

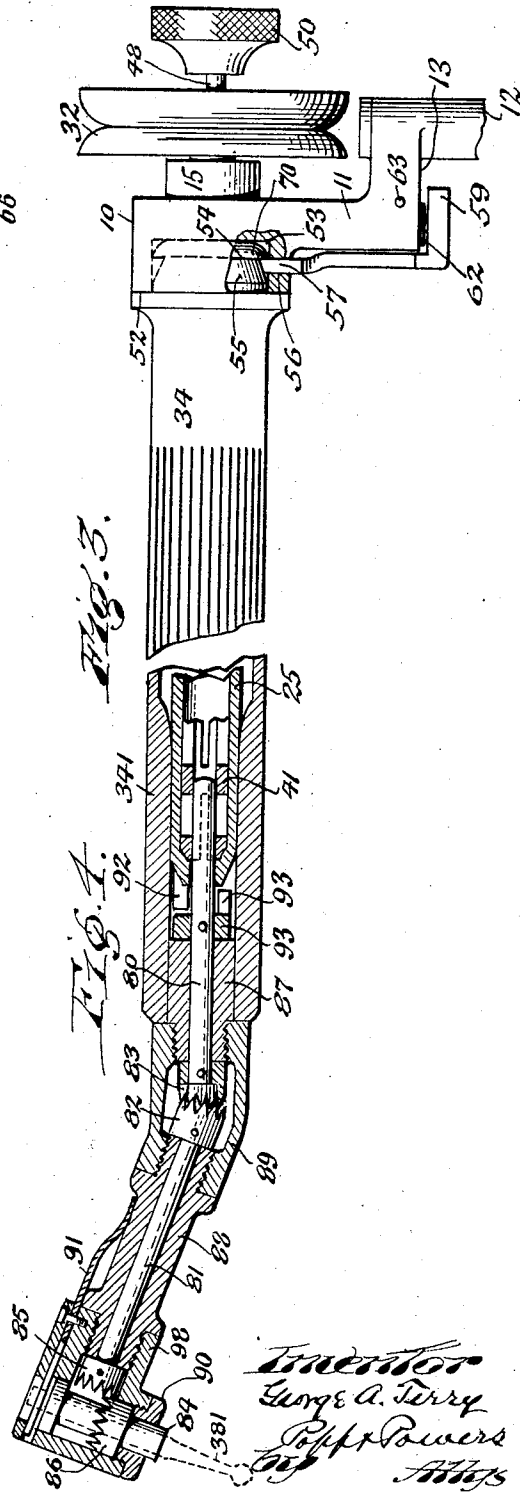
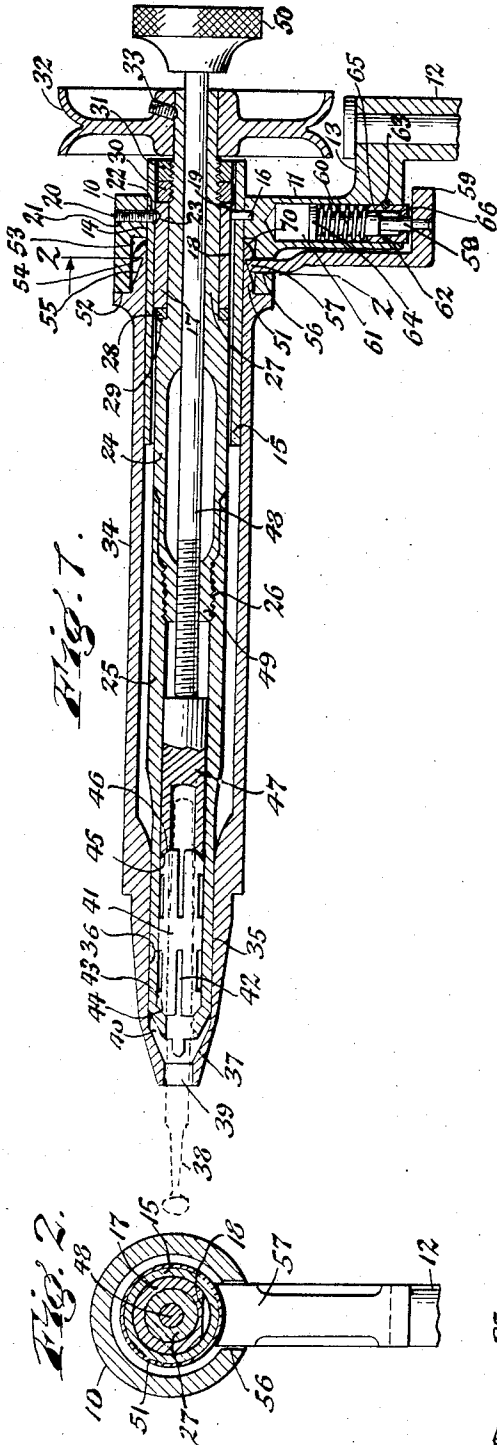
Aug. 9, 1927.

G. A. TERRY

1,638,175

DENTAL HANDPIECE

Filed Feb. 10, 1926



Inventor
George A. Terry
By
Ralph Powers
Attorney

Patented Aug. 9, 1927.

1,638,175

UNITED STATES PATENT OFFICE.

GEORGE A. TERRY, OF BUFFALO, NEW YORK.

DENTAL HAND PIECE.

Application filed February 10, 1926. Serial No. 87,305.

This invention relates to a dental hand piece whereby the dentists holds and manipulates the rotary tool which is employed for doing various kinds of dental work.

5 Such hand pieces are provided with an outer sheath or enclosing casing which is removably connected with a frame so as to permit of uncovering the internal mechanism of the hand piece for the purpose of
10 cleaning and lubricating the working parts and also adjusting and repairing the same when this is necessary. One of the objects of this invention is to provide a fastening
15 whereby the sheath is detachably connected with the frame, which fastening is of simple and compact construction and will reliably hold the sheath in its proper position on
20 the frame and which permits of quickly and easily locking the sheath on the frame or unlocking the same therefrom.

Another object of this invention is to improve the means of journaling the shaft on the frame and the sheath so as to provide an improved bearing surface and also
25 insure a proper bearing of the shaft on the frame and sheath without involving undue expense in manufacture.

A further object of this invention is to provide simple and efficient means whereby
30 motion is transmitted from the shaft to the bur, bit or tool when the same is mounted at an angle to the main shaft by means of an extension of the sheath.

In the accompanying drawings:

35 Figure 1 is a longitudinal section of my improvements embodied in a straight hand piece.

Figure 2 is a cross section taken on the correspondingly numbered line in Fig. 1.

40 Figure 3 is a fragmentary side elevation, partly broken away, of the hand piece shown in Figs. 1 and 2.

45 Figure 4 is a fragmentary longitudinal section of the front part of an angular hand piece embodying my invention.

Similar characters of reference indicate corresponding parts in the several views of the drawings.

50 The frame of the hand piece may be of any suitable and well known construction, that shown in the drawings comprising a transverse head 10, and an angular bracket comprising an inner arm 11 which projects laterally from the head 10, an outer arm 12
55 which is offset rearwardly from the inner arm and is adapted to be connected with a

support, and a web 13 connecting the opposing ends of the arms 11 and 12.

Removably mounted in an opening 14 of this head 10 is a supporting sleeve or tube 60 15 which is normally held against turning and against lengthwise movement in the frame by means of a key 16 passing transversely through the opposing parts of this tube and the head of the frame, as shown 65 in Fig. 1. Within the supporting sleeve 15 is arranged a tubular bearing 17 which is inserted into this tube from the rear end thereof and is limited in this movement and also held against turning in this supporting 70 sleeve, this being preferably accomplished by engaging the inner end of the pin or key 16 with a flat sided locking face 18 extending from the front end of this bearing tube rearwardly and terminating in a forwardly 75 facing shoulder 19 which locking face and stop shoulder 19 are adapted to engage with the inner end of the key or pin 16, as shown in Fig. 1. The bearing 17 is held in this 80 position by means of a set screw 20 passing through a threaded opening 21 in the head 10 and through an opening 22 in the supporting sleeve 15 and into a notch 23 on the adjacent part of the bearing tube 17. These 85 openings 21 and 22 and the notch 23 are arranged diametrically opposite the pin 16 and locking face 18 which permits the pin 16 to be passed through the opening 21 for the purpose of engaging the same with the supporting sleeve 15 and the frame in as- 90 sembling the parts. The shaft of the hand piece comprises a rear section 24 and a front section 25 which are detachably connected by means of a screw joint 26. The rear section is provided with a contracted 95 neck 27 which turns in the bearing tube 17 and is detachably mounted therein by means which also operate to hold the same normally against longitudinal movement when the parts are assembled for use. In the pre- 100 ferred construction this is accomplished by interposing a thrust washer 28 between the front end of the bearing tube 17 and a rearwardly facing shoulder 29 formed on the rear section of the shaft between its enlarged 105 part of the reduced rear part 27 of the same, and a stop screw nut 30 arranged on an external screw thread on the neck 27 and adapted to engage the rear end of the bearing tube 17 and a locking screw nut 31 also 110 engaging with this threaded part of the shaft and engaging with the rear side of the

stop nut 30 for the purpose of holding the latter against rotation. These screw nuts 30 and 31 are preferably arranged within the rear end of the sleeve 15. Upon removing the set screw 20 the shaft together with its bearing tube may be removed from the supporting sleeve 15 and then upon removing the screw nuts 30 and 31 this shaft may be withdrawn forwardly from the bearing 17 when this becomes necessary for cleaning, repairing, or adjusting the instrument. Rotary motion is imparted to the shaft by means of a pulley 31 secured to the rear end of the neck 27 by means of a set screw 33 or other suitable means and adapted to receive a driving belt on its periphery in a manner similar to that now commonly practiced in dental engines.

Surrounding the shaft is a tubular sheath 34 which forms a handle which is grasped by the dentist and whereby the bit of the tool is controlled while doing dental work. This sheath has its rear part surrounding the front end of the supporting sleeve 15 and the same has the front part of its bore constructed in the form of a longitudinal cylindrical bearing 35 in which turns the cylindrical front part 36 of the front section of the shaft. The front end of the sheath 34 is contracted forming an internal rearwardly facing shoulder 37 which is spaced apart from the front end of the shaft so that in the assembled position of the parts the front end of the shaft does not engage with the rearwardly facing shoulder 37 but is supported and turned solely on the cylindrical bearing surface 35 arranged inwardly in rear of the shoulder 37. By this means considerable latitude is permitted in the manufacture of the shaft and the sheath which permits the same to fit each other properly at their front ends for producing a rotary joint between the same and is therefore less expensive than a joint which made it necessary to accurately fit the front end of the shaft against a shoulder on the front part of the sheath, as has been necessary heretofore.

The tool or bit which is to be rotated by the shaft, for instance a bur 38, is inserted through an opening 39 at the front end of the sheath and through an opening 40 at the front of the shaft and this bit may be detachably connected with the shaft in any suitable manner the means shown in the drawings, for example, consisting of a contractable chuck 41 of tubular form which receives the rear end of the bit or bur and is provided with a plurality of longitudinal slits 41 which render this chuck flexible and permit the same to contract and grip the bit. Such contraction of the jaws of the chuck is effected by engagement of the tapering front ends 43 of the chuck jaws with the tapering front end 44 of the shaft

and the engagement of the tapering rear ends 45 of the chuck jaws with the tapering front end 46 of a clamping sleeve or block 47 which slides lengthwise in the shaft in rear of the chuck. The longitudinal movement of the clamping sleeve 47 for opening and closing the chuck and causing the same to either release or grip the tool inserted therein is effected by means of a clamping rod 48 which has a screw thread engaging with an internally threaded part 49 on the rear shaft section and bears at its front end against the rear end of the clamping sleeve 47 while its rear part extends through the rear part of the shaft to the exterior thereof and is provided with a button or finger piece 50 whereby the same may be turned.

The quick detachable connection between the sheath and the frame of the hand piece which embodies my improved fastening mechanism is constructed as follows:

The rear end of the sheath is contracted so as to form a reduced neck 51 and a rearwardly facing shoulder 52. This neck moves into an annular recess or pocket 53 on the front side of the head 10 and the shoulder 52 bears against the front side of this head. On its periphery the neck 51 is provided with an annular groove which is constructed to form an annular forwardly facing abrupt locking shoulder 54 and a rearwardly tapering face 55 in front of said locking shoulder. At its rear end the neck 51 is tapered or rounded as shown at 70.

Sliding laterally in an opening 56 on the head of the frame is a catch 57 the inner end of which is provided with an abrupt rear face and an inclined front face for engagement respectively with the abrupt face 54 and the tapering face 55 on the sheath when the latter is moved into its rearmost position and engages its neck fully with the pocket 53 on the frame, as shown in Fig. 1. This catch is yieldingly held in this position but capable of being withdrawn readily therefrom by means which are constructed as follows:

The numeral 58 is a transversely movable tension rod which is guided on the frame and connected at its outer end with a rearwardly projecting lug 59 on the catch and yieldingly drawn inwardly by means of a spring 60 for the purpose of holding the catch 57 in engagement with the locking groove of the neck 51. The inner part of this tension rod 58 is arranged within a pocket or recess 61 in the arm 11 while the intermediate part of the same slides in a bushing 62 which is secured in the outer end of this pocket by means of a pin 63. The spring 60 surrounds the shifting rod 58 and bears at its inner end against a head 64 at the inner end of this rod, while the outer end of this spring bears against the

inner end of the bushing 62. The outer part of the shifting rod 58 is reduced so as to form an outwardly facing shoulder 65 which is adapted to engage with an inwardly facing shoulder 66 on the bushing 62 for the purpose of limiting the outward movement of the shifting or tension rod and thereby prevent the inner end of the catch 57 from being wholly withdrawn from the guide opening 56 in the frame.

For the purpose of assembling the sheath with the frame and retaining the same in position in which it encloses the shaft and other internal parts of the dental hand piece it is only necessary to slip the sheath rearwardly over the supporting sleeve 15 and insert its neck 51 within the pocket 53 until the shoulder 52 of the sheath engages the front side of the frame. In doing this the rounded rear end 70 of the sheath first deflects the catch 57 laterally and when the forwardly facing shoulder 54 of the sheath has passed beyond the catch then the resilience of the spring 60 will immediately draw the catch in again and engage the abrupt rear or locking face of the latter with the forwardly facing abrupt locking face 54 of the sheath and thereby automatically lock the sheath in its operative position on the frame. For the purpose of releasing the sheath from the frame in order to permit its withdrawal therefrom it is only necessary to pull the catch 57 laterally outward by grasping the lug 59 on the outer end thereof which is somewhat enlarged so that it performs the function of a finger piece for this purpose during which time the spring 60 will be flexed and its resilience will serve to again return this catch to its inner normal position.

These means for detachably connecting the sheath and frame are very simple and compact in construction so that they do not interfere with the manipulation of the hand piece while performing dental work. The same contain no delicate parts which are liable to get out of order and they permit of very quickly locking the sheath on the frame as well as unlocking the same therefrom when this becomes necessary, thereby enabling a dentist to open up the hand piece more readily and conveniently for the purpose of cleaning the interior of the instrument and lubricating the same which is required in order to render the instrument sanitary and maintain the same in its most efficient condition. Owing to the convenience and rapidity with which the sheath may be thus removed from the frame and re-applied thereto a dentist can do this more often without loss of time which is the chief objection that has been urged against the detachable connections between the sheath and frame of dental hand pieces heretofore on the market and has been the principal

cause for neglecting cleaning and oiling of the instrument and proper sterilization which should be done in order to maintain the same in a sanitary condition and also cause the same to wear longer and work better when properly cleaned and oiled.

Moreover by means of this quick detachable sheath the dentist may provide a plurality of sheaths for the hand piece which permits of sterilizing one or more sheaths while one is in use on a patient and thus enables the dentist to treat each patient in the most sanitary manner without loss of time, convenience or expense.

When my invention is incorporated in an angular hand piece the same is organized in the manner shown in Fig. 4. In this construction the bur 381, or other dental tool is arranged at an angle to the axis of the main shaft instead of being in alinement therewith and motion is transmitted from the main shaft to this bur by means of a rear extension shaft section 80 which may enter but not necessarily be grasped at its rear end by the chuck 41, an intermediate extension shaft section 81 which is connected with the front end of the rear extension shaft section 80 by means of intermeshing gear wheels 82, 83 said shaft sections 80 and 81 being arranged at an angle with reference to each other, and a socket shaft 84 which is arranged at right angles to the shaft section 81 and receives the bit 381 and is operatively connected with the shaft section 81 by means of intermeshing gear wheels 85 and 86 mounted respectively on these parts.

The rear extension shaft section 81 is journaled in a bearing bushing 87 which is mounted on the front end of a sheath 341 which is adapted to enclose the main shaft sections of the hand piece and to be connected at its rear end with the main frame and in the same manner in which this is done in the construction shown in Figs. 1, 2 and 3. The intermediate extension shaft section 81 is journaled in a bearing 88 which is connected with the bushing bearing 87 by means of a tubular bracket 89 having a screw connection with the front end of the bearing bushing 87 and the intermediate bearing 88. The socket shaft 84 is journaled in a supporting head 98 which is connected by means of a screw joint with the front end of the extension bearing 88 and is held in this head 98 by means of a screw cap 90 applied to the lower side thereof and bearing against the under side of the gear 86. The tool 381 passes through the socket shaft 84 and is held therein by means of a latch 91 in a manner well known in dental practice.

For the purpose of obtaining a positive driving connection between the main shaft and the extension shaft 80 the front end of

the front shaft section 25 is provided with one or more coupling lugs 92 which are adapted to engage with one or more coupling lugs 93 on a collar 94 which is secured to the shaft extension 80 and preferably bears against the inner end of the bearing bushing 87, as shown in Fig. 4.

When therefore it is desired to use the instrument as a straight hand piece the straight sheath shown in Fig. 1 is employed which permits the bur or other tool to be inserted directly into the chuck and connected with the main driving shaft while the bit is in alinement therewith, but when the dental work requires the use of an angular hand piece then the straight sheath shown in Fig. 1 is removed from the main shaft and the angular sheath and its extension members are used instead by simply slipping the straight portion 341 of the sheath of the angular hand piece lengthwise over the main shaft until the rear end of this sheath is interlocked with the frame at which time the cooperating driving lugs 92 and 93 of the main driving shaft and the auxiliary or extension shaft 80 will be brought into their proper positions for transmitting motion from the main shaft to the bit.

I claim as my invention:

1. A dental hand piece comprising a frame provided with a bearing and a pocket concentric with said bearing, a shaft journaled in said bearing, a tubular sheath surrounding said shaft and having its rear end arranged in said pocket and provided with an annular groove forming a forwardly facing shoulder, and a catch guided on the frame and movable laterally thereon into and out of engagement with said shoulder.

2. A dental hand piece comprising a frame provided with a bearing and a pocket concentric with said bearing, a shaft journaled in said bearing, a tubular sheath surrounding said shaft and having its rear end arranged in said pocket and provided with an annular groove forming a forwardly facing shoulder, a catch guided on the frame and movable laterally thereon into and out of engagement with said shoulder and resilient means for holding said catch yieldingly in engagement with said shoulder.

3. A dental hand piece comprising a frame provided with a bearing and a pocket concentric with said bearing, a shaft journaled in said bearing, a tubular sheath surrounding said shaft and having its rear end arranged in said pocket and provided with an annular groove forming a forwardly facing shoulder, a catch guided on the frame and movable laterally thereon into and out of engagement with said shoulder and provided at its outer end with a lug, a tension rod connected with said lug, and a spring

mounted on the frame and operating to draw said rod and catch inwardly.

4. A dental hand piece comprising a frame provided with a bearing, a pocket concentric with said bearing, a guideway extending laterally from said pocket, and a recess arranged on the side of said frame, a shaft journaled in said bearing, a tubular sheath surrounding said shaft and provided at its rear end with a forwardly facing shoulder arranged within said pocket, a laterally movable catch arranged in said guideway and adapted to engage its inner end with said shoulder and provided at its outer end with a lug, a bushing arranged in the outer end of said recess, a tension rod arranged in said recess and sliding in said bushing and connected at its outer end with said lug and provided at its inner end with a shoulder, and a spring surrounding said tension rod and bearing at one end against the shoulder on said rod and at its other end against said bushing.

5. A dental hand piece comprising a frame, a supporting sleeve mounted in said frame, a bearing tube arranged in said sleeve, a shaft journaled in said bearing tube and having a shoulder opposing the front end of said bearing tube, a screw nut arranged on said shaft and opposing the rear end of said bearing tube, said bearing provided on its periphery with a key seat and a forwardly facing shoulder, and a key arranged on said sleeve and engaging with said seat and shoulder.

6. A dental hand piece comprising a frame, a supporting sleeve mounted in said frame, a bearing tube arranged in said sleeve, a shaft journaled in said bearing tube and having a shoulder opposing the front end of said bearing tube, a screw nut arranged on said shaft and opposing the rear end of said bearing tube said bearing provided on its periphery with a key seat and a forwardly facing shoulder, a key mounted on said sleeve and frame and engaging said seat and shoulder, and a set screw arranged on the frame and engaging with said sleeve and tube.

7. A dental hand piece comprising a frame, a main shaft journaled on the frame, a sheath surrounding said main shaft and detachably connected with said frame, an extension for said sheath, and a driving mechanism for a bit arranged within said extension and adapted to be positively interlocked with said main shaft and comprising an extension shaft journaled in the front part of said sheath and co-operating coupling lugs arranged on said main shaft within the sheath and said extension shaft.

In testimony whereof I hereby affix my signature.

GEORGE A. TERRY.