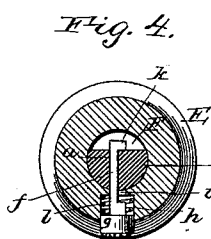
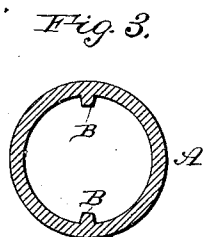
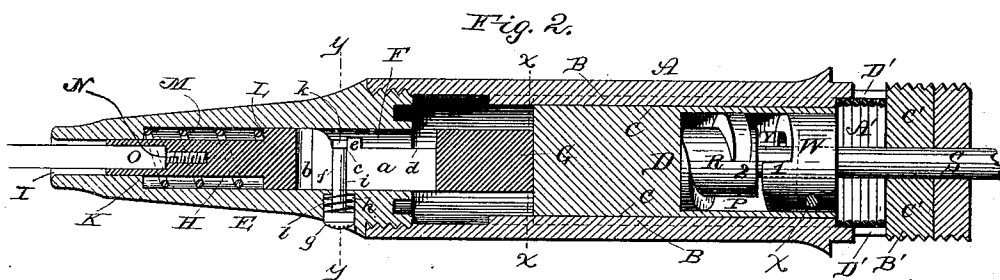
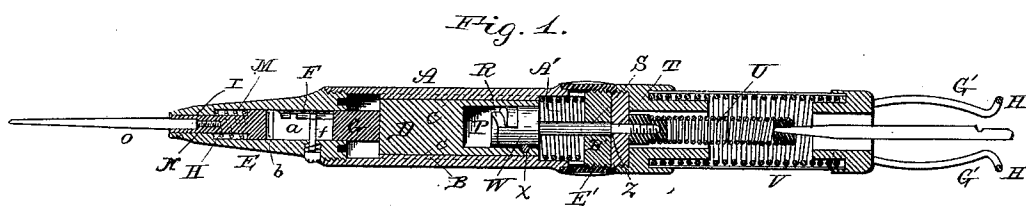


(No Model.)

B. S. BYRNES,
DENTAL PLUGGER.

No. 415,495.

Patented Nov. 19, 1889.



Witnesses

W. Warner
Chas. Beach

Inventor

B. S. Byrnes,
per Freeman & Money

Attorneys.

UNITED STATES PATENT OFFICE.

BENIJAH S. BYRNES, OF MEMPHIS, TENNESSEE.

DENTAL PLUGGER.

SPECIFICATION forming part of Letters Patent No. 415,495, dated November 19, 1889.

Application filed June 11, 1889. Serial No. 313,924. (No model.)

To all whom it may concern:

Be it known that I, BENIJAH S. BYRNES, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented certain new and useful Improvements in Dental Pluggers; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to an improvement in dental pluggers; and it consists in the peculiar construction and combination of devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal central sectional view of my improved dental plugger. Fig. 2 is a similar view of the same, showing the hammer out of gear with the cam to adapt the instrument for use in hand manipulation. Fig. 3 is a cross-sectional view taken on the line *xx* of Fig. 2. Fig. 4 is a similar view taken on the line *yy* of Fig. 2.

The main casing A is cylindrical in form, and is provided on its interior at diametrically-opposite points with longitudinal guide-tongues B, which enter grooves C in opposite sides of the hammer D, arranged in the casing, and thereby serve to prevent the hammer from revolving in the casing and to guide the same in a longitudinal direction. A conical tip E is screwed to the outer end of the casing and serves to close the same, and in the longitudinal bore F of the tip is arranged the shank G. The outer end of the shank is reduced in diameter to form the spindle H, which extends through the reduced portion I of the bore F at the outer end of the tip, and thereby a shoulder K is formed in the bore of the tip and a shoulder L is formed in the shank. The coiled spring M is arranged on the reduced portion of the spindle H and bears against the shoulder *h* of said spindle and against the annular shoulder K formed in the tip E, and serves to normally move the shank inward, so that its inner end or head will be in position

to receive the blows of the hammer, as will be described hereinafter. A threaded socket N is formed in the outer end of the spindle, in which is screwed the plugging-tool or other instrument O. The lower portion of the hammer is solid; but the upper portion thereof is provided with a bore P, and in the same is arranged a cam R, which is attached to the lower end of a shaft S. The latter has its upper end reduced to form a stud T, which is journaled in an opening in the inner or upper end of the casing, and is threaded at its outer extremity to adapt it to be attached to a flexible shaft U, arranged in a hand-piece V and connected to a dental engine (not shown) of suitable well-known construction, whereby rotary motion may be imparted to the cam-shaft. A cam-collar W is loose on the cam-shaft S, and is secured in the inner or upper end of the hammer-bore P by means of a pin X. The cam-face Y of the cam-collar is similar to that of the cam, shoulders or offsets 1 2 being formed on the said cam-collar and cam, respectively. The shoulder Z on the cam-shaft S prevents the latter from moving longitudinally in the casing. A coiled extensile spring A' is arranged in the inner or upper end of the casing and bears on the hammer, tending to force the latter down and to keep the cam-collar normally in engagement with the rotary cam. When the latter is in rotation, the inclined faces of the cam and cam-collar force the hammer upward against the tension of the spring A' until the shoulder 2 of the cam clears the shoulder 1 of the cam-collar, when the said spring A' causes the hammer to deliver a blow on the upper end or head of the shank, which blow is communicated by the tool or instrument O to the filling in the tooth of the patient. Against the upper end of the hammer-spring A' bears a collar B', which has a pair of lugs C' projecting in opposite directions and guided in longitudinal slots D' at the inner end of the casing. The ends of the said lugs project through the said slots and are screw-threaded and engaged by an interiorly-threaded adjusting-sleeve E', which is loose on the end of the casing. By turning this adjusting-sleeve the tension of the spring A' may be increased or decreased, and consequently the

force of the blows of the hammer may be varied at will, as will be readily understood.

It is of importance in an instrument of this class to adapt the hammer to be thrown out of gear instantly, and while the engine or motor continues in operation, to the end that the instrument may be manipulated by hand when arranging the filling in the cavity of the tooth and to enable the point of the instrument to be employed to pick up particles of the filling material and convey the same to the tooth, and I will now describe my improved means whereby this may be effected. The shank *G* is provided with a longitudinal slot *a* of suitable length, at the outer end of which is a circular enlargement *b*, that extends transversely through the shank and communicates with the slot. On one side of the shank, in line and communicating with the slot *a*, are longitudinal recesses or rabbets *c d*, separated by an offset or shoulder *e*. The recess *d* is of much greater length than the recess *c*, and the depth of the shoulder *e* is only equal to half the depth of the recesses. A pin *f* is provided with an enlarged head *g*, which is adapted to enter a countersunk recess *h* in one side of the tip. The shank of the pin is passed through the enlargement *b* when the latter is in line therewith when inserting the shank *G* in the tip, and one side of the said pin-shank is flattened and cut away to form a recess *i*, and thereby reduce the thickness of the pin sufficiently to enable the same to enter the slot *a*. The shoulder *k* at the inner end of the pin projects laterally beyond one side of the slot *a*, and is thereby adapted to enter the recesses or rabbets *c d*, and while the flattened and reduced portion of the pin is held in the slot the said pin is rendered incapable of rotation, and hence its shoulder *k* is maintained at right angles to the shank *G*, or in a transverse position thereon. A coiled extensile spring *l* is placed below the head of the pin and bears against the same, and thus causes the shoulder *k* to normally bear against the recessed side of shank *G*. When the pin is in such relative position to the shank *G* that its shoulder *k* is in the recess *d*, the shank is in its automatic operative position and the hammer is caused to deliver a blow thereon at each revolution of the cam-shaft. By pressing on the head of the pin, so as to cause the shoulder *k* thereof to clear the shoulder *e*, the spring on the outer end of the shank *G* forces the latter inward in the tip until the shoulder *k* is in the recess *c*, and when thus adjusted the shank *G* has moved the hammer so far into the casing that the cam-collar is entirely out of engagement with the rotary cam, and consequently the hammer will cease to operate, and the instrument is then adapted to be manipulated by hand. The outside of the head of the pin is milled to adapt the same to be readily pressed inward by the thumb of the operator.

From the foregoing it will be understood that the hammer may be thrown into or out

of gear instantaneously while the engine or motor is running and while the instrument is being used to fill a tooth, thereby adapting the instrument to be used automatically or by hand at will, and without the necessity of shifting the instrument in the hand of the operator. This is a very great advantage, inasmuch as it enables the operation of filling a tooth to be performed in a very short space of time. By bearing on the point of the tool the operator can cause the shank *G* to be moved inward to any desired extent within the range of the cam and cam-collar, so that the distance traversed by the hammer when it delivers its blows may be shortened to any desired extent, according to the requirements of the case, and thereby temper and reduce the force of the blows to such an extent that nervous irritation may be entirely avoided, even when operating on persons of extreme nervous susceptibility. The hand-piece *V* is flexible and is screwed to the inner end of the casing *A*, and at the opposite end of the hand-piece are a pair of grip-jaws *G'*, each of which is made of a piece of spring-wire doubled substantially in the form of the letter *U* and having their outer ends bent outward at right angles, as at *H'*. These grip-jaws form an exceedingly simple and efficient means for coupling the hand-piece to the flexible driving-shaft of the engine.

Having thus described my invention I claim—

1. In a dental plugger, the combination of the longitudinally-movable hammer, the rotary cam to operate the same, the spring bearing on the hammer, for the purpose set forth, the longitudinally-movable shank adapted for the attachment of the tool and having the slot *a* and recesses *c d*, and the spring-pressed pin in said slot, having the head to engage the recesses, and thereby hold the hammer in and out of engagement with the cam, substantially as set forth.

2. In a dental plugger, the combination, with the hammer and its operating cams and spring, of the longitudinally-movable shank or tool-holder having the recesses *c d* and the pin to engage either of said recesses, for the purposes set forth, substantially as described.

3. In a dental plugger, the shank or tool-holder having the slot *a*, enlargement *b* at one end thereof, recesses *c d*, and intermediate shoulder *e*, in combination with the pin having the flattened or reduced shank to operate in the slot and the shoulder *k*, to engage either of the recesses and clear the shoulder *e*, for the purpose set forth, substantially as described.

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

BENIJAH S. BYRNES.

Witnesses:

J. M. TREZEVANT,
W. I. MOODY.