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J. T. RYAN

2,286,440

AMALGAM MIXER

Filed March 25, 1940

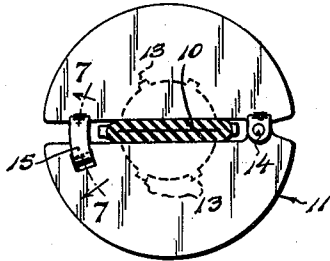


Fig. 3.

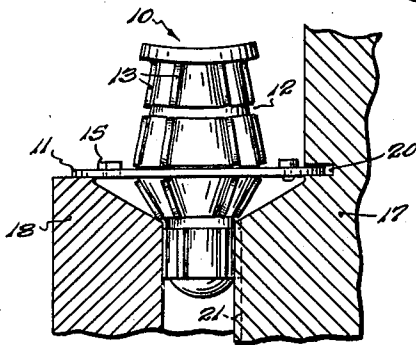


Fig. 4.

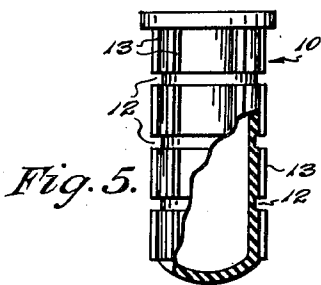


Fig. 5.

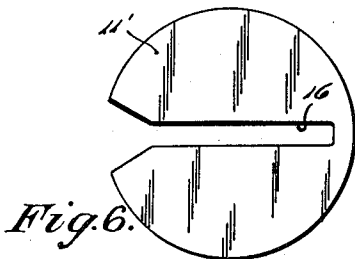


Fig. 6.



Fig. 7.

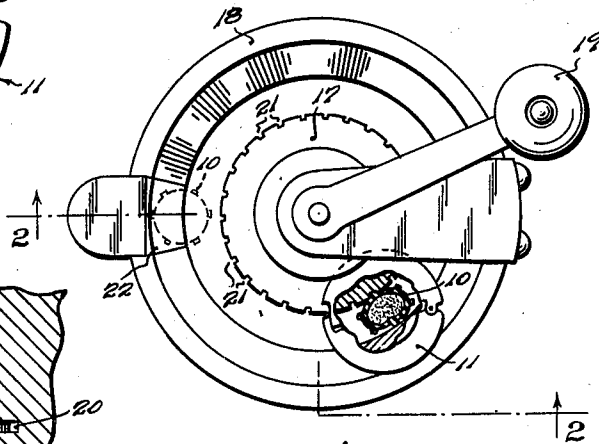


Fig. 1.

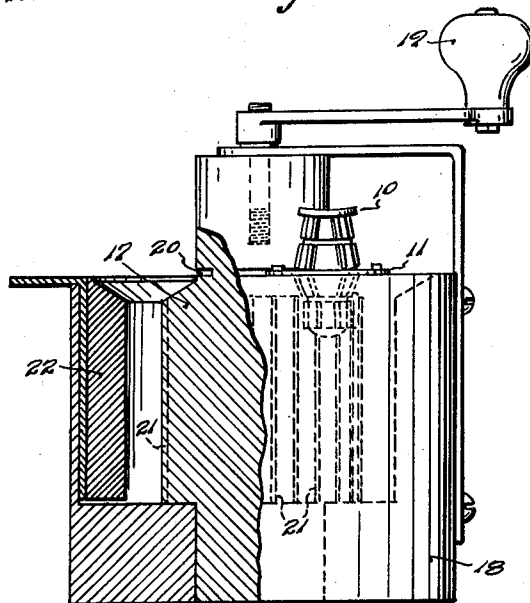


Fig. 2.

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UNITED STATES PATENT OFFICE

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AMALGAM MIXER

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12 Claims. (Cl. 259—72)

This invention relates to amalgam mixers for use in the dental profession in the preparation of a mix of mercury and silver for filling tooth cavities. Its principal object is to perfect equipment for this purpose by devising a compression-pressure mixer in which the mixing agent, which is to say the pressure applied, is controlled more effectively than heretofore through means assuring uniformity in both the degree and duration of the exerted force.

For clarity in description, it is believed advantageous to here state that the invention essentially consists in a compressible receptacle having the ingredients sealed therein and associated with a mill the action of which is to rub the filling materials. Produced from rubber or other suitable flexible material, the receptacle is in the form of a sack and the mill therefor, in its preferred form, is comprised of an annular bowl having a revoluble drum mounted therein, the drum being of a reduced compass as compared to the inner surface of the bowl in order thereby to define an endless canal between the facing surfaces of which the sack is squeezed. The sack, so compressed, is given a planetary action by the frictional grip of the drum as the latter is turned.

The sack which I employ is one which, preferably, is graduated into plural chambers of differing volumetric capacity to permit variable measures of the filling materials to be received in the sack, and I find that the desirable method of sealing the measured materials within the sack is to pinch the later on the graduation line predeterminedly related to the measure. Performing this pinching function is a clip element which, desirably, is produced with a circular perimeter to serve the added office of a guide in the application of the sack to the mill in that the clip is caused to marginally track in a groove for restraining the epicyclic sack against end-wise movement from the canal.

Referring now to the drawing:

Figure 1 is a top plan view of an amalgam mixer constructed in accordance with the present invention, a part of the guide-forming clip being broken away to better portray the action of the canal walls in imparting planetary movement to the sack while compressing the latter.

Fig. 2 is a view partly in side elevation and partly in longitudinal vertical section on line 2—2 of Fig. 1.

Fig. 3 is an enlarged detail section illustrating the sack as the same is pinched by the clip preparatory to the application to the mill.

Fig. 4 is a fragmentary vertical sectional view detailing the application of the sack to the mill.

Fig. 5 is a side elevation with parts broken away and shown in section detailing the sack.

Fig. 6 is a plan view showing a modified form of clip; and

Fig. 7 is a fragmentary vertical section taken to an enlarged scale on line 7—7 of Fig. 3 to detail the catch by which complementary halves of my preferred hinge-type clip are secured in pinching relation to the neck of the sack.

Referring by numeral to the parts as I illustrate the same in the drawing, the sack is denoted by 10 and the clip therefor by 11, the latter functioning to pinch the sack on selective graduation lines predeterminedly positioned in relation to varying given measures of the materials to be mixed, the graduations being defined by grooves 12 running circumferentially about the sack. Also characterizing the sack for a purpose which will become apparent in the description of the mill are a series of circumferentially spaced vertical ribs 13. The clip is of a circular form and, preferably, is comprised of a pair of bi-segments arranged to clamp the sack therebetween, the two segments being hinged at 14 and being detachably secured in sack-clamping position by means such as the indicated hook 15. As a modified form of clip, the key-type disc 11' having a diametral slot 16 (Fig. 6) might be employed.

Reverting to the mill, it will be seen that I have provided what constitutes an endless canal of a width somewhat less than the diameter of the sack, this canal being defined at the inside by a drum 17 and at the outside by a bowl 18, the drum being revolubly carried by the bowl and manually rotated by a handle 19. Extending circumferentially about the drum in a plane substantially flush with the upper level of the bowl is a horizontal groove 20, the office of which is to accommodate the rim of the clip 11 and, as a guide race, resist endwise displacement of the sack from the canal. Also provided by the drum as a complement to the described ribs of the sack are a series of vertical channels 21, the purpose thereof being to augment the natural friction as between the drum and the rubber of the sack to insure epicyclic travel of the sack.

In using the mixer, the dentist or his assistant introduces to the sack such amounts of alloy and mercury as are required for the filling operation, sealing these materials within the sack by applying the clip over the particular graduation groove 12 related to the quantitative measures used. So sealed, the sack is inserted in the pressure canal of the mill to have the circular clip marginally track in the guideway 20, whereupon the handle is rotated a given number of turns at a clocked rotating speed.

As an enlargement of the canal facilitating the insertion of the sack I have provided a recess in the canal wall which normally is closed by a removable plug 22, the plug being desirably tapered and formed such that its inner surface constitutes a prolongation of the curve of the canal's outer wall.

Recognizing the accepted fact that the major obstacle to efficient use of silver as a dental filling is that of shrinkage within the cavity, and pointing out the experimentally established consensus of the manufacturing chemists that this shrinkage increases relatively with the degree to which the user departs, in his mixing operation, in the physical condition of his pressure factors—degree and duration—from those specified by the chemist whose product is being employed, it will, it is believed, be readily apparent that the mixer which I have devised permits a definite control of the time duration through a governing of the speed and number of rotations of the drum, and a positive control of the applied force by fixing the dimensions of both the sack and the canal.

It is obvious that numerous modifications other than those illustrated and described may be resorted to without departing from the spirit of the invention, and it is my intention that the hereto annexed claims be given a scope in their interpretation commensurate with the state of the advance in the art.

What I claim is:

1. In an amalgam mixer, in combination: a sack forming a compressible mixing chamber for the amalgam; a drum; a bowl supporting the drum for rotary movement and with the latter producing a circular canal of a width somewhat less than the diameter of the sack; means for functionally positioning said sack within the canal; and manually operable means for rotating the drum to have the latter, through frictional engagement with the sack, impart epicyclic movement to the sack.

2. In an amalgam mixer, in combination: a sack produced from a flexible material to form a compressible mixing chamber for the amalgam; a drum; a bowl surrounding the drum and with the latter producing a circular canal for the sack of a width somewhat less than the diameter of the sack; means for functionally positioning said sack within the canal; and means for obtaining relative movement as between the bowl and drum about the center of the latter as an axis for imparting, through frictional engagement with the sack, epicyclic movement to the sack.

3. In an amalgam mixer, in combination: a pressure chamber characterized in that the side walls lie in paralleling relation and are movable longitudinally, one in relation to the other; and a container for the amalgam produced from a flexible material to a diameter exceeding the span between said side walls arranged to be compressed between the latter and by relative movement of the walls given a rolling action within the chamber, means being provided for functionally positioning the container within the pressure chamber.

4. In an amalgam mixer: the combination of a pressure chamber laterally defined by paralleling walls movable longitudinally, one in relation to the other, one of said walls being fluted; and an externally ribbed flexible container for the amalgam of a diameter exceeding the span between said walls arranged to be compressed between the walls and by relative movement of the latter given a rolling action longitudinally of the chamber, means being provided for functionally positioning the container within the pressure chamber.

5. An amalgam mixer according to claim 4 of which the container ribs are spaced a distance

corresponding to the spacing between the flutes to have the one register with the other in the rolling movement of the container.

6. In an amalgam mixer: the combination of a sealed amalgam-containing pliable receptacle; an elongated chamber of a width somewhat less than the normal width of the amalgam-containing receptacle arranged to receive the receptacle and by the act of squeezing the latter between its side walls exert a compression pressure to the amalgam within the receptacle; and devices for obtaining relative longitudinal movement of one as respects the other of the chamber side walls for developing a rolling action of the receptacle coincident with the exertion by said walls, upon the receptacle, of said compression pressure.

7. In an amalgam mixer, in combination: a container for the amalgam produced from a flexible material and graduated to define a plurality of selectively employed amalgam-receiving chambers of differing predetermined volumetric capacities; means for sealing the container to confine the amalgam within a selected chamber thereof; and mechanism operatively associated with the container for rolling the same while compressing the amalgam therein, the graduations of said container being comprised of grooves running circumferentially about the container at longitudinally spaced intervals, said means for sealing the container comprising a clamp functioning by seating engagement in a selected groove to pinch the container walls into contiguous relation.

8. A receptacle for use in mixing amalgam comprising a pliable container having transverse division lines at spaced intervals of its length defining a plurality of chambers of differing volumetric capacities; and means arranged to clamp the walls of the container, one against the opposite wall, and adapted to be applied on a selected division line for sealing the amalgam within the chamber related to the selected division line, said clamping means comprising a pair of hingedly connected segments having a hook at the side thereof opposite the hinge for securing the segments in clamping relation over the container.

9. A receptacle for use in mixing amalgam comprising a pliable container grooved circumferentially at spaced intervals of its length to define a plurality of chambers of differing volumetric capacity; and a clamp arranged to seat in a selected groove and by the act of pinching the container walls into contiguous relation seal the amalgam within the chamber related thereto.

10. Structure according to claim 9 in which the clamp is comprised of a pair of hingedly connected segments having a hook at the side thereof opposite the hinge for securing the segments in clamping relation over the container.

11. An amalgam mixer according to claim 2 in which the sack and the canal wall provide registering ribs and flutes disposed at spaced intervals about the respective peripheries for augmenting friction in imparting the epicyclic movement from the canal wall to the sack.

12. The amalgam mixer of claim 2, means for said functionally positioning the sack comprising a horizontal groove extending circumferentially about the drum; and a circular collar carried by the sack and marginally tracking in the groove for restraining the sack against end-wise movement in the epicyclic travel of the sack about the drum.

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