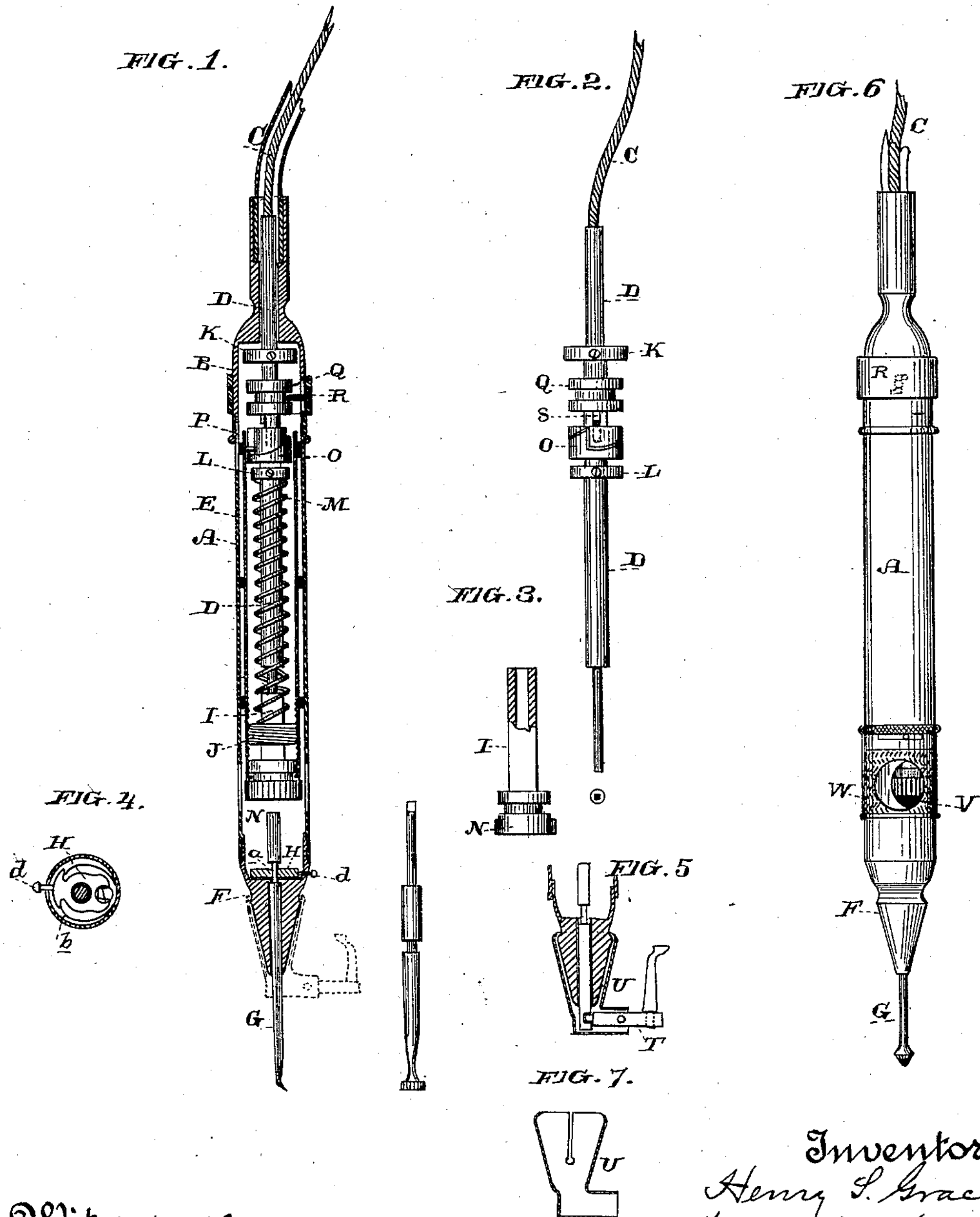
(No Model.)

H. S. GRACE & W. A. L. MILLER.

HAND PIECE FOR DENTAL ENGINES.

No. 303,723. Patented Aug. 19, 1884.



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UNITED STATES PATENT OFFICE.

HENRY S. GRACE AND WILLIAM A. L. MILLER, OF SAN FRANCISCO, CAL.

HAND-PIECE FOR DENTAL ENGINES.

SPECIFICATION forming part of Letters Patent No. 303,723, dated August 19, 1884.

Application filed March 20, 1884. (No model.)

To all whom it may concern:

Be it known that we, HENRY S. GRACE and WILLIAM A. L. MILLER, of the city and county of San Francisco, and State of California, have invented an Improvement in Burring and Plugging Dental Hand-Pieces; and we hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to a dental implement; and it consists of a plugger and a burring-tool in a single dental hand-piece, and, in combination therewith, of a mechanism by which either part may be put into operation while the other remains inactive.

Referring to the accompanying drawings for a more complete explanation of our invention, Figure 1 is a longitudinal section of the hand-piece, showing the internal mechanism. Fig. 2 shows the cam and connected mechanism by which the plugger or drill is operated. Fig. 3 is a view of the hammer-head and square hollow shank by which the tension of the spring is regulated, and through which the blows are delivered. Fig. 4 is a view of the device for holding the tool in place. Fig. 5 is a view of a device for giving a backward stroke. Fig. 6 is an exterior view of the case, showing the opening through which the spring is regulated, and the sleeve or cover. Fig. 7 is a sectional view of the device for holding the lever-arm, which produces the backward stroke in place.

A is the outer cylindrical shell of the hand-piece, made long enough to contain the necessary mechanism. The upper end is fitted with a cap, B, which screws upon the part A, and makes an ornamental finish. Through the top of this cap the flexible driving-cable C enters, and is connected with the stem or spindle D, which extends down to near the lower end of the instrument, passing within a cylinder, E, which slides loosely within the outer casing, for a purpose to be hereinafter described. The point or tip F is screwed upon the lower end of the shell A, and has a hole made through it, through which the plugging or burring tool G passes. Near the base of this tip is a flat plate, H, having a hole, through which the shank of the tool passes. Each tool has a channel, *a*, turned in it at the point where it passes through this plate, and the plate is forced to one side by a spring, *b*, so that one side of the opening is pressed into the channel or groove, and the tool is thus kept in place. The burring-tools have the channel or groove made of a length to allow the edge of the plate to just fit into it, as they only revolve, but the plugging-tools have the groove made longer, so that they may have some longitudinal movement when the blow is given.

I is a square shank having a hole through it, into which the lower reduced end of the stem D fits so as to turn loosely. This end of the stem has a square socket, into which the square head of the burring-tool fits, and when the stem is revolved freely it will turn the drill. Around the outside of the square shank I a collar or nut, J, fits loosely, and its periphery is screw-threaded, so as to fit similar threads which are cut in the interior of the cylinder E near its lower end. When the shank I is turned around, it will turn the nut or collar J and cause it to travel up or down in the screw-threads in the cylinder E. A collar, K, on the upper end of the stem D, by its contact with the interior flat end of the cap B, prevents the stem from being forced upward, and another collar, L, secured lower down and within the cylinder E, receives one end of a spiral spring, M, which extends from it down to the adjustable collar or nut J, against which it acts, and thus tends to press it and the cylinder E downward. The adjustable collar J, by being moved up or down, increases or decreases the tension of the spring. As the stem D is rotated by the flexible driving-cable C, and turning loosely in the shank I, into which it extends, as before described, it will be seen that the burring-tool G, which fits into a square socket in its lower end, will be rotated by it without any reciprocating motion.

When it is desired to use the implement as a plugger, by pressing upon the pin *d* the plate H will be pressed back until the hole through it is in line with the hole through the tip F, and the burring-tool may be removed. The plugging-tool is then introduced, and is held by the plate H in the same manner, but its upper end is flat, and the head N on the lower end of the shank I will rest upon it, the cylinder E and shank (which are united by pins which pass through the sides of the cylinder into a groove in the head N) are pressed down by the action of the spring M, as before described.

In order to produce a reciprocating motion

of the cylinder E, a cam, O, is loosely fitted to the stem D, so that the latter revolves loosely through it. A pin, P, extends inward from the cylinder E, so that its inner end engages the cam, but no movement is communicated to the cam or cylinder until the collar Q is pressed down by means of a pin, R, which projects through a slot in the side of the cap B. This collar is fitted to slide on a feather upon the stem D and constantly revolve with it. The pin R projects into a channel or groove in the periphery of the collar, so that without interfering with its rotation it may be used to push it up clear of the cam or down, so that a pin, S, upon the lower face of the collar will engage the cam and cause it to rotate also. This acts upon the pin P of the cylinder, and it travels up the inclined face of the cam until it reaches the highest point from which it drops off, and the spring M causes the whole cylinder E and shank I, with its head N, to fall upon the head of the plugging-tool G. This being pressed upon the surface to be acted upon, and the channel in which the plate H fits to hold it being somewhat longer than the thickness of the plate, the full force of the blow will be transmitted to the surface. The rapid rotation of the stem D and cam give the strokes in a rapid continuous manner. This action may be stopped at any time by raising the collar Q to disengage its pin S from the cam, so that the latter will cease from rotating.

When it is desired to produce an upward or backward blow of the plugger, it is done by means of a lever-arm, T, the center of which is fulcrumed to a socket, U, which slips over the tip F, so that the inner end of the lever will stand just beneath the hole which is made through the tip. The pin, which extends down through the tip, has its lower end notched, so that the end of the lever fits into the notch, and the blows of the hammer or striker are communicated to the lever, and through it to the plugger. The outer end of the lever has an upwardly-projecting socket, into which pluggers may be inserted, and when the blows are given it will be seen that the action of the lever will change the direction, so that they will be given upward and backward. The lower part of the case A has holes V made in it, and a loose sleeve, W, turning around the outside, has similar holes, which may be turned to correspond with the holes V, so that through them the head N may be reached, and by turning it the stem I will act to move the nut J, and regulate the tension of the spring M. When the sleeve W is turned around half-way, the holes V are covered and protected from dirt.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The exterior casing and interior movable cylinder, the stem D, extending from the upper end, where it is connected with the driving mechanism, into the shank I, in which it turns loosely, and having a socket to receive the head of the burring-tool, and the transversely-moving plate H and spring, and the grooved tool passing through the plate into the socket in the stem D, substantially as herein described.

2. The stem D, extending down through the cylinder E, turning loosely in the shank I, and surrounded by a spiral spring which extends between a fixed collar upon the stem D and a collar, J, having its periphery threaded, so that it may be screwed up or down within the cylinder E, to regulate the tension of the spring, substantially as herein described.

3. The exterior case, interior cylinder, and the stem D, extending through and rotated within the cylinder, as shown, and the cam O, pin P from the cylinder E, collar Q, and pin S, substantially as herein described.

4. In a dental hand-piece, the exterior casing, the interior cylinder with the head N, grooved and connected with its lower end so as to rotate the square shank I, extending inward from the head, and the nut J, fitting loosely over the shank, and having its periphery threaded to travel up and down in the screw-threaded interior of the cylinder, substantially as herein described.

5. The exterior casing, A, interior cylinder, E, stem D, to the upper end of which a rotary motion is imparted, the lower end having a socket to receive the burring-tool, and a perforated plate through which the tool passes, with a spring by which it is pressed to one side so as to engage a groove formed around the tool, substantially as herein described.

6. The exterior casing, A, interior cylinder, E, having the lower rotating head N, and shank I, upon which a nut, J, fits, while its periphery fits screw-threads within the cylinder, and the stem D, with the cam O, and the fixed collars K and L, together with the spring M, substantially as herein described.

7. The exterior casing, A, interior cylinder, E, with head N, adjusting shank and nut, and spiral spring, together with the rotating stem D, loose cam O, and the collar Q, fitted to a feather upon the stem and movable, so as to engage or disengage with the cam and cause it to rotate, substantially as herein described.

8. The casing A, with interior cylinder, E, and spiral spring, the rotary shaft D, with cam by which the cylinder E is drawn back, and a stem passing through the point or tip, upon which the head of the cylinder strikes its blow, together with a detachable tip or socket, U, and lever T, with a tool-holder at its outer end, substantially as herein described.

In witness whereof we have hereunto set our hands.

HENRY S. GRACE.
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Witnesses:
JOHN D. GAGNON,
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