

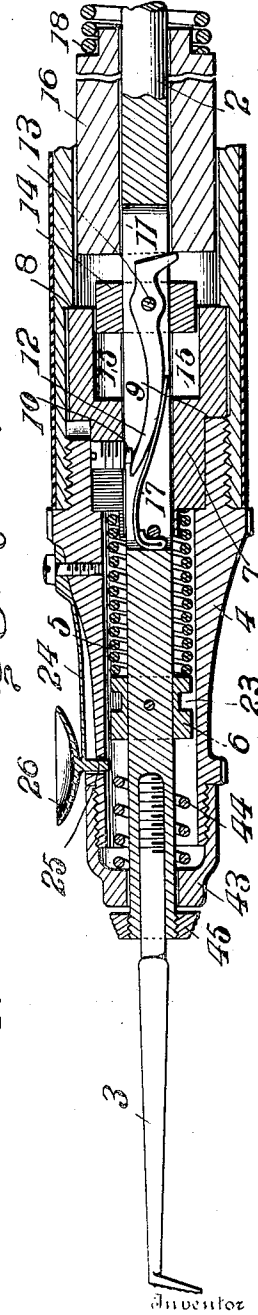
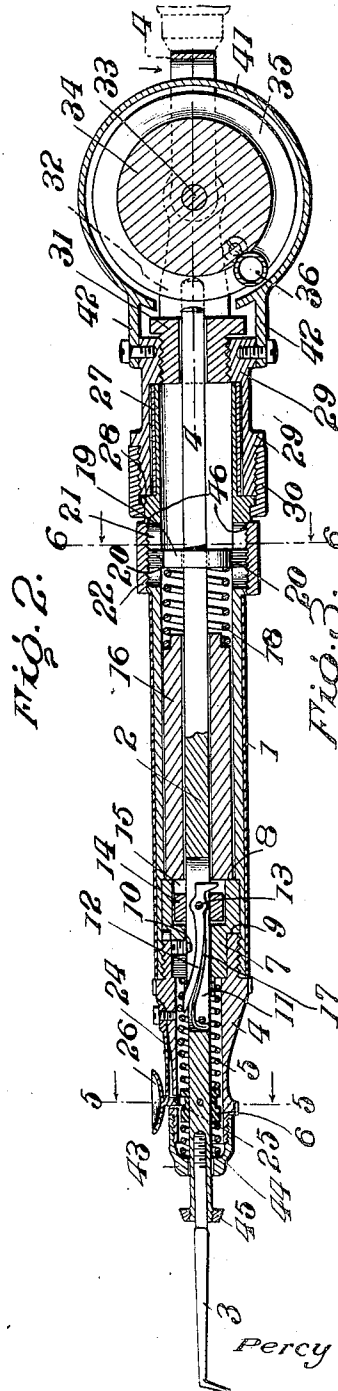
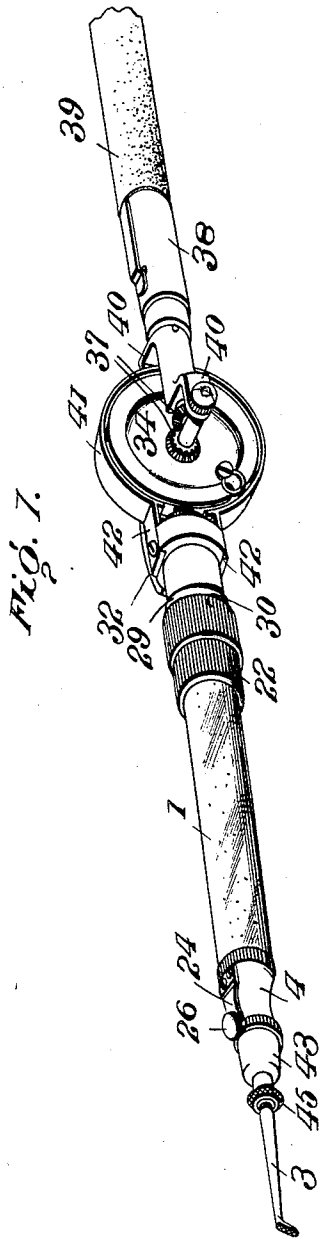
No. 848,334.

PATENTED MAR. 26, 1907.

P. E. WILLIAMS.
COMBINATION DENTAL PLUGGER.

APPLICATION FILED JUNE 9, 1905.

2 SHEETS—SHEET 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 4.

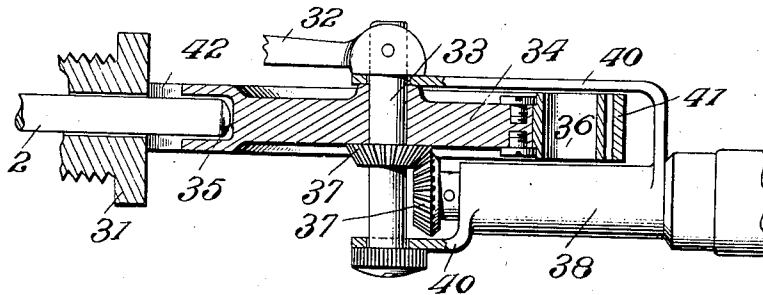


Fig. 5.

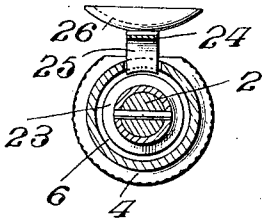


Fig. 6.

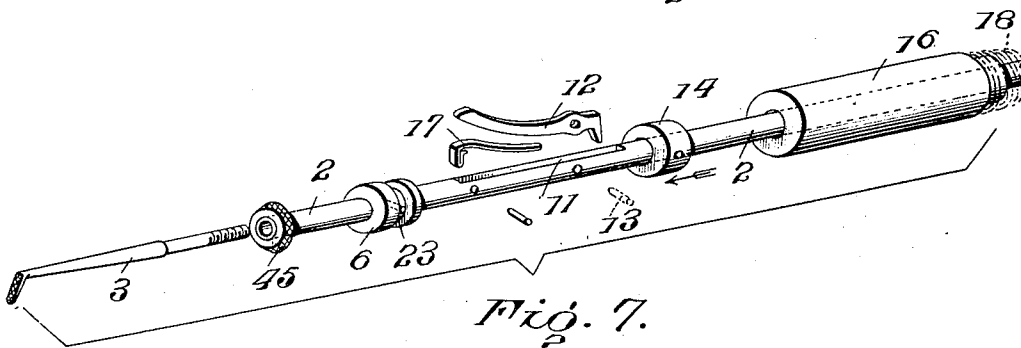
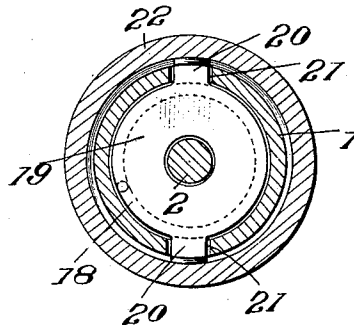


Fig. 7.

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COMBINATION DENTAL PLUGGER.

No. 848,334.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed June 9, 1905. Serial No. 264,534.

To all whom it may concern:

Be it known that I, PERCY EARL WILLIAMS, a citizen of the United States, residing at Savannah, Chatham county, State of Georgia, have invented certain new and useful improvements in Combination Dental Pluggers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain improvements in dental pluggers, and relates more particularly to a combination dental plugger.

An object of the invention is to produce a single dental plugger capable of use as a power or engine operated plugger, a hand-operated plugger, and a hand-pressure plugger, and which shall be comparatively simple and durable in construction and easily handled and operated as any one of the above-named instruments.

A further object of the invention is to provide a power or engine operated plugger embodying a hand-operated plugger and capable of ready adjustment or adaptability to operation or use as either a hand-operated or power-operated plugger.

A further object of the invention is to provide certain improvements in arrangements of elements and in construction of parts and details whereby a highly efficient and advantageous improved dental plugger will be produced.

The invention consists in certain novel features in construction and arrangements of parts, as more fully and particularly described hereinafter.

Referring to the accompanying drawings, which show what I now consider the preferred embodiment of my invention from among other constructions within the spirit and scope of the invention, Figure 1 is a perspective view of the plugger, a portion of the flexible driving-shaft being shown with the plugger coupled thereto. Fig. 2 is a longitudinal section of the plugger and its power-driven rotary actuating-wheel, the plugger being shown in adjustment for operation as a power-plugger. Fig. 3 is a longitudinal section of a portion of the plugger on a larger scale, the parts thereof being shown in adjustment for operation as a hand-operated plugger. Fig. 4 is a longitudinal section, enlarged, through the swivel connection and rotary actuating-wheel, a portion of plugger being

shown in the position assumed with respect to said wheel when the plugger is in the adjustment shown by Fig. 3—that is, when the plugger is employed as a hand-operated plugger and the actuating-wheel is not driven by the engine. Fig. 5 is a detail cross-section, enlarged, in the plane of the line 5 5, Fig. 2. Fig. 6 is a detail cross-section, enlarged, in the plane of the line 6 6, Fig. 2. Fig. 7 is a perspective view of certain detached parts of the plugger—to wit, the reciprocating tool-stock or spindle and certain attached or cooperating parts.

By my invention I provide in one plugger provisions for accomplishing the operations and results of the enumerated three devices, and hence my device embodies a combination dental plugger.

In the drawings, 1 is the exterior casing of the plugger.

2 indicates the longitudinal reciprocatory spindle or tool-stock, at its outer end suitably formed to detachably receive any suitable bit, plugger, or tool 3. The spindle 2 is arranged longitudinally within and projects beyond both ends of the casing 1. The outer end of the casing is internally threaded or otherwise formed to receive the end nipple or head 4, which is formed with a longitudinal bore to loosely receive the spindle 2, and the hand-operated plugger expansive spring 5, coiled thereon and arranged to be compressed between the collar 6, rigidly secured on the spindle, and the outer end of the sleeve 7, through which the spindle loosely extends. The sleeve 7 is clamped and held in the casing between the internal annular shoulder 8, formed in the inner wall of the casing 1, and the inner end of the nipple 4, which engages an exterior annular shoulder 9 intermediate the length of the sleeve 7. This sleeve 7 carries the projection which operates the trip controlling the striker or hammer that imparts the blow to the spindle when the device is used as a hand-operated plugger. In the present instance I show this projection, consisting of an adjustable radially-disposed pin 10, extending through the sleeve 7 and projecting into the bore thereof and into a longitudinal slot 11 in the spindle 2. The pivoted dog or trip 12 is located longitudinally in said slot, and is fulcrumed on a pin 13, passing through the spindle and rigidly securing a collar 14 on the exterior of the spindle, and which is slidably located within the enlarged end portion 15 of the bore of the

sleeve 7. The inner end of the trip 12 is formed with a lateral head or toe projecting outwardly through the spindle-slot 11 to engage the outer end of the hammer or striker 16, and the trip is normally yieldingly held by spring 17 with its said toe engaging the end wall of the hammer to hold the same separated a distance from the collar 14 and to cause the hammer to move inwardly of the casing and with the spindle against the tension of hammer-spring 18. The hammer consists of a tubular body longitudinally and slidably arranged in the casing and through which the spindle loosely extends. The hammer-spring 18 is coiled loosely around the spindle and abuts against the inner end of the hammer and at its inner end abuts against a collar 19, through which the spindle loosely passes and which is held in place by the radial lugs 20, passing loosely through longitudinal slots 21 in the casing. The outer ends of the lugs 20 are toothed or threaded to mesh with the internal screw-threads of a rotary adjusting nut or sleeve 22 on the exterior of the casing and held against longitudinal movement. By rotating the nut 22 the collar 19 will be longitudinally moved to tighten or loosen the spring 18 to vary the force of the blow imparted by the hammer 16. The parts are so arranged that when the tool 3 is forced with sufficient pressure against the filling and the casing 1 is pressed toward the filling the casing will move longitudinally of the spindle against the tension of spring 5, the trip 12 will hold the hammer against movement with the casing, the collar 19 will compress spring 18 against the hammer, and as the movement continues the projection 10 will move outwardly into engagement with the free or outer end of the trip 12 and will rock the trip, thereby moving its inner end or toe into the spindle-slot 11, releasing the hammer 16, which under the impulse of spring 18 is then forcibly projected into engagement with collar 14, imparting the blow to the spindle and tool 3. The operator then releases pressure on the casing, and the spring 5 returns the parts to their normal positions, and the trip again springs out at the end of the hammer in readiness to repeat the operation.

The instrument when operated as thus far described performs the functions and operations of a hand-operated plugger.

In order to permit the operation of the instrument as a hand-pressure plugger, I form an annular groove 23 in the collar 6, located in the end nipple 4 and provide a finger-operated device to project into said groove, and thereby lock the spindle and casing together against independent longitudinal movement. When the spindle and casing are thus locked together, the tool 3 can be pressed against the tooth or filling by hand with the desired force, as is often desirable and necessary to

avoid breaking the enamel or for other purposes. Various devices can be employed for thus locking together the casing and spindle. For instance, I show a plate-spring 24, arranged longitudinally of the exterior of the nipple 4 and at one end secured thereto, so that its opposite and free end tends to spring outwardly. The free end of the spring is provided with a flange or projection 25, arranged in a radial hole through the nipple. The free end of the spring is also provided at its outer side with a finger cup or piece 26. The projection 25 is arranged in the plane of the groove 23 in collar 6 when said collar is in its normal position, with spring 5 distended or inactive. When the collar is in its said normal position, inward pressure on the finger-piece 26 will bend the spring and force the projection 25 into the groove 23, and thereby lock together the spindle and casing. The release of pressure on the finger-piece 26 allows the spring to return to its normal position, with the projection 25 withdrawn from the groove 23.

In carrying out other features of my invention I provide means for reciprocating the spindle by power independently of and without operating the hammer or striker mechanism hereinbefore described.

The inner end 27 of the casing is extended beyond the collar 19 and is externally reduced and is provided with a shoulder and with an intermediate external annular rib 28 between said reduced portion and the slots 21. 29 is an end cap or head fitting loosely and longitudinally over the reduced end 27 of the casing and having an annular rib 29'. The outer end portion of this cap 29 is externally screw-threaded to receive the coupling-sleeve 30, which screws thereon, and at its outer end loosely embraces the casing 1 and the rib 28, with its intumed annular flange located between the rib 28 and the nut 22. The casing is thus loosely coupled to the end cap 29 and is free to rotate or turn therein. A hard-metal plug 31 is screwed into the outer end of the cap 29 and has a longitudinal opening through which the spindle snugly passes and in which it reciprocates. This plug forms the guide-bearing for the outer end of the spindle.

32 indicates a rigid arm fixed to and projecting longitudinally from the end cap 29. 33 indicates a transverse shaft carried by and projecting laterally from said arm and constituting the axis of the swivel-joint between the driving connection and the instrument and also the axis for the actuating-wheel for the spindle. 34 indicates the actuating-wheel mounted on said shaft 33. This wheel is formed with the peripheral groove 35 formed to receive the projecting end of the spindle 2, as hereinafter described. Said wheel is also formed with the cam or projection 36 arranged across said groove and extending out-

wardly beyond the periphery of the wheel to engage the end of the spindle 2 as the wheel revolves, and thereby longitudinally move said spindle.

5 As a means which can be employed for rotating the wheel I show bevel-gearing 37, actuated by a shaft-section in coupling-sleeve 38, detachably receiving flexible shaft 39 from any suitable motor. This sleeve 38
10 forms part of a fork comprising rigid arms 40, at their free ends mounted and confined on the end portions of the shaft 33, so that said shaft is free to rock in said arms, thereby forming the swivel joint or connection be-
15 tween the instrument and the driving connection.

41 indicates an annular guard plate or ring extending completely around and inclosing the periphery of the wheel 34 and having projecting ends 42 rigidly secured to the end cap 29. This guard is in width equal to the thickness of the wheel, and it affords complete protection against napkins or other articles catching in the wheel. I arrange an
25 end cap 43 on and projecting beyond the outer end nipple 4, and the spindle passes loosely through the outer end of this cap.

44 indicates an expansive spring coiled around the spindle and arranged between the collar 6 and the end wall of cap 43. This
30 spring 44 is so arranged with respect to spring 5 that when the spindle is in its normal position with the spring 5 inactive the spring 44 will also be inactive, as shown in
35 Fig. 2, and the spindle will be so located that the projection 36 of wheel 34 will just clear the inner projecting end of the spindle. When in this position, the spring 44 holds the spindle inwardly, so that the spindle is vir-
40 tually balanced between the springs 5 and 44, and the collar 14 is held back a sufficient distance from the front wall of enlarged portion 15 of the sleeve 7 to permit the desired reciprocation of the spindle under the impact of
45 the projection 36. To give the operator convenient control of the spindle for the purpose of moving the same into the path of the projection 36 of the actuating-wheel, I arrange a finger-hold 45 on the outer or front end of
50 the spindle. This finger-hold 45 can be formed by a beveled milled nut screwed on the end of the spindle about as shown.

When the instrument is to be used as a power-operated plugger, the actuating-wheel
55 is thrown into gear with the driving-motor, the parts of the instrument are in the positions shown by Fig. 2, and the projection 36 of the wheel will rotate without operatively engaging the end of the spindle. The opera-
60 tor applies the tool 3 to the filling and by his fingers presses back slightly on the finger-hold 45, thereby moving the spindle the slight distance necessary to bring the end into the path of the projection 36. The wheel ro-
65 tates at a high rate of speed, and conse-

quently the spindle will be very rapidly moved longitudinally as the spindle is held yieldingly with its end in the path of the striking projection of the wheel by the pressure of the operator's fingers on the finger-hold 45. 70
When the instrument is thus in use as a power-operated plugger, the spring 5 is practically inoperative, and the hammer and trip devices are out of action.

When the instrument is to be used as a 75 hand-operated plugger, the actuating-wheel 34 is at rest and the spindle when forced back to trip the hammer projects into the groove 35 in the wheel, said groove being thus provided to receive the rear end of the spindle 80 when forced back to its full stroke. It will be understood that when the instrument is operated as a hand-operated plugger the spindle is forced back in the casing a distance beyond the position it assumes when 85 the instrument operates as a power-operated plugger.

To permit free axial movement of the instrument in the end head 29, I prefer to hold the nut 22 from engagement with the coup- 90 ling-sleeve 30, which holds the casing and end head longitudinally together. Hence I provide the casing with an external annular shoulder 46, against which the inner end of the nut 22 is held by the pressure of the 95 hammer-spring 18. This shoulder 46 holds the nut 22 from engagement with the coupling-sleeve 30, and consequently avoids undue friction at the joint between the casing and end head. The spring 18 holds the nut 22 100 against longitudinal movement with the collar 19 when the nut is rotated to adjust the tension of the spring 18.

What I claim is—

1. A dental plugger comprising in its con- 105 struction, a casing having a side opening through its front end portion, a longitudinally-movable tool-holder in the casing, a coiled spring in the casing acting on said holder to force the same to its limit of out- 110 ward movement, a circumferentially-grooved collar on said holder with its groove normally opposite said opening, a finger-piece at the exterior of the casing having an inwardly-extending locking projection adapted to pro- 115 ject through the opening into said groove to lock the casing and holder against independent longitudinal movement, and a spring normally holding said finger-piece and pro- 120 jection outwardly from locking position.

2. A dental plugger comprising in its construction, a casing, a longitudinally-movable tool-holder arranged within the casing, op- 125 posing springs within the casing and both acting on said holder to yieldingly maintain the same in normal position, and means for locking the casing and holder against independent longitudinal movement comprising a finger-piece at the exterior of the casing 130 having an inwardly-extending locking pro-

jection adapted to be moved inwardly into locking position when the holder is in its said normal position and a spring yieldingly holding said projection outwardly from locking position.

3. A dental plugger comprising in its construction, a casing having a front end nipple, a cap on the outer end of the nipple, a reciprocatory tool-holder arranged longitudinally within said casing, a spring within said nipple and acting on said holder to yieldingly press the same forwardly, an opposing spring in said cap and acting on said holder to yieldingly press the same rearwardly, and a holder operating hammer, substantially as described.

4. A dental plugger, comprising in its construction, a casing, a sleeve 7, therein, an adjustable pin 10, extending through the sleeve and projecting into the interior thereof, a reciprocatory tool-holder longitudinally arranged in the casing and passing through said sleeve, a spring-pressed reciprocatory hammer in said casing and on said holder, said holder having an anvil to be engaged by said hammer, and a trip carried by said holder to set and release said hammer, said trip adapted to be engaged and rocked by the inner end of said pin, substantially as described.

5. A dental plugger comprising in its construction, a casing, a spring-held tool-holder in the casing and having a variable longitudinal movement therein, a rotary power-actuated hammer for acting on said holder when the same is in one position, a spring-hammer and trip mechanism within the casing and acting on said holder when the same is in another longitudinal position, and a finger-actuated lock operative from the exterior of the casing and adapted to lock said holder, when in its normal position, against longitudinal movement with respect to the casing.

6. A dental plugger comprising in its construction, a casing, a spring-held tool-holder in the casing and having a variable longitudinal movement therein, a rotary power-actuated hammer for acting on said holder when the same is in one position within its

range of longitudinal movement, a spring-hammer and trip mechanism within the casing and acting on said holder when the same is in another longitudinal position, and a spring within said casing and acting on said holder to yieldingly hold the same in its normal position and out of operative position with respect to said hammer mechanisms, substantially as described.

7. A dental plugger comprising in its construction, a casing, a rotary power-actuated hammer arranged at the rear end thereof and comprising a rotary wheel having an annular circumferential groove and a striking projection, a reciprocatory tool-holder extending longitudinally through the casing and having a limited range of rearward movement to bring its rear end into operative position with respect to said striking projection, and having an extended range of rearward movement with its rear end extended rearwardly into said groove and beyond operative relation to said striking projection, a spring in the casing and acting on said holder to yieldingly hold the same outwardly beyond said extended range of rearward movement, and a trip and spring-hammer mechanism within the casing and acting on said holder when in its extended range of rearward movement.

8. A dental plugger comprising in its construction, a casing, a reciprocatory tool-holder arranged longitudinally of the casing and having a variable longitudinal movement therein, a rotary power-actuated hammer for operatively acting on said holder when the same is in one longitudinal position, and a spring-hammer and trip mechanism arranged within the casing and acting on said holder when the same is in another longitudinal position with respect to the casing.

In testimony whereof I affix my signature in presence of two witnesses.

PERCY EARL WILLIAMS.

Witnesses:

M. L. COOPE,
HUBERT E. PECK.