United States Patent Office.

SAMUEL LAWRENCE, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND AMBROSE LAWRENCE, OF SAME PLACE.

Letters Patent No. 94,324, *dated August* 31, 1869; *antedated August* 24, 1869.

IMPROVED COMPOSITION FOR MOULDS AND MODELS IN CASTING DENTAL PLATES AND OTHER ARTICLES.

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, SAMUEL LAWRENCE, of Lowell, in the county of Middlesex, and State of Massachusetts, have invented a new and improved Composition for Forming Moulds and Models Used for Casting Dental Plates, of which the following is a full, clear, and exact description.

This invention and improvement consists of a composition of calcined plaster and silex, and in proportions and conditions which I have found by experiments to be the best suited or adapted for the different parts of the mould, or for the mould and model; different proportions for each.

In forming the male model upon which the plate is cast, I use the plaster and the silex in about equal proportions by bulk.

For this male model, the silex as well as the plaster should be finely pulverized, so as to produce a smooth and even surface upon which to fit the try-plate, and upon which to cast that side of the dental plate which comes next to the mouth.

These two substances are mixed, and the model formed in the usual way, as also the fitting of the try-plate, and the fitting up of the teeth; and if it is desired to cast the plate directly upon the teeth, then the teeth should be fitted up as for vulcanite, except that the wax should be kept down below thegums so as to prevent the teeth being broken by shrinkage of the cast-metal.

If the plate and teeth are not connected by casting the former upon the latter, then the precaution concerning the wax need not be observed.

After the male model has been formed, and the try-plate or other parts fitted, and all ready for bedding in the flask, I mix composition of the same substances, but a larger proportion of the "silex;" say from one-half to three-fourths "silex," and generally about three-fourths of the latter, and the balance, or about one-fourth by bulk, of the calcined plaster.

This last-named proportion of the aforesaid ingredients serves for the bedding of the model, and also for the packing in the top piece, and which forms the matrix, and for these purposes the "silex" need not be so finely pulverized; in fact, the coarser particles make the composition more porous, which is favorable for the exit of gases generated within the mould, and the water contained in the composition, and expelled by heat; and I find that by using this composition, the water is expelled and the mould dried and heated in much less time than with any other substance I have ever used.

Instead of the silex, and where the latter cannot be readily obtained, "sand" from the sea-shore, and some other kinds of sand which contain the largest part of "silex" may be used with the plaster to form the mould or the model; but I prefer the pure "silex," as it contains little or no foreign matter, and insures a better proportion of the composition.

Proportionate expansion and contraction of the mould, the metal, and the teeth, is another and important result in the use of this composition, the expanding and contracting-capacity of one being about equal to the other; and when the mould of this composition and the teeth therein are heated, preparatory to pouring the melted metal to form the plate, and connect it with the teeth or otherwise, the mould is so widely expanded (and also the teeth if within the mould) that when the metal is poured to form the plate, the dimensions of the latter will be so much larger than by the use of any of the well-known dental-mould materials, and the contracting of all the parts will be so nearly equal, that the plate so formed will fit the male mould or the mouth of the patient, and the teeth will remain unharmed by heating or by expansion or contraction, shrinkage, or otherwise; whereas, by the use of any of the well-known substances used for moulds for casting dental plates, the proportionate contraction of the metal so far exceeds the expansion of the mould, and the expansion of the ordinary mould-substance is so slight or limited, that the plate, when contracted by cooling, is too small for the model or the mouth of the patient; besides, the proportionate expansion of the teeth and the common mould-substance is so unequal that the teeth are pressed or crowded together while heating, and when the melted metal is poured upon the teeth in this crowded condition, the contraction of the metal, in cooling, draws still closer around the already crowded teeth, and breaks them in pieces.

My improved composition is well adapted for moulds for making other small castings than dental plates, and which require precision and accuracy of dimensions. It can be successfully used for any of the above-named purposes, regardless of the form or construction of the flask, or the arrangement of the parts, or the method of pouring or gaiting the metal.

I claim the composition of the herein-described ingredients in the portions specified, for the purpose and in the manner described.

SAMUEL LAWRENCE.

Witnesses:
J. S. WHITNEY,
JOHN E. CRANE.