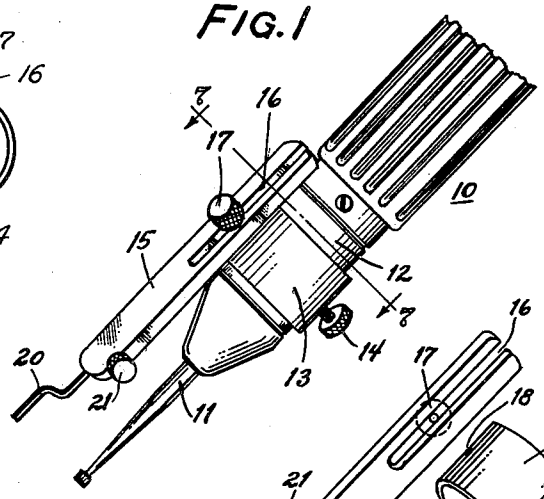
Dec. 16, 1952 H. R. KLEIN 2,621,408

PARALLELING ATTACHMENT FOR DRILL AND CUTTING TOOLS

Filed July 10, 1950

FIG. 1



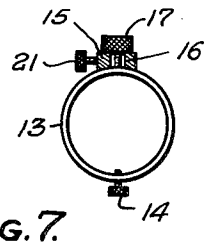


FIG. 7.

FIG. 3

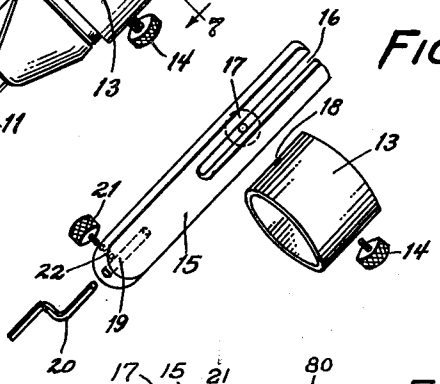
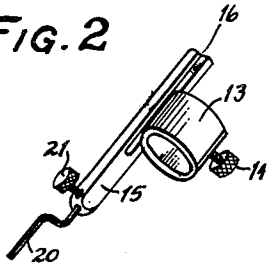


FIG. 2



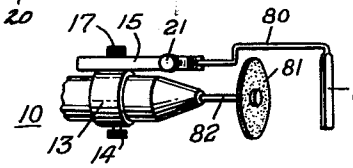
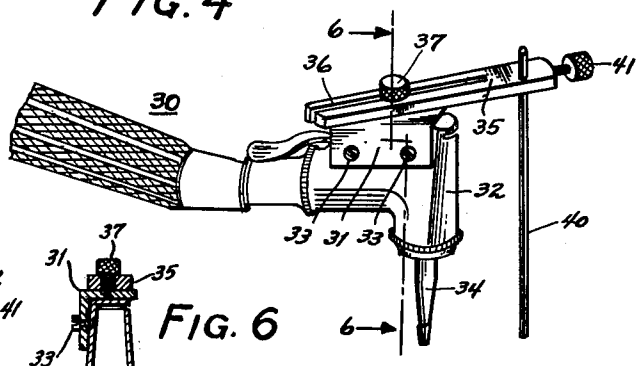


FIG. 8.

FIG. 4



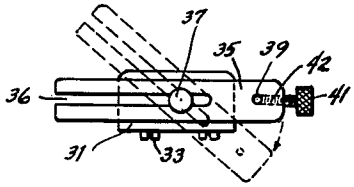


FIG. 5

FIG. 6

INVENTOR
Hellmuth R. Klein,

BY Eric D. Frankel

PATENT AGENT

Patented Dec. 16, 1952

2,621,408

UNITED STATES PATENT OFFICE

2,621,408

PARALLELING ATTACHMENT FOR DRILL AND CUTTING TOOLS

Hellmuth R. Klein, Elmhurst, N. Y.

Application July 10, 1950, Serial No. 172,985

15 Claims. (Cl. 32—67)

1

The invention relates to paralleling attachments or gauges for drill and cutting tools and more particularly to gauging means to be attached to conventional hand pieces of dental engines.

It is an object of the present invention to provide a simple, compact and readily adjustable paralleling gauge which can be easily and quickly attached to and detached from the hand piece of a dental engine.

Another object of the invention is to provide a paralleling gauge pin associated with a holder of a drill or similar tool, said pin being adapted to be held in contact with a reference surface to which a parallel hole or a parallel other surface shall be prepared, and being secured to the one end of an arm member projecting from the tool holder, the other end of said arm member being adjustably mounted thereon.

A still other object of the invention is to provide a paralleling gauge for a holder of a drill or similar tool, said gauge being adapted to be held in contact with a reference surface, while the drilling or other operation is in progress, thus assuring an absolute parallel hole or surface to be prepared.

A further object of this invention is to provide a simple and inexpensive paralleling gauge which can be readily attached to and detached from the hand piece of a dental engine, which may be either the standard dental hand piece or angle hand piece.

A still further and important object of the invention is to provide a paralleling gauge for dental engine hand pieces, said gauge being universally adjustable for different kinds of work in the patient's mouth and being constructed in such ingenious manner that the tool can be used even in the posterior region of the patient's mouth without being obstructed, or interfering in any way with the drilling operation, and without obstructing the dentist's view.

Another important object of the invention is to provide this paralleling gauge in such a manner that its pin will always remain parallel with respect to the axis of the tool inserted in the dental engine hand piece, while the effective length of said pin and its distance from the tool can be adjusted.

Other and further objects and advantages of the present invention will be more fully understood by reference to the following description and the accompanying drawings, illustrating the preferred embodiments thereof, wherein

Figure 1 is a perspective view of the front portion of a standard hand piece of a dental engine with a paralleling gauge according to this invention attached thereto;

2

Figure 2 is a perspective side view of the paralleling gauge of Figure 1 alone;

Figure 3 shows perspective side views of the parts of the assembled paralleling gauge of Figures 1 and 2 disassembled;

Figure 4 is a perspective side view of the front portion of an angle hand piece of a dental engine with a paralleling gauge according to this invention attached thereto;

Figure 5 is a top view of the paralleling gauge of Figure 4;

Figure 6 is a cross-section through the housing of the dental angle hand piece and the attached paralleling gauge along the line 6—6 of Figure 4, looking in the direction of the arrows, the angle hand piece being partially shown in front view;

Figure 7 is a cross-section through a part of the device, shown in Fig. 1, along the line 7—7 and looking in the direction of the arrows;

Figure 8 is a perspective view of the front portion of a standard hand piece of a dental engine with a cutting disk rather than a bur, as in Fig. 1, inserted and a modified paralleling gauge attached.

Referring to Fig. 1 of the drawings, the front end of a standard dental hand piece 10 holds a shank 11 of a drill or bur in a conventional manner. The hand piece 10 has a slightly cone-shaped seat portion 12 near its front end tapering forwardly, upon which a ring or annular member 13, being part of the paralleling gauge in accordance with this invention, is slipped. This ring or annular member 13 has a cone-shaped inner surface corresponding to and tightly fitting on said seat portion 12 in such a manner that the ring or annular member 13 will be firmly secured on the hand piece 10 after tightening of a clamp screw with a knurled head. This screw 14 engages a threaded hole through the wall of the ring or annular member 13. The outer surface or circumference of this ring or annular member 13 is cylindrical.

As shown in Figures 1 to 3, inclusive, an arm member or elongated plate 15 having a slot 16 extending from one of the ends of said member or plate suitably through about half its length is fastened to the ring or annular member 13 by means of a second screw 17 having a knurled head, said screw 17 being passed through the slot 16 and engaging a second threaded hole 18 in said member 13, said threaded hole 18 being suitably located opposite said first threaded hole.

The slotted arm member 15 can be adjusted lengthwise with respect to the tool by displacing it in the direction of its slot 16, when the screw 17 is loosened. After tightening the screw 17, the selected position of the slotted arm member is fixed, as said slotted arm member frictionally engages the annular surface of the ring 13. The parallel position of the member 15 with respect to the shank 11 of the bur or drill is assured by providing the member 15 with a concave or curved surface of exactly the same curvature as the outer cylindrical surface of the ring or annular member 13. (See Fig. 7.) The tight fit of the arm member 15 on the ring or annular member 13 assures an absolute parallelism.

A small, suitably cylindrical opening 19 is provided in that end of said slotted arm member 15 which is opposite the slotted end, said opening 19 running in the same direction as the slot 16. A guide prong or gauge pin 20 having a diameter of about that of the cylindrical opening 19 is inserted therein and is firmly secured to said arm member or plate 15 by means of a third screw 21 with a knurled head screwed in a threaded hole 22 provided near the free end of said member 15 and extending into said cylindrical opening 19. The angle between the threaded hole 22 and the cylindrical opening 19 is advantageously 90°. The guide prong or gauge pin 20 may be straight or offset, as shown in the drawing. The offset construction has the advantage that said prong or pin 20 can be adjusted to a great number of positions by turning it within the cylindrical opening 19 before tightening the screw 21. It is further possible to adjust the prong or pin 20 lengthwise by inserting it in the hole 19 to a greater or lesser extent. While the prong or pin 20 can be readily adjusted in this manner according to the particular working conditions, no adjustment of its parallelism with respect to the axis of the drill or bur shank 11 is required since the parallel position is absolutely fixed, as described in the foregoing. By exchanging the prong or pin 20 for prongs or pins of different length shapes or eccentricity, the number of possible positions can be increased.

The front portion of a conventional angle hand piece 30 of a dental engine is shown in Figure 4. A thin bent plate or angle member 31 is mounted on the top of the front end 32 of the housing of the angle piece 30, as shown in Figure 6. This plate or angle member 31 may be designed so as to be mounted on the housings of angle pieces of different shape and/or construction as that shown in Figures 4 and 6. Small screws 33 are provided to secure said angle member 31 to the housing. In place of the screws 33 rivets can be used. The angle member 31 may also be made integral with the housing of the front end 32 of the angle hand piece 30. This angle member 31 is the connecting means between the angle hand piece 30 and the paralleling gauge, i. e., it is the equivalent of the ring or annular member 13 in the first embodiment, shown in Figures 1, 2, and 3. In contrast to this ring or annular member 13, the angle member 31 remains suitably permanently attached to the front end housing of the angle hand piece, i. e., it will not be detached therefrom when the tool is used without the paralleling gauge.

According to Figures 4 to 6, inclusive, an arm member or elongated plate 35, similar to the member 15 in Figures 1, 2, and 3, is provided with a longitudinal slot 36 extending from one end of said member 35 suitably through more than half of its length. The arm or plate member 35 is detachably mounted on the flat top of the angle member 31 by means of a screw 37 with a knurled head, said screw being passed through the slot 36 and engaging a threaded hole provided in the top of the angle member 31, or may be attached to the top of the angle member 31 in any other suitable manner. The arm or plate member 35 can be readily adjusted lengthwise and angularly after loosening of the screw 37. While the longitudinal displacement is principally the same as that of the member 15 in Figs. 1, 2 and 3, the angular adjustment is obtained by turning the member 35 about the screw 37. The selected position of the arm member 35 is then fixed by tightening the screw 37. Two different angular positions of the member 35 are indicated in Figure 5, one with full lines and the other one with dotted lines.

Close to the free end of the slotted arm or plate member 35, i. e., close to that end which is opposite the slotted end, there is provided a small, suitably cylindrical hole 39 through said member 35, the axis of said hole 39 being parallel to the axes of said screw 37 and that of a drill or bur 34 inserted in the front end of the angle hand piece 30 in a conventional manner. A straight guide prong or gauge pin 40 having approximately the same diameter as that of the hole 39 is inserted therein and can be adjusted to the proper position required in any particular case by displacing it in the direction of the axis of said pin 40. After the proper position has been found, the pin 40 is fixed in this position by tightening a screw 41 with a knurled head, said screw being screwed in a threaded hole 42 provided in the free end of said slotted arm or plate member 35 and extending to the hole 39. In place of a straight prong or pin 40, an offset pin construction similar to pin 20 in Figures 1, 2, and 3 may be employed. By using a plurality of pins of different lengths, shapes and eccentricity, an extremely great number of positions can be easily adjusted.

The parts of the new paralleling gauges may be made of any suitable strong material, in particular, of metal, such as steel, stainless steel, nickel, chromium, etc.

The new device can be easily cleaned and sterilized as there are only few and simple parts to be disassembled.

In place of an arm member with a slot open at one of its ends, as shown in the drawing, it is possible to provide a slotted arm member with both of its ends closed.

As the dimensions of the parts of the paralleling gauge according to the invention are small, no difficulties will be encountered when the tool is inserted in the patient's mouth. In spite of the reduced dimensions of the parts, the construction is sturdy to assure an exact operation. When the prongs or pins 20 or 40 are adjusted according to the particular working conditions, the cutting or drilling operation may be performed in the patient's mouth whereby said prongs or pins 20 or 40 are held in contact with a surface on or in a tooth. The surface or hole to be prepared by the action of the drill or bur 11 or 34, respectively, will be absolutely parallel with respect to the first or guiding surface, because the prongs or pins 20 or 40 remain in contact with said guiding surface, while the operation is progressing.

In the modification of Fig. 8, the same stand-

ard dental hand piece 10 as in Fig. 1 is shown and the same reference numerals as in Fig. 1 are used for like parts. A cutting or grinding disk 81 is mounted on a shank 82 which is inserted in the hand piece in a conventional manner. The gauging attachment comprises the same ring or annular member 13 and the same elongated or arm member 15 as in Fig. 1. The gauge prong 80 is offset somewhat similar as the gauge pin 20 in Fig. 1 and its one end is inserted in the hole 19 of the arm member 15 as in Fig. 1. The free end 83 of the prong 80 is flat and bent toward the tool at a right angle in such a manner that the flat side is parallel with respect to the surface of the disk 81. This flat side of the free end 83 of the prong 80 serves as guiding means for the disk during the cutting or grinding operation in principally the same manner as the free ends of the pins 20 or 40 in the embodiments of Figs. 1 or 4. The guiding prong of Fig. 8 may be attached to the arm member 35, if a cutter or grinder disk is inserted in the tool holder 30, in Fig. 4.

The parallelism of the arm member 15 with respect to the tool shank in Figs. 1 and 8 may be assured by providing in place of the concave or curved seat surface of this member 15 a flat seat surface and by providing a channel of the width of this arm member in the outer surface of the ring 13, said channel being adapted to be engaged by the slotted arm member 15. As this channel has a uniform depth from the cylindrical outer surface of the ring 13 and the side walls of this channel tightly engage the arm member 15, an absolute parallelism of the guide prong with respect to the tool is assured. Such construction has the advantage that the same flat arm member 15 may be used for the angle hand piece in Figure 4, if an additional set of holes for inserting the prong and for its clamping screw is provided therein.

While the invention is described as applied to dentists' tools, the new parallel gauge may be adapted to any other tool, for example, precision tools, such as drills and grinders, of jewelers, watchmakers, and for fine mechanical work of any kind.

Although, in accordance with the provisions of the patent statutes, this invention is described as embodied in concrete forms and the principle of the invention has been explained together with the best modes in which it is now contemplated, applying that principle, it will be understood that the elements and combinations shown and described are merely illustrative and that the invention is not limited thereto, since alterations and modifications will readily suggest themselves to persons skilled in the art without department from the true spirit of the present invention or from the scope of the annexed claims.

I claim:

1. A gauge for guiding a toolholder-supported cutting and drilling tool to produce parallel cuts, comprising in combination a single arm member, one end portion of said arm member being slotted lengthwise, releasable fastening and locking means on said toolholder, said fastening and locking means extending through the slot of said slotted portion and firmly securing said arm member to said toolholder, a gauge pin adapted to be held in contact with a reference surface during the cutting and drilling operation of said tool and means to firmly secure said gauge pin to the other end portion of said arm member.

2. A gauge according to claim 1, means to adjustably attach said gauge pin to said arm member.

3. A gauge according to claim 1, means providing a seat for said slotted arm member, said seat means being mounted on said tool holder and having a threaded hole, and bolt means extending through the slot of said slotted member being screwed in said threaded hole of said seat means and pressing said slotted arm member on said seat means.

4. A gauge according to claim 1, means providing a seat for said slotted arm member, means to detachably mount said seat means on said tool holder, said seat means having a threaded hole and bolt means, extending through the slot of said slotted member, being screwed in said threaded hole and pressing said slotted arm member on said seat means.

5. A dental gauge for producing parallel cuts, comprising in combination, an element providing a seat, said element being adapted to be secured to a drill holder supporting a drill, a single arm member, one end of said arm member being slotted lengthwise, means extending through the slot of said arm member to adjustably mount and lock said slotted end of said arm member on said seat, a gauge pin and means to firmly attach said gauge pin to the other end of said arm member.

6. A dental gauge according to claim 5, wherein said element providing a seat is ring-shaped and is adapted to be removably slipped over and tightly fitting a tapered front portion of said drill holder, screw means in said ring-shaped element adapted to firmly attach said element to said tapered portion.

7. A dental gauge according to claim 5, wherein said element providing a seat is ring-shaped and is adapted to be removably slipped over and tightly fitting a tapered front portion of said drill holder and wherein said seat engaging end of said arm member is provided with a concave contact surface of the same curvature as said ring-shaped seat to assure a tight fit and firm mounting of said arm member on said ring-shaped seat.

8. A dental gauge according to claim 5, wherein said element providing a seat is an angle piece and is adapted to be mounted on and over an edge of a substantially square-shaped housing of said drill holder, fastening means to permanently secure said angle piece to said housing.

9. A dental gauge according to claim 5, wherein said arm member is slotted and said means to adjustably mount said arm member on said seat is a screw extending through said slot screwed in a threaded hole in said seat and pressing said arm member on said seat.

10. A dental gauge according to claim 5, wherein a cylindrical hole is provided at said other of the ends of said arm member, said hole being adapted to receive said gauge pin and wherein a threaded hole is provided in said arm end extending to said gauge pin hole and being adapted to receive a screw firmly securing said gauge pin to said arm member.

11. In a standard hand piece of a dental engine, gauge means for producing parallel cuts, said gauge means comprising an annular member adapted to be removably slipped on and fitting a cone-shaped front portion of said hand piece, a first threaded hole in said annular member, a clamping screw screwed in said threaded hole and adapted to fix said annular member to said

cone-shaped portion, a second threaded hole in said annular member, a slotted arm member, a screw extending through the slot of said arm member and being screwed in said second threaded hole to press said arm member on said annular member, a gauge pin and means adapted to removably and adjustably attach said pin to said arm member.

12. In a standard hand piece of a dental engine according to claim 11, wherein said slotted arm member is formed with a concave contact surface for engagement with said annular member, the curvature of said concave surface being the same as that of the outer diameter of said annular member.

13. In an angle hand piece of a dental engine, gauge means for producing parallel cuts, said gauge means comprising an angle member adapted to be applied on and permanently secured to an edge of a substantially square-shaped housing of said hand piece, said angle member providing a seat on its outside, a threaded hole in said seat, a slotted arm member, a screw extending through the slot of the arm member and being screwed in said threaded hole to press said arm member on said seat, a gauge pin and means to removably and adjustably attach said pin to said arm member.

14. A gauge for guiding a holder supported disk cutter, comprising in combination a single arm member, one end of said arm member being slotted lengthwise, means extending through the slot of said arm member to adjustably mount and lock said slotted end of said arm member on said holder, a gauge prong, one end of said gauge prong being adjustably and firmly secured to the other end of said arm member, the other end of said gauge prong, adapted to be held in contact with a reference surface during the cutting operation, being bent at a right angle with respect to its other end and being parallel with respect to the surface of said disk cutter.

15. A gauge according to claim 14, wherein said reference surface engaging end of said prong is flattened.

HELLMUTH R. KLEIN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,321,130	Schlueter	Nov. 11, 1919
1,380,040	Chayes	May 31, 1921
1,692,712	Tannebaum	Nov. 20, 1928
2,399,231	Klein et al.	Apr. 30, 1946