

UNITED STATES PATENT OFFICE.

JACOB C. ROBIE, OF BINGHAMTON, NEW YORK.

IMPROVEMENT IN PROCESSES FOR MOLDING CELLULOID DENTAL PLATES.

Specification forming part of Letters Patent No. **179,667**, dated July 11, 1876; application filed August 20, 1875.

To all whom it may concern:

Be it known that I, JACOB C. ROBIE, of Binghamton, county of Broome, State of New York, have invented a new and useful Process for Treating Celluloid Bases for Artificial Teeth, which process is fully set forth in the following specification.

Two serious difficulties are met with in the use of celluloid in the manufacture of dental plates by the ordinary method of placing a "blank" or plate of as nearly the proper size as can be readily determined between the upper and lower plaster casts, and then forcing these casts together whenever the celluloid shall have been rendered sufficiently plastic by the application of heat. The first defect is, it is difficult, if not practically impossible, to render the plate sufficiently dense by this method; hence it is apt to shrink and warp after it is taken from the flask. The second fault is, the camphor which is employed as a constituent in the manufacture of these bases is not removed from them in the ordinary manipulation to which they are subjected; consequently its gradual dissipation, as the teeth are worn, sometimes causes them to warp, and the continual taste of camphor, which can be detected as it is being slowly eliminated, is very objectionable. The first difficulty is obviated by treating the plate in the flask under a heavy pressure, which pressure is increased as the process progresses; and the second objection is overcome by vaporizing and driving out the camphor by means of combined heat and increased pressure applied, at the will of the operator, while the plate is in the flask.

In carrying out my invention I prefer to use my improved apparatus for molding rubber, with slight modifications applicable to the present case, patented January 2, 1866, No. 51,865, or other similar device, by which the material may be injected into the mold. The lower section of the flask, containing the teeth and mold for the plate, is prepared in the usual manner. The upper section is then placed in position and filled with plaster. The cover and "slide-stopper" are placed and the flask secured together. The "sprue" and "vent" pins are then inserted through the plaster in the upper section of the flask.

The plaster is then allowed to set, after which the sprue and vent pins are removed, and the wax mold removed in the ordinary manner. The flask is then reclosed and secured for the reception of the material, which is cut in small pieces and mixed with filings of the same material. The mass is then saturated with camphor or other solvent and placed into the cylinder, which is then screwed onto the screw projection on the top of the flask-cover. The aperture in the bottom of the cylinder, through which the celluloid is forced into the mold, should be made small enough to insure that sufficient pressure shall be applied to form the pieces and filings, (with the aid of the solvent) into a homogeneous mass before it enters the mold. The flask is now placed into the heater, and the temperature raised to the required degree to give the material the necessary plasticity—say, about 240°. At a few degrees lower steam will form from the water held in the plaster. During this stage of the operation the vapor of the camphor and water in the flask will pass up through the opening in the bottom of the cylinder and materially assist in softening the contents. The "wrenches" are then applied and the screw-piston turned down until the mold is filled, which will be indicated by an increased resistance to the movement of the wrench, and by the appearance of the material through the vent-opening in the cover of the flask. The opening is then closed to prevent further escape of the material, and the pressure continued, allowing the heat to ascend to about 280°, which will be indicated by the diminution of the escape of steam from the mold, which, at a temperature of about 300°, will become entirely dry. The heat should now be diminished, still slowly turning down the "screw-piston," for the purpose of securing the utmost condensation of the material. The "slide-stopper" is then driven in, which cuts off the communication with the cylinder and maintains the pressure in the mold. The cylinder is then detached and used on another flask, if desired. The flask is then cooled and the work removed for finishing, in the usual manner.

It is obvious that, in addition to the rendering the plate homogeneous and extremely dense by this operation, the camphor will be

much more effectually eliminated from it than it can be by any of the processes or methods of manipulation heretofore in use. This results, first, from the fact that, no matter how long time may have elapsed since the plate or blank has been manufactured, the camphor which it possessed when it was put into the cylinder will be the more easily dissipated from having been treated, under pressure, with a hot vapor of the same, and then having the temperature raised within the flask while the mass is subjected to severe pressure. As the water used in mixing up the plaster in the flask will have been nearly or quite driven out by the heat before the sprue or vent holes are closed, the plaster will be left in a porous condition. Therefore, such camphor as may be driven from the plate by the combined action of heat and pressure, after the sprue or vent holes are closed, can, as the flask and its contents cool off, crystallize in these pores should it (the camphor) be present in sufficient quantities.

The whole operation may be performed in less time than by the ordinary method for molding and vulcanizing rubber, leaving the work in an unusually condensed and satisfactory condition, and as permanent as a piece of casting.

I do not claim, broadly, the employment of the porous mold from which the water has been evaporated or partially evaporated, nor the use of heat for expelling the camphor from the plate after said plate is placed in the mold; nor do I claim, broadly, a dental plate formed by injecting the material of which it is formed into a mold while it (the material) is in a plastic condition.

I claim as my invention—

1. The herein-described method of making dental plates by rendering celluloid plastic and homogeneous by means of heat, a solvent, and pressure, then forcing the mass into a mold containing the teeth, and cooling it under an increased pressure, substantially as set forth.

2. The herein-described method or process of expelling camphor from celluloid dental plates by means of heat and an increasing pressure, applied in a closed mold from which water has been expelled, substantially as set forth.

JACOB C. ROBIE.

Witnesses:

PERRY P. ROGERS,
MOSES E. CONKLIN.