June 16, 1942. E. L. CHOTT 2,286,600

DENTAL AMALGAMATOR

Filed Aug. 19, 1939

Fig. 1.

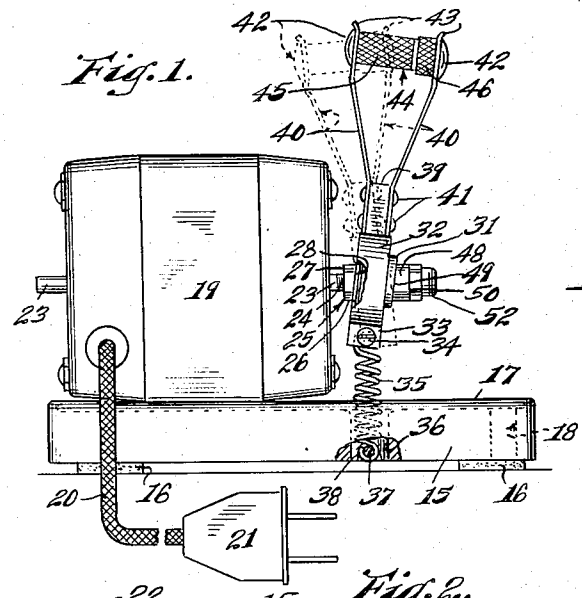


Fig. 3.

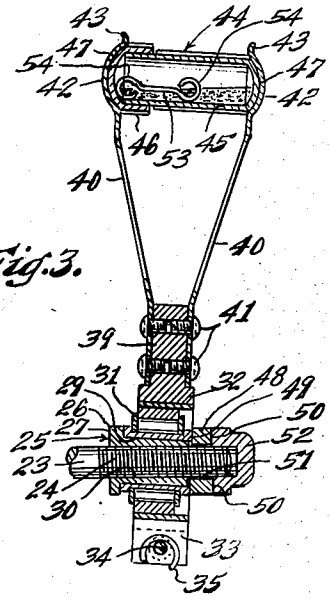


Fig. 2.

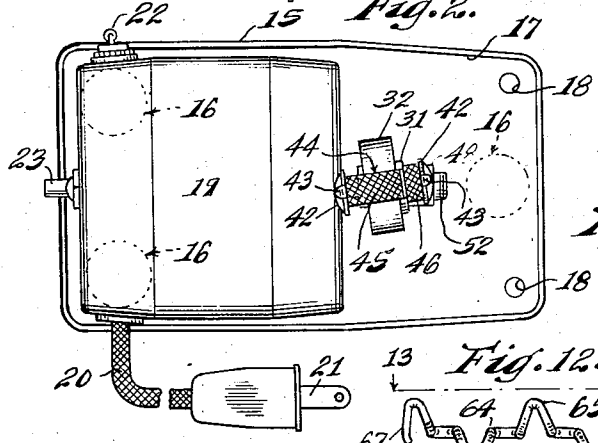


Fig. 4.



Fig. 5.

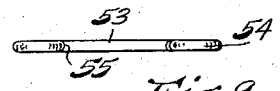


Fig. 9.

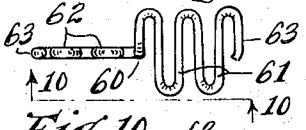


Fig. 12.

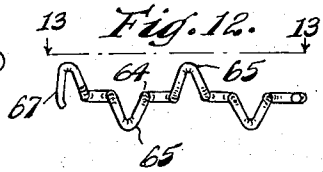


Fig. 10

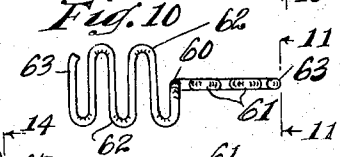


Fig. 6.

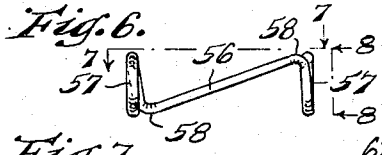


Fig. 13.

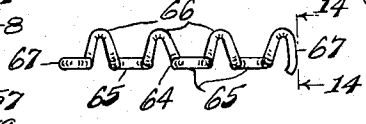


Fig. 7.

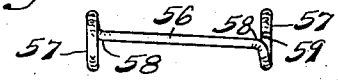


Fig. 11.

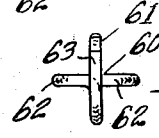


Fig. 14.

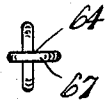
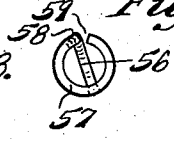


Fig. 8.



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UNITED STATES PATENT OFFICE

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DENTAL AMALGAMATOR

Edward L. Chott, Chicago, Ill.

Application August 19, 1939, Serial No. 291,037

10 Claims. (Cl. 83—10)

My invention relates to the trituration and amalgamation of materials and especially dental alloys, and more particularly to a novel triturator or amalgamator and pestle or pellet adapted to be used in a mortar in the form of a capsule which is moved or oscillated in several directions from a power driven shaft.

There are over fifty brands of dental alloys on the market and each manufacturer furnishes directions for triturating it in a hand mortar.

The triturating pressures vary from 5 pounds pressure on the pestle to just stirring it without applying any pressure. It is therefore necessary to simulate these various pressures from 5 pounds where it is necessary to grind the alloy and reduce the particle size to practically no pressure on some of the alloys where the particle size is not to be disturbed by mixing.

From a series of experiments and research I have found that different alloys require different size pestles, ranging in weight from 1.5 grams to .1 gram in order to meet the various technics of trituration to simulate the various pressures recommended by the different manufacturers. Here, it is also necessary to have the pestle of a given shape in addition to a given weight.

If this capsule (or mortar) is agitated without any weight or pestle in it, the amalgamation is very slow, and when amalgamation does take place it forms a globule which is dry in the center, because the inertia caused by this agitation forces the mercury to the outer ends or surface of the globule, which is due to the difference in the specific gravity of the mercury and alloy materials. The mercury being forced to the surface causes the center to be dry, and in order to make the amalgam fit for practical use, it is or would be necessary to place it in a glass mortar and triturate it until it becomes a plastic, homogeneous mass. This latter operation however, in the majority of cases, causes an over trituration which renders it useless for insertion into the tooth cavity, because over trituration causes shrinkage, leaky fillings, and loss of strength.

Under Government requirements, an amalgam must expand when used as a filling in order to prevent same from getting loose or falling out, as distinguished from contraction or shrinking. In coarse cut amalgams a heavy pestle and pressure is required in the mortar. For fine cut amalgams a lighter type of pestle is required to finely divide and triturate the material and to prevent too severe a pressure and impact, or any of the objections heretofore referred to herein.

The primary object of the present invention is to provide a novel type of pestle for quickly triturating the ingredients, and which consists of light and cheap material such as wire, of irregular or tortuous shape with bent ends, loops at the ends, open or closed, convex portions and rebent ends whereby points or sharp portions are avoided at the ends or points of impact or engagement with the ends of the capsule mortar, to prevent piercing the latter, and at the same time, to insure proper and thorough mixing of mercury and alloy materials in less time, without too much pressure where light pressure or practically no pressure, but substantially merely a mixing operation is required.

This application is a continuation in part of the subject matter shown and described in my prior application for patent for Dental amalgamator, Serial No. 262,118, filed March 16, 1939, which matured in Patent No. 2,201,428 on May 21, 1940.

Further objects and advantages will appear and be brought out more fully in the following specification, reference being had to the accompanying drawing, in which:

Fig. 1 is a side elevation of an amalgamator with which the pestle or pellet is especially designed for effective use;

Fig. 2 is a top plan view thereof;

Fig. 3 is an enlarged vertical sectional view of the mortar supporting means or arm, mortar with a pestle or pellet therein and arm actuating means;

Figs. 4 and 5 are a side elevation and an edge view respectively of one form of pestle in accordance with the present invention;

Figs. 6, 7 and 8 are side view, plan view and end views of another form of pellet or pestle;

Figs. 9, 10 and 11 are views similar to Figs. 6, 7 and 8 of another form of pellet; and

Figs. 12, 13 and 14 are similar views of still another form of pestle.

Referring to the drawing, there is shown in Figs. 1 to 3, the type of amalgamator or triturator shown in my copending application, Serial No. 262,118, filed March 16, 1939, which matured in Patent No. 2,201,428 on May 21, 1940, of which this is a continuation in part, in which 15 designates the base having cushion feet 16 and a surrounding top flange 17 which forms a sort of pan to collect and retain any droppings of amalgam while openings 18 are provided in any suitable number to fasten the base to a horizontal support, bench or table by means of screws or the like. 19 is an electric or other motor, either A. C. or D. C., or both, having a wiring conduit 20

with a plug 21 for connection with a suitable electric outlet or wall socket for electric current supply. 22 is a switch for controlling the operation of the motor, the shaft 23 of which has an angular or eccentric portion. The end 24 is shown threaded to take an eccentric sleeve 25 having a collar 26 at its inner end with the face 27 normal to the axis of the shaft and the face 28 normal to the axis of the sleeve with a slight divergence between the angle of the periphery of the bushing or axis thereof, and that of the shaft which is acute and preferably about six degrees. The peripheral surface 29 of the sleeve is similarly eccentric to the shaft and forms the eccentric portion thereof which as designated at 30 is internally threaded to fix the sleeve to the shaft. Loosely mounted on the sleeve is a bushing 31 with suitable anti-friction bearings and a split collar 32 having apertured ears 33 connected by the bolt 34 to clamp the same to the bushing or loose part. Suitable means is provided to hold the collar in a fixed position or upright, such as shown in my prior application and illustrated in the form of a contractile spring 35 connected to the bolt 34 and in an opening 36 in the base secured to a pin 37 by means of a coil 38.

An arm 39 projects up from the collar 32 and carries a motor supporting means with divergent spring arms 40 anchored to the arm portion 39 by suitable fastenings 41. The arms are provided with concavo-convex sockets 42 and outturned ends 43 by which the arms may be separated so as to receive a mortar in the form of a cylindrical chamber or capsule 44 comprising a body section 45 and a cap 46 with convex ends received in the sockets 42 against the concave faces 47. In order to retain the bushing and mortar supporting means on the sleeve, an eccentric collar 48 is provided which contacts with the bearing, but not with the outer end of the sleeve to permit rotation of the shaft and sleeve without undue friction. The inner face 49 of the collar is eccentric to the axis of the shaft and the outer face 50 is normal thereto while the bore 51 is loose and the collar is held in position by a cap nut 52 threaded on the end of the shaft. With this device, as the shaft is rotated, the arm and capsule will be oscillated horizontally laterally on a vertical axis and simultaneously reciprocated or caused to take a swinging oscillatory motion back and forth with each horizontal lateral oscillation as shown in dotted lines in Fig. 1 and in Fig. 2. This is due to the fact that there is a connection between the shaft and the mortar or capsule supporting means for oscillating the mortar on its upright or vertical central transverse axis which passes radially through said skewed or eccentric sleeve 25 or substantially radially to the shaft 23 and for simultaneously reciprocating the mortar on its longitudinal axis while preventing rotation of the mortar supporting means with the shaft. This movement is particularly effective with a form of pestle or pellet, as will be later described, but the use thereof is not limited to this particular machine.

In Figs. 3, 4 and 5 of the drawing one type or form of light weight pestle or pellet is shown, which consists of a short length of high grade spring wire or other suitable strand of metal, of spring steel, stainless, non-corrosive or other suitable metal having a straight intermediate, shank or connecting portion 53 and rebent inwardly curved ends or coil 54 at the extremities in the same or different planes forming the terminal thereof. Preferably the strand or length of wire is bent at spaced points of the ends thereof in angular relation and in opposite directions and then coiled or otherwise bent to form curved portions or terminals, loops, rebent portions, convex portions as shown, and the extremities are disposed in close proximity or contiguous to the angularly bent portions and ends of the intermediate portion 53, as shown at 55. The purpose of this is to present rounded or transversely curved inbent portions at the ends of the pestle or pellet to avoid excessive wear or piercing of the capsule form of mortar 44 as shown, such as would occur or be caused by sharp or exposed ends in longitudinal or lengthwise direction of the pestle and prevent such from piercing of the metal of the capsule, especially at the ends thereof and for securing an intimate and thorough mixing of the alloys of the amalgam due to various directions in which the mortar or capsule and the pestle or pellet are moved when agitated and caused to act on the materials such as alloy and mercury as described, or otherwise.

In Figs. 6, 7 and 8 of the drawing another form of pestle or pellet is shown in which 56 is the intermediate, connecting or shank portion extending diagonally and having the bent portions or coils 57 at the ends thereof at intersecting planes or preferably bent as at 58 substantially normal to the longitudinal axis or length of the pellet and to the portion 56 viewing the latter in one direction, as shown in Fig. 7, and at acute angles thereto when viewed in a direction or plane at right angles thereto or turned 90 degrees with respect to the diagonal or oblique extension of the portion 56 as seen in Fig. 6 with the terminals 59 adjacent the bent portions. Both forms above, as well as others to be later described, present portions at various angles transversely, longitudinally and diagonally to contact with the walls of the mortar or capsule whereby to secure thorough trituration of the ingredients of the amalgam.

In Figs. 9, 10 and 11 of the drawing, a still further modification is shown in which the intermediate or connecting portion 60 is bent substantially at right angles transversely and the portions 61 and 62 on opposite sides thereof toward the ends of the pellet are disposed in the same planes with the angular portions or planes of extension thereof but normal to each other and bent in sinuous, corrugated, rebent or tortuous form as shown with rebent inwardly curved terminals, as shown at 63, extending substantially entirely or less or approximately half way across the portions 61 and 62 as do the angular portions 60, as shown in the drawing.

In Figs. 12, 13 and 14 of the drawing another form or modification is shown in which the central intermediate or connecting portion is designated at 64, angularly bent at right angles as is portion 60 and oppositely extending portions 65 and 66, each being a verge or acute angled portion alternating at opposite sides in the same plane or in planes at right angles to each other. The ends or terminal portions 67 each correspond to one side of a portion 65 or 66, are bent or curved transversely and inwardly, as shown, so that the points or ends will not be presented to extend longitudinally thereby preventing excessive wear or penetration of the ends of the capsules. All forms of the device have rounded or convex ends to prevent injury to the capsule and also insure better trituration and act in all

directions, as well as give a certain degree of resiliency to the pestle or pellet.

The various shapes of pestles of the present application prevent the possibility of the amalgam forming into a ball or globule because the force of agitation of the amalgam is distributed and thus prevented from forming a globule, wherein the inertia could effect a dry center of the mass formed in the mortar alone, that is, the capsule. With the proper shape pestle for a given alloy I have been able to have amalgamation take place in three seconds using 1.25 grams of alloy and 2.25 grams of mercury; whereas, without the use of a pestle of proper weight and design it takes from one-half to one minute to amalgamate this above mass and then the amalgam is not ready for immediate use. With my method of mixing amalgam it is ready for immediate use, and trituration is completely finished in approximately one-twelfth the time, or less in some cases.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. The combination with an amalgamator having a driven shaft and mortar supporting means, a cylindrical capsule mortar supported thereby and having oppositely concaved internal ends and a connection between said shaft and said supporting means for oscillating the mortar on its transverse axis which axis passes substantially radially through said shaft and simultaneously reciprocating the mortar upon its longitudinal axis, and a pestle in the mortar comprising a single strand with a single intermediate connecting portion and arcuately bent ends turned inwardly in a longitudinal direction.

2. In combination with an amalgamator having a horizontal motor driven shaft provided with an angular portion, an arm having a bearing loosely mounted eccentrically on the angular portion to permit the shaft and angular portion to turn in the bearing, said arm being limited against sidewise movement, prevented from turning with the shaft and adapted to oscillate horizontally laterally on a vertical axis upon rotation of the shaft and to oscillate in an arc on a horizontal axis with each horizontal oscillation when the shaft is rotated, a mortar supported horizontally in the arm and having concaved ends internally and convex ends externally and a pestle in the mortar comprising an intermediate portion in the form of a single strand with convex inwardly turned intersecting end portions bent in opposite directions on opposite sides of the intermediate portion.

3. In combination, a capsule mortar with oppositely concaved ends at the inside thereof and a pestle in said mortar comprising a wire in the form of a single strand bent to provide an intermediate connecting portion and rounded ends bent transversely in opposite directions longitudinally beyond the ends of the intermediate connecting portion and turned inwardly at their extremities.

4. A pestle for use with capsule mortars comprising a wire strand having a diagonal connecting portion intermediately and loops at the ends bent in opposite directions at acute angles to the connecting portion.

5. A pestle for use with capsule mortars comprising a single spring wire strand having a rectilinear connecting portion intermediately and loops at the ends bent in opposite directions laterally and longitudinally beyond the extremities of the connecting portion in transverse planes normal to a longitudinal plane through the connecting portion.

6. A pestle for mortar capsules comprising a spring wire member having an intermediate portion with end portions bent transversely on opposite sides of said intermediate portion and end loops on opposite sides of the longitudinal axis of the intermediate portion.

7. A pestle for mortar capsules comprising a spring wire member having an intermediate connecting portion and end portions bent substantially perpendicularly and transversely to extend on opposite sides of said intermediate connecting portion and inturned ends forming convex portions longitudinally beyond the ends of the intermediate connecting portion.

8. A pellet for capsule mortars comprising a connecting portion, serpentine portions and loops at the ends thereof longitudinally beyond the ends of said serpentine portions and in planes intersecting said connecting portion and bisected thereby.

9. A pellet for capsule mortars comprising a rectilinear intermediate connecting portion extending diagonally and loops at the ends and outwardly longitudinally beyond the ends of said connecting portion disposed substantially normal to a plane of the connecting portion and extending in opposite directions.

10. A pellet for capsule mortars comprising an intermediate connecting portion of angular form with zig-zag portions at right angles to each other and inturned convex end portions on opposite sides of the longitudinal axis of the intermediate portion disposed in intersecting planes.

EDWARD L. CHOTT.