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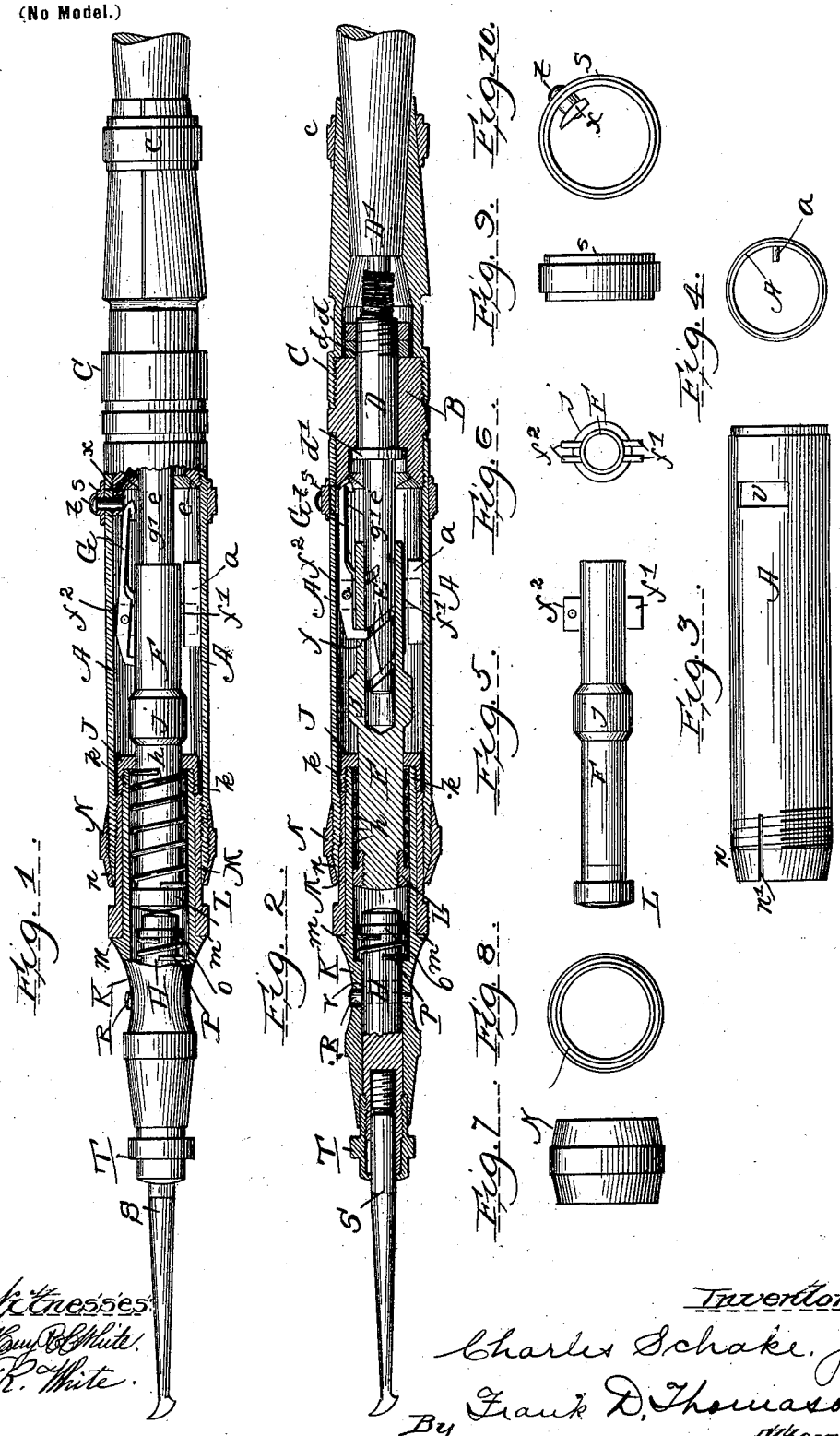
C. SCHAKE, JR.

DENTAL PLUGGER.

(Application filed Mar. 2, 1899.)

(No Model.)



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DENTAL PLUGGER.

SPECIFICATION forming part of Letters Patent No. 645,608, dated March 20, 1900.

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To all whom it may concern:

Be it known that I, CHARLES SCHAKE, Jr., a citizen of the United States, and a resident of Davenport, in the county of Scott and State of Iowa, have invented certain new and useful Improvements in Dental Pluggers, of which the following is a full, clear, and exact specification.

My invention relates to that class of dental mallets in which the tamping action of the plugger is the result of the operation of devices held in the case of the instrument.

The object of my invention, aside from its economy of construction, its compactness, and perfection of operation in the performance of the work for which it is adapted, is to intermit the tamping action of the plugging-tool, whenever desired, easily and quickly without stopping the engine to regulate the force of the blow of the hammer by an adjusting device that cannot turn accidentally when the instrument is in use and prevent the binding of the hammer-actuating spindle. This I accomplish by the means and in the manner hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a side view of my invention, showing the central portion of the shell or case of the instrument broken away, so as to show a side view of the hammer and conjunctive devices. Fig. 2 is a longitudinal central section of the same. Figs. 3 and 4 show, respectively, side and end views of the cylindrical shell of the instrument. Figs. 5 and 6 show, respectively, side and end views of the hammer. Figs. 7 and 8 show, respectively, side and end views of the lock-nut used in connection with the adjusting devices. Figs. 9 and 10 show, respectively, side and end views of the hammer-locking device.

In the drawings, A represents the cylindrical case or shell of my invention, the rear end of which is interiorly screw-threaded to receive the forward or front screw-threaded end of a head B. The central portion of this head B is slightly greater in diameter than the rest of it, so as to provide an intervening shoulder between the shell A and the cylindrical forward portion of the clamp C, which screws down over the rear screw-threaded portion of the said head and has a compression-ring *c* slipped over its longitudinally-slit conoidal-shaped rear end. Journaled in the central bore of this head B is the actuating shaft or spindle D of the instrument, which is provided with the lock-nuts *d d* just in rear of its bearing and with a collar *d'*, of sufficient diameter, just forward of its bearings to prevent its longitudinal displacement. The forward end of the bore of head B, in which the collar *d'* moves, is countersunk or slightly increased in diameter, and the edge *e* of the mouth of this countersunk end is inversely beveled to trip the releasing-pawl of the hammer of the instrument, as will hereinafter more fully appear. The rear end of spindle D terminates in a flexible part D', through the medium of which it is connected to the engine-shaft, which effectually prevents the possibility of the spindle binding, and the forward portion of said spindle beyond collar *d'*, which is preferably less in diameter than the portion in rear of said collar, extends beyond the center of the length of shell A a short distance and is provided with a spiral groove E. This spiral groove E extends from the forward extremity of the spindle to a point about midway between the same and collar *d'*, and the portion of said spindle in which this groove is made enters and revolves in the blind bore *f* in the rear part of the cylindrical hammer F.

Hammer F is provided near its rear end on one side with a couple of corresponding parallel guide-lugs *f' f'*, which project one on each side of a longitudinal spline *a*, projecting interiorly from the inner circumference of shell A, so as to prevent the rotation of the hammer, while permitting of its longitudinal movement. At a point about diametrically opposite lugs *f' f'* the hammer is provided with outwardly-projecting lugs $f^2 f^2$, between which the setting and tripping pawl G of the hammer is pivoted. The shorter forward arm of this pawl has its nose inturned and extended through a suitable aperture in the hammer normally into the spiral groove E of spindle D, and the longer or rear arm of the pawl extends longitudinally a suitable distance beyond the rear end of the hammer, substantially as shown in the drawings, and preferably has its extremity bent back upon itself. The nose of the pawl is kept normally

pressing inward toward the spindle by a leaf-spring g', secured, as shown, to the inner surface of the longer arm thereof, so that its shorter or forward end bears inward against the hammer. The hammer, which is spring-actuated, as will hereinafter more fully appear, is retracted preparatory to striking by virtue of the nose of the pawl entering groove E of the revolving spindle D until the end of the rear arm of pawl G impinges against and is pushed inward by the inverse bevel of forward edge e of head B, thus releasing the hammer from the spindle and permitting the coil-spring h, surrounding its forward end, (which has been compressed by the rearward movement of the same,) to rapidly throw it forward to strike the tool-holder H. The hammer is preferably of the same diameter throughout, excepting at about its center of length, where it is stepped to a slightly-greater diameter, so as to provide a boss j, the shoulders of which serve to limit its reciprocal play. The lower portion of the hammer extends through a suitable guide-opening in the cap J, which is screwed down over the rear end of the tubular shank k of the tip K of the instrument and has a retaining-nut L screwed onto the reduced forward end of the same that has its forward edge flanged, so as to have a bearing contact with the walls of the bore of said shank k and also to form a bearing for the outer or forward end of spring h, the rear end of which bears against cap J. Surrounding the shank k of the tip is an adjusting-sleeve M, which fits snugly between the forward end of cap J and an annular shoulder m of the tip K, made by increasing the diameter thereof at a point about midway the length of said tip. The forward end of the sleeve M is beaded and milled, so as to afford a suitable finger-grasp, and by turning this sleeve its rear screw-threaded portion, which engages the interiorly-screw-threaded forward portion of shell A, can be adjusted longitudinally to a suitable extent to move the head of the tool-holder H nearer to or farther from the hammer, so as to lengthen and regulate the force of the blow dealt thereto by said hammer. In order to prevent the accidental turning of this adjusting-sleeve, I taper the forward end n of shell A and provide the same with one or more longitudinal slits n', as shown, so that by proper manipulation of a lock-nut N, which engages the forward screw-threaded portion of the said shell and has the inner surface of its forward portion beveled to correspond to the taper of said shell, the forward end of said shell immovably clamps said adjusting-sleeve. The bore of the tip at a point slightly beyond shoulder m is less in diameter than that in rear of it and forms the guide for the cylindrical body of the tool-holder H, which latter is provided with a circumferential bead o near its rear end, between which and the shoulder formed by reducing the diameter of the bore of the tip a coil expansion-spring P surrounds the mallet, so as to normally keep it at the rear limit of its movement.

The reciprocal movement of tool-holder H is determined by the length of a slot r, made diametrically through its body, through which the barrel of a gage-screw R, tapped through the tip, passes, which tip, it will be observed, can be turned within the sleeve M, so as to change the position of the plugger-point according as desired.

The forward end of the tool-holder H is split and is provided with a longitudinal socket for the reception of the shank of the plugging-tool S, which is securely clamped therein by screwing a lock-nut T of the usual construction upon the split end of the tool-holder.

In order to intermit the blow of the hammer upon the tool-holder whenever desired, I have provided a simple locking device, consisting of a suitable milled band s, surrounding the rear end of a shell A, which carries a screw t, that is tapped therethrough and extends through a circumferentially-elongated slot v in said shell, located at a point just in front of the transverse plane of the forward end of head B. On the inner end of screw t I secure in suitable manner a nut x, the surface of which adjacent to the inner surface of the shell A is curved so as to be parallel thereto, but is separated therefrom a suitable distance. Now the circumferential location of slot v is such that the reciprocations of the hammer carry the rear end of pawl G forward and backward in a radial plane, striking through, say, the left-hand end of said slot v. When it is desired that the hammer should reciprocate freely, the position of the nut x will be at the end of the slot farthest from the pawl. When it is desired to intermit the same, the band is turned so that said nut will wedge in back of the upper end of the longer arm and keep it pushed inward, so as to hold the nose of the shorter arm out of the spiral groove of the spindle altogether, and thereby prevent the reciprocations of the hammer, as hereinbefore explained.

What I claim as new is—

1. In a dental plugger, the combination with a case, of a spring-returnable tool-holder, a spring-actuated hammer provided at its rear end with a blind bore, a rotary spindle having in its forward portion a spiral groove, said forward grooved portion extending into the bore of the hammer, devices carried by the hammer and extending through an aperture therein, which normally enter the groove in said spindle to raise the hammer, and means for releasing the hammer when raised, substantially as set forth.

2. The combination with a suitable case, of a tool-holder mounted in the forward end of the same, a non-rotary spring-actuated hammer having a blind bore in the rear end thereof, a rotary spindle having in its forward portion a spiral groove, said forward, grooved portion extending into the bore of

the hammer, a pawl pivoted to the exterior of said hammer and having an inturned end extending through an aperture in the hammer and normally engaging the spiral groove, whereby the rotation of said spindle operates to retract the hammer, and means for releasing the pawl from engagement with the groove when the hammer is fully retracted, substantially as set forth.

3. In a dental plugger, the combination with a case and a tool-holder mounted therein, of a spring-actuated reciprocating hammer, means for directing its movements, a rotary spindle having a spiral groove therein, a two-armed pawl pivotally mounted on the hammer provided at the end with a nose normally engaging said spiral groove, whereby the rotation of the spindle operates to retract the hammer, and having its other arm free, and devices carried by the case arranged to engage the free arm of the pawl when the hammer is retracted, to depress the said free arm and release the hammer, substantially as set forth.

4. In a dental plugger, the combination with a case having a bearing-head near the rear end thereof, said head having its forward end inversely beveled, of a spring-returnable hammer mounted to reciprocate in the forward end of the case, a non-rotary, spring-actuated hammer having a recess in the rear end thereof, a rotary spindle journaled in said head and having a spiral groove in its forward end, said spindle extending into the recess in the hammer, a pawl pivotally mounted on the exterior of said hammer provided at its forward end with an inturned nose normally engaging the spiral groove in the spindle, whereby the rotation of the spindle operates to retract the hammer, and having its other arm extending rearwardly a sufficient distance to engage the beveled edge of the head when the hammer is fully retracted, whereby the nose of the pawl is disengaged from the groove and the hammer released, substantially as set forth.

5. The combination with a case, a guide-head in the rear end thereof, the forward end of which is inversely beveled and a tool-holder, of a spring-actuated reciprocating hammer having a bore in the rear end thereof, a rotary spindle journaled in said head the forward portion of which enters the bore in the hammer and has a spiral groove therein, a pawl pivotally connected to the exterior of the hammer, the forward inturned end of which enters and engages said groove to retract the hammer, and the rear end of which is extended a suitable distance beyond the hammer, and devices for holding said pawl out of engagement with said spindle to intermit the action of the hammer.

6. The combination with a shell A having a circumferentially-elongated slot *v* therein, a band *s* and suitable devices connected thereto which extend through said slot, a rotary spindle having a spiral groove in the forward portion thereof, a non-rotary spring-actuated hammer having a bore in its rear end into which the grooved end of the spindle extends, a spring-actuated pawl pivotally connected to the exterior of said hammer, the forward inturned end of which enters and engages the groove in the spindle to retract the hammer, and the rear end of which is extended longitudinally a suitable distance and is adapted to be engaged by devices carried by said band *s* and projecting through the slot *v*, and a spring-returnable tool-holder, substantially as set forth.

7. In a dental plugger, the combination with a case, of a hammer mounted therein, means for operating said hammer, means for limiting its range of movement, a tip connected with the case, a tool-holder carried by the tip, adjusting devices for adjusting said tip and tool-holder relative to the hammer and means for locking said tip in adjusted position, substantially as set forth.

8. The combination with a suitable case, exteriorly and interiorly screw-threaded near its forward end, the portion between said threaded part and the end being exteriorly tapered and longitudinally slit, a suitably-shaped lock-nut engaging said threaded and tapered portions, a spring-actuated reciprocating hammer, and means for actuating the same, of a tip K having a tubular shank, a longitudinally-yielding tool-holder in said tip, a cap closing the end of the shank and provided with a guide-opening for the hammer, an adjusting-sleeve M surrounding the shank between said cap and a shoulder *m* on the tip, the rear end of which is exteriorly threaded to engage the interior screw-thread in the forward end of the shell, substantially as set forth.

9. In a dental plugger, the combination with a suitable shell, a guide-head in the rear end thereof having a bore therethrough the forward portion of which is increased in diameter and the forward end of which is inversely beveled, a revolving spindle journaled in said head provided with a collar arranged adjacent to the bearing and within the enlarged bore, lock-nuts *d* on the spindle above said head, and a flexible connection D′ connecting said spindle to a suitable engine-shaft, of a spring-actuated, reciprocating hammer and devices through the medium of which the said spindle actuates said hammer, and a spring-returnable tool-holder, substantially as set forth.

10. In a dental plugger, the combination with a suitable shell having an inwardly-projecting spline, *a*, a guide-head in the upper end thereof the lower end of which is inversely beveled, a revolving spindle journaled in said guide-head, having a spiral groove in the lower portion thereof, a cylindrical hammer F having a blind bore in the rear portion thereof and having guide-lugs projecting exteriorly therefrom on each side of said spline and having a central portion of increased di-

ameter, a pawl G pivoted to the exterior of said hammer having its forward end inturned and extending through the adjacent wall of the same to normally enter and engage said groove, and the rear arm of which is extended longitudinally a suitable distance beyond the rear end of the hammer, a retaining-nut L and a spring *h*, of a tip K adjustable longitudinally in the lower end of the shell having a tubular shank *k*, a cap J screwed over the upper end of said shank, and a spring-returnable, reciprocating tool-holder, in said tip, substantially as set forth.

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