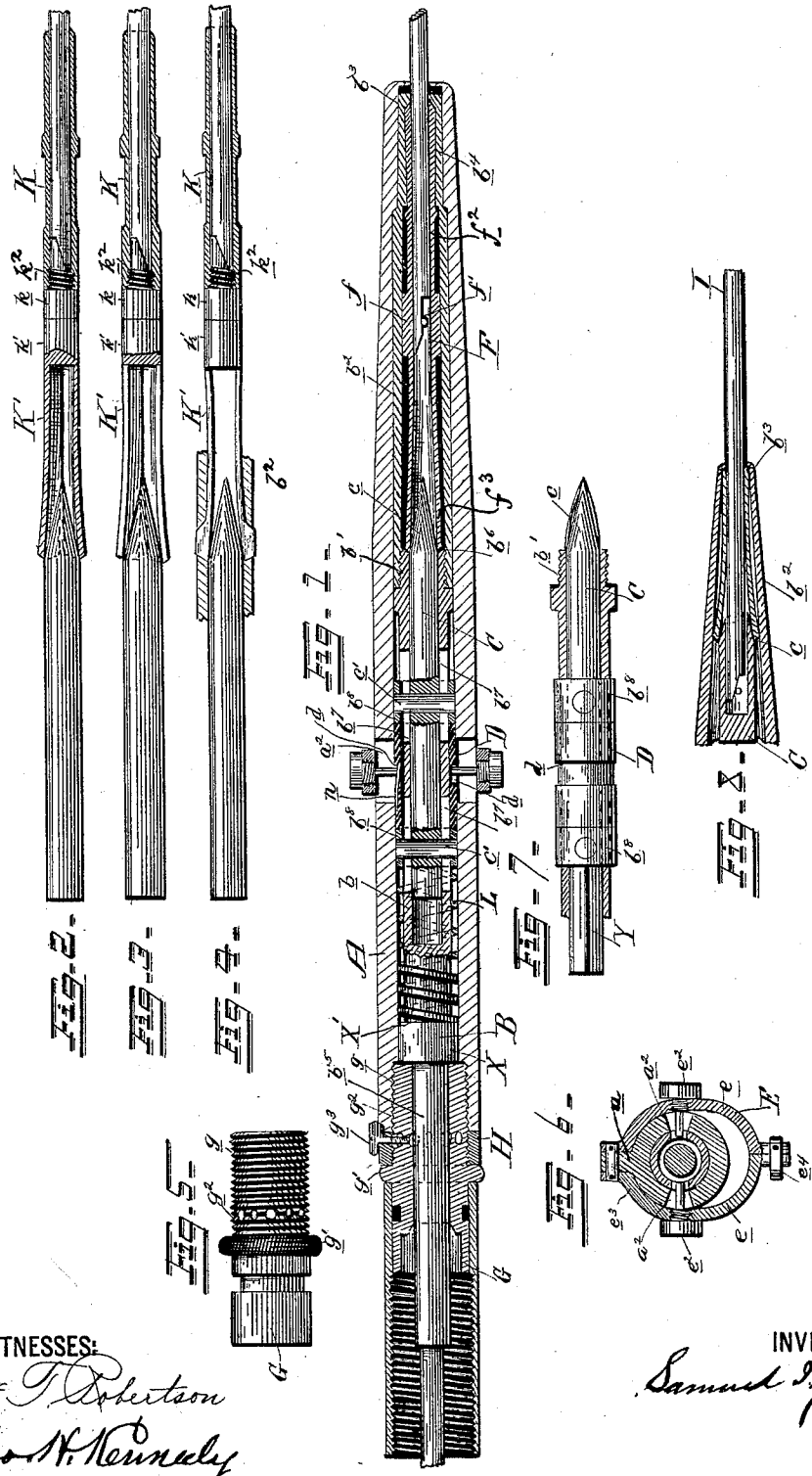
(No Model.)

S. I. SCOTT.

DENTAL ENGINE HAND PIECE.

No. 395,252. Patented Dec. 25, 1888.



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UNITED STATES PATENT OFFICE.

SAMUEL I. SCOTT, OF WASHINGTON, DISTRICT OF COLUMBIA.

DENTAL-ENGINE HAND-PIECE.

SPECIFICATION forming part of Letters Patent No. 395,252, dated December 25, 1888.

Application filed March 31, 1888. Serial No. 269,207. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL I. SCOTT, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Dental-Engine Hand-Pieces, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is the production of a hand-piece for dental engines in which the tool may be inserted in the chuck, withdrawn therefrom, and replaced without interrupting or stopping the motion of the machine. The clamping or unclamping of the tool may be effected by the thumb or finger of the hand while the hand-piece is held therein, thus leaving the other hand free to handle the tool.

A further object consists in the construction and arrangement of certain details, hereinafter described.

I accomplish these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section through the center of the hand-piece. Figs. 2, 3, and 4 are modified forms of the chuck. Fig. 5 is a side elevation of the rear adjustable bearing. Fig. 6 is a transverse section of the hand-piece, showing the yoke-lever for operating the clamping mechanism. Fig. 7 is a detail showing the bolt and sleeve, and Fig. 8 is a detail of another form of chuck.

A represents the outside case, and B the spindle or driving-shaft, which is bored out, as shown at *b*. The front end is screw-threaded, as shown at b', and on this part is threaded a tubular cap, b^2, having a contracted mouth, b^3. The parts B and b^2 together form a hollow driving-shaft, having front and rear bearings, b^4 and b^5. The front end of the bored-out shaft is beveled outwardly, as shown at b^6, and within the hollow shaft is placed a bolt, C, having a conoidal or wedge-shaped point, *c*.

The hollow shaft B is provided with small slots b^7, and through these slots and through the bolt C are passed two rivets, c' c', which are secured in collars b^8 b^8. Intermediate between the two collars b^8 b^8 is secured a loose sleeve, D, having a groove, *d*, therein. This sleeve is loose upon the hollow shaft B, but is prevented from revolving therewith by a cross-bar, *n*, which engages one of the pins from the lever-yoke. The lever-yoke E is composed of two parts, *e e*, pivoted upon a lug, *a*, projecting from the outside case, A, and in the parts *e* of this yoke are screw-threaded pins e^2, the ends of which project through slots a^2 in the outer case, A, and engage the groove *d* in the sleeve D. The yoke surrounds the outer case and projects a slight distance above the same, and pressure on the upper end of the yoke by the thumb or finger causes a movement of the bolt C back and forth within the hollow shaft. The yoke-pieces *e* are provided with hinges e^3 and a clamp, e^4. By loosening the clamp e^4 the yoke-pieces can be turned upon their hinges to withdraw the pins from the slots in the outer case, thus allowing the instrument to be taken apart without first taking off the yoke. Instead of this lever or yoke, I may use a pin or screw with a knob on its outer end.

F is the chuck. I prefer to make this chuck F hollow throughout and slotting out the front end, so as to form two or more jaws, f^2, which are adapted to clamp and surround the tool. The rear end of the chuck is also slotted out to form two or more arms, f^3, which abut against the inclined surface b^6 of the hollow shaft B. The central portion, *f*, of the chuck I prefer to make thicker than the arms and jaws, and through this thickened portion or belt I insert a pin, f'. The tool being flattened, as shown in the drawings, fits against the pin, and is thereby prevented from turning in the chuck.

G is the rear bearing, which is screw-threaded at *g* and is provided with a milled surface, g'. This bearing G is centrally bored to form a journal for the shaft B, and the screw-threaded end *g* is screwed into the outside case, as shown in the drawings.

The end of the bearing-block G engages the shoulder X on the shaft B. The forward bearing, b^4, is tapering, and any wear or slackness of the parts may be taken up by adjusting the bearing G in the outer case. It will also be seen that this bearing receives the thrust of the shaft, which may be caused by using the tools. In order to prevent this bearing

from becoming loose in the outer case, I use a jam-nut, H, which is screwed upon the bearing until it rests against the milled surface. The bearing is then screwed into the outer case until it rests against the shoulder X of the shaft B. The jam-nut is then screwed down hard against the end of the case. As a further security to the joint, the bearing-block G is provided with a series of holes, g^2. These holes are tapped to receive a set-screw, g^3. A recess is formed partly in the jam-nut and partly in the end of the case, through which the screw passes. A portion of the set-screw where it passes through between the jam-nut and the end of the case is cut away on one side, so that in giving the screw a half-turn it presents a flat side to the end of the case, which may then be unscrewed; but when turned to occupy both parts of the recess the joint is securely locked. The head of the screw g^3 may be marked to indicate the flat side. A very fine adjustment may thus be obtained. The screw-threaded part of the bearing G being forty threads to the inch, and ten holes being provided, gives an adjustment of one four-hundredths of an inch. The connections between the driving-shaft B and the motive power are as commonly made and need no description here.

The chuck has spring-jaws of the usual kind, and they are brought down upon the tool by being forced into the contracted mouth of the tubular cap which forms a part of the hollow shaft, as hereinbefore explained. The forcing forward of the chuck is effected by the sliding bolt having a conical or wedge-shaped surface which engages with the spring-arms of the chuck.

In the modification shown in Fig. 8 the sliding bolt is provided with a hollow end, within which the end of the tool I is secured. The end of the bolt, however, is provided with a conical or wedge-shaped surface, which engages the arms of the chuck in the same manner as explained with reference to Fig. 1.

In the modification shown in Fig. 4 the tubular cap b^3 is slotted and the arms of the chuck are provided with wedge-shaped projections which fit into the slots and operate in the same manner to force forward the chuck as described with reference to the inclined surfaces shown in Fig. 1.

An important feature of my invention consists in making an abutment on some part of the driving-shaft, as before explained, upon which the rear end of the chuck or some part directly connected therewith rests, and in making one or both of the abutting surfaces inclined to the axis of the shaft, so that a thrust in or out of one of the parts will cause the proper movement of the chuck.

It will be seen that by my construction I make use of the wedge or inclined plane both in the abutting surfaces and the end of the sliding bolt which forces outward the arms of the chuck. It will also be seen that in the use of the tool when pressure is applied to the end thereof these wedge-shaped surfaces tend to bind the chuck more firmly to the tool and to the hollow driving-shaft, so that the harder the tool is pressed the more secure will it become. Another point to be considered in this connection is that the operating lever or button projects to the outside of the case and receives the hand-pressure when the tool is used, thus tending to move the sliding bolt forward and still further tighten the chuck upon the tool. On the hollow shaft back of the rear collar b^8 is located a spiral spring, L, which rests on the collar X′ of the shaft. This spring tends to keep the sliding bolt in the forward position. This spring might be located within the hollow shaft, instead of being on the outside, as shown in the drawings, or it may be dispensed with, as the closing of the chuck does not depend necessarily upon the action of the spring. If the spring is dispensed with, the bolt may be split, as at Y in Fig. 7, and spread so as to make it bind with sufficient friction in the hollow shaft to hold it in any desired position.

In Figs. 2, 3, and 4 I have shown a two-part chuck, one part being provided with spring-jaws to clamp the tool and the other part being provided with spring-arms to co-operate with the sliding bolt. K represents the part having the spring-jaws, and K′ the part having the spring-arms. The abutting ends $k\,k'$ are made solid and have plain surfaces abutting together. The friction between these abutting surfaces is sufficient when the chuck is clamped within the tubular case to make it operate as though made in one piece. In order to make the length of these chucks adjustable, I fit into the end of one of the parts a screw-plug, k^2, as shown in the drawings. By screwing the plug in or out the length of the chuck may be regulated as desired.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a dental hand-piece, the combination of an outer case, a hollow driving-shaft having a contracted mouth and a forward inclined abutting surface, b^6, an independent chuck provided at its forward end with tool-receiving spring-jaws and having spring-arms at its rear end, a sliding bolt for engaging and forcing the rear spring-arms of the chuck outward and against the adjacent abutting surface of the hollow driving-shaft, thereby forcing the chuck forward and causing its spring-jaws to grip the tool, and a lever for actuating said bolt from the outside of the case, substantially as described.

2. In a dental hand-piece, the combination of a hollow driving-shaft provided with slots and having a forward inclined abutment and a contracted mouth, a sliding bolt having a wedge point, two collars adapted to slide on the shaft and connected to the sliding bolt by pins or rivets passed through the slots in said shaft, a loose non-rotating sleeve located on the shaft between said collars, a lever for

actuating said sleeve, whereby the sliding bolt can be moved back and forth, and a chuck having spring-arms to engage said bolt and spring-jaws to engage and hold the tool, substantially as described.

3. In a dental hand-piece, the combination of the hollow driving-shaft, the collars sliding thereon, the sliding bolt connected with said collar and provided with a wedge point, the loose sleeve and lever pivoted to the outer case and projecting out from the same and engaging the loose sleeve, and the chuck having spring-arms to engage the bolt, substantially as described.

4. In a dental hand-piece, the combination of a hollow driving-shaft having an inclined abutting surface, b^6, a tool having a flattened inner end, a sliding bolt having a wedge point, and a chuck having spring-arms which abut against the inclined surface b^6 and engage the point of said bolt, spring-jaws which engage the tool, and a central re-enforced portion or belt, f, provided with a transverse pin, f', to engage the flattened portion of the tool, substantially as described.

5. In a dental hand-piece, the combination, with the outer case having a lug thereon, of a yoke pivoted to said lug, encircling said outer case, and adapted to engage the loose sleeve on the driving-shaft, substantially as described.

6. In a dental hand-piece, the combination, with the outer case having a lug, of a yoke-lever pivoted to the lug, the arms of said yoke being pivoted at e^3 and held together at the top by a clamp, substantially as described.

7. In a dental hand-piece, an outer case screw-threaded at its end, in combination with a bearing having a screw-threaded portion and provided with a series of holes, g^2, a jam-nut adapted to be screwed up against the end of the case, and a screw-pin adapted to fit either of said holes and to pass through a recess between the jam-nut and the case, substantially as described.

8. In a dental hand-piece, the combination of an outer case, a hollow driving-shaft having inclined abutting surfaces, a sliding conically-pointed bolt working parallel therewith, a loose ring or collar connected with said bolt, and a lever connected with said collar and projecting through the outer case, whereby the bolt may be forced forward or backward while the shaft is in motion, substantially as described.

9. In a dental hand-piece, the combination of an outer case, a hollow driving-shaft, a chuck having spring-arms, and a conically-pointed bolt having its rear end split to form spring-jaws to hold the bolt firmly in its forward position, substantially as described.

10. In a dental hand-piece, the combination of an outer case, a sliding bolt, a chuck, a hollow shaft having a rear bearing provided with a wide shoulder, X, an adjustable bearing-block, G, to engage said shoulder, and a jam-nut, H, substantially as described.

11. In a dental hand-piece, the combination of the outer case, a driving-shaft, a tubular bearing-block, G, having holes g^2 at equal distances apart, a jam-nut screwing against the outer case, and a small flat-sided screw, g^3, passed through the jam-nut to engage one of said holes, whereby the bearing-block can be adjusted to a small fraction of an inch and be securely fastened to the case, substantially as described.

12. In a dental hand-piece, the combination of an outer case, a driving-shaft, a two-part chuck having a length-adjusting screw, and a chuck-actuating bolt, substantially as described.

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

SAMUEL I. SCOTT.

Witnesses:
GEO. H. KENNEDY,
J. E. KENNEDY.