No. 847,591. PATENTED MAR. 19, 1907.

H. S. MILLER.

DENTAL HANDPIECE.

APPLICATION FILED JUNE 22, 1904.

Fig. 1.

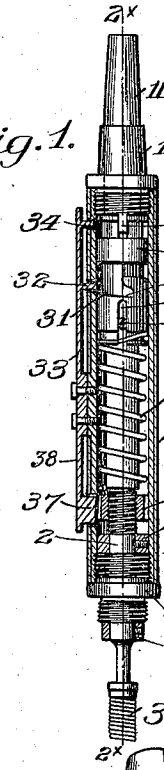


Fig. 2.

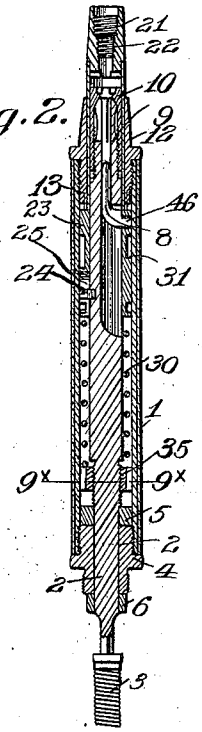


Fig. 3.

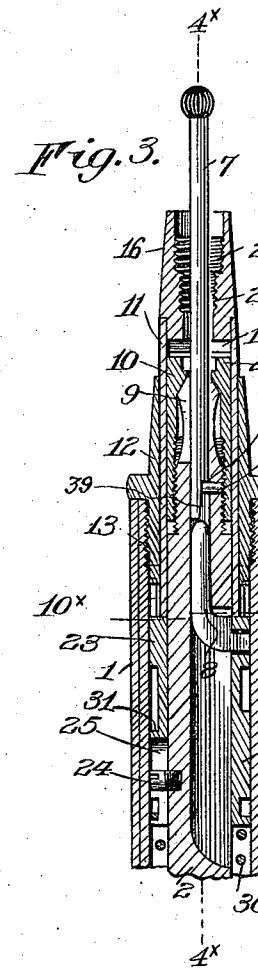


Fig. 4.

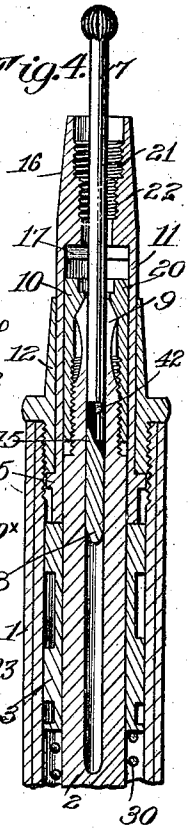


Fig. 5.

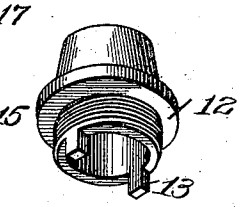


Fig. 6

Fig. 7.

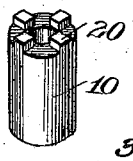


Fig. 8.

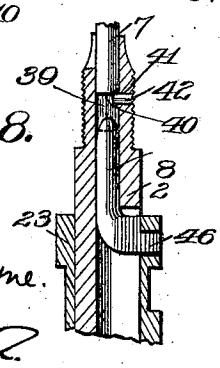


Fig. 9.

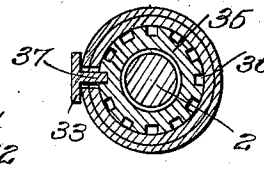
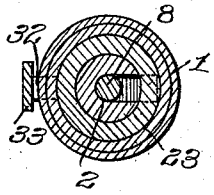


Fig. 10.



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DENTAL HANDPIECE.

No. 847,591. Specification of Letters Patent. Patented March 19, 1907.

Application filed June 22, 1904. Serial No. 213,583.

To all whom it may concern:

Be it known that I, HENRY S. MILLER, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Dental Handpieces; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to dental handpieces, and particularly that form of instruments adapted for performing the dual operations of burring and plugging; and it has for its object to provide an improved form of chuck or holder adapted to secure different instruments in operative position and which is capable of being operated to permit them to be quickly inserted or removed from the handpiece.

To these and other ends my invention consists in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings, Figure 1 is a side elevation of the handpiece constructed in accordance with my invention, the casing being shown in section to better illustrate the interior arrangement of the various parts. Fig. 2 is a longitudinal sectional view on the line $2^{\times}$ $2^{\times}$ of Fig. 1. Fig. 3 is a similar enlarged view illustrating the manner of inserting a tool. Fig. 4 is a sectional view on the line $4^{\times}$ $4^{\times}$ of Fig. 3, showing a tool locked in position. Fig. 5 is a perspective view of the tip-piece. Fig. 6 is a similar view of the chuck-operating member or sleeve movably mounted in the tip-piece. Fig. 7 is a perspective view of the adjusting-collar of the tool-chuck. Fig. 8 is a detail sectional view taken on the same plane as Fig. 3 and showing a tool in the locked position. Fig. 9 is a cross-sectional view on the line $9^{\times}$ $9^{\times}$ of Fig. 2, and Fig. $10^{\times}$ is a similar view on the line $10^{\times}$ $10^{\times}$ of Fig. 3.

Similar reference-numerals in the several figures indicate similar parts.

In illustrating my invention I have shown the handpiece consisting of the tubular casing or shell 1, in which is journaled the driving shaft or spindle 2, operated by any suitable form of motor device attached to the end of a flexible shaft 3. At its rear end the spindle 2 is journaled in the bearing 4, provided with a screw-thread, as shown, and secured in the rear end of the handle 1. The spindle is prevented from longitudinal movement in the handle by means of collars 5 and 6 thereon located at the inner and outer ends of the bearing 4. The forward end of the shaft is provided with a central tubular aperture adapted to receive the shank of a tool 7, which at its rear end extends laterally, opening at the side of the spindle to receive a key or locking device 8, as will be further described.

In order to permit the tools to be rigidly attached to the spindle, its forward end is reduced in diameter and split to form the jaws 9, which are movable relatively to each other by means of an adjustable collar 10, threaded on the spindle and provided with an inner conical surface coöperating with a similar surface on the jaws, as will be understood. To permit the chuck to be readily opened and closed, I employ an operating member in the form of a sleeve 11, inclosing the collar 10 and movable into engagement therewith by a relative longitudinal adjustment in the shell or casing 1. The sleeve is supported in the tubular tip-piece 12, rigidly secured in the end of the casing and provided with rearwardly-extending projections 13, engaging in recesses 14, formed in an annular enlargement or head 15 at the rear end of the sleeve 11. These projections 13 form guides on the casing or shell, which engage the sleeve and permit it to be moved relatively inwardly and outwardly in the tip-piece and preventing its rotary movement therein. The outer end of the sleeve is closed by a perforated cap 16, the inner end of which is provided with a plurality of lugs or projections 17, adapted to engage between corresponding lugs or projections 20 on the end of the collar 10, whereby the latter may be held stationary during the rotary movement of the spindle in either direction to open or close the jaws 9 of the chuck.

As the handpiece is also adapted to be used for plugging operations, the cap 16 is provided with threaded steps 21 and 22, adapted to receive the shanks of different-sized plugging instruments, and to this end the handpiece is also provided with a hammer, which may be controlled at the will of the operator to automatically cause blows or concussions to be transmitted to the plugging instrument. In the present instance this hammer consists of a sleeve 23, encircling

the spindle and held in position thereon by means of a stud or screw 24, projecting from said spindle into an elongated aperture 25 in said sleeve. The hammer is held in its forward position, as shown in the several figures, by means of a coil-spring 30, and as the forward end of the hammer abuts against the end of the head 15 of the sleeve 11 it forms means for normally holding the sleeve projected forwardly, so that the lugs 17 thereon are held out of engagement with the projections 20 of the collar 10, yet permitting the operating member or sleeve to be moved rearwardly when it is desired to adjust the chuck.

The hammer is provided with a spiral shoulder 31, forming a cam, with which a projection 32 on the spring-finger 33 is adapted to coöperate, said finger being also provided with a projection 34, adapted to lie in rear of the sleeve 11 when the hammer is retracted to prevent the rearward movement of the sleeve. The strength of the blows delivered by the hammer may be regulated by increasing or decreasing the tension of the spring 30, which is accomplished by an adjustment of the nut 35, threaded on the spindle, against which the rear end of the spring rests. This nut is provided with a series of peripheral notches or depressions 36, with which coöperates a finger 37 on the rearwardly-extending end 38 of the finger 33, which holds the nut stationary, while it is caused to travel longitudinally on the spindle by the rotation thereof in one direction or the other, as will be understood.

The burring-tools may be secured to the spindle by the chuck, and while this method of securing them permits tools having shanks of various diameters to be employed I provide further means for securing them independently of said chuck, whereby an operator after adjusting the handpiece to receive the tools of the size with which he may be supplied it is unnecessary to change the adjustment of the chuck save to accommodate tools of greater or less diameter. For this purpose the extremity of the tool-shank is cut away at one side to form a face 39, which is inclined slightly to the axis of the tool, and a shoulder 40, as shown particularly in Fig. 3. In the side of this reduced portion of the shank is provided a recess 41, located adjacent the shoulder 40, as shown in Fig. 4, which is adapted to coöperate with a pin or projection 42, arranged within the spindle and located a short distance in rear of the chuck-jaws 9. The key or locking member 8 is provided with the forward beveled or wedged-shape end 45, and its rear end extends laterally and has a projection 46, extending into an aperture formed in the hammer 23. When inserting a tool in the chuck, the operator moves the operating member or sleeve 11 rearwardly, carrying with it the hammer 23 and retracting the locking-piece or key 8 to the position shown in Fig. 3, when upon inserting the shank of the tool 7 until the shoulder 40 thereon engages the projection 42 and rotating it a partial revolution the notch 41 will engage the pin 42, preventing the tool from being disengaged from the spindle until it has been rotated relatively thereto in the opposite direction, which movement, however, is normally prevented by the beveled end 45 of the key or locking-piece 8, which when projected is held in a forward position in engagement with the face 39 by the spring 30.

If the jaws 9 of the chucks are adjusted so that the shank of the tool is guided and supported to prevent its wabbling in the handpiece, no further adjustment of the chuck is required, as the tool is securely held by the locking devices just described; but if the operator desires to further secure the tool this may be done quickly by moving the sleeve 11 rearwardly until the projections 17 thereon interlock with the projections 20 on the collar 10, when the rotary motion given the spindle either manually or by means of the motor devices to which it is connected will cause the jaws of the chuck to be closed, or the chuck may be closed by a relative rotary movement of the sleeve 11 when the spindle is held stationary.

A dental handpiece embodying my improvements consists of few parts which are simple in construction and may be readily assembled to form a compact instrument-holder which is equally well adapted for operating burring or plugging tools.

I claim as my invention—

1. In a dental handpiece, the combination with a casing and a spindle therein, of a tool coöperating with the spindle and a locking device in the latter adapted to engage the tool, means for moving said device into operative position and a sleeve extending exteriorly of the casing forming a bearing for the spindle and movable into engagement with the locking device to disengage it from the tool.

2. In a dental handpiece, the combination with a casing, a spindle journaled therein having jaws and a collar on the spindle for adjusting them relatively to each other, of a sleeve movably mounted in the casing and adapted to engage the collar and means for normally holding the sleeve out of engagement therewith.

3. In a dental handpiece, the combination with a casing, a rotatable spindle journaled therein having jaws and a collar carried on the spindle for adjusting the jaws relatively to each other, of a longitudinally-movable sleeve mounted in the casing and adapted to engage the collar, guides on the casing engaging the sleeve, means for normally holding the latter out of engagement with the collar.

4. In a dental handpiece, the combination with a casing, a rotatable spindle journaled therein having jaws and a collar carried on the spindle for adjusting the jaws relatively to each other, of a longitudinally-movable sleeve mounted in the casing and adapted to engage the collar to hold it stationary relatively to the spindle, means for preventing the rotation of the sleeve in the casing and means for normally holding it out of contact with the collar.

5. In a dental handpiece, the combination with a casing, a rotatable spindle journaled therein, clutch-jaws and a collar carried on the spindle and coöperating with the jaws to adjust them relatively to each other, of projections on the collar, a longitudinally-movable sleeve carried in the casing and projecting exteriorly thereof and provided with projections adapted to coöperate with those on the collar, means for preventing the rotation of the sleeve and means for holding the latter out of engagement with the collar.

6. In a dental handpiece, the combination with a casing, a spindle therein, devices on the spindle for engaging a burring-tool, of a member for adjusting said devices extending exteriorly of the casing and adapted to receive a plugging-tool and a hammer coöperating with the member.

7. In a dental handpiece, the combination with a casing, a rotatable spindle journaled therein and devices on the spindle for securing a tool thereto, of an operating-sleeve movable on the casing into engagement with said devices, said sleeve being adapted to support a tool, a hammer operated by the spindle and having a cam, means for moving the hammer in one direction and an actuating member coöperating with the cam to move the hammer in the other direction which engages the sleeve to prevent it from engagement with the tool-securing devices on the spindle.

8. In a dental handpiece, the combination with a casing, a hollow spindle and a projection therein, of a tool having a shank provided with a shoulder and an end projecting therefrom having a recess adapted to receive the projection, a locking device engaging the end of the shank, means for yieldingly holding the device in operative position, and a sleeve extending forwardly and exteriorly of the casing and coöperating with said means to move the locking device into the inoperative position.

9. In a dental handpiece, the combination with a casing, a rotatable spindle journaled therein having tool-engaging devices thereon, and an operating-sleeve movable on the casing into engagement with said devices, of a hammer carried on the spindle having a cam, a spring for moving the hammer in one direction and an actuating member having two projections, one engaging the cam on the hammer and the other extending in rear of the sleeve to prevent its longitudinal movement in the casing.

10. In a dental handpiece, the combination with a casing, a spindle journaled therein having tool-engaging devices thereon, and a tip-piece in the casing having a rearwardly-extending key, of a sleeve movable longitudinally in the tip-piece and provided with a collar in rear of the tip-piece having a recess fitting the key, coöperating projections on the tool-engaging devices and the sleeve and means for normally holding them out of engagement.

11. In a dental handpiece, the combination with a casing, a hollow spindle journaled therein and having clamping-jaws, a collar on the spindle coöperating with the jaws to move them relatively to each other and a projection in the spindle, of a tool having a shank reduced at the end and provided with a recess adapted to receive the projection, a locking-piece in the spindle engaging the end of the shank and a sleeve movable longitudinally on the casing and coöperating with the collar and the locking-piece to disengage the latter and means for moving said locking-piece into operative position and normally holding the sleeve in the inoperative position.

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Witnesses:
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