May 27, 1952 P. J. VAN DER WOUDE 2,598,624

DENTAL INSTRUMENT

Filed Oct. 23, 1947

2 SHEETS—SHEET 1

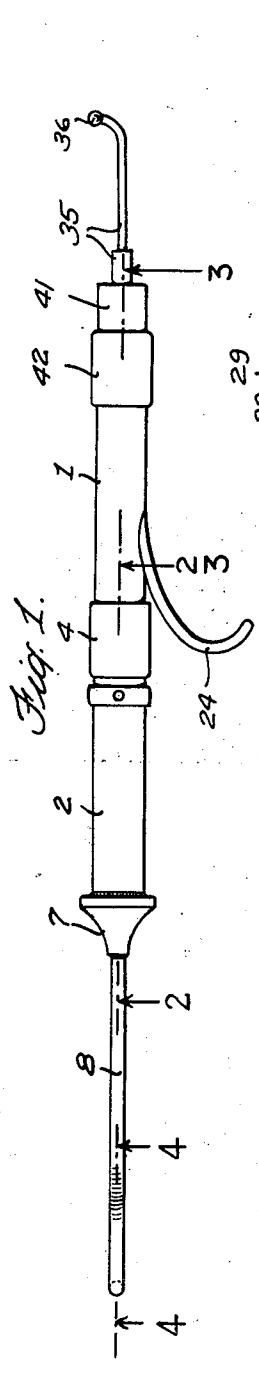


Fig. 1.

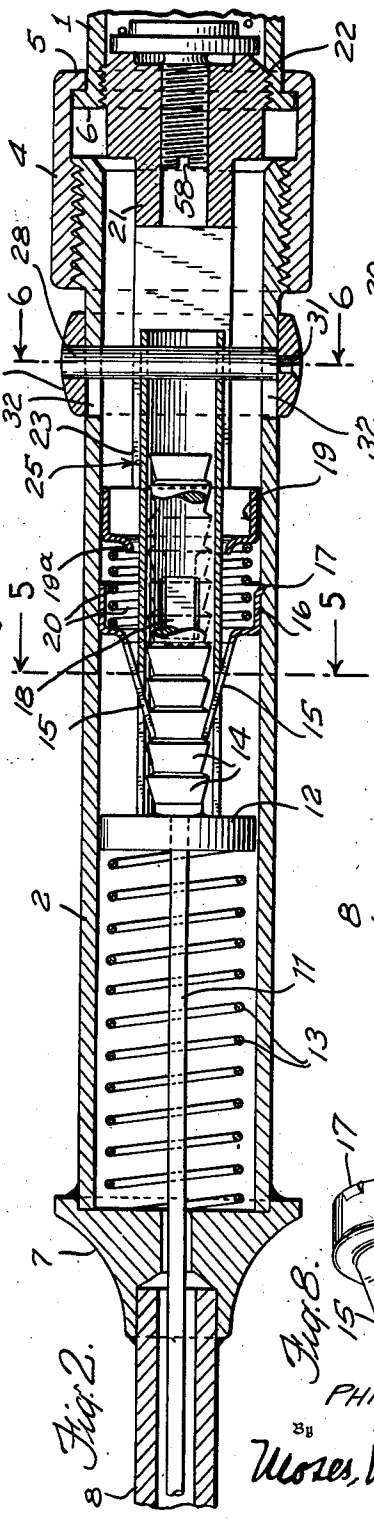


Fig. 2.

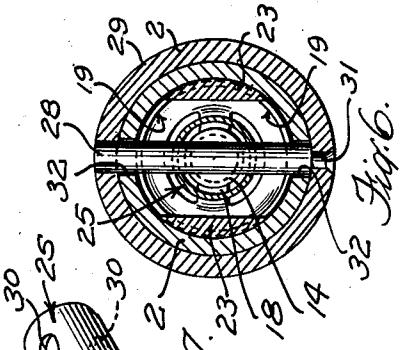


Fig. 6.

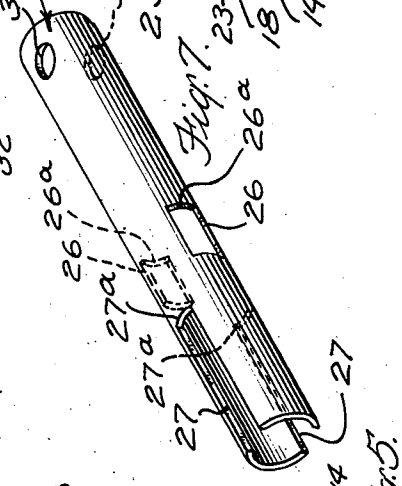


Fig. 7.

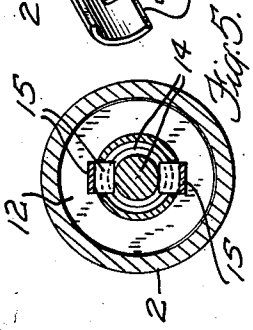


Fig. 5.

Fig. 4.

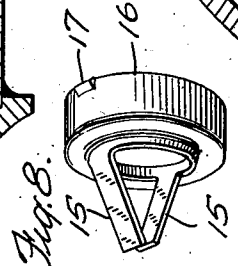


Fig. 8.

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DENTAL INSTRUMENT

Filed Oct. 23, 1947 2 SHEETS--SHEET 2

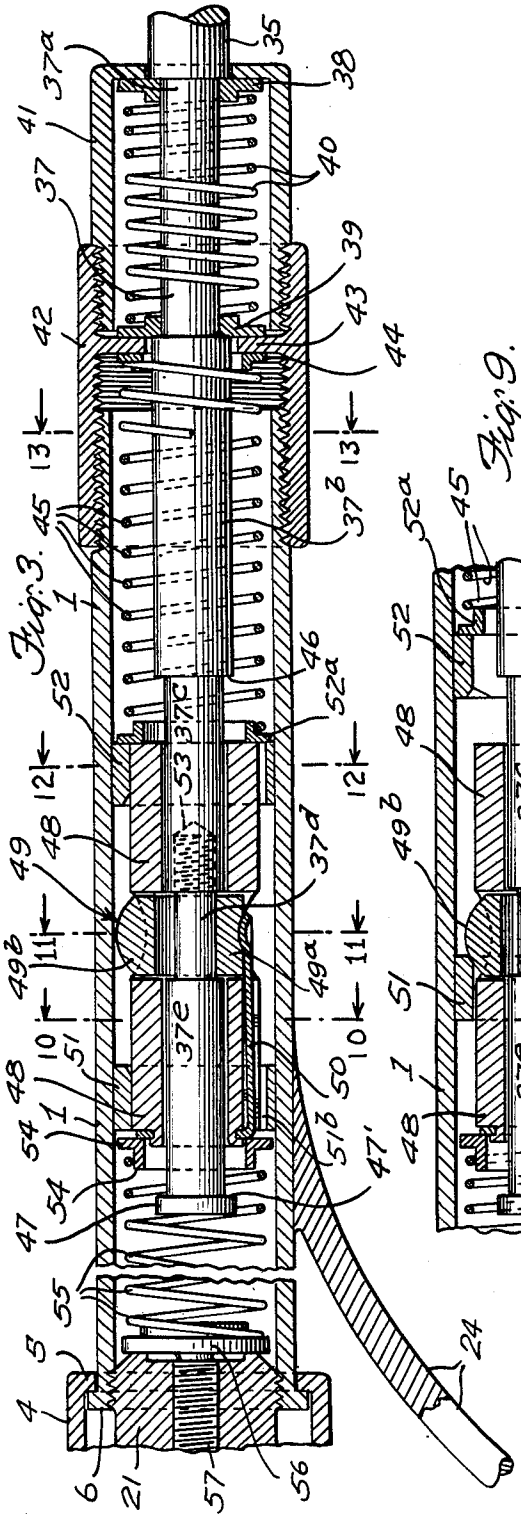


Fig. 3.

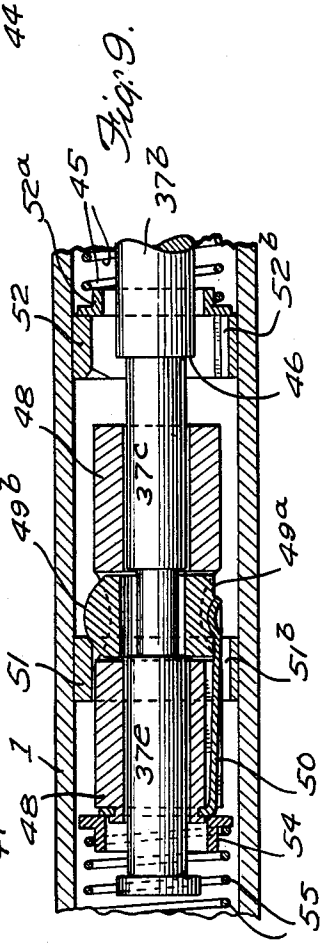


Fig. 9.

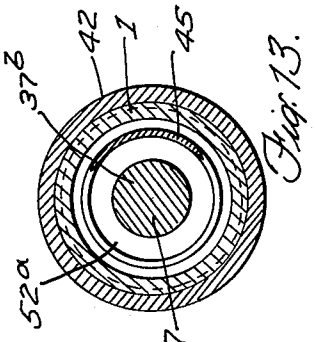


Fig. 13.

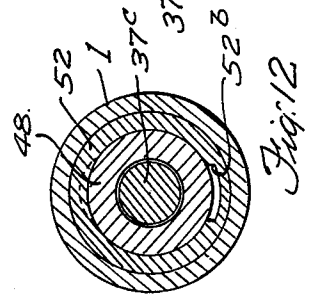


Fig. 12

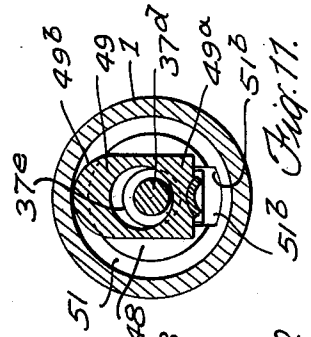


Fig. 11.

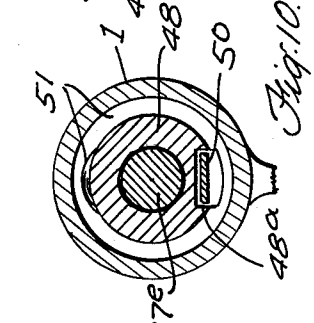


Fig. 10.

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UNITED STATES PATENT OFFICE

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DENTAL INSTRUMENT

Philip J. Van der Woude, New York, N. Y.

Application October 23, 1947, Serial No. 781,573

4 Claims. (Cl. 32—60)

1

My present invention relates to dental apparatus of the type used by dentists for filling teeth. In the usual operation, when the cavity has been prepared, the operator deposits a small quantity of the filling paste, e. g., the usual mercury amalgam or porcelain cement, and immediately tamps the paste so as to compact it and cause it to completely fill one or more crevices of the cavity. Because of the quick setting property of most filling materials it is highly desirable that the operations of inserting and tamping the paste follow one another with the least possible delay. In the usual situation the operator lays down his spatula or other filling instrument and picks up his tamping instrument, after which the latter is laid down and the filling instrument picked up, these operations being alternated until the cavity has been filled. Not only is there loss of valuable time by so proceeding but the constant laying down of the instruments makes for the likelihood of picking up dirt or bacteria. Furthermore, once out of the operator's hand the instrument may roll or be pushed aside and further delay had in again grasping it.

It is therefore a principal object of my invention to provide a combined instrument having at one end a step by step acting filler and at the other end a plugger (also termed a tamper or hammer) which by a simple twist of the wrist may be used to carry out either the function of filling or tamping. A further object is to so combine the two instruments that the barrel or casing proper of the hammer may be gripped as by a thumb piece and used to operate the filler and whereby the casing of one instrument affords a more adequate grip for the other.

A still further object is to improve each individual instrument. For example, it is an object to provide a filler having a step by step action which when exhausted of filling material may be instantly reset. It is also an object to provide a plugger which is of improved construction, of positive operation and capable of delivering a blow in either direction along or parallel to the axis of the instrument.

Further objects of my invention and the advantages thereof will be apparent as the description proceeds, and the features of novelty will be pointed out in the appended claims.

My invention will be best understood by reference to the following detailed description taken with the annexed drawings in which

Fig. 1 is a view of the entire instrument constituting an illustrative embodiment of my invention.

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Fig. 2 is an enlarged view along section 2—2 of Fig. 1.

Fig. 3 is an enlarged view along section 3—3 of Fig. 1.

Figs. 4, 5 and 6 are respectively views taken along sections 4—4 of Fig. 1 and sections 5—5 and 6—6 of Fig. 2.

Fig. 7 is a view in isometric perspective of an element of functioning to release the pawls seen in Fig. 2.

Fig. 8 is a similar view of one pair of spring pawls also seen in Fig. 2.

Fig. 9 is a view along the same section as Fig. 3 but showing the hammer in a different position with respect to the plunger.

Figs. 10, 11, 12 and 13 are respectively views taken along sections 10—10, 11—11, 12—12 and 13—13 of Fig. 3.

The device consists of a casing or housing 1 for the plugger which is seen at the right hand portion of Fig. 1, and a casing or housing 2 for the filler, comprising the left hand portion of Fig. 1, the casings 1 and 2 being joined by means of a flanged nut or coupling 4 having a threaded engagement with the end of casing 2 and having an internal flanged end 5 engaging over an external flange 6 of the casing 1. The coupling 4 also permits the flange 6 to move to the left as seen in Fig. 2 as will be hereinafter pointed out.

The details of the filler will now be described:

Attached to the casing 2 as by welding or other means is a centrally perforated cap 7 which at its reduced portion holds the duct 8, the outer extremity of which holds the supply of filling paste 9. It also contains plunger 10 attached to a flexible rod 11 which latter passes through the central core of the cap 7 and extends to a centering ring 12. A compression spring 13 extends from ring 12 to the inner flat surface of the cap 7.

Integral with the flexible rod 11 and the ring 12 is centrally disposed ratchet rod 14 having the circumferential ratchet teeth as shown. The ratchet rod 14 is held in relatively fixed position by means of holding pawls 15 which are integral with a ring 16 (see Fig. 8) which is fitted into the casing 2 so as to be immovable therein for which purpose the ring is provided with an ear 17 of a springy material which may be caused to engage a corresponding groove within casing 2, as shown clearly in Figs. 2 and 8. In order to propel the plunger and ratchet rod 14 to the left, driving pawls 18 are provided which are attached to ring 19 freely movable in the casing 2, except for the action of a spring 20

held within ring 16 and exerting its action on the annular base 19a of said ring 19. Except that it is movable in the casing the ring and pawl assembly 18 and 19 is substantially similar to that of ring 16 and pawls 15, 15. It will be noted for reasons which will be later apparent that the pawls 18, 18 are turned approximately 90° to pawls 15, 15. In order to move the ring 19 and hence the plunger 10, an element 21 is provided which is held in threaded engagement with the casing 1 (screw threads 22), such element having depending bifurcations 23 which engage the periphery of the ring 19 (see Fig. 6) while keeping free of rod 14. It will further be seen that by moving the casing 1 toward cap 7 as by means of a thumb hook 24 attached thereto such movement is transmitted through the element 21 to the ring 19 and the driving pawls 18 so as to move the ratchet rod 14 the length of one stroke which normally is just equal to the distance between the ratchet teeth on rod 14. This stroke is determined by the spacing between the flange 6 and the right hand end of the casing 2, this space being adjustable by turning the casing 1 with respect to the element 21.

Having exuded the supply of filling material by repeated strokes of the plunger 10, it is necessary to retract the same and to accomplish this, means are provided for releasing both the holding pawls 15 and the driving pawls 18, such means taking the form of a tube 25, Fig. 7, having a pair of opposed longitudinal slots therein 26, 26, the arcuate edges 26a of which engage respectively beneath the driving pawls 18, 18. Tube 25 also has a pair of opposed slots 27, 27 longitudinally and radially spaced from slots 26. Edges 27a, 27a, of slots 27, 27 similarly engage beneath the holding pawls 15, 15. Tube 25 is moved by means of a transverse pin 28 secured to a ring 29, pin 28 engaging tube 25 by extending through holes 30 therein, the pin and ring being secured together by means of a set screw 31. To permit movement of the ring 29 longitudinally of the casing 2 the latter is slotted as shown at 32. To release the plunger 10 it is then merely necessary to grasp the casing 2 with one hand and slide the ring 29 to the left as seen in Fig. 2 thereby releasing the pawls 15 and 18 by allowing spring 13 to retract the plunger 10. This action may be simultaneous with feeding the paste 9 as by pressing the end of the duct or nozzle 8 into a small mass of same. Due to the fact that the tube 25 abuts plunger ring 12 in its extreme position to the right in Fig. 2, the retraction of the plunger ring 12 insures that the tube 25 will be moved fully to the right, thereby allowing pawls 18 and 15 to engage the rod 14.

The plugger as seen best in Figs. 1 and 3 consists of a terminal rod 35, preferably having an approximate 90° bend at its end and equipped preferably with a ball tip 36 or other device for contact with the filling or other object to be hammered or tamped. Rod 35 is made integral with a plunger 37 having a portion 37a of reduced diameter to form a shoulder accommodating a spring retaining washer 38. The plunger also has a portion 37b of somewhat larger diameter than 37a whereby to form a shoulder accommodating a spring retaining washer 39. The two washers 39 and 38 serve to hold a spring 40 which encircles the portion 37a of the plunger. Enclosing the spring 40 is a cap 41 which is bored to accommodate the movement therethrough of

rod 35. In effect it forms an extension of the casing 1. Said cap is secured thereto by means of a ring 42 which is in screw threaded relation to the casing 1 and the cap 41. Ring 42 has an inwardly extending annular flange 43 which serves to hold a washer 44 holding a spring 45 to be later described.

The plunger further has a reduced portion 37c providing a shoulder 46, the purpose of which will be hereinafter apparent, the plunger terminating at the left in a head 47 providing a shoulder 47'. Plunger 37 has slidable thereon an annular sleeve 48 of sufficient mass to constitute a hammer for striking the blow to be delivered to the plunger. Normally, however, the sleeve 48 is locked to the plunger 37 by means of a latch 49 which surrounds a further reduced portion 37d, the bore of the latch 49 being considerably larger than the reduced portion 37d, and large enough to permit passage of opposed plunger sections 37c and 37e as is seen best in Fig. 11. Latch 49 has the lower portion 49a which in the position shown in Fig. 3 serves to lock the sleeve 48 to the plunger 37, the latch 49 being held in the position shown in Fig. 3 by means of a leaf spring 50 which has an annular portion secured in the head of the sleeve 48 as seen in Fig. 3, it being further noted that the spring 50 is contained in a slot 48a in the sleeve 48. Adapted to cooperate with the cam surface 49b of latch 49 is a tripping lug 51 secured to the casing 1 at the left end of the sleeve 48 as shown in Fig. 3 and a lug 52 at the right end of said sleeve, such lugs having chamfered portions shown which engage the cam surface 49b as seen in Figs. 3 and 9. For convenience of assembly that portion of the plunger 37 to the left of the cam 49 is preferably separable by means of the screw threaded connection 53 as seen in Fig. 3. Lug 52 also serves to hold washer 52a for the left end of spring 45. Lugs 51 and 52 also have cut out portions 51b and 52b respectively to accommodate spring 50.

At the left end of sleeve 48 is a flanged ring or washer 54 which serves to hold a spring 55 which at its other end engages a head 56 of a screw bolt (screw 57) in the head of element 21. Thus by adjusting the position of the head 56 as by means of a screw driver inserted in the slot 58 the tension of spring 55 and hence the magnitude of the blow may be adjusted.

In use the striking tip 36 is placed against the filling or other object to be struck a forward blow, the operator exerts a rightward pressure or push, as seen in Fig. 3, which causes the casing 1 to move to the right with respect to the plunger 37 thereby compressing spring 55 (as well as spring 40) and carrying the tripping lug 51 against the cam surface 49b of the latch 49, as seen in Fig. 9. Continued movement of the tripping lug causes the latch 49 to release the sleeve hammer 48 enabling it to be shot by action of spring 55 against the shoulder 46 of the plunger, the force of the blow being transmitted by the tip 36. The blow having been delivered by the hammer 48, the casing is retracted by means of spring 40, spring 45 causing the hammer to move back to the position of Fig. 3 where it locks the plunger 37 by engagement with latch 49.

Similarly when it is desired to strike a blow in the reverse direction the casing 1 is moved to the left compressing spring 45 (and spring 40) and moving tripping lug 52 against the cam surface 49b to release the sleeve hammer 49 and cause it to strike against the shoulder 47' of the

plunger. The force of this blow may be varied by screwing ring **42** on casing **1** thus modifying the tension of spring **45**. When the blow has been struck, the parts are returned to their inactive positions by means of spring **49** and spring **55**.

It will be seen from the foregoing that the combined instrument as described lends itself to the operations of filling a cavity and tamping the filling without the operator having to let the instrument out of his hand. It will be understood that various changes may be made in the embodiments as shown without departing from the spirit of my invention or the scope of the appended claims.

I claim:

1. A dental filler comprising a casing terminating in a member having a restricted bore, a plunger mounted for reciprocation in said casing, a ratchet shaft connected to said plunger, a feeding pawl engaging said ratchet for advancing same, a holding pawl for maintaining said ratchet shaft in fixed position when said feeding pawl is released, a spring acting to retract said plunger, a releasing element for said pawls and an actuating device external of said casing for said releasing element, and permitting said plunger to be retracted by said spring.

2. A dental filler in accordance with claim 1

having means whereby the retraction of the plunger is caused to retract the releasing element.

3. A filler according to claim 1 in which the releasing element is in the form of a slotted sleeve, the arcuate edges of which slots engage beneath said pawls to release same.

4. In a dental filler according to claim 1 in which the holding pawl is fixed with respect to said casing and has a housing integral therewith, a spring in said housing and pressing against a housing for said feed pawl whereby said spring retracts said feed pawl upon a forward stroke thereof having been made.

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