

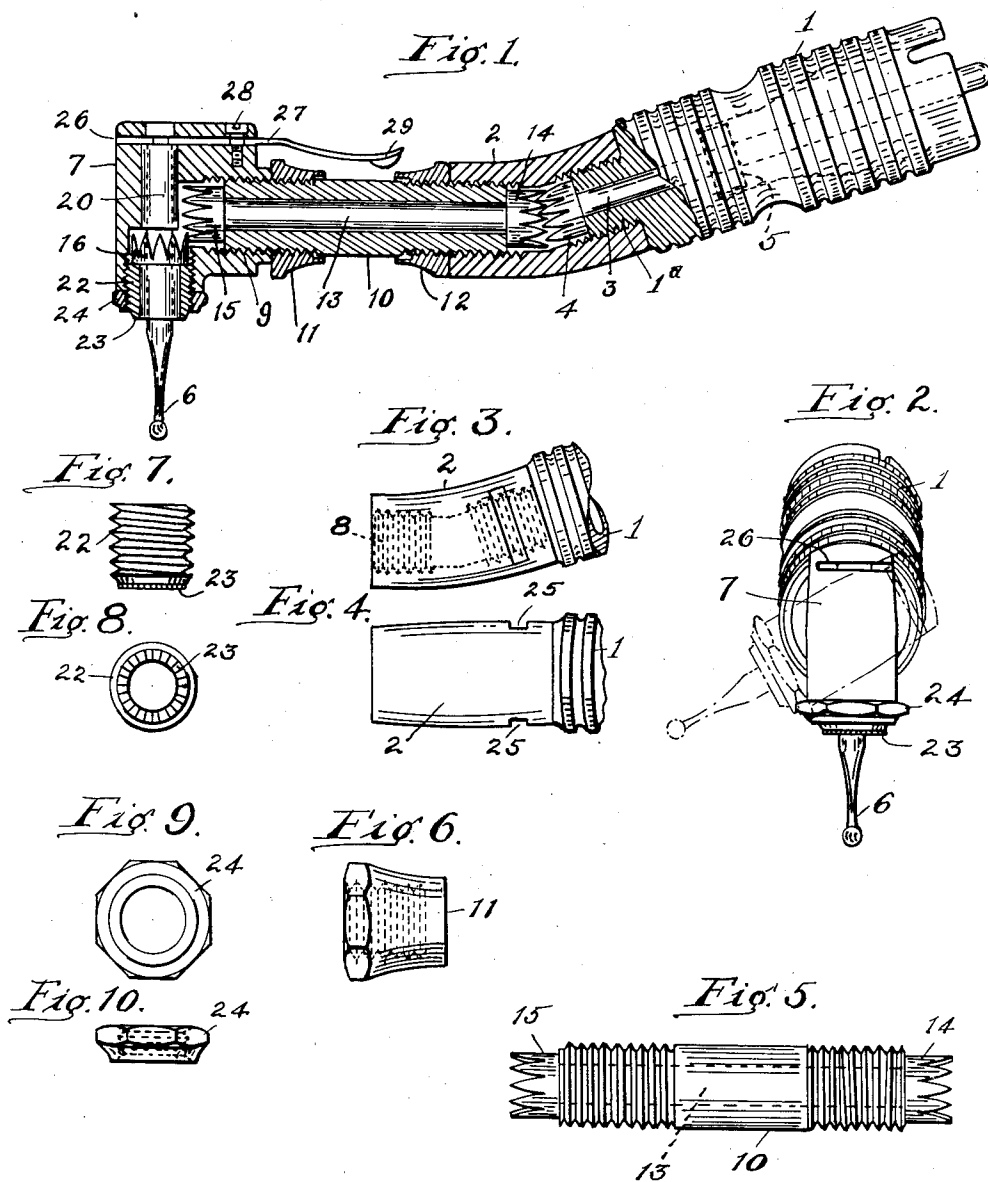
May 31, 1949.

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2,471,526

DENTAL HAND PIECE

Filed Aug. 21, 1946



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UNITED STATES PATENT OFFICE

2,471,526

DENTAL HAND PIECE

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Application August 21, 1946, Serial No. 692,010

2 Claims. (Cl. 32-27)

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My invention relates to hand pieces used by dentists for the manipulation of the burrs, or rotary tools, employed in the preparation of cavities in teeth and other drilling and cutting operations and it has for its object to provide an improved hand piece serving as the connection between the flexible drive shaft and the tool whereby the angularity of the latter may be adjusted with reference to its holder for the greater convenience and comfort of the dentist in the performance of difficult operations and at the same time maintain a perfectly smooth transmission of the power delivered to the tool.

My invention also has for its further object to provide a contra angle hand piece for dental use in which provision is made for the relative adjustment of the intermeshing gears to effect a smooth transmission of the power delivered to the tool, said adjustment facilitating the initial assembly of the tool, the subsequent take-up required to compensate for wear of the parts, and also to accommodate the proper operation of the parts when changes in the angular position of the tool on the handle are made from time to time.

A still further object of my invention comprehends the provision of a fitting, between the elbow of the hand piece per se of a contra angle hand piece and the angular head which carries the tool or burr, in the way of a threaded neck piece carrying a section of the power shaft and gears, and an adjustable element on the head for the burr carrying sleeve and its driving gear with reference to its intermeshing gear carried by the aforementioned neck.

To these and other ends my invention embodies further improvements all of which will be fully described in the accompanying specification, the novel features thereof being set forth in the appended claims.

In the drawings:

Figure 1 is a side elevation partly in section of a dental hand piece constructed in accordance with my invention.

Figure 2 is an end view showing the angular adjustment of the head relatively to the hand piece or holder.

Figures 3 and 4 are detail side and top plan views respectively of the elbow portion of the holder.

Figure 5 is a detail view showing in side elevation the neck piece forming the connecting element between the elbow on the holder and the head.

Figure 6 is a side elevation of one of the lock nuts used on the connecting neck piece.

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Figure 7 is an enlarged detail in side elevation of the adjusting member carrying the sleeve in which the burr or tool is removably secured.

Figure 8 is a bottom plan view of the member shown in Fig. 7 and

Figures 9 and 10 are face and side views respectively of the lock nut employed in connection with the adjusting member shown in Figs. 7 and 8.

Similar reference characters in the several figures indicate similar parts.

A contra angle hand piece embodying my invention comprises a holder or handle portion 1 the rear exterior portion of which is provided with knurled annular ridges to facilitate its being grasped in the hand of the operator, and a forward elbow portion 2 which is curved, as shown, and is permanently connected to the part 1 by a threaded connection with the reduced portion 1^a thereon. These parts are hollow and portion 1^a serves as a journal for the main drive shaft 3, the outer end of which is adapted to be connected to a suitable source of power such as the usual flexible motor driven shaft, as will be understood. The forward end of the shaft carries a spur pinion 4 which is embraced by the rear end of the elbow and lies in a central position therein. The rear side of the pinion engages the boss 1^a holding the shaft against axial movement in one direction while its movement in the opposite direction is prevented by an annular collar 5 which engages a shoulder within the holder.

The dental tools which are driven by the shaft 3, generally referred to as burrs, of which one is indicated by 6, in Figs. 1 and 2, are carried in a head 7. In order to provide a readily adjustable connection for the latter so that the tool may be set at any desired angular position with reference to the handle 1 I provide special fittings between these elements.

The forward end of elbow 2 is threaded, as indicated at 8, and the rear side of the head 7 is provided with a boss which is likewise threaded, as indicated at 9. Between these parts I interpose a neck piece 10 (Fig. 5) the extremities of which are provided with threads for uniting the parts 2 and 7 and are each made of sufficient length to carry nuts 11 and 12 (Figs. 1 and 6) which by being tightened against the shoulders formed on the parts serve to lock the neck piece in its adjusted position with respect to each of them.

As will be seen in Fig. 1 the threads on the ends of the neck piece extend thereon toward each other to receive the nuts 11-12 and the proxi-

mate ends of the latter are recessed and form sleeves which cover the end threads at all times.

The neck piece 10 carries a transmission shaft 13 having fixed at its two ends spur gears 14 and 15, the former being adapted to mesh with gear 4, at the crook in elbow 2, and the latter engages a similar gear 16, at right angles thereto carried in the head 7 and serving as the driving element of the hollow spindle which carries the tool 6. The gears 14 and 15 abut accurately against the end faces of the neck piece 10 thus preventing longitudinal movement of shaft 13, hence it will be appreciated that by the longitudinal position or adjustment of the neck piece 10 in elbow 2 a very accurate meshing of gears 4 and 16 can be obtained in the first instance and maintained by subsequent adjustment, when necessary. Likewise the gear 15 may be properly positioned with reference to its companion gear 16. The nuts 11 and 12 serve independently to secure the two ends of neck piece 10. Moreover, by loosening either or both of such nuts the head 7 may be turned as required, either to the right or the left to obtain the desired angularity of the tool with reference to the handle as shown in Fig. 2. This is accomplished without materially disturbing the pitch engagement of the gears. This is due in fact to the fineness of the threads 8 and 9 between which the degree of adjustment may be divided. If desired all of this angular adjustment may be effected on the threaded connection between the head 7 and neck piece 10 as I have also provided for the separate independent adjustment of the tool spindle driving gear 16, as will be now explained.

The shank of dental tools, as indicated by 6, are carried in a tubular spindle 20, journaled in a recess bored in the head 7, which carries the spur pinion 16 meshing with gear 15 lying in an intersecting bore of the head. The pinion provides a collar on the spindle which rides upon the inner end of a threaded sleeve 22 (Fig. 7) which also forms a journal for the lower end of tool spindle 20. Sleeve 22 is adjustable in head 7 to accurately position the pitch line of the gear teeth on pinion 16 in mesh with that of the teeth on gear 15 and to facilitate its adjustment by one's fingers I knurl its lower edge as indicated by 23 and shown particularly in Fig. 8. And to securely lock it in position the sleeve carries a nut 24 (Figs. 1, 9 and 10) which engages the rim of the collar formed on lower side of head 7.

While each of the nuts 11, 12 and 24 may be finger operated and provided with knurled surfaces for this purpose I deem it preferable, because of their small size to give them a polygonal shape which permits the use of a wrench for tightening them. To this end I also provide the elbow 2 of the holder with flattened surfaces 25 on its opposite sides for the reception of the jaws of a spanner wrench, for holding it while one or the other of the nuts 11 and 12 is being set in place.

The head 7 is provided with a slot 26 which is open at one side and lying therein is the burr latch 27. This is pivoted on a small shouldered screw 28 so that it may be moved laterally by applying a slight pressure on its free end 29 to engage or disengage its opposite extremity from the annular groove provided in the shank of the burr or tool 6, as will be understood.

It will be readily appreciated from the arrangement of the parts herein described that I have provided a unique construction of elements capable of being readily assembled in the first instance and subsequently adjusted to position the tool carrying head at any desired position with reference to the handle and also adjusted to compensate for wear of any of the parts, thus preserving a smooth operation between the several pinions or gears at all times.

What I claim and desire to protect by Letters Patent is:

1. In a dental hand piece the combination with a tubular handle having a drive shaft carrying a driving pinion, and a head mounted on the handle having a bore intersecting the pinion axis and provided at its outer end with an interior thread, of a spindle journaled in said bore carrying a pinion meshing with the drive pinion, a sleeve carried by the threaded portion of the head having an inner end engaging the spindle pinion and an outer end extending beyond the head and knurled on its outer end for finger adjusting engagement and a nut on the projecting end of the sleeve cooperating with the head for locking said sleeve.

2. A contra angle dental hand piece comprising a handle proper provided with an interior threaded elbow and a drive shaft in the handle operating a pinion in the elbow, a head piece having a boss at one side facing said elbow and interiorly threaded and provided with a tool journal bore extending at right angles to said boss, a tool spindle therein carrying a pinion, a tubular neck having threads at its opposite ends engaging within those of the elbow and head for uniting them, said threads also extending toward each other beyond said points of engagement, a transmission shaft in said neck, pinions thereon abutting the ends of the neck arranged for cooperative engagement one with the drive pinion and one with the spindle pinion the pitch engagement of the several pinions being adjustably controlled by movement of the sleeve on its threads, nuts on the exposed portions of said threads for independently locking the opposite ends of the sleeve to the elbow and head, said nuts on their proximate ends having recessed ends extending beyond the threads on the neck, the journal bore of the head at its outer end being also threaded, a sleeve carried thereby for adjusting the spindle pinion having an outer knurled and extending beyond the head for finger adjusting engagement and a lock nut for said sleeve bearing against the end of the head.

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