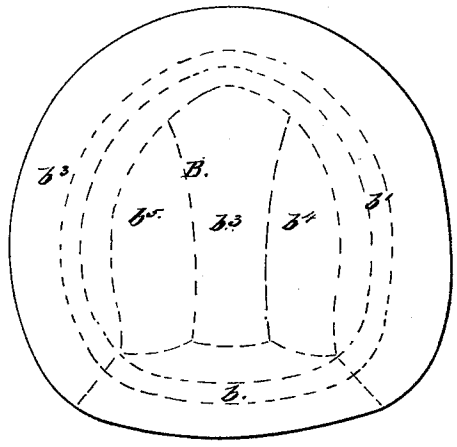
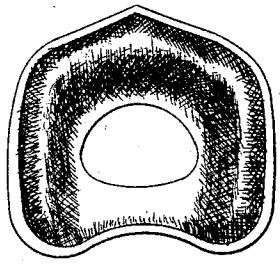


Fig. 5.



Witnesses:

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United States Patent Office.

JAMES B. BEAN, OF BALTIMORE, MARYLAND, ASSIGNOR TO HIMSELF AND A. H. BALDERSTON, OF SAME PLACE.

Letters Patent No. 69,614 *dated October* 8, 1867.

MODE OF CONSTRUCTING MOULDS FOR CASTING ALUMINUM PLATES FOR ARTIFICIAL TEETH.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JAMES B. BEAN, of the city and county of Baltimore, and State of Maryland, have invented a new and improved Method of Constructing Moulds for Casting Aluminum Plates for Artificial Teeth; and I do hereby declare the following to be a full, clear, and exact description of the same, sufficient to enable one skilled in the art to which the invention appertains to make use of it, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a top view of the impression-cup C.

Figure 2 shows the upper side of the model D.

Figure 3 is a top view of the mould B.

Figure 4 is a bottom view of the same, and

Figure 5 is a view of the concave side of the matrix.

In this invention the contractibility of the aluminum, or other metal used for casting the plates, is compensated by the enlargement of the moulds in which the plates are cast, a new composition being used for the mould, and a new series of operations employed in its construction for the purpose of obtaining the end desired.

The advantages which would result from the use of aluminum plates as a base for artificial teeth have long been acknowledged by every one acquainted with the subject, and many efforts have been made to utilize the metal for this purpose, and although the casting of the metal has long since been attained by myself, as well as others, in moulds of the dimensions of the patient's mouth, yet the plate, when cooled, will be so much smaller as to be entirely unfit for the purpose. This difficulty, hitherto deemed insuperable, can be entirely overcome by a new process, which I have invented, and which I shall now proceed to describe in detail.

In the first place, I take an impression of the patient's mouth in plaster of Paris, either in a thin elastic metallic impression-cup, or in the usual way. I deem the thin elastic metallic impression-cup C far preferable for the purpose, and I use one of thin sheet brass, struck up between dies, so as to make an approximate fit to the patient's mouth. This cup or plate is coated on its upper surface with a thin coating of gum-shellac. While warmed over a lamp, &c., to the melting point of the shellac, the whole is quickly enveloped in a handful of cotton, which is pressed upon it until cool, when the superfluous cotton is removed, thus leaving a coating of adherent fibre, which will effectually retain the thin film of plaster used for the impression, which is now taken in the usual manner, using, however, much less plaster than by the ordinary impression-cup. The elasticity of this cup allows the plaster to expand freely, and moreover is easily removed from the impression, when desired, by heating it to the melting point of the shellac.

Secondly, into this impression just taken, after being varnished, &c., as usual, I cast a model, D, of plaster of Paris.

Thirdly, upon this model, after being varnished, &c., I form a mould, B, in several parts, composed of the best calcined plaster of Paris. The drawings show a mould, constructed in my laboratory in making a set of artificial teeth, which gave perfect satisfaction, in which six pieces are used, three, b b^1 b^2, forming the sides or walls, and three, b^3 b^4 b^5, forming the bottom of the mould, all being of the shape shown in fig. , and each fitting into the other by short dowels or projections and recesses on their contiguous surfaces. The pieces thus fitted to each other may be held together by a band of India rubber, or any other suitable fastening.

Fourthly, into this mould, after being varnished, &c., I cast a compound of two parts, by weight, of powdered pumice-stone, and one part of plaster of Paris, mixed with water. I first boil the powdered pumice in water for a moment to expel the air, then wash and cool, and afterwards add the plaster. The composition having become solid, the parts of the mould are removed very carefully one at a time to prevent injury to the fragile cast. This cast is the matrix on which the perfect-fitting plate is produced, and forms a part of the mould in which the aluminum is to be cast.

The object to be attained by the foregoing operations is accomplished in the following manner:

From careful experiments and delicate micrometer measurements it is found that a cast-aluminum plate, two and a half inches in width, in being heated from the ordinary temperature of the mouth to near the melting point of the metal, expands two hundred and fifty ten thousandths of an inch. An impression in plaster of an

equal width, in a thin elastic impression-cup, expands, in setting, fifty-five ten thousandths in the same distance. A plaster model cast into this impression expands eighty-three ten thousandths. The mould formed on this model expands eighty-three ten thousandths. The compound of pumice-stone and plaster cast into this mould expands seventy-five ten thousandths in setting. Expansion of the impression, .0055 of an inch; expansion of the first cast, .0083 of an inch; expansion of the plaster mould, .0083 of an inch; expansion of the matrix, 0075=.0296. The contraction of the aluminum plate may be put down at two hundred and sixty ten thousandths in cooling, from its point of congelation to the temperature of the mouth. Then the contraction of the mould in drying may be safely put down at sixteen ten thousandths. Then .0260+.0016=.0276=the whole sum of contractions, .0296—.0276=.0020. This gives a plate two one thousandths of an inch larger than the gums from which the impression was taken, which is necessary to a comfortable fit. These measurements, determined before the actual experiment with a dental plate was tried, are found to work out exactly in practice, and the result is a most perfect-fitting plate, adhering more perfectly to the gums by atmospheric pressure than any other heretofore produced.

In order to complete the mould for casting the plate for a set of teeth the model or pattern-plate of wax, or wax and tin-foil, is gotten up as if for a cast of vulcanite work, except the plate is one-half the thickness usually employed for vulcanite, the teeth or blocks having their pins embedded in plaster, and trimmed smooth, so as to form the groove in the plate along the line of the teeth for the purpose of fastening the teeth thereto, and also to enable them to be easily separated from the wax. The teeth or blocks are now oiled all over their surface, and put in their proper place on the wax model, in the articulator, if necessary, and hot melted wax is introduced under and around each tooth and block, so as to fill up all the vacancies between and beneath the teeth or blocks. The wax is also carefully modelled to represent all the fullness and outline desired in the aluminum plate. The plate and teeth are now placed upon the matrix, and the edges secured all around by melted wax, and the whole made as smooth as possible. The teeth are now carefully removed from the wax plate, being careful that no wax comes away with them. Now cut out the groove, into which the pins of the teeth or blocks project, all along the line of the teeth; again replace the teeth, and repair any damage to the wax fitting against them. This matrix, containing the pattern-plate and teeth, is now secured in the lower half of the flask by means of the composition of two parts of pumice-stone and one of plaster, mixed with water in the same manner as if for a case of vulcanite work. The teeth are now removed, and the whole surface of the wax and composition is oiled. The upper portion of the flask is then put on and filled in like manner, making provision for the gate and bents. When solid the flask is warmed, opened, and the wax pattern-plate removed, leaving the desired mould for the aluminum plate.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. I claim the thin metallic impression-cup C, for the purpose specified.

2. I claim the use of the model B, made in several pieces, substantially as and for the purpose described.

3. I claim the process of constructing moulds for casting aluminum plates for artificial teeth, substantially as above described.

JAS. B. BEAN.

Witnesses:

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