(No Model.)

G. M. RENN.

Dental Plugger.

No. 232,758. Patented Sept. 28, 1880.

Fig. 1.

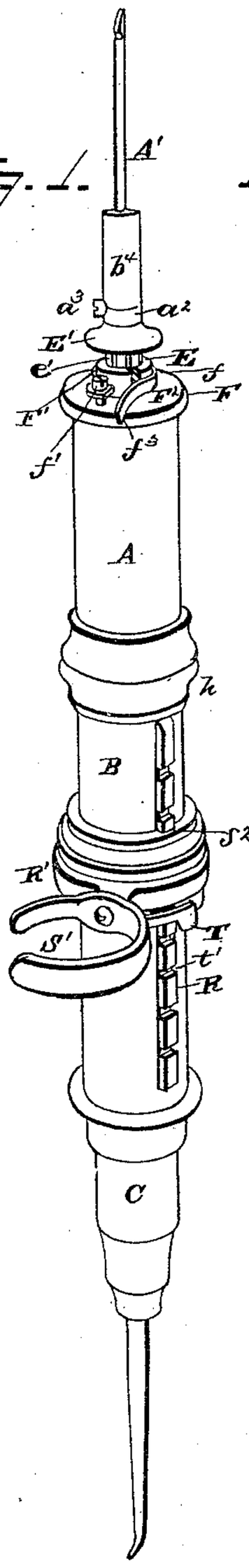

Fig. 2.

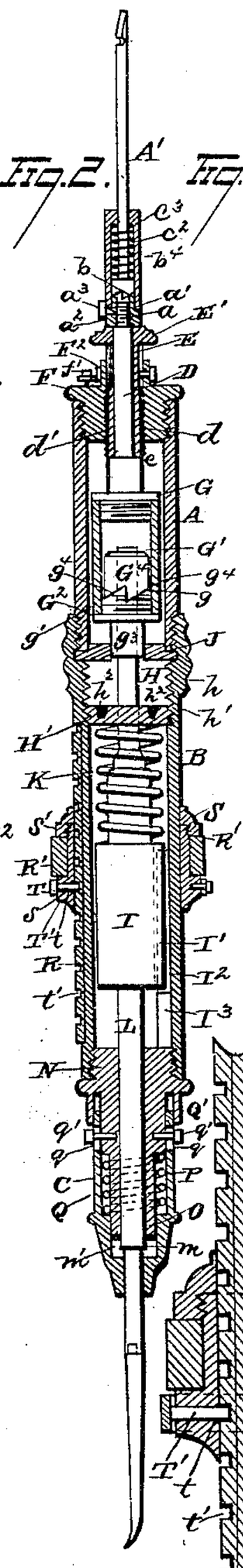

Fig. 3.

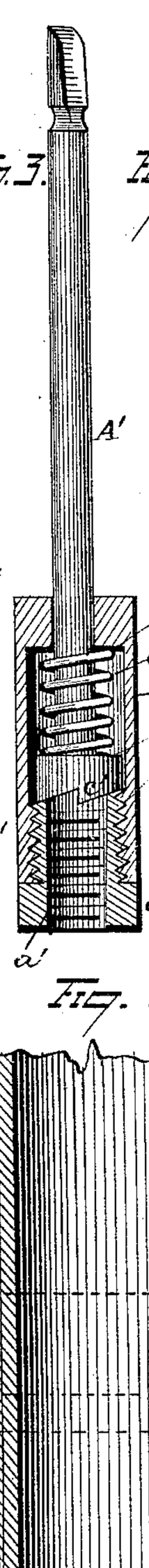

Fig. 4.

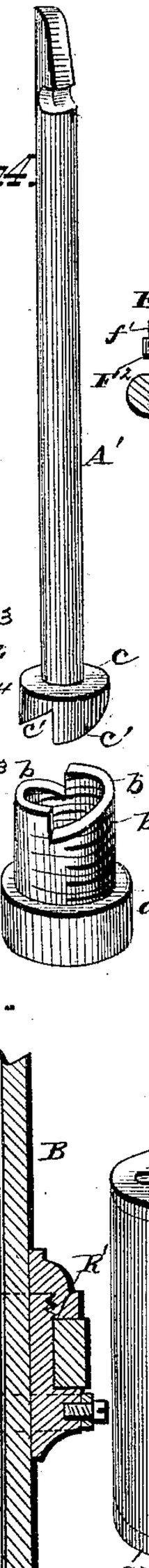

Fig. 5.

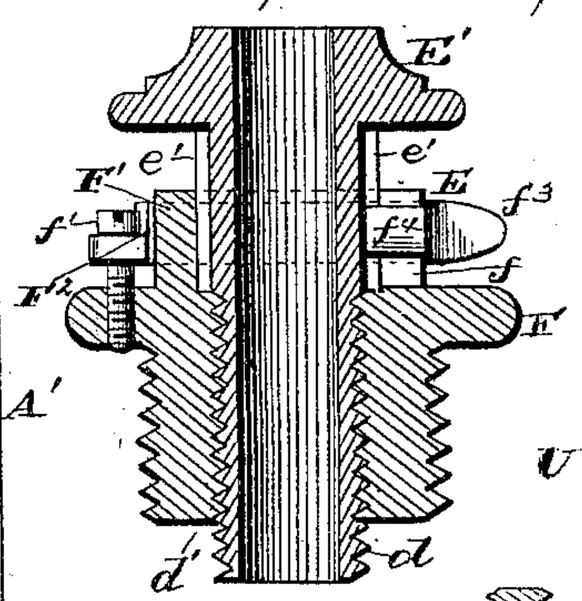

Fig. 9.

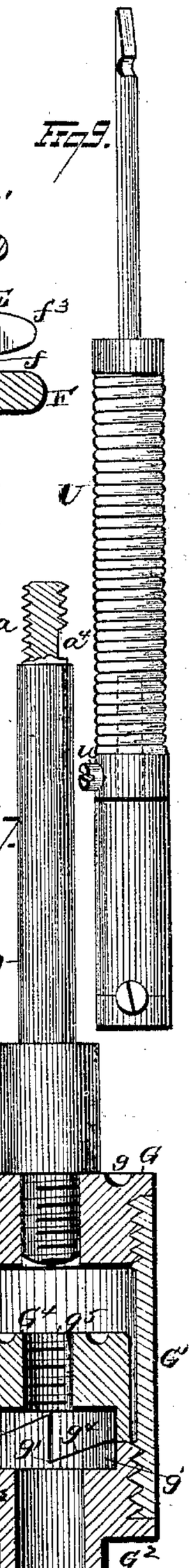

Fig. 8.

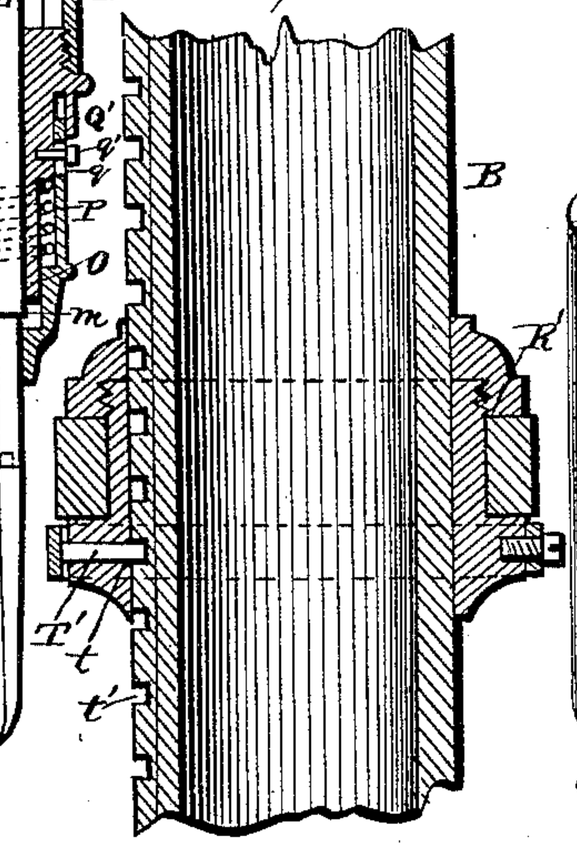

Fig. 6.

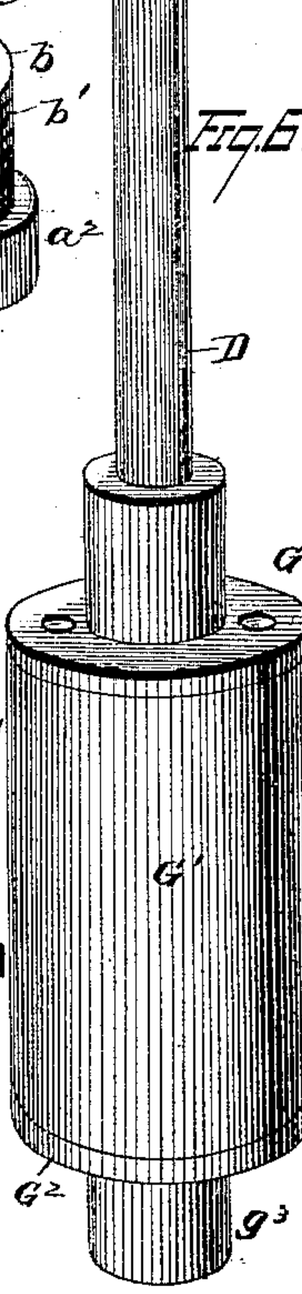

Fig. 7.

WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE M. RENN, OF SUNBURY, PENNSYLVANIA.

DENTAL PLUGGER.

SPECIFICATION forming part of Letters Patent No. 232,758, dated September 28, 1880.

Application filed June 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. RENN, of Sunbury, in the county of Northumberland and State of Pennsylvania, have invented certain new and useful Improvements in 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in dental pluggers, the object being to provide an instrument which shall be durable and efficient in use and capable of imparting quick and regular blows to the tool or point, the actuating mechanism to be inclosed within a compact case, and the parts to be so constructed and arranged that the tool or point may be readily rotated without changing the position of the hand in which the instrument is held, and also the length of the stroke of the tool or point to be readily regulated by adjusting mechanism capable of being locked against accidental displacement. Further, to provide means whereby the mechanism for reciprocating the tool or point may be readily thrown out of gear by pressure exerted by the fingers of the hand in which the instrument is held without stopping the rotation of the driving mechanism and without changing the position of the instrument.

With these ends in view, my invention consists in a dental plugger embodying certain features of construction and combinations of parts, as will hereinafter be described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view, in perspective, of a dental plugger embodying my invention. Fig. 2 is a vertical section of the same. Fig. 3 is an enlarged view, in vertical section, of the clutch mechanism for transmitting rotary movement to the actuating-shaft. Fig. 4 represents detached views of the parts shown in Fig. 3. Fig. 5 is an enlarged view of the devices employed for adjusting the length of the stroke. Fig. 6 is a view, in perspective, of the driving and actuating shaft. Fig. 7 is an enlarged view, in section, of the driving-shaft represented in Fig. 6. Fig. 8 is an enlarged view, showing the adjustable holder. Fig. 9 is a modification.

A represents the upper section of the case or cylinder. B is the central section, and C the lower and adjustable section. D is a rotary driving-shaft, through which a reciprocating motion is imparted to the plugging tool or point, as will be hereinafter explained. The upper end of shaft D is screw-threaded at a, with which engage corresponding female screw-threads a', formed on the inner side of the stationary clutch-section a^2, which latter is prevented from being accidentally unscrewed by means of the set-screw a^3, the end of the latter engaging a flattened surface, a^4, on the screw-threaded portion a of shaft D.

One end of clutch-section a^2 is furnished with two face-cams, b, while its outer surface is reduced in diameter for a portion of its length, and such reduced portion furnished with screw-threads b', which engage in corresponding screw-threads b^3, formed within the lower end of the clutch-sleeve b^4.

A′ is a coupling-shaft, the upper or outer end of which is constructed to be readily attached to the ordinary coupling-sleeve attached to the end of a flexible rotary shaft, such as are usually employed in connection with dental engines. The opposite end of the coupling-shaft is provided with a disk, c, the lower face of which is furnished with two face-cams, c', which fit the correspondingly-shaped cams b on the upper end of the stationary clutch-section a^2. A spiral spring, c^2, encircles the coupling-shaft A′, one end of the spring resting against the upper head, c^3, of clutch-sleeve b^4, while the opposite end of the spring is seated upon the upper face of the disk c, and serves to retain the face-cams c' in engagement with the face-cams b, when the coupling-shaft A′ is turned in one direction. Should the coupling-shaft be accidentally rotated in the opposite direction the face-cams c' will be allowed to slip or ride over the face-cams b, owing to the yielding movement allowed the shaft, and thus prevent any motion being imparted to the mechanism of the dental plugger when the shaft is rotated backwardly or in the wrong direction.

E is an adjusting-sleeve, which serves as a bearing for the upper portion of shaft D. The upper end of sleeve E is furnished with a col-

lar, E′, by means of which it may be easily rotated. The lower end of sleeve E is furnished with screw-threads *d*, which engage in corresponding screw-threads *d′*, formed on the inner surface of the cap F, the latter being screwed into the upper end of section A of the tubular casing.

The lower end of sleeve E is seated upon a shoulder, *e*, formed on the rotary shaft D, while the collar E′, which constitutes the upper portion of the sleeve, abuts against the stationary clutch-section a^2, which is secured to the upper end of shaft D, as hereinbefore explained. Thus it will be understood that the shaft D may have an endwise movement imparted thereto by turning the collar E′ in either direction. The outer surface of the sleeve E, below the collar E′, is provided with any desired number of grooves *e′*, which are formed parallel to the axis of the sleeve.

Cap F is constructed with an upwardly-projecting flange, F′, having a slot, *f*, formed therein. A spring-detent, F^2, is secured thereto at one end by a screw, *f′*, or other device fastened to the top of cap F, while the free end of the detent is outwardly bent to form a thumb-piece, f^3, for its easy manipulation. A lug, f^4, is attached to the inner side of spring-detent F^2, said lug being arranged to project through the slot *f* and engage with the grooves *e′* on the sleeve E, and thereby retain the latter in any desired adjustment.

To the lower end of shaft D is secured the cylinder-head G, the latter being screw-threaded and screwed into the upper end of cylinder G′. Cylinder-head G is furnished with two holes, *g*, into which a wrench may be inserted for removing the head when desired.

G^2 is the lower head of cylinder G′ and extends upwardly into said cylinder any desired distance, the upper end thereof having two face-cams, *g′*, formed thereon. The central portion of the head is cut away, as at g^2, in order to lessen the width of the cams. A sleeve, g^3, extends downwardly from the lower cylinder-head, G^2, for a purpose hereinafter described. Within cylinder G′ is placed a disk, G^4, having two face-cams, g^4, formed on its lower side, said cams being of the same size and form as cams *g′*, and adapted to engage therewith. Disk G^4 is furnished with a screw-threaded hole, g^5, in which engages the upper end of the hammer-shaft H, the latter having a bearing in sleeve g^3, and secured at its lower end to the hammer I. Sleeve g^3 has its bearing in collar J, which latter is located within the lower end of the tubular case-section A, and rests upon the upper end of the central section, B, the two sections being connected by a coupling, *h*.

The sleeve g^3 serves as a bearing for the rotary cylinder G′, and thus prevents any lateral displacement of the latter, and hence retains it from contact with the inner surface of the tubular case-section A.

K is a spiral spring which encircles the hammer-shaft H, the lower end of the spring resting upon the upper end of hammer I, while the upper end thereof is seated against an adjusting-collar, H′, which latter is screw-threaded on its periphery and fits corresponding screw-threads *h′*, formed in the upper end of central section, B, of the tubular case. Collar H′ is furnished with holes or pockets h^2, to enable a wrench to be applied thereto for the purpose of adjusting its position and thereby regulate the tension of spring K, and cause the hammer to impart light or heavy blows, as may be desired. Hammer I is provided with a groove, I′, formed parallel to the axis of the hammer, within which groove is received a guide, I^2, secured to the inner surface of the central section, B, this construction of parts allowing of the free vertical movement of the hammer, but preventing any rotary movement thereof. The lower end of guide I^2 is provided with one or more stops or abutments I^3, which extend toward the center of the case and serve to limit the downward movement of the hammer.

To the lower end of hammer I is secured or formed solid therewith a shaft, L, which has a bearing in the adjustable section or nose-piece C of the casing. Shaft L is provided with an annular shoulder, *m*, which is located within a cylindrical pocket or opening, *m′*, in the nose-piece. A coupling-head, N, is screwed into the lower end of section B, the lower end of the head being furnished with a bearing-sleeve, O, which extends downwardly into the upper end of the nose-piece C, thereby serving as an extended bearing for the shaft L, and also as a connecting-piece to retain the nose-piece against displacement. Around the sleeve O is placed a spiral spring, P, one end of which rests against the lower end of coupling-head, N, and its opposite end against the upper end of the nose-piece, the tension of the spring serving to force the nose-piece downwardly.

To the upper end of the nose-piece is secured a tubular case or sleeve, Q, the upper end of which snugly fits the coupling-head N, and is free to reciprocate thereon. A narrow sleeve, Q′, attached to the coupling-head, projects downwardly over the upper end of the tubular case or sleeve Q, serving to protect and conceal the upper end thereof, and also to strengthen the same. Sleeve Q is furnished with two elongated slots, *q q*, through which are inserted screws *q′ q′*, the latter being secured to the coupling-head and serving to limit the downward movement of the nose-piece.

The lower end of the shaft L is screw-threaded for the attachment of a plugging-point. The central section, B, of the tubular case has a rack or ratchet bar or plate, R, secured thereto.

Upon section B is placed a sleeve, S, made in two parts, *s s′*, the part *s′* being screwed upon part *s*. The interior of sleeve S is fur-

nished with a longitudinal groove, s^2, into which fits the rack-bar R, thereby allowing the sleeve to be freely reciprocated, but preventing any rotary movement thereof. Within the groove R in the two-part sleeve is placed a ring, R′, to which is swiveled the open finger-ring S′. Sleeve S has secured thereto a spring-detent, T, having a lug, T′, which extends through a slot, *t*, in the sleeve, and engages with the grooves *t′* in the rack-bar R.

If desired, the instrument may be connected with the flexible driving-shaft of the dental engine by means of a short flexible coupling, U, as represented in Fig. 9. When this extra coupling is desired for use the coupling-shaft is dispensed with, and in lieu thereof I use a short shaft having a cam-faced disk on one end thereof, which engages with the stationary clutch-section, the same as hereinbefore described, and to the outer end of said shaft attach the sleeve *u* of the flexible coupling-shaft.

Having described the construction and relative arrangement of parts of my improved dental plugger, I will now briefly explain its operation.

Rotary motion being imparted to shaft D in one direction by any suitable dental engine, the cylinder G′, attached to the lower end of the shaft, is rapidly rotated, causing the face-cams on the lower head of said cylinder to engage with the correspondingly-shaped face-cams on the disk attached to the upper end of the hammer-shaft, and thus raise the hammer and plugging-point against the force of spring K, the latter serving to drive the hammer and plugging-point downward and outward, and insure quick and effective blows. As the face-cams of the rotating cylinder always bear on diametrically-opposite sides of the face-cams on the hammer-shaft, the latter will be prevented from any lateral displacement and all undue friction on the bearings will be avoided.

The length of the stroke of the hammer and plugging-point may be readily regulated by rotating the collar E′ in either direction, and the stroke made long or short, as desired. By turning the collar in one direction the rotating cylinder is raised, causing its face-cams to engage the entire length of the face-cam on the hammer-shaft, and thus raise the latter to the highest limit of its movement and produce a long stroke. By turning the collar E′ in the opposite direction the rotating cylinder is lowered, causing the face-cams on the latter to engage with only a portion of the length of the cams on the hammer-shaft, and thus raise the latter a correspondingly less distance, and producing a short stroke.

The blow of the hammer and plugging-point may be made light or heavy, irrespective of the length of stroke, by varying the adjustment of the collar H′.

The hammer and plugging-point may be quickly stopped or the length of the stroke regulated without stopping the dental engine by simply pressing the nose-piece backwardly by the fingers in which it is held without changing the position of the instrument.

By forcing the nose-piece backwardly in opposition to the force of the spring P the lower end of pocket *m′* strikes the shoulder *m* on shaft L, thereby forcing the latter upwardly or inwardly, and operates to move the cam-faced disk connected with the hammer-shaft out of gear with the rotating cam. Thus the plugging-point may be retained in a stationary position without stopping the dental engine or altering the position of the instrument.

The attachment for holding the instrument enables it to be firmly and steadily held in any desired position.

The open ring is slipped upon the forefinger of the hand and the nose-piece held between the thumb and finger.

By disengaging the lug on the spring-detent from the groove in the rack-bar the sleeve to which the finger-ring is connected may be moved toward or from the nose-piece to suit the length of hand or fingers of the operator, and when in proper position the spring-detent is released and engages with one of the grooves in the rack bar or plate, thus locking the finger-ring in the desired position relative to that of the nose-piece. As the open finger-ring is swiveled to a ring capable of rotation in the sliding sleeve the instrument may be rotated and brought into proper adjustment without removing the finger from its holder.

I am aware that a collar provided with a set-screw has been attached to the rotary shaft of a dental plugger for the purpose of securing the rotary shaft in any desired longitudinal adjustment, and hence I would have it understood that I make no claim to such combination of parts. The collar secured to the shaft must revolve therewith. In my improved construction the sleeve for adjusting the shaft does not revolve therewith, but is adjustably secured within a cap in the end of the tubular casing, and has end bearings connecting it with the rotary shaft, and enabling it to impart an endwise movement to the same.

I am also aware that a ring adapted to have a longitudinal and rotary movement imparted thereto has been connected with the tubular casing of a dental plugger, and hence I make no claim to such construction. In my improved device I employ a longitudinally-adjustable ring and an independently-adjustable rotary ring having an open finger-ring swiveled thereto.

It is evident that slight changes in the construction and relative arrangement of parts might be resorted to without departing from the spirit of my invention, and hence I would have it understood that I do not restrict myself to the exact construction and arrangement of devices shown and described; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a dental plugger, the combination, with a rotary shaft for imparting a reciprocating movement to the plugger-point, of a two-part coupling-sleeve, one portion of which is removably secured to the rotary shaft, and is provided on one end with a face-cam, a coupling-shaft provided with a face-cam which engages with the face-cam on the removable end of the coupling-sleeve, and a spring inserted between the face-cam on the coupling-shaft and the outer end of the coupling-sleeve, substantially as set forth.

2. The combination, with a cylinder attached to a rotary shaft, said cylinder having a double-faced cam on its lower head, each cam formed with an inclined face and with its end parallel to the axis of the cylinder, of a double cam-faced disk located within said cylinder and attached to the upper end of the hammer-shaft, the cams on said disk formed with an inclined face and their ends made parallel to the axis of the hammer-shaft, whereby the inclined faces of the cams engage with each on the opposite sides of the hammer-shaft, and the latter is allowed a free unobstructed outward or downward stroke, substantially as set forth.

3. In a dental plugger, the combination, with the rotary shaft and reciprocating hammer-shaft, of a rotary cylinder attached to one end of the rotary shaft and containing face-cams for reciprocating the hammer-shaft in one direction, said cams arranged to engage with each other on opposite sides of the hammer-shaft, said cylinder provided with a tubular bearing at its lower end and a collar secured to the tubular casing and serving as a bearing for said tubular bearing, substantially as set forth.

4. In a dental plugger, the combination, with a rotary shaft, hammer-shaft, and face-cams for reciprocating the hammer-shaft, of a cap secured to one end of the tubular casing and an adjustable sleeve screwed into said cap and adapted to impart longitudinal adjustment to said rotary shaft, substantially as set forth.

5. In a dental plugger, the combination, with a rotary shaft, hammer-shaft, and face-cams for reciprocating the hammer-shaft, of a cap secured to one end of the tubular casing, an adjustable sleeve screwed into said cap, said sleeve provided at its upper end with grooves arranged in line with its length, and a spring-detent attached to said cap and adapted to engage said grooves and retain the sleeve in any desired longitudinal adjustment, substantially as set forth.

6. In a dental plugger, the combination, with a rotary shaft, a reciprocating hammer-shaft, and face-cams for retracting the hammer, of a yielding nose-piece for throwing the face-cams out of gear, substantially as set forth.

7. In a dental plugger, the combination, with the hammer and hammer-shaft, of a nose-piece and sleeve adapted to have a yielding movement and a spring for retaining the nose-piece in its extended position, substantially as set forth.

8. In a dental plugger, the combination, with the tubular case, of a longitudinally-adjustable ring provided with an independent rotary ring having an open finger-ring attached thereto, substantially as set forth.

9. The combination, with the rotary shaft D, of the adjusting-sleeve E, having grooves e' in its outer surface, and provided with collar E′ at its upper end and screw-threaded at its lower end, cap F, furnished with flanges F′, having slot f, and spring-detent F^2 with its lug f^4, substantially as set forth.

10. In a dental plugger, the combination, with the shaft L, provided with shoulders m, of the nose-piece C, sleeve L, provided with elongated slots q q, coupling-head N, screws q' q', and spring P, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 15th day of June, 1880.

GEORGE M. RENN.

Witnesses:
W. W. HERTZ,
P. H. RENN.