UNITED STATES PATENT OFFICE.

WILLIAM G. A. BONWILL, OF PHILADELPHIA, PA., ASSIGNOR TO THE S. S. WHITE DENTAL MANUFACTURING COMPANY, OF SAME PLACE.

METHOD OF PREPARING AMALGAMS.

SPECIFICATION forming part of Letters Patent No. 249,880, dated November 22, 1881.

Application filed July 5, 1881. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM G. A. BONWILL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented or discovered a certain new and useful method of preparing amalgams to increase the percentage of gold therein, as well as a new and useful amalgam for dental purposes, of which the following is a specification.

Alloys for mixture with mercury to form amalgams for dentists' use in filling teeth and engrafting artificial crowns upon natural tooth-roots while in the mouth have heretofore generally been made of silver and tin. Such alloys, however, when mixed with the mercury to form an amalgam, are open to serious objections in use. The amalgam sets or hardens too slowly after manipulation, while it soon discolors as well as blackens the tooth substance and loses more or less weight from oxidation. Gold has been added to the silver and tin at the time of fusion, so as to make it a constituent of the alloy; but not more than a small proportion—say about five per cent.—of gold could be used, as a greater proportion of gold than about five per cent. makes an ingot or mass of alloy so hard that it is cut or filed with difficulty. Moreover, when a greater proportion of gold than five per cent., or thereabout, is used in the alloy, and when such an alloy is mixed with the mercury to form a pasty or plastic amalgam, the amalgam sets or hardens too rapidly for good results. Thus is the use of a large proportion of gold in the alloy forbidden.

Gold is well known to those skilled in the art to be the best of the precious metals to resist oxidation and discoloration of tooth substance, and therefore it has been very desirable that a method should be discovered or invented of preparing the amalgam by which a larger proportion or greater quantity of gold can be used, and this without making the amalgam of a nature to set or harden too rapidly for practical purposes or good results.

Gold alone as a filling is expensive, and this is due not only to its value as a precious metal and to the cost of working it into shape for dental uses, but to the skill and time required in placing and impacting it in the teeth. When placed in the teeth and rammed in by hand-pressure or impacted by a mallet or any of the automatic pluggers commonly used by dentists, the gold will preserve the tooth substance, but only so far as it is thoroughly impacted, and no capillary tubes are left between the gold and the tooth-bone. The use of gold as a preservative of the teeth in a great number of cases results in failure, and it would seem that the pastes or plastic amalgams are the only stoppings or fillings which promise nearly absolute protection.

After considerable study, investigation, and experiment, I have invented or discovered a method of preparing the amalgam so that a greater proportion of gold can be incorporated than heretofore without making the amalgam of a nature to set or harden either too quickly or too slowly for practical purposes and good results in its manipulation in filling a tooth or in applying or engrafting an artificial crown to a natural root. The amalgam produced has incorporated in it gold in such quantity that it is a practically non-shrinking, non-discoloring amalgam.

In carrying out my invention I take the alloy, which is preferably composed of silver, tin, and gold, the gold being in the proportion of about five per cent., or even a little greater; but, instead of amalgamating the alloy with mercury alone, I amalgamate it with a preparation, compound, or amalgam of mercury and gold, which may be prepared in advance, and which always remains in a fluid or pasty form, and does not set or harden so long as the gold remains alone with the mercury. I prefer this mercury-gold preparation or amalgam to consist of mercury in which is dissolved or amalgamated from ten to fifteen per cent. of fine gold.

When a tooth is to be filled or an artificial crown applied to a natural root—for example, such a crown as is described and claimed in Letters Patent granted to me March 1, 1881, as No. 238,334—the alloy is mixed with the mercury-gold preparation I have described, and the amalgam thus formed at once commences to set or harden, but not any sooner than if the same alloy had been mixed with pure mercury instead of mercury and gold. If the same amount of gold which is incorpo-

rated in the mercury-gold preparation and in the alloy were mixed with the silver and tin in forming the alloy of silver, tin, and gold, an amalgam resulting from the mixture of such an alloy with mercury alone could not be manipulated soon enough for practical purposes or good results.

My improved method of preparing the amalgam also gives to the operator more time in which to incorporate the prepared mercury with the alloy; and this is desirable, as gold does not at once become amalgamated throughout its mass when in the alloy alone. Preparing the mixture of mercury and gold beforehand saves valuable time, and the mass is mixed with the mercury into a more perfect amalgam—so much so that the amalgam, while yet plastic, is in such a condition as to enable the operator to press, hammer, or mallet the mass in the same manner as if it were plastic gold.

I claim as my invention—

1. The method hereinbefore set forth of preparing amalgams to increase the percentage of gold therein, which consists in mixing or amalgamating an alloy with a mercury-gold preparation or amalgam.

2. An amalgam composed of an alloy and a pasty or fluid mercury-gold preparation or amalgam.

In testimony whereof I have hereunto subscribed my name this 23d day of June, A. D. 1881.

WM. G. A. BONWILL.

Witnesses:
JAMES HOGAN,
AND. W. GALEY.