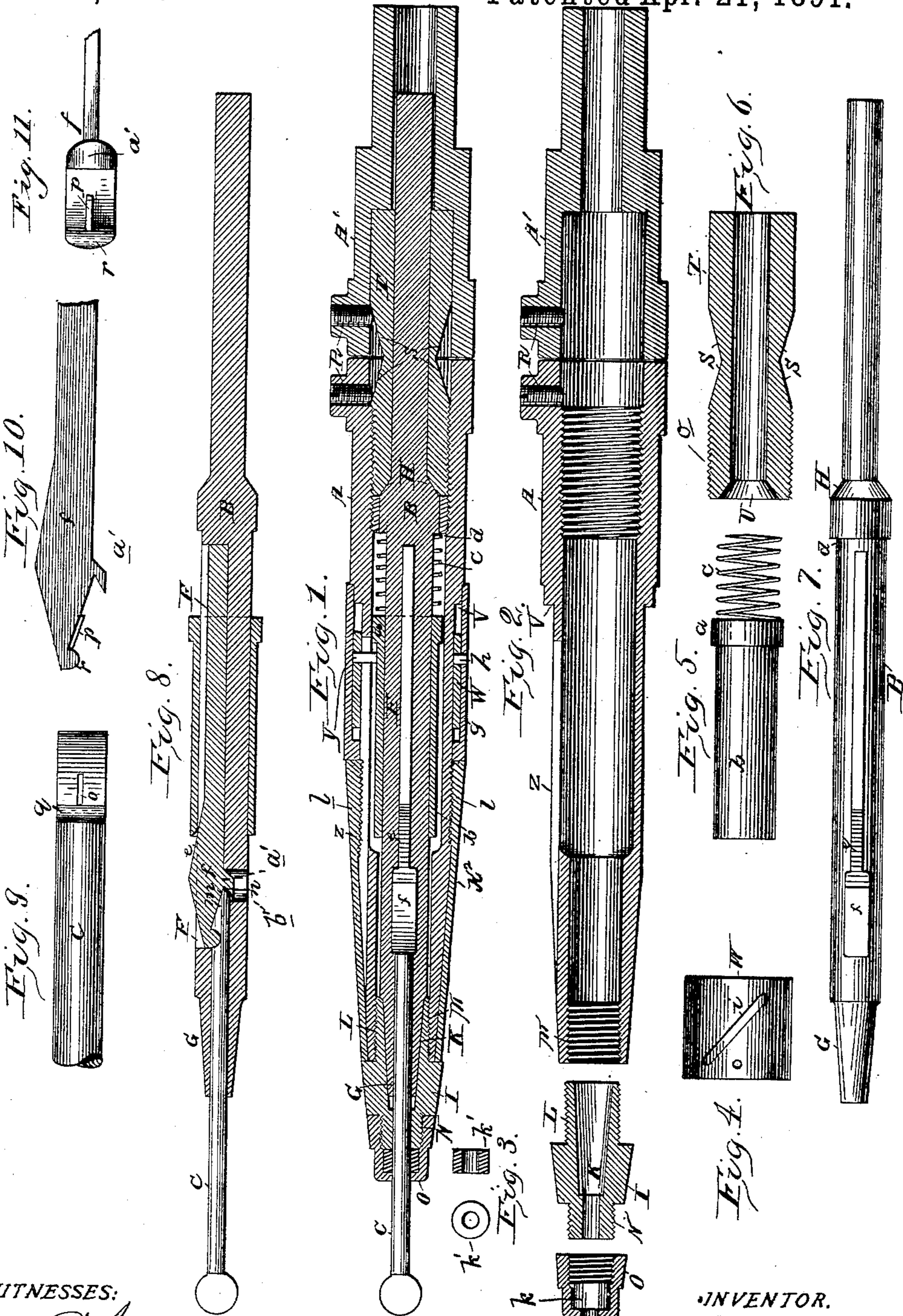


(No Model.)

C. M. RICHMOND.
HAND PIECE FOR DENTAL ENGINES.

No. 450,682.

Patented Apr. 21, 1891.



WITNESSES:

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HAND-PIECE FOR DENTAL ENGINES.

SPECIFICATION forming part of Letters Patent No. 450,682, dated April 21, 1891.

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To all whom it may concern:

Be it known that I, CASSIUS M. RICHMOND, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Hand-Pieces for Dental Engines; 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 appertains to make and use the same.

The object of my improvements, stated generally, is to simplify the construction of dental hand-pieces, to arrange and connect their parts more conveniently and securely, so as to facilitate their operation in use, and to reduce the liability of derangement of their parts by wear or otherwise.

In the accompanying drawings, Figure 1 is a longitudinal diametrical section of a hand-piece embodying my improvements. Fig. 2 is a diametrical section of the casing and the nosing and supplemental nosing shown detached to indicate their relations to the casing. Fig. 3 is a plan and cross-section of a removable bushing adapted to be seated in the supplemental nosing to form a bearing for the operating-tool. Fig. 4 shows a thimble detached and provided with a spiral groove. Fig. 5 shows a sliding sleeve detached and a spring adapted to force the sleeve forward. Fig. 6 is a longitudinal section of an internal sleeve through which the spindle passes and to which the two parts of the casing are adapted to be secured. Fig. 7 is a view of a spindle, showing a latch-bar in place on the spindle. Fig. 8 is a longitudinal section of the spindle, showing the latch-bar and operating-tool in place. Fig. 9 is a view of the rear end of the operating-tool. Fig. 10 is a side view of a section of the latch-bar, and Fig. 11 is a plan view of the under side of the latch-bar.

My improvements relate particularly to that species of hand-piece in which the operating-tool is locked into the socket of the rotary spindle by means of a latch-bar.

One of the oldest forms of locking device in a hand-piece is a latch.

The improvements previous to my own

upon the mode of fastening an operating-tool to the rotary spindle of a hand-piece by means of a latch consist, generally, of pivoted latch-pieces and a series of parts not readily detachable by the professional operator. By my invention I dispense with a pivoted latch and construct a single latch-bar so that it can be instantly placed in its slot in the spindle and is complete of itself as a latch mechanism, requiring only to be pressed into the latched position, and is not weakened by the presence of pivot-holes. The mechanism which I provide for this purpose consists of a tube sliding upon the spindle and held in position by the action of a spring, the sleeve bearing upon an inclined plane formed on the latch-bar, so as to hold it in engagement with the shank of an operating-tool.

In order to instantly and conveniently slide the sleeve back off from the inclined plane of the latch-bar, I provide a rotary external sleeve flush with the external surface of the casing of the hand-piece and containing within it a longitudinally-sliding sleeve, the two sleeves being connected together in such a manner, as hereinafter explained, that by rotating the external sleeve the latch-fastening tube will be thrown back and off from the inclined plane of the latch-bar and permit the latter to release its hold upon the shank of the operating-tool. I thus provide means for operating the latch mechanism from the exterior of the casing of the hand-piece instantaneously and with perfect facility by the practitioner.

Another part of my invention has for its object a simple and convenient means for more securely adjusting the cone-bearings of the rotary spindle, doing away with all possibility of the bearing parts getting out of place, and at the same time providing for the most convenient readjustment, when need be, to compensate for wear; and it consists in providing a sleeve at and upon the rear portion of the spindle, the forward end of such sleeve being screwed into the rear end of the casing, said sleeve being formed with a central groove or annular channel inclined from opposite directions, as clearly shown at Figs. 1 and 6, so that it may be held at any varied

and predetermined adjustment by set-screws, as will be hereinafter more fully set forth.

My invention has also for its object to improve the bearing for the tool.

5 In every hand-piece using a latch-bar or pivotal latch there must be a bearing for the operating-tool (which is connected with the spindle) forward of the end of the spindle. This bearing has usually been the opening
10 in the nose-piece itself through which the operating-tool passes. The difficulty in practice with this construction is found to be that the opening in the nose-piece rapidly wears away, which increases its size, and, in fact,
15 destroys it as a bearing. This wearing of the nose-piece is due to the fact that in operating with the tool it is subjected to lateral pressure, which causes it to bend to one side out of alignment with the spindle, and as it ro-
20 tates a wobbling motion is produced, and inaccurate work is the result, in addition to unequal wear of the bearing-surface. When wear once begins upon the bearing in the nos-
25 ing, this wobbling motion rapidly accelerates it, so that an ordinary nose-piece, even when made of steel, soon becomes so worn that it is necessary to replace it with a new one, which is expensive and inconvenient. With my im-
30 proved construction all these objections and disadvantages are overcome, and I provide for this by providing what I term a "supplemental nose-piece," or by dividing the nose-piece proper into two parts, the forward portion thereof having a special removable bearing for
35 the operating-tool, which bearing I advance as far—that is to say, as near—the cutting end of the operating-tool as possible. It may be made of a material—for example, jewels—that will not wear out, or, if preferred, it may be
40 made of a cheap material that can be replaced as often as need be with extremely small expense and with entire convenience to the operator. By this provision I avoid the neces-
45 sity of replacing the nose-piece or any part of it, and the supplemental nose-piece which I provide, being merely a socket for the remov-
able bearing, is subject to no wear whatever.

Referring to the letters upon the drawings, A A' indicate an ordinary casing of a hand-
50 piece, made in two parts, and B a spindle within the casing, adapted to be connected at its rear end by any ordinary or suitable clutch with a rotary shaft—usually a flexible shaft. (Not illustrated in the drawings.)

55 C indicates a tool connected to the spindle at its forward end in a particular manner, which will be described farther on. The spindle is hollow at its forward end, as usual, and is also slotted at F to receive the latch mechanism which serves to connect it with the
60 shank of an operating-tool. It is provided, as usual, with cone-bearings G and H.

I indicates a hollow nose-piece having, as usual, a conical seat K for the forward conical
65 bearing of the spindle. This nose-piece is provided with a male screw-thread L, adapted to enter the female screw M in the forward

end of the forward part of the casing. It is also provided with a screw-thread N for re-
70 ceiving a supplemental nose-piece O.

The rear portion A' of the casing, like the front part A, is provided with a set-screw R. These set-screws are adapted to bear against the oppositely-inclined surfaces S of an inter-
75 nal sleeve T, the forward end of which screws into the forward part of the casing. This internal sleeve T fits over the spindle and con-
80 tains a conical socket U to receive the rear cone-bearing of the spindle B. It is to be screwed into the forward part of the casing until this conical socket receives the rear con-
85 ical bearing of the spindle, and after the rear portion A' of the casing has been placed over said sleeve and the spindle B the set-screws R are turned to place against the oppositely-
90 inclined surfaces of the sleeve T, the effect of which is to securely hold the sleeve and casing in proper relation, and the usual jam-
95 nut is avoided and a better result secured. It will also be seen that it is more convenient to adjust the parts to compensate for any wear upon the bearings of the spindle and that the
100 reaction of the set-screws R to the inclines S of the sleeve T is such that there is a constant tendency to self-adjustment. The forward
105 part of the casing is cut away and reduced in diameter at V to receive a sleeve W. This sleeve is provided with an inwardly-project-
110 ing lug or pin Y, adapted to enter the longitudinal slot Z in the forward part of the hand-
115 piece and to extend through it and bear against a shoulder a upon a sliding tube b , arranged upon the spindle B.

c indicates a spring, one end of which bears against a shoulder on the spindle at d , the
120 opposite end bearing against the rear end of the sleeve b , as clearly shown in Fig. 1. The action of this spring is to force and hold the sleeve forward. The object of throwing this
125 sleeve forward by means of this spring is to cause the forward end of the sleeve to ride up an incline e , formed upon the upper sur-
130 face of the latch-bar f , which forces the forward end of the latch-bar down and into en-
135 gagement with the shank of the operating-tool and holds it there, thus securing the tool in operative relation with the spindle. By
140 this arrangement it will be seen that it becomes unnecessary to drill the shank of the latch-bar or to pivot it in place, which is an
145 important fact when it is remembered that this bar must of necessity be of limited pro-
150 portions.

g indicates a sleeve or casing inclosing the sleeve W and provided with a pin or projec-
155 tion h , which enters a spiral slot i in the sleeve W, which latter is thus made capable of a longitudinal movement within the sleeve or casing g sufficient to lock and release the
160 latch-bar f .

k^2 indicates a supplemental or exterior cas-
165 ing applied by means of a screw-thread l to the forward part of the casing proper and serving to hold the thimble g in place on the

casing. By means of this construction it is only necessary to rotate the sleeve *g* in order to force back the thimble *W*, and through it the inner tube *b*, in order to release the latch-bar, so that the operating-tool can be removed and another put in its place, if desired. As the tube *b* is drawn back by the pin *Y* the spring *c* is compressed, and when the outer tube or casing *g* is released the spring forces the tube *b* forward to its normal position.

The operating-tools have their rear or locking ends beveled rearward to form an incline *m*, as clearly shown in Fig. 8, and at the head or top of the incline there is a transverse slot or recess *q*, adapted to receive the nose *r* on the forward end of the latch-bar *f*, and centrally of the incline *m* there is a longitudinal slot *o*, adapted to receive the feather *p* on the latch-bar just back of the nose *r*, so that, the nose *r* resting in the slot or recess *q*, the tool is locked against longitudinal movement, and, the feather or spline *p* being located within the longitudinal slot *o*, the tool must of necessity rotate with the spindle, within which the latch-bar *f* is located. The forward end of the latch-bar *f* is formed with a short arm or teat *a'*, which locates itself within a hole or recess *b'* in the spindle *B*, which thoroughly braces the latch against any rearward thrust and causes it to rotate with the spindle. The extreme rear end of the tool and the forward surface of the teat *a'* on the latch-bar are so fashioned with reference to each other that their contact may serve as an additional means of preserving the proper relation between the tool and the latch. By the construction and arrangement described it will be seen that the tool is properly centered with the spindle and all wobbling of the former is prevented. When it is desired to remove a tool, the internal tube *b* is drawn back by the rotation of the casing *g*, as before described, and a longitudinal pull on the tool will cause the nose *r* on the end of latch-bar to ride up and out of the recess or slot *q*, and thus release the tool.

The supplemental nose-piece *O* of the casing is bored centrally, as at *j*, to receive tools of a standard gage, and it is counterbored interiorly, as at *k*, to receive a jewel or other removable bearing *k'*, through which the tool passes and by which it is successfully braced at the extreme end of the case, where the greatest strain is exerted. As before stated, this bearing *k'* may be made of any suitable material, as it is readily removed and renewed;

but I prefer to use a jewel bearing on account of its hardness and durability.

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

1. In combination with the spindle of a dental hand-piece, a free latch-bar formed with an inclined plane upon its upper side, and a sleeve or tube having a longitudinal movement over said inclined plane of the latch-bar and upon the spindle, and means for operating the sliding tube, substantially as and for the purpose set forth.

2. In a dental hand-piece, a latch-bar for securing the tool in position, having its forward end formed with a nose *r* and spline *p*, adapted to interlock with the rear end of an operating-tool, substantially as hereinbefore set forth.

3. The free latch-bar *f*, having the inclined upper surface and provided near its forward end with a teat *a* to enter a slot in the spindle and serving as a stop for the tool-shank, substantially as described.

4. In a dental hand-piece, a supplemental nosing counterbored interiorly and provided with a removable tool-bearing, substantially as and for the purpose set forth.

5. In combination with the spindle and the two parts *A A'* of the casing of a dental hand-piece, the connecting-sleeve *T*, adapted to be secured to the part *A* of the casing by a screw-thread and formed with oppositely-inclined surfaces *S*, and the set-screws *R*, substantially as and for the purpose set forth.

6. In combination with the spindle and the slotted casing of a dental hand-piece and a free latch-bar having an inclined surface on its upper side, the rotatable sleeve *g*, provided with pin *h*, interiorly-arranged sleeve *W*, provided with spiral groove *i* and pin *Y*, and the longitudinally-movable tube *b*, provided with a shoulder *a*, substantially as and for the purpose set forth.

7. In a dental hand-piece, the casing *A*, cut away or reduced in diameter, as at *V*, the rotatable operating-sleeve *g*, and the supplemental casing-piece *k'*, secured in position by the screw-thread *l*, whereby said sleeve *g* is secured in place, substantially as described.

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

CASSIUS M. RICHMOND.

Witnesses:

ELLA F. BRAMAN,
J. S. CAMPBELL.