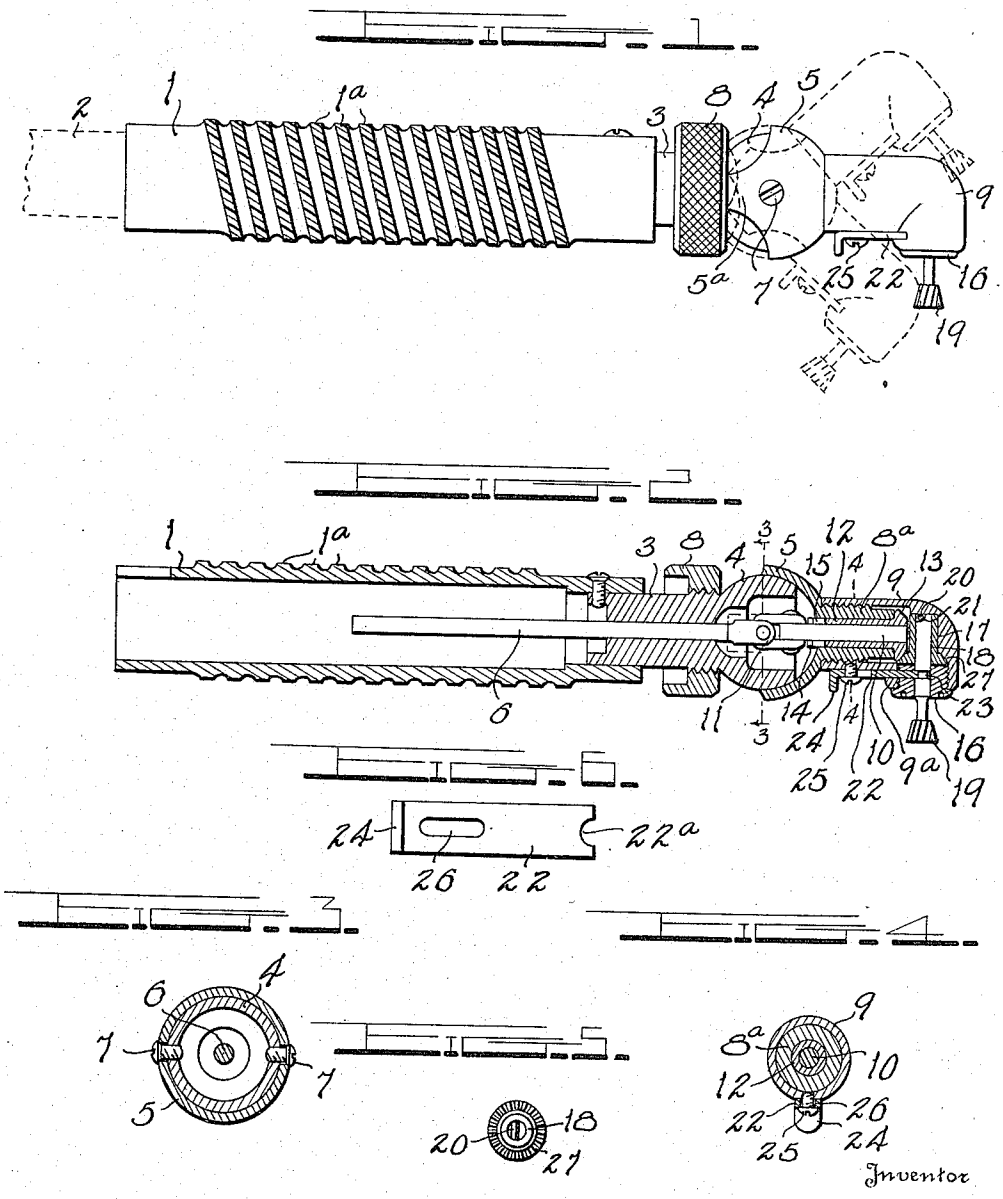
A. FERNALD.

DENTAL HANDPIECE.

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1,170,524.

Patented Feb. 8, 1916.



Inventor

A. FERNALD

By H. S. Ike

Attorney

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ADELBERT FERNALD, OF BOSTON, MASSACHUSETTS.

DENTAL HANDPIECE.

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Application filed July 23, 1915. Serial No. 41,441.

To all whom it may concern:

Be it known that I, ADELBERT FERNALD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Dental Handpieces, of which the following is a specification.

The present invention relates to certain new and useful improvements in dental hand pieces, and has for its object to provide a device of this character which embodies novel features of construction whereby it can be used in places hitherto inaccessible to a power driven instrument, and by means of which back cavities can be drilled out quickly without the tedious and painful use of a hand operated device.

Further objects of the invention are to provide a dental hand piece which is compact in its construction and can be used for preparing cavities in the buccal or cheek side of the twelve year molar and wisdom teeth without lacerating the cheeks or causing pain or inconvenience to the patient, which can be adjusted so as to be used to the greatest advantage for all kinds of work, which admits of a short drill being used, and which can be easily controlled and manipulated by the operator.

With these and other objects in view, the invention consists in certain novel combinations and arrangements of the parts as will more fully appear as the description proceeds, the novel features thereof being pointed out in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawing, in which:—

Figure 1 is a side elevation of a dental drill constructed in accordance with the invention, the head being shown in one position by full lines and in different adjusted positions by dotted lines. Fig. 2 is a longitudinal sectional view through the instrument. Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 2. Fig. 4 is a similar view on the line 4—4 of Fig. 2. Fig. 5 is a rear end view of the tubular chuck, showing the same as removed from the instrument. Fig. 6 is a detail view of the drill locking slide.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawing by the same reference characters.

Specifically describing the present embodiment of the invention, the numeral 1 designates a tubular handle which is knurled or roughened upon the exterior thereof, as indicated at 1^a, so as to be readily grasped by the hand, and which is adapted to receive a flexible shaft 2 from a dental motor. Fitted within one end of the tubular handle 1 and projecting therefrom is a stock 3, said stock terminating at the outer end thereof in a hollow ball 4 upon which a substantially semispherical socket 5 is loosely mounted. A drive shaft 6 extends axially through the stock 3 and is journaled therein, the rear end of the drive shaft being adapted to be connected in the usual manner to the flexible shaft 2. A pair of diametrically opposed pivot screws 7 connect the socket 5 to the ball 4 so that the former can be swung back and forth upon the latter, and the socket is provided at the pivot points thereof with rearwardly projecting ears 5^a adapted to coöperate with a collar 8 threaded upon the stock to lock the socket in different angular positions upon the ball.

Projecting forwardly from the socket 5 and integral therewith is an exteriorly threaded neck 8^a upon which the rear end of the right angle head 9 is fitted. A shaft 10 extends through the neck 8^a of the socket 5 and is connected to the end of the drive shaft 6 by means of a universal joint 11 arranged within the hollow ball 4 at substantially the central portion thereof. A sleeve 12 is slipped upon the shaft 10 and journaled within the neck 8^a, the outer end of the sleeve terminating in a bevel gear 13 which bears against the end of the neck 8, while the inner end of the sleeve is formed with notches 14 adapted to engage lugs 15 upon the shaft 10 to produce an interlocking connection between the sleeve and the shaft when the members are properly assembled.

The outer end of the head 9 is formed with a laterally disposed opening within which a threaded plug 16 is removably fitted, a chuck receiving seat 17 being provided at the base of the lateral opening. A tubular chuck 18 which is arranged at right angles to the axis of the head 9 and faces the lateral opening of the head is ro-

tatably mounted upon the chuck seat 17, the bore of the tubular chuck being in alinement with a central opening in the plug 16 so that the shank of a suitable drill 19 can be readily inserted into the chuck through the opening of the plug 16. The base of the tubular chuck is shown as provided with a transverse pin 20 which is adapted to interlock with the notched end 21 of the drill. A locking slide 22 is provided for retaining the drill in position within the chuck, said locking slide being mounted upon the exterior of the head and being formed with a forked end 22ª adapted to engage an annular groove 23 in the drill. The forked end of the locking slide 22 extends through a short neck 9ª surrounding the lateral opening, and also through the removable plug 16 so as to lock the said plug against rotation when the instrument is in use. The rear end of the slide 22 terminates in a small finger piece 24 which can be engaged by the thumb for locking a drill in position or releasing the same, and the slide is attached to the head 9 by means of a screw 25 passing through a slot 26 therein. This screw may also serve to engage the neck 8 of the socket 5 so as to lock the head in position upon the neck and prevent the same from working loose when the tool is in use.

The chuck 18 is provided at the outer end thereof with a bevel gear 27 which meshes with the bevel gear 13 of the sleeve 12, thereby producing a driving connection between the drive shaft 6 and the chuck. A very short drill can be used, and after being inserted in position is locked against displacement by means of the slide 22. Power is transmitted to the drill from the flexible shaft 2 which is inserted in the tubular handle 1 and caused to engage the drive shaft 6. When the adjusting collar 8 which is threaded upon the stock 3 is brought into a positive engagement with the square ends of the ears 5ª projecting rearwardly from the socket 5, the head 9 is locked in a position in alinement with the handle 1, as indicated by full lines upon Fig. 1. However, by causing the adjusting collar 8 to engage either set of inclined sides of the ears 5ª the head 9 can be locked in either of the angular positions indicated by dotted lines on Fig. 1. These three angular positions are all that are ordinarily necessary for dental work, although it will be obvious that by forming the ears 5ª with a greater or less number of angular sides the possible positions of adjustment can be increased or decreased as found most desirable.

It will be particularly observed that the manner of constructing the drill admits of a comparatively small head being used, so that with a short drill the end of the head can be easily inserted between the cheek and the teeth, so that the instrument can be used for work in inaccessible places, such as is ordinarily done by hand and not only consumes a great deal of time but is very painful to the patient. Furthermore, the back and end of the head 9 are absolutely smooth and free from projections which might lacerate the cheek and cause unnecessary pain and discomfort to the patient.

Cavities can be readily prepared in the back teeth, on either side thereof, with the present instrument, although with the bulky drills now in common use this is impossible and cavities in the back teeth must be prepared by hand instruments.

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

1. A dental hand piece including a stock terminating in a hollow ball, a drive shaft extending through the stock and journaled therein, a socket pivotally mounted upon the ball and provided with rearwardly extending ears, a locking collar mounted upon the stock for coöperation with the said ears to hold the socket in different angular positions, a head projecting longitudinally from the socket and provided at the end thereof with a lateral opening, a chuck journaled within the head and facing the lateral opening, means for locking a drill within the chuck, a shaft extending longitudinally through the head, gearing between the shaft and the chuck, and a universal joint arranged within the hollow ball and connecting the shaft to the drive shaft.

2. A dental hand piece including a stock terminating in a hollow ball, a drive shaft extending through the stock and journaled therein, a socket adjustably mounted upon the ball, means for locking the socket in different angular positions upon the ball, a head projecting longitudinally from the socket and provided at the end thereof with a lateral opening, an apertured plug fitted within the lateral opening, a tubular chuck journaled within the head with the bore thereof in registry with the aperture of the plug, said chuck being held in position within the head by the plug, means for locking a drill within the chuck, a shaft extending longitudinally through the head, a sleeve slipped upon the shaft and having an interlocking connection therewith, gearing between the sleeve and the chuck, and a universal joint arranged within the ball and connecting the shaft to the drive shaft.

3. A dental hand piece including a stock terminating in a hollow ball, a drive shaft extending through the stock and journaled therein, a socket adjustably mounted upon the ball and formed with a longitudinally extending sleeve, means for locking the socket in different angular positions, a tubular head fitted removably upon the sleeve and having a lateral opening in the end

thereof, an apertured plug fitted within the lateral opening, a tubular chuck journaled within the head and arranged with the bore thereof in registry with the aperture of the plug, a drill insertible into the tubular chuck through the aperture of the plug and having an annular groove in the side thereof, a locking slide mounted upon the head for engagement with the annular groove to retain the drill in position, a shaft extending longitudinally through the head, a sleeve slipped upon the shaft and journaled within the neck of the socket, said sleeve having an interlocking connection with the shaft, bevel gearing between the sleeve and the tubular chuck, and a universal joint arranged within the hollow ball and connecting the shaft to the drive shaft.

4. A dental hand piece including a stock terminating in a hollow ball, a drive shaft extending through the stock and journaled therein, a socket pivotally mounted upon the ball and formed with a longitudinally extending neck, ears projecting rearwardly from the socket, a collar threaded upon the stock for coöperation with the ears to lock the socket in different angular positions, a tubular head fitted upon the neck of the socket and provided at the end thereof with a lateral opening, an upright plug fitted within the lateral opening, a tubular chuck journaled within the head with the bore thereof in registry with the aperture of the plug, a drill insertible through the apertured plug into the chuck and having an annular groove therein, a locking slide mounted upon the head for engagement with the annular groove of the drill to retain the drill in position, a shaft extending longitudinally through the head, a sleeve slipped upon the shaft and journaled within the neck of the socket, said sleeve having an interlocking connection with the shaft, bevel gearing between the sleeve and the tubular chuck, and a ball and socket joint arranged within the hollow ball and connecting the shaft to the hollow drive shaft.

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

ADELBERT FERNALD.

Witnesses:
C. W. GRAY,
O. F. FERNALD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."