

S. QUIGLEY.
DENTAL INSTRUMENT.
APPLICATION FILED AUG. 6, 1908.

940,058.

Patented Nov. 16, 1909.

Fig. 1.

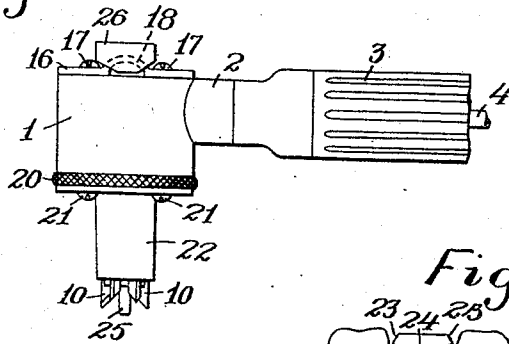


Fig. 2.

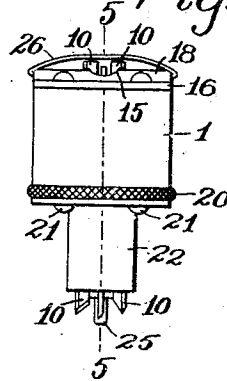


Fig. 7.



Fig. 3.

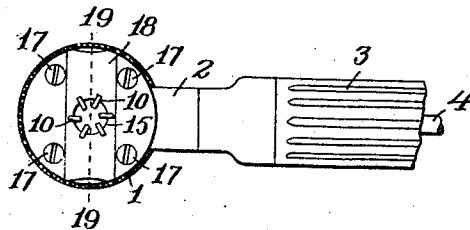


Fig. 4.

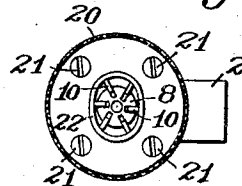


Fig. 5.

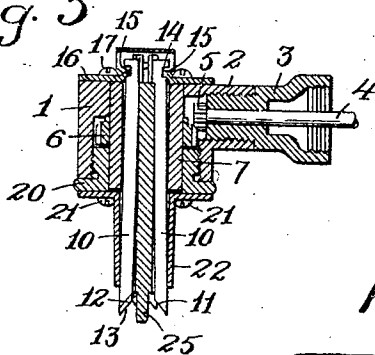


Fig. 6.

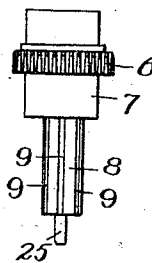
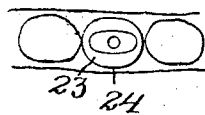


Fig. 8.



Witnesses

Roy D. Tolman.
Evelyn Comberbach.

Inventor

Samuel Quigley
By Rufus B. Fowler
Attorney

UNITED STATES PATENT OFFICE.

SAMUEL QUIGLEY, OF FITCHBURG, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO
FREDERIC I. JOHNSON, OF FITCHBURG, MASSACHUSETTS.

DENTAL INSTRUMENT.

940,058.

Specification of Letters Patent.

Patented Nov. 16, 1909.

Application filed August 6, 1908. Serial No. 447,328.

To all whom it may concern:

Be it known that I, SAMUEL QUIGLEY, a citizen of the United States, residing at Fitchburg, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Dental Instruments, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

- 10 Figure 1 represents a side view of a dental instrument embodying my invention. Fig. 2 is an end view. Fig. 3 is a top view with the guard plate removed. Fig. 4 is a bottom view. Fig. 5 is a central sectional view. 15 Fig. 6 is a detached view of the rotating cutter holding spindle. Figs. 7 and 8 are diagrammatic illustrations of the operation of my improved dental instrument showing respectively side and plan views of teeth operated upon.

Similar reference figures refer to similar parts in the different views.

- My present invention relates to a dental instrument designed for cutting or shaping the ends of teeth to form a seat for an artificial crown, and it consists in the construction and arrangement of parts as hereinafter described and pointed out in the annexed claims.

- 30 Referring to the accompanying drawings 1 denotes a shell or case inclosing the rotative parts of the mechanism, and provided on one side with an internally screw threaded boss 2 to receive a handle 3 in which is journaled a shaft 4, adapted to be driven by a suitable motor through a flexible shaft connection, as is usual in power operated dental instruments. The inner end of the shaft 4 is provided with a pinion 5 which 40 engages a gear 6 carried by a rotating cutter head 7 journaled in the case 1. The cutter 7 is provided with a longitudinal extension 8 on its lower end projecting beyond the cutter head 7 and the case 1. The extension 45 8 consists of a spindle which is first provided with longitudinal grooves 9 to receive the cutters. The spindle is then driven tightly into the rotating head 7, thereby forming longitudinal ways for the cutters in which 50 they are capable of a slight longitudinal sliding movement.

The instrument, in the present instance, is provided with six cutters 10, each of

which consists of a steel blade longer than the rotating head 7 and extension 8, and 55 having their lower ends provided with a transverse bevel, as shown at 11, Fig. 5. The beveled ends are also cross beveled, as shown at 12, Fig. 5, in order to provide a cutting edge 13. The upper ends of the 60 cutters are provided with notches 14 formed in their outer edges and adapted to inclose the cam shaped edge 15 of a plate 16, attached by screws 17 to the upper end of the case 1. As the head 7 is rotated rapidly in 65 the case 1 carrying the cutters 10, the latter will receive a slight longitudinal movement within the grooves 9 by means of the cam 15, thereby regulating the depth of the cut in the upper surface of the tooth. The cam 70 15 is formed, in the present instance, by a diametrically curved bend 18 in the plate 16, so that each of the cutters will be raised as they approach the plane indicated by the broken line 19, 19, and will be depressed as 75 they recede from it, thereby producing a warped surface as the beveled ends of the cutters move over the surface of the tooth.

The lower end of the case 1 is open to receive the rotating head 7 and is closed by a 80 screw threaded cap 20 to which is attached by screw 21, the flanged end of a sleeve 22 which is elliptical in its cross section, with the plane of its major axis corresponding with the diametrical plane 19 of the cam 15. 85

The grooves 9 in which the cutters are held, permit a slight radial movement to the lower ends of the cutters 10, allowing them to be forced outwardly by the pressure of their beveled ends 11 upon the surface of 90 the tooth, until the outer edges of the cutters are restrained by the inner wall of the sleeve 22. Due to the oval shape of the sleeve 22, each of the cutters, as it approaches the plane corresponding to the 95 major axis of the sleeve 22, is capable of being forced radially outward, and as it recedes from the plane of the major axis of the sleeve, of being forced radially inward. The area of the tooth acted upon by the cutters will, therefore, be oval or elliptical in 100 plan view, corresponding to the contour of the sleeve 22.

When the cam 15 and sleeve 22 are arranged, as shown in the accompanying figures, the instrument is held by the handle 3 105

so that the major axis of the sleeve 22 will correspond with the greatest length of the tooth which is the distance between the two contiguous teeth. As each of the cutters
5 approaches a contiguous tooth it will be crowded outwardly and at the same time be raised by the action of the cam 15, so that the depth of the cut between the teeth will be reduced.

10 The contour of the shaped surface of the tooth as produced by the rotating cutters will be determined by the form of both the cam 15 and sleeve 22, the inner wall of which acts as a cam to crowd the cutters
15 radially inward at two diametrically opposite points and allow them to be expanded radially at two diametrically opposite points.

The contour of the shaped tooth is approximately indicated by two diametrical
20 views, Figs. 7 and 8, the former showing the side and the latter a plan view of three contiguous teeth. By the rotating of the cutters they will be raised at the points 23, 23, and will be lowered at the points 24, 24, increasing the depth of the cut upon the outer
25 and inner sides of the teeth and reducing it at the points of contact with contiguous teeth. The plate 16 carrying the cam 15 and also the sleeve 22 may be exchanged for
30 others giving a different contour to the cut surfaces, and also varying the longitudinal movement of the cutters to suit individual cases. The plate 16 and sleeve 22 may also
35 as the attaching screws are equidistant, in order to enable the instrument to be applied at a different angle to the teeth.

So far as I am aware, no mechanical or power driven instrument has hitherto been
40 in use by the dental profession for automatically determining the shape of a seat for an artificial crown irrespective of the shape of the tooth. In my present invention I automatically prepare a seat for an artificial
45 crown in any predetermined shape irrespective of the shape of the tooth and, since this is automatically accomplished by mechanical means, the shape of the seat can be reproduced or duplicated, thereby enabling
50 the tooth to be accurately prepared to receive a crown which has been fitted upon a form outside the mouth.

The extension 8 is preferably provided with a projecting concentric point 25 which
55 entered into the end of the tooth serves to determine the position of the crown seat.

I do not wish to confine myself to the specific details of construction as shown and described, as many minor changes may be
60 made without departing from the spirit of my present invention, such, for example, as the application of polishing blades or bars in the place of the cutters 10, a variation in the shape and character of the cutting sur-
65 faces, or a modification in the application of

the cam 15 to the cutters may be resorted to, and at the same time embody the essential features of my invention.

The exposed upper ends of the cutters 10 are preferably protected by a curved guard
70 plate 26 provided with hooked ends which are sprung over the ends of the raised section 18 of the plate 16.

I claim,—

1. A dental instrument, comprising a ro-
75 tatable head, a series of blades longitudinally slidable in said head, provided with cutting edges at their ends, and means operating automatically for sliding said blades
80 individually.

2. In a dental instrument, the combination with a rotatable head and means for rotating said head, of a series of cutting
85 blades carried by said head, and means for imparting a longitudinal sliding movement to said blades by the rotation of said head.

3. In a dental instrument, the combination with a rotatable head, of a series of
90 cutting blades carried by said head, and means acting automatically for imparting a longitudinal sliding movement to each blade individually.

4. In a dental instrument, the combination with a rotatable head, of a series of
95 cutting blades carried by said head, means for rotating said head, and a nonrotatable cam engaged by said blades to impart a longitudinal movement thereto.

5. In a dental instrument, the combination with a rotatable head and means for ro-
100 tating said head, of a series of cutting blades carried by said head, and means for imparting a longitudinal sliding movement to each blade individually by the rotation of said
105 head.

6. In a dental instrument, the combination with a rotatable head provided with
110 ways for a series of cutting blades, each of said blades having a notch in its outer edge, and a fixed cam engaging said notches, whereby said blades are individually moved
longitudinally.

7. In a dental instrument, the combination of a case, a rotatable head held in said
115 case, a series of blades carried by said head, and a fixed cam adjustably held on said case and engaging said blades.

8. In a dental instrument, the combination of a case, a rotatable head journaled in
120 said case, a gear attached to said head, a pinion engaging said gear, a driving shaft carrying said pinion, and a series of blades carried by said head and having cutting or
abrading surfaces at their ends.

9. In a dental instrument, the combination
125 of a case, a rotatable head journaled therein and provided with an extension of reduced diameter, a series of longitudinal grooves in the periphery of said extension
and extending through said head, and a
130

series of blades held in said grooves and provided with cutting or abrading ends, capable of slight radial movement in said grooves.

5 10. In a dental instrument, the combination of a rotatable head having an extension of reduced diameter, longitudinal ways or grooves in said head and said extension, and a series of blades adapted to engage the surface of the tooth at their ends and capable
10 of a radial movement and a longitudinal sliding movement.

15 11. In a dental instrument, the combination with a rotatable head and a series of cutting blades carried thereby and capable of a radial movement in said head, and of an inclosing sleeve by which the radial position of said blades is determined.

20 12. In a dental instrument, the combination with a rotatable head and a series of cutting blades carried by said head and ca-

pable of a radial movement, of an inclosing sleeve oval in cross section by which the position of said blades is radially varied.

13. In a dental instrument, the combination of a rotatable head, a series of blades carried therein and having beveled cutting ends, whereby said blades are crowded outwardly by longitudinal pressure, and an inclosing sleeve to limit the outward movement of said blades. 25 30

14. In a dental instrument, the combination of a rotatable head, means for rotating said head, blades carried by said head and capable of a slight radial movement, and a sleeve elliptical in cross section and inclosing said blades. 35

Dated this first day of August 1908.

SAMUEL QUIGLEY.

Witnesses:

THOMAS CASEY,
R. T. TORKEHON.