H. D. JUSTI.

Dental Hand-Piece.

No. 215,932. Patented May 27, 1879.

Fig. 1.

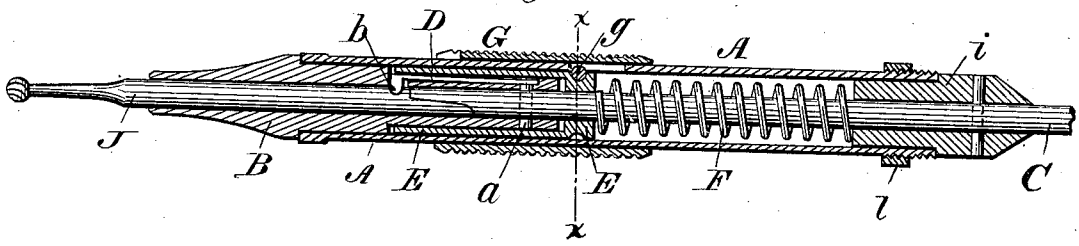


Fig. 2.

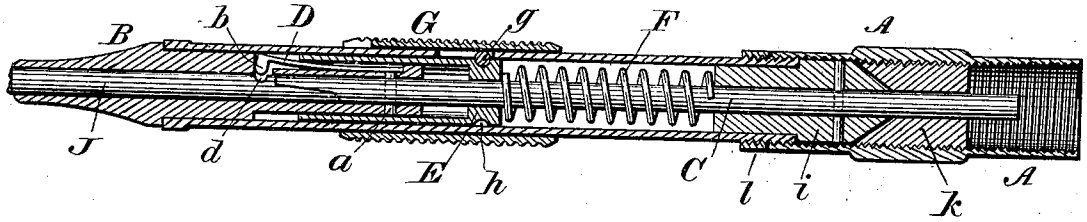


Fig. 3.

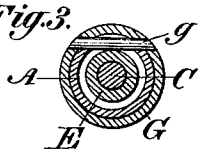
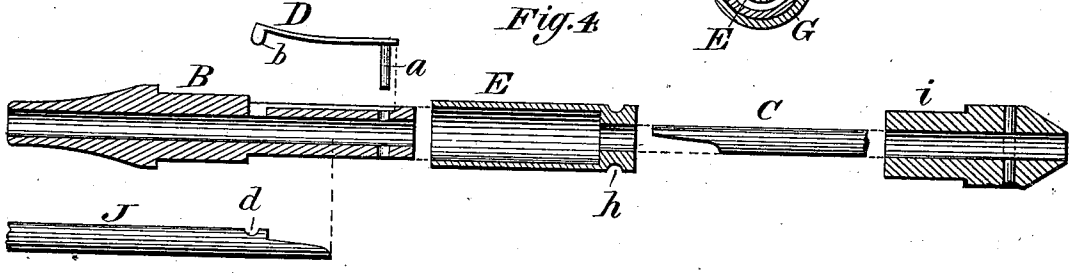


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY D. JUSTI, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN DENTAL HAND-PIECES.

Specification forming part of Letters Patent No. **215,932**, dated May 27, 1879; application filed January 8, 1879.

To all whom it may concern:

Be it known that I, HENRY D. JUSTI, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Tool-Holders, of which the following is a specification.

This invention relates to that class of tool-holders and tools which are operated with a rotary motion, and particularly to the tool-holders or hand-pieces of dental engines; and consists in a particular construction of the holder and tool, whereby the holder is caused to secure the tool firmly both against withdrawal therefrom and rotary motion therein, the instantaneous removal or insertion of the tool permitted without stopping the motion of the driving-shaft, and without first bringing the holder, as usual, to a particular position in the hand.

In the use of dental tools it is necessary to frequently change the tool during the operation upon one tooth, and this, too, oftentimes when the operator has one hand partially engaged in holding the head, lips, or mouth of the patient, and while the patient is undergoing a severe nervous strain, and it is therefore highly important that the operator shall be able to disengage and remove one tool and substitute another in the quickest possible time, and without stopping to first adjust the holder to a particular position in the hand—a position which he may again have to change after the tool is in place. It is to facilitate the removal and insertion of the tools from and into the holder, therefore, that my invention is mainly directed.

Figure 1 represents a longitudinal central section of my holder and tool, showing the latter locked fast in place; Fig. 2, a like view, with the exception that the tool is unlocked; Fig. 3, a cross-section on the line *x x*; Fig. 4, a sectional view of the various parts or pieces separated from each other.

A represents the tubular body or non-rotating portion of the device, designed to be held firmly in the hand; B, a tubular socket or tool-carrier, having its shank inserted loosely into the front end of the body; and C, the driving-shaft, inserted into the body from the rear end, and secured firmly within the socket B by a transverse pin or screw, *a*, as shown in Figs. 1 and 2, so that the rotation of the shaft causes the rotation of the socket also within the body. In one side the socket B is grooved or recessed to receive a spring-catch or detent, D, one end of which is held rigidly by the pin *a*, while the other is provided with a lip or stud, *b*, to pass through an opening into the interior of the socket, for the purpose of holding the tool J.

As shown in Figs. 1, 2, and 4, the ends of the tool and the driving shaft or spindle are each flattened or cut away on one side, so that when lapped past each other within the confining-socket the tool must turn with the shaft. In advance of its flattened end, and in such position as to have no connection or communication therewith, the tool-shank is provided in one side with a shallow transverse groove or notch, *d*, to receive the lip of the catch or detent, as shown. Around the inner end of the socket B, within the body A, I mount a rotating and sliding sleeve or tube, E, which serves, when moved forward, to force the detent or catch inward and hold its end into the notch in the tool, in the manner represented in Fig. 1. The sleeve surrounding both the socket and the spring-catch serves to retain the tool rigidly and positively in place, and as the sleeve turns with the other parts no amount of strain upon the tool can cause the holding devices to bind or cramp within the body. When the sleeve is moved backward the catch is permitted to spring outward and release the tool.

As a means of throwing and holding the sleeve forward, a spiral spring, F, is mounted within the body and arranged to bear against the end of the sleeve, as shown.

As a means of drawing back the sleeve to release the tool, I mount around the outside of the body a sliding collar or sleeve, G, and pass through the same a transverse pin, *g*, which extends through an opening in the side of the body and bears in a circumferential groove, *h*, in the internal sleeve in the manner represented, so that while the external collar is permitted to remain at rest during the rotation of the internal parts it may at any time be slid upward upon the body, and in so doing will operate the sleeve E and release the tool.

The outside collar, operating as described, is

a feature of great value and importance, as it admits of the tool being removed without stopping the motion of the driving-shaft, and without first adjusting the holder in a particular position or a particular side up in order to admit of the releasing device being operated by the finger, as is necessary in other holders of this order.

It is of importance that, as shown in the drawings, the collar shall slide upward to unlock the parts, since the collar is subjected to the downward pressure of the fingers during the use of the tool.

The collar, extending as it does entirely around the body near its lower end, and standing at rest thereon, may be readily and easily grasped and operated by the thumb and finger without changing the position of the holder in the hand.

The collar may be milled, grooved, or roughened on the outside, and may be extended up or down the body to any desired extent.

The driving shaft or spindle has secured upon its upper end a steel collar, *i*, which runs within the body, and which has its upper end tapered and seated within a bearing or bushing, *k*, screwed into the upper end of the body, as shown in Fig. 2. This upper end of the body is made separate from the lower part and screwed thereon, so that it may be turned downward to keep the bushing *k* snugly against the collar *i* as the latter wears away.

As a means of controlling the adjustment of the bushing, the main portion of the device has screwed upon it a ring or nut, *l*, to serve as a stop and jam-nut for the upper and adjustable end.

By the use of the ring the accurate and ready adjustment of the parts is secured, and the accidental separation of the two parts of the body by the vibration of the holder prevented, for the reason that the ring and the body-section, being screwed tightly together, serve like jam-nuts to bind each other rigidly against and upon the screw-threads.

By means of my improvements I produce a tool-holder which is both cheap and simple, which holds the tool with great firmness, which avoids the necessity of weakening the tool-shanks, and which may be operated with ease and quickness.

It is manifest that any other swiveling connection may be substituted for that shown between the outside collar and the inside sleeve.

I am aware that the combination of a non-rotating body or sleeve and an internal tool-socket with tool-fastening devices to be operated from the outside of the body is old, and that such devices have been constructed and combined in various forms, the external means of operating the fastening device consisting in each case of a small stud or small exposed portion of a sleeve at one side of the body, which construction necessitated the turning or adjustment of the body to a particular position in the hand, in order to bring the operating devices in position to be conveniently actuated.

My holder differs from those above mentioned in that the collar completely encircling the body and connected with the tool-fastening devices admits of the tool being unlocked and removed instantly, regardless of the position of the body in the hand.

I am aware that a driving-shaft has been coupled to the tool-holder of a hand-piece by means of a sliding clutch actuated by an outside sleeve, the parts being disconnected by a downward movement of the sleeve. This arrangement differs from mine in that it does not release the tool from the holder or have any connection with devices for so doing, and also in the important particular that the parts are unlocked by a downward instead of an upward movement of the sleeve—an arrangement which would be fatal in my instrument, for the reason that the application of the required pressure in operating with the instrument, the sleeve being constantly exposed to the pressure of the fingers, would cause the release of the tool at the time when it should be most securely fastened. Hence I do not claim merely a sleeve, or broadly the combination of a sleeve and internal mechanism; but I believe myself to be the first to so apply and combine the sleeve with a body and the internal socket and devices for fastening the tools within the socket that the latter may be actuated by the upward movement of the sleeve; and it is to this combination, which gives much greater ease and facility in using the tool, that my invention is limited in this regard.

I am also aware that it is old to flatten the end of the tool and the driving-shaft that they may overlap each other, and to provide the flattened end of the tool with a transverse notch intersecting the flattened end, or with a diametric hole in advance of the flattened portion; but these constructions were faulty in that they so reduced and weakened the tool that it was frequently broken by the strain to which it was subjected, and it is to overcome this evil that my construction is designed.

Having thus described my invention, what I claim is—

1. The combination of the non-rotating body A, the socket B, radially-moving catch D, and sliding collar E, arranged to rotate together within the body, and the external non-rotating sleeve G, encircling the body, connected with the internal sleeve by a swivel-joint, and arranged to unlock the parts by an upward movement, as shown, whereby the removal of one tool and substitution of another is permitted without changing or adjusting the body within the hand.

2. The combination of the socket, the driving shaft or spindle, and the catch with the single pin arranged to unite them, as shown.

3. In a hand-piece for dental engines, the combination of the shaft, provided with the shouldered collar *i*, and the body A, consist-

ing of the two parts screwed together, and provided with the bushing *k*.

4. The combination of the two-part body A, having its parts screwed together, the bushing *k*, seated in one part, the driving-shaft, having the collar *i*, and the ring *l*, applied, as shown, to serve the double purpose of preventing a separation of the body and of controlling the pressure applied to the collar.

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