

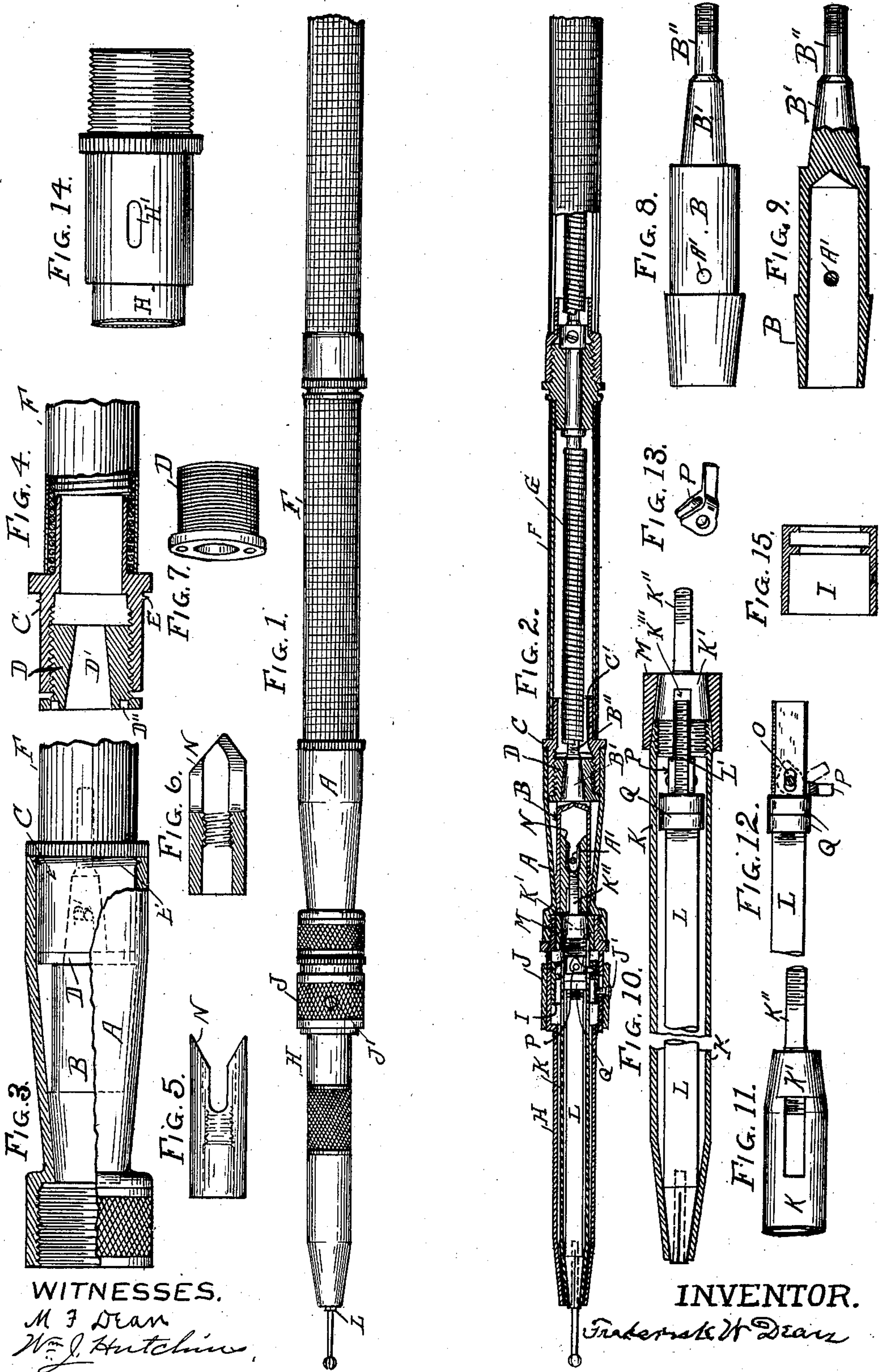
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Patented Jan. 28, 1902.

F. W. DEAN.
HANDPIECE FOR DENTAL ENGINES.

(Application filed Jan. 5, 1901.)

(No Model.)



UNITED STATES PATENT OFFICE.

FREDERICK W. DEAN, OF DES MOINES, IOWA.

HANDPIECE FOR DENTAL ENGINES.

SPECIFICATION forming part of Letters Patent No. 691,753, dated January 28, 1902.

Application filed January 5, 1901. Serial No. 42,268. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. DEAN, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Handpieces for Dental Engines, of which the following is a specification, reference being had to the accompanying drawings, and the letters of reference marked thereon, which form a part of this specification.

My invention relates especially to improvements in the handpiece of a dental engine, which improvements are fully set forth and explained in the following specification and pointed out in the claims hereunto annexed.

The objects of my invention are to simplify and render the handpiece of a dental engine less complicated than others now in use, to so construct and arrange the operative parts that adjustment thereof may be made from time to time to compensate for wear occasioned by continued use of the instrument, and thereby constantly maintain the instrument in perfect working condition, to avoid the use of latches for holding the parts coupled together, which are commonly used in other instruments of this class, and encumber and render the instrument liable to catch on clothing or other objects, and to so confine the journals of the instrument that lubricants applied thereto will not escape and soil the hand of the operator or get upon the patient being operated upon. I attain these objects by means of the mechanism illustrated in the accompanying drawings.

Referring to said drawings, Figure 1 is an exterior view of the handpiece and a portion of the cable for connecting with the engine; Fig. 2, a longitudinal sectional view of the same; Fig. 3, a detailed sectional view of the main shell of the handpiece having fitted therein the tool-driving spindle and cable-connecting coupling; Fig. 4, a detailed section of said coupling having a portion of the cable casing or sheath; Fig. 5, an exterior view of the tool-driving clutch which operates in the tool-driving spindle; Fig. 6, a longitudinal section of the same; Fig. 7, a detailed perspective of the adjustable cone-bearing of said cable-coupling; Fig. 8, a detailed exterior view of the said tool-driving spindle; Fig.

9, a longitudinal section of the same; Fig. 10, a detailed sectional view of the terminal portion or tool end of the interior operative parts of the handpiece; Fig. 11, a detailed exterior view of the rear or inner end portion of the tool-chuck-inclosing case or tube; Fig. 12, a detailed side view of the rear or inner end portion of the tool-chuck of the adjusting nuts or collars turned thereon and a sectional view of the adjusting-lever attached thereto; Fig. 13, a detailed perspective of said lever; Fig. 14, a detailed exterior view of the rear or inner end portion of shell of the handpiece terminal portion; and Fig. 15, a detailed longitudinal section of the inner and annularly-flanged slide whereby the tool-chuck-adjusting lever is actuated.

In the drawings, A represents the main shell of the handpiece, and B the tool-driving spindle, which is coned or cone-shaped at its forward end portion and bears thereat in a corresponding bearing in said shell.

C represents the cable-coupling, which is made at its forward end with a portion which sleeves into the rear end portion of shell A to a point nearly to an annular flange of the coupling, whereat a single screw-thread of the coupling (shown at E in Figs. 3 and 4) turns into a female corresponding thread of shell A, and thus when such turn is made the coupling-flange is brought to bear against the end of shell A and the coupling is effected. Said end of coupling C, which enters shell A, is hollow and is therein made with an annular thread, wherein a bushing D, which is provided with a corresponding thread, is turned, which bushing is made with a cone-shaped journal-bearing, (shown more particularly at D' in Fig. 4,) which bearing thus arranged receives the cone-shaped journal B' of spindle B, bringing the butt of the bushing to bear against the shoulder of the spindle surrounding said journal. Said spindle thus placed bears at each end in cone-shaped bearings. The bushing D, which forms one of said bearings, is adapted to be adjusted from coupler C by means of a spanner-wrench placed in the sockets D'' in its end for the purpose of taking up wear of the spindle and bearings from time to time as occasion may require, and the cone shape of said spindle, journals, and bearings maintains perfect working bear-

ings under such adjustments. Said coupling C is made with a rear extending neck C', whereon the casing or cable-sheath F is fixed and within which the end portion of the coil or flexible shaft G is arranged, which coil or shaft is thus within sheath F and extends rearward to and is driven by the dental engine in the usual manner. Spindle B is provided with a shank B'', which extends rearwardly from journal B' into a coupling, where it may be operatively connected with the flexible shaft G in any usual or suitable manner.

The terminal portion or tool end of the hand-piece comprises an exterior shell H, flanged and screw-threaded at its rear end and adapted to be turned into the correspondingly-threaded portion of the forward end of shell A. The rear end portion of shell H is enlarged, as shown, so as to form an annular chamber h, in which is located an annularly-flanged slide I. A sleeve J is slidably mounted on the exterior of said chamber and is connected to slide I by means of a screw J', passing through said sleeve and slot H' in the walls of the chamber h and taking into said slide I, so that by the movement of said sleeve the interior slide is correspondingly moved for a purpose hereinafter set out. Placed within said shell H and slide I is an inner shell or tube K, wherein the tool-chuck L is placed, and after placing said chuck has turned into its rear end a cone-shaped journal K', as shown in Figs. 2 and 10, which journal bears in an adjustable cone-shaped bearing M, which is fitted in the rear end of shell H. Said journal K' is made with a rearwardly-extending shank K'', which is screw-threaded and turns into a forked clutch N, which extends into spindle B, with the fork thereof striding the cross-pin A' of said spindle, which clutch thus connected and placed is driven by spindle B and in turn drives shell K through the medium of journal K' and shank K'', and as a means of driving chuck L said journal K' is made with a cross-recess K''', opening into shell K, and the rear end of said chuck is flattened, and a portion of its flattened section is entered into said journal-recess, (see Fig. 10,) and thus caused to operate with said journal and shell.

The terminal portion of shell H, of shell K, and chuck L are all tapered or cone-shaped, as shown, which shape of shell H forms a bearing wherein that end of shell K operates, and such interior shape of shell K serves to close the jaws of chuck L on a tool placed therein, as represented, when said chuck is forced forward hard into said shell K. As a means of thus forcing said chuck it is provided with a short slot o in its flattened portion adjacent the forward end of journal K', whereat a double-headed eccentric lever P is fulcrumed to said chuck by placing the fulcrum-pin thereof through said chuck-slot. That end of chuck L is screw-threaded and has turned thereon a pair of set nuts or collars Q, so adjusted as to bear against said

lever-heads. The lever P thus placed extends radially into the annular recess between the two annular flanges of slide I, so that movement of said slide will operate it and cause the eccentric portions of the heads thereof to bear against the end of journal K', and thereby force chuck L out and pinch and hold the tool. Reverse movement of said slide will reverse the lever and release such force or hold on the chuck, and thus permit the tool to be removed. Adjustment of set-collars Q, bearing against said lever, changes the longitudinal position of the fulcrum, and thus regulates the degree of force exerted on said chuck to grip its tool. As a means of operating said lever as described the exterior slide J is grasped and moved, which likewise moves slide I and actuates the lever in the direction desired.

As a means of adapting clutch N to readily enter spindle B and not abut cross-pin A' the entering end of the clutch-fork is flared and the branches thereof pointed, as shown—that is to say, scarfed on opposite sides to the central point and at right angles to the bifurcation or slot, the tool-carrying spindle with said clutch attached being free to revolve in its case. When the clutch is pushed inside of the driving-spindle, its points will pass the round pin in said spindle without obstruction, and the scarfed faces of said points serve to revolve the clutch as it proceeds until the cross-pin in the spindle is brought in line with the bifurcation or slot, when the clutch will slide toward and strike the pin, and so a close joint can be effected as readily when in rapid motion as when at rest.

It will be observed by reference to the above description and the drawings that each journal of the hand-piece is cone-shaped and that one bearing of each journaled part is made adjustable for taking up wear, and thus maintaining a perfect working condition of the instrument. It will further be observed that with the parts fully connected all avenues for the escape of lubricants placed within are closed, thus rendering the instrument proof against the leakage of its lubricants when in service, and it will further be observed that the parts assembled in the construction of this instrument are of a design easy of manufacture, simple in pattern, easily placed and adjusted, and few in number compared with instruments of this class now in general use.

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

1. In a hand-piece for dental engines, the combination with the rear shell having a cone-shaped bearing in its forward end, a detachable cable-coupling fitted in its rear end and a reverse-shaped cone-bearing adjustably fitted in said coupling; of a spindle having a cone-shaped journal at each end and mounted in said bearings, a flexible shaft coupled thereto and a tool-chuck detachably connect-

ed therewith substantially as shown and specified.

2. In a handpiece for dental engines the combination with the rear shell having a cone-shaped bearing in its forward and a detachable cable-coupling fitted in its rear end, and a reversed cone-shaped bearing therein of a spindle having a cone-shaped journal at each end and adapted to be seated in said bearings a flexible shaft coupled thereto a forward shell detachably fitted into the forward end of said rear shell and a tool-chuck rotatably mounted in said forward shell, and a clutch connecting said chuck and spindle substantially as shown and described.

3. In a dental handpiece, the combination with the driving-shaft G, the hollow driven shaft B having cross-pin A' and connected to said driving-shaft; of the chuck-carrying spindle K, a slip-joint comprising in construction a forked clutch N, the ends whereof are flared and pointed, whereby it is adapted to enter the hollow drive-shaft and be seated astride the cross-pin therein, and means for operatively connecting said clutch with the chuck-carrying spindle, substantially as shown and described.

4. In a dental handpiece the combination with the shell H having mounted thereon the slide J and mounted therein the slide I connected with slide J and provided with the annular groove as shown; the chuck-carrying shell K operatively mounted in shell H, and slotted in its side adjacent slide I, the chuck

L arranged in said shell K and provided with the lever P fulcrumed thereto and arranged with its end protruding the side slot of shell K and terminating within the annular groove of slide I, and with eccentric portions impinging bearings of the interior of shell K, and adapted to be actuated so its eccentric portions will act to force the nose of chuck L hard into shell K, or release such force by actuating the connected slides J and I, substantially as described.

5. In the herein-described handpiece for dental engines, the combination of the spindle B; the clutch N; the tool-chuck L K bearing K' and shank K'' thereof, substantially as set forth.

6. In the herein-described handpiece for dental engines the combination with the shell H; the connected slides J and I, the latter slide being provided with the annular flanges as described, the chuck-shell K provided with the journal K' and shank K'', of the chuck L provided with the adjustable collars Q and the lever P fulcrumed to said chuck, substantially as and for the purpose specified.

In testimony whereof I have hereunto affixed my name in the presence of two subscribing witnesses.

FREDERICK W. DEAN.

In presence of—

M. F. DEAN,

WM. J. HUTCHINS.