UNITED STATES PATENT OFFICE.

CRAFT C. CARROLL, OF NEW YORK, N. Y.

COMPOSITION OF MATTER AND METHOD OF PRODUCING THE SAME.

SPECIFICATION forming part of Letters Patent No. 475,382, dated May 24, 1892.

Application filed June 20, 1891. Serial No. 396,978. (No specimens.)

To all whom it may concern:

Be it known that I, CRAFT C. CARROLL, a citizen of the United States, residing in the city and county of New York, in the State of New York, have invented a certain new and useful Composition of Matter and Method of Producing the Same, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to an alloy or metallic compound that can be dissolved by mercury and rendered temporarily plastic, so that it can be molded or shaped into any desired form, and that will by molecular movement set or harden without shrinkage or expansion, and that will not afterward oxidize, tarnish, or in any way be affected by atmospheric, sulphurous, septic, or other gases, and that will at the same time have resisting strength, tenacity, and malleability sufficient to render it of great value in many branches of the mechanical arts, and particularly in dentistry as an agent for stopping or repairing decayed or broken teeth, and from which new teeth may be formed, and which will, in fact, serve as a substitute for gold and other substances now used in dentistry, and be superior to many, if not all, of such substances heretofore employed for such purposes.

I have discovered, after long investigation and many experiments with various metals, that alloys may be formed of many of the well-known metals or combinations thereof and aluminum by mixing them in certain proportions and reducing the product to a powder, which may be readily dissolved by mercury and made into a plastic or semi-solid mass, thus forming an amalgam that can be manipulated into any desired form and possessing all the qualities hereinbefore specified. The alloys referred to may be composed of aluminum in connection with almost any of the well-known metals—such as gold, silver, copper, platinum, tin, and many others—either separately or in combinations of two or more of them, according to the product or result required or the purpose for which the same is intended, which may be as broad as the field of the mechanic arts. In order, however, that the alloys referred to may be amalgamated or united with mercury, as described, I find that it is necessary to employ with either of the metals or combinations thereof from which it is desired to produce the alloy a proportion of from one-half of one per cent. to two per cent. of aluminum, and the remainder must be made up of the other substance or substances employed. For instance, alloys of gold and aluminum in the ratio of ninety-eight to ninety-nine (98 to 99) per cent. of the former to from two to one (2 to 1) per cent. of the latter, or of silver and aluminum or copper and aluminum in the same proportions, may be formed, which may be converted into an amalgam in the manner described. Again, alloys of certain combinations of these metals, together with aluminum, may be formed, which may be amalgamated in the same manner.

For dental and many other purposes I prefer an alloy composed of the following elements in the proportions given, viz., silver, forty-two and three-tenths (42.3) per cent.; tin, fifty-two (52) per cent.; copper, four and seven-tenths (4.7) per cent.; aluminum, one (1) per cent. This combination produces an alloy which, when reduced to a powder and dissolved with mercury, forms an amalgam in the form of a plastic mass that has no equal for the purposes of dentistry. It can be manipulated or formed in any manner desired, readily packed into the cavities of teeth with steel or other instruments, the more easily if said instruments are heated to about 200° Fahrenheit, making a complete and harmonious restoration of decayed, broken, and lost parts of the natural teeth that subserves all the desirable purposes of a perfect tooth and restores and conserves the same beyond any hitherto-known amalgamating compound, in that it is easily and speedily manipulated, sets quickly, and becomes very hard and homogeneous, with a strong edge strength that forms a closely adhering line of union with the tooth structure, making a perfect stopping against the air and fluids of the mouth, and that resists to the highest degree any action of oxygen, sulphur, or other materials that deteriorate other amalgams used for the same purpose.

I have long regarded aluminum as possess-

ing peculiar conserving properties as an element for an amalgam alloy, if it could only be made to amalgamate, which hitherto has not been successfully done, as far as my knowledge goes, but which at length I have accomplished by following the law of chemical affinities, in accordance with the true chemical equivalency of the metals employed.

In the formula last given for producing an amalgam alloy it is not absolutely necessary to employ the exact percentages of the parts given, though in doing so a perfectly-satisfactory result is obtained. The percentage of aluminum employed may be decreased to one-half of one per cent. or increased to two per cent. with perfect safety, and it is also possible to slightly vary the percentage of the other elements of the combination without serious disadvantage, and for some purposes and uses the element of tin in this formula may be entirely omitted, in which case the proportion of silver and copper should preferably bear the same ratio to each other as when the tin is included. In all cases, however, the percentage of aluminum employed should never be less than one-half of one per cent, and not much, if any, over two per cent.

It is evident that many other alloys in which aluminum forms an element may be produced, which may be amalgamated in the manner described, and my invention is not limited to those herein described; but,

Having fully set forth my invention, its construction, purposes, and uses, what I claim, and desire to secure by Letters Patent, is—

1. The method of producing an amalgam for dental and other purposes, which consists in forming an alloy in which aluminum constitutes an element and then adding mercury to the alloy, as and for the purposes set forth.

2. The method herein described of producing an amalgam for dental and other purposes, which consists in forming an aluminum alloy, reducing the same to powder, and dissolving the powder with mercury, substantially as shown and described.

3. An alloy composed of silver, tin, copper, and aluminum in the proportions specified.

4. An alloy composed of silver, tin, copper, and aluminum in the proportions specified and reduced to a powder, as and for the purposes set forth.

Signed at the city and county of New York, in the State of New York, this 19th day of June, A. D. 1891.

CRAFT C. CARROLL.

Witnesses:
C. L. DAVIS,
C. E. ELLIS.