(No Model.)

B. S. BROWN.

DENTAL HANDPIECE.

No. 563,131. Patented June 30, 1896.

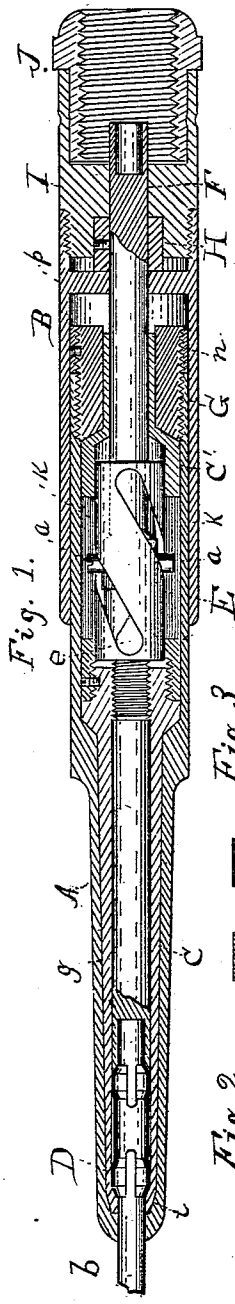

Fig. 1.

Fig. 2.

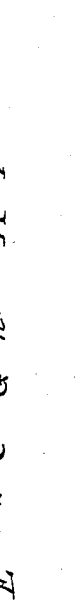

Fig. 3.

Fig. 4.

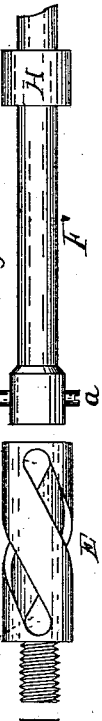

Fig. 5.

Fig. 6.

Fig. 12.

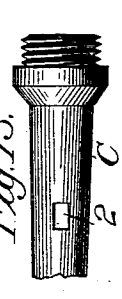

Fig. 13.

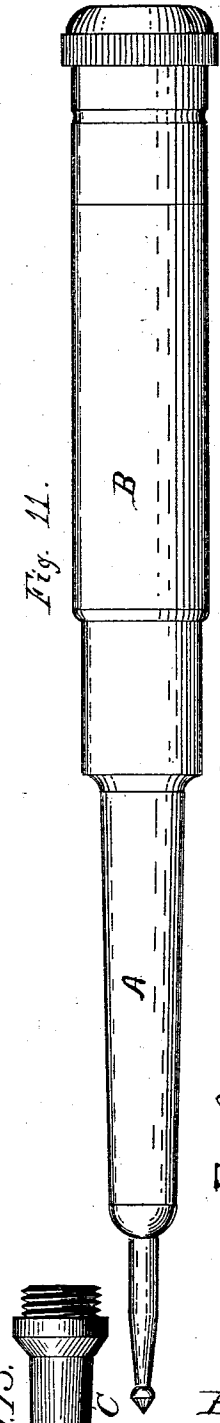

Fig. 11.

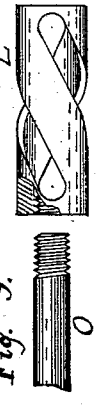

Fig. 10.

Fig. 9.

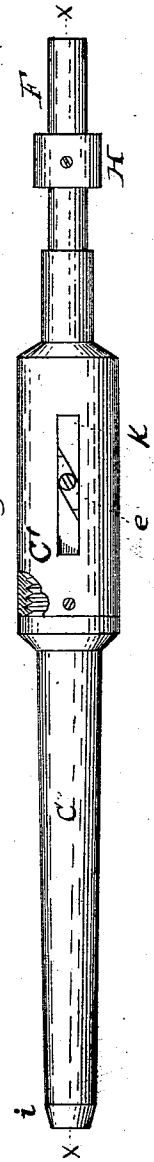

Fig. 8.

Witnesses.

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UNITED STATES PATENT OFFICE.

BENONI S. BROWN, OF ONSET, MASSACHUSETTS.

DENTAL HANDPIECE.

SPECIFICATION forming part of Letters Patent No. 563,131, dated June 30, 1896.

Application filed June 19, 1894. Serial No. 515,054. (No model.)

To all whom it may concern:

Be it known that I, BENONI S. BROWN, residing at Onset, in the county of Plymouth and State of Massachusetts, have invented a new and Improved Dental Handpiece, of which the following is a specification.

Similar letters refer to like parts.

The object of my device is to provide a dental handpiece or a tool-holder for dental engines, and for other purposes, in which burs, drills, and tools of various kinds used in operations upon the teeth and for other purposes are carried and frequently changed, whereby the tools will be firmly and securely held or chucked without any lock or notch and can be easily and quickly removed and changed while the engine is in motion or at rest.

The instrument described herein is substantially and simply constructed and is not liable to get out of order.

An outer shell or case having a sliding sleeve contains a composite hollow shaft which revolves therein. The shaft contains in its forward end a suitable split chuck or holder to receive the tool and which is contracted by the end pressure exerted by screw-threads on a helically slotted or grooved cylinder or pressing-piece, of suitable form, contained in the middle part of the shaft, and connected by means of a central actuating-rod having one or more pins operating in the slots with the outer sliding sleeve.

In the drawings, Figure 1 is a view, partly in section, taken through the dotted line $x\,x$ in the shaft C C′, Fig. 8. Fig. 2 shows an exterior view of the bushing G, with the ring n partly in section; Fig. 3, exterior of ring n; Fig. 4, exterior view of double split chuck D; Fig. 5, exterior view of chuck-rod; Fig. 6, exterior view of the helically-slotted cylinder; Fig. 7, exterior view of the actuating-rod, with pins and hub which operates the cylinder; Fig. 8, exterior view of the hollow shaft with the actuating-rod F. Fig. 9 is a modification of chuck or chuck-rod; Fig 10, a modified form of cylinder or pressing-piece internally threaded; Fig. 11, elevation of complete handpiece. Figs. 12 and 13 are views of the modification of the chuck-rod and shaft-section.

The part A is the casing or shell which contains the shaft and tool-holding devices. It has a bushing G, which screws into its rear end and bears against the shoulder of the shaft C C′ to provide for wear and end play and which has a central opening to admit the small part of the said shaft.

The bushing G has a ring n screwed onto it and held by a set-screw, said ring forming a shoulder or stop to regulate the depth to which the bushing G enters the casing A. The set-screw presses against the bushing in a narrow annular channel cut in the threads thereof, as shown in Fig. 2.

The part B is a sleeve or section of the casing A sliding freely over it, can be of any suitable form, and in this case it is partly closed near its rear end by a partition or wall p, having a central opening to admit the actuating-rod F, and has an extension I, which screws into its rear end and which is recessed to receive the hub H. A plug or bushing J is rotatively seated in the rear portion of the extension I and is internally screw-threaded to permit the cable-sheath of the engine to be attached thereto.

The part C is exteriorly threaded at its rear end and screws into the part C′, forming the shaft proper. A small screw passing through the outer part of the part C′ and into the part C binds or prevents the joint thus made from turning. The part C is beveled externally at its forward end at i, which forms a bearing in a counter-bevel in the forward end of the case A, and it is internally beveled also at its front end to fit a counter-bevel of a split chuck or grip, which may be in different forms and styles.

In Fig. 1 the part C is internally threaded at its rear end to receive a screw on the cylinder E, whereby the chuck-rod and chuck or grip is operated or contracted. The part C′ has one or more longitudinal slots K K in its periphery to receive the end of one or more pins on the actuating-rod F, thus preventing said rod from turning in it, and is reduced in diameter at its rear end for a short distance to form a shoulder of any suitable form, (in the drawings this shoulder is slightly beveled,) and has also a central opening to admit the actuating-rod F. The split chuck or grip D is hollow to receive a tool-shank, is beveled at each end, split or cut out length-

wise for a short distance at each end to render it flexible, and reduced in diameter near its middle length to render it more flexible.

The chuck-rod *g* is bored out centrally for a short distance to admit the shank of a tool *b* and is counter-beveled to fit and receive one end of the chuck D.

The cylinder E rotates within the shaft C C′, is hollow and provided with one or more helical slots *e e* to receive the pins *a a* on the actuating-rod F, which slides within and by which it is operated, and it can be either internally or externally threaded at its front end to suit different forms of chucks or chuck-rods. In Figs. 1 and 6 it is shown with an external thread or screw smaller than its main part, (in diameter.) The actuating-rod F is slightly larger at its front end and is provided with pins or screws *a a*, set opposite in its periphery, and is provided with a hub H, (fastened with a screw or pin,) and by which it receives a lengthwise motion from the sliding sleeve B or its equivalent, but can rotate freely and independently of the same.

The rear end of the actuating-rod F is bored out centrally for a short distance to receive the driving-cable of a dental engine, which is usually soldered therein and by which motion is imparted to the entire shaft C C′ and its contents. Any suitable method of connecting the actuating-rod F with the sliding sleeve B can be employed.

The instrument is put together as follows: The chuck D is slipped into the shaft C. The chuck-rod *g* is then put into the screw end of the cylinder or pressing-piece E, and is then inserted into the rear of the part C until it binds slightly. The rod F without pins or hub is then put into the cylinder E. Then the rear part C′ of the shaft is slipped over the actuating-rod F and cylinder E. The parts C and C′ are then screwed together and the fastening-screw put in the joint, and the pins or screws *a a* are then passed through the slots K K and the helical slots *e e* into the actuating-rod F.

The shaft C C′ and its contents are now put into the casing A, the bushing G screwed in and adjusted by the ring *n*, the sleeve B is then slid on the casing A, the hub H put on the actuating-rod F and fastened, and the extension I screwed into the end of the sleeve B.

The operation is as follows: In the drawings, Fig. 1 shows the handpiece with the tool clamped in it. To release the tool and insert another, the sleeve B is drawn backward as far as the pins *a a* will allow, the motion being communicated to the actuating-rod F by the hub H, and as the rod F moves backward the pins *e e* cause the cylinder E to rotate and move backward. This releases the contracted chuck and allows it to expand, thereby freeing the tool. Another one is now put in, the casing B pushed forward, causing the cylinder to rotate and move forward slightly and with great pressure upon the chuck-rod *g*, whose beveled end crowds against one end of the chuck, thus forcing the other end against the bevel in the shaft C C′, thereby contracting both ends with great force upon the tool and securely holding it.

The chuck and cylinder or pressing-piece can be varied in form without changing the main principle of my invention. Figs. 9 and 10 represent such. Fig. 10 shows the cylinder with an internal thread, which may be right or left handed, according to whether it is desired to operate the part O by forward or backward pressure.

The part O, Fig. 9, may represent the end of a single coned or beveled chuck or may be a chuck-rod similar to the rod *g*. In this case the threads would be left-handed, while in the former case the direction of the threads would depend upon the position of the beveled end as regards the bevel in the shaft C C′.

The part O can be kept from turning in the shaft-section C, and still have a slight longitudinal motion therein, in any suitable way. In the construction here shown in Figs. 12 and 13 a pin or screw 1 is inserted into and projects from the periphery of said part O, and enters and is adapted to slide within the slot 2, cut through the shell of the shaft-section C. The cylinder or pressing-piece in the modification here described does not move lengthwise necessarily, but by its rotation draws and expels the screw-threaded end of the chuck or chuck-rod.

The advantages of the device herein described will be readily seen, as there are no springs to break and the forward pressure upon the sliding sleeve B when held in the hand causes the tool to be gripped with increased pressure. Tools with plain shanks and tools slightly varying in size may be used.

A dental handpiece having a hollow shaft rotating in a casing and containing a split chuck is not new, but the mechanism for operating a chuck or tool-holder here shown as applied to dental handpieces is new, and it can be applied to various other purposes, as may hereinafter suggest themselves, notably in lathe-chucks, bit-braces, car brakes and couplers.

I claim—

1. The combination of a hollow shaft, a beveled tool-holder or clutch longitudinally movable therein, a rotatable pressing-piece also contained therein having screw-threads and helically-inclined surfaces and operatively connected with the clutch or tool-holder, and means for rotating said pressing-piece, substantially as described and shown.

2. The combination of a hollow shaft, a beveled tool-holder or clutch longitudinally movable therein, a rotatable pressing-piece having screw-threads and helically-inclined surfaces also contained therein and operatively connected with the said clutch or tool-holder, an actuating-rod for moving the pressing-piece and adapted to reciprocate within the shaft, and means for operating the actuating-rod substantially as described.

3. The combination of a hollow shaft, a beveled clutch adapted to move lengthwise therein, a rotatable pressing-piece operatively connected with the clutch and having screw-threads and helically-inclined surfaces, an actuating-rod adapted to be reciprocated having projections to engage with the helically-inclined surfaces of the pressing-piece and kept from rotation as regards the shaft, and means for moving the reciprocating rod, substantially as described.

4. The combination of a hollow shaft, a beveled clutch adapted to slide longitudinally therein, a chuck-rod with one end beveled to fit the clutch, a rotatable pressing-piece having screw-threads and helically-inclined surfaces, for operating the chuck-rod, an actuating-rod adapted to reciprocate for operating the pressing-piece, mounted to move longitudinally in said shaft, and means for operating said actuating-rod substantially as described.

5. The combination of an outer case or shell, a telescopic sleeve or section thereof adapted to move longitudinally, a hollow shaft adapted to rotate in said outer casing, a beveled tool-holder or clutch adapted to move lengthwise in the hollow shaft, a rotatable pressing-piece operatively connected with the clutch, said pressing-piece having screw-threads and helically-inclined surfaces, an actuating-rod adapted to reciprocate within the shaft to operate the pressing-piece and connected with the sleeve or telescopic section of said outer case whereby the longitudinal motion of said section will be imparted to the actuating-rod and thus operate the pressing-piece and connected clutch mechanism substantially as set forth.

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Witnesses:
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