(No Model.)

C. H. DAVIS.

ANGLE ATTACHMENT FOR DENTAL ENGINES.

No. 522,291. Patented July 3, 1894.

Fig. 1.

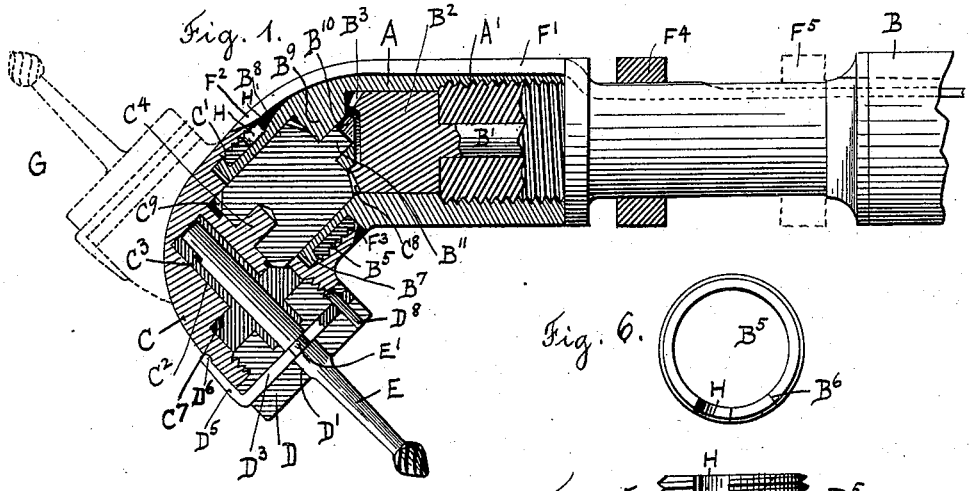


Fig. 6.

Fig. 5.

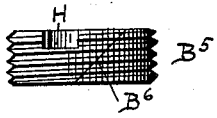


Fig. 2.

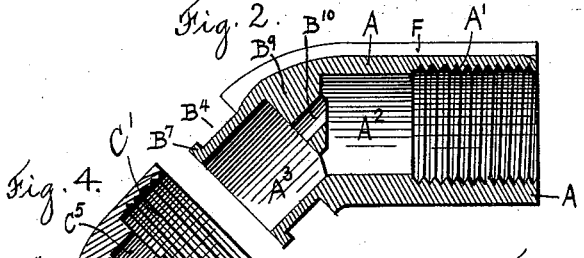


Fig. 3.

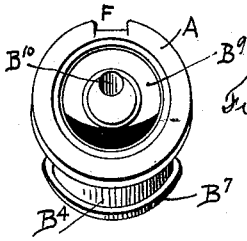


Fig. 4.

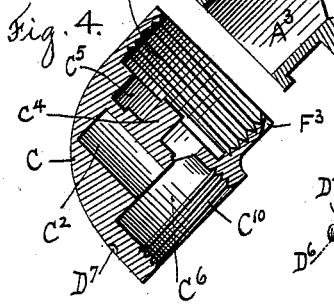


Fig. 7.

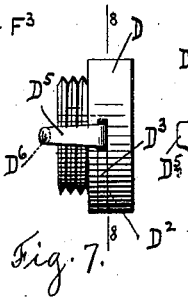


Fig. 8.

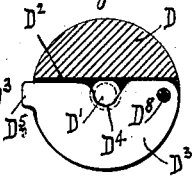


Fig. 10.

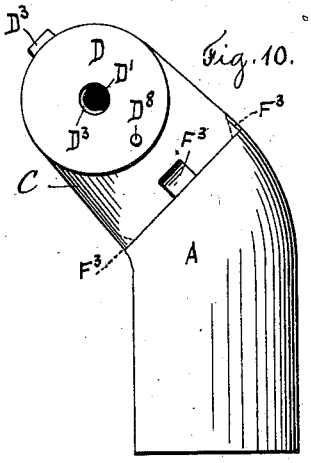
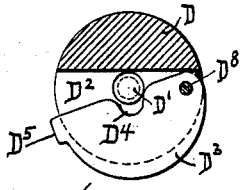


Fig. 9.



Witnesses
Chas. F. Schmeel.
Emma Kester.

Inventor
Charles H. Davis
By Attorney
Rufus B. Fowler.

UNITED STATES PATENT OFFICE.

CHARLES H. DAVIS, OF WORCESTER, MASSACHUSETTS.

ANGLE ATTACHMENT FOR DENTAL ENGINES.

SPECIFICATION forming part of Letters Patent No. 522,291, dated July 3, 1894.

Application filed April 18, 1893. Serial No. 470,906. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. DAVIS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Angle Attachments for Dental Engines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of the attachment shown in central, longitudinal, sectional view, in order to disclose the operating parts. Fig. 2 is a central, sectional, longitudinal view of the tubular shell provided at one end with an internal screw thread and at the opposite end with a grooved neck, upon which the head is journaled. Fig. 3 is an end view of the tubular shell in sectional view in Fig. 2. Fig. 4 is a central, sectional, view of the head with the hollow tool carrying spindle removed. Fig. 5 is a detached view of the screw threaded collar held by the grooved neck of the tubular shell. Fig. 6 is an end view of the same. Fig. 7 is a detached and side view of the screw threaded cap by which the opening in the head is closed. Fig. 8 is an end view of the same shown in section on line 8, 8, Fig. 7, in order to disclose the pivoted latch by which the tool is retained. Fig. 9 represents the same view as Fig. 8, but with the pivoted latch disengaged from the tool and Fig. 10 is a side view of the attachment showing the head in the position in which the tool is held with its axis at right angles with the axis of the driving shaft, but as offset, or lying in a different plane.

Similar letters refer to similar parts in the different figures.

The object of my invention is to provide an angle attachment for a dental engine, by which a tool may be held and operated, either at an acute, or an obtuse angle to the axis of the hand piece, and at the same time with the axis of the tool and the axis of the hand piece lying in the same vertical plane, and also by which the tool may be "offset" as represented in Fig. 10, and I accomplish these objects by the means hereinafter described and shown in the accompanying drawings, in which—

A denotes a tubular sleeve, provided at one end with an internal screw thread A′, by which the sleeve is attached to the section B, serving as a hand piece by which the instrument is held by the operator. Extending through the section B is a rotating spindle B′, operatively connected in the usual manner with the flexible shaft of a dental engine and provided at its inner end with a cylindrical wheel B^2, preferably filling the interior of the sleeve A, so as to form a bearing at its periphery and provided with the beveled gear teeth B^3.

The sleeve A is attached at one end to the section B by the screw thread A′ and at its opposite end the sleeve A is bent obliquely so the axis of the bent end of the sleeve will form an oblique angle preferably of one hundred and thirty-five degrees with the axis of the section B. Upon the bent end of the sleeve A, is an external annular groove forming a neck B^4, adapted to receive a screw threaded collar B^5, as represented in Figs. 5 and 6, wide enough to fill the neck B^4 and turn freely therein, the collar being preferably cut apart upon one side as at B^6, in order to allow it to be expanded and sprung over the flange B^7.

The sleeve A is provided with a concentric chamber A^2 to receive the cylindrical wheel B^2 and also with a cylindrical chamber A^3 concentric with the bottom of the groove B^4 to receive an intermediate cylindrical wheel B^8 and between the chambers A^2 and A^3 and at the bent portion of the sleeve A is an internal lug B^9 having a hole B^{10} concentric with the chamber A^3 to receive the gudgeon B^{11} of the intermediate wheel B^8. The screw threaded collar B^5 carries a head C provided with an internal screw thread C′ by which the head is screwed upon the collar B^5 and at right angles with the axis of the screw thread C′, is a bearing C^2 to receive a hollow tool holding spindle C^3. The head is provided with a spur C^4 concentric with the screw thread C′ and surrounded by an annular concentric chamber C^5 to receive the end of the intermediate wheel B^8, which incloses and turns upon the spur C^4. The head C is also provided with a circular chamber C^6 concentric with the bearing C^2 to receive a gear C^7, preferably integral with the hollow spindle C^3.

The intermediate wheel B^8 is provided with beveled gear teeth C^8, which are engaged by the gear teeth B^3 and at the opposite end with

the beveled gear teeth C^9, which engage the teeth of the gear C^7 causing the rotary motion of the spindle B′ to be imparted to the hollow spindle C^3.

The head C is provided with a screw thread C^{10} to receive a screw threaded cap D provided with a concentric opening D′ to receive a tool E and having upon one side a slot D^2, within which is pivoted a plate D^3 provided with a notch D^4 adapted to inclose an annular groove, or neck E′ upon the tool E by which the tool is locked within the hollow spindle C^3. The pivoted latch plate D^3 is provided with an elastic prong D^5, provided with a small projection D^6 arranged to spring into an indentation D^7 upon the side of the head C and hold the latch plate D^3 from turning upon its pivotal pin D^8 when the tool is engaged and held by the latch.

The convex side of the sleeve A is provided with a longitudinal groove F to receive a narrow elastic blade spring F′ having one end held within a recess, or socket provided in the hand piece B and having its free end lying within the groove F with the tip F^2 entering one of a series of notches F^3 formed in the head C. The narrow blade spring F′ is held within the groove F and one of the notches F^3 by means of a sliding ring F^4, which is capable of being moved back into the position indicated by the broken lines F^5, where the blade F′ is thinner, thereby allowing the end of the spring to be raised out of the notch F^3 and release the head C, so the head and collar B^5 may be turned around the neck B^4 from the position shown in Fig. 1, in which the tool is held at an acute angle, with the axis of the hand piece, to the position indicated by the broken lines G, Fig. 1, in which the tool is held at an obtuse angle with the hand piece; the gear C^7 being rotated around the gear teeth C^9 upon the intermediate wheel B^8 as the position of the tool is being changed. In both these positions, viz., with the tool held at an acute and at an obtuse angle, the axis of the tool and the axis of the hand piece will lie in the same vertical plane, so that a pressure applied to the end of the tool will not tend to rotate the hand piece within the hand of the operator, or to rotate the sleeve A upon the hand piece. If the head C be locked in position midway between the position shown in Fig. 1 and that indicated by the broken lines G, Fig. 1, the tool will then be held with the plane of its axis at right angles with a vertical plane containing the axis of the spindle B′, as represented in Fig 10; but the tool carried by the head will in that position be "offset," that is, it will be held in a different vertical plane from that of the spindle B′.

The screw threaded collar B^5 is provided with a notch H which allows the collar to be dogged, or held from rotating, which is accomplished by sliding the ring F^4 back into the position F^5 and withdrawing the spring from its socket in the hand piece and removing it from the groove F, which will allow the tip F^2 to be inserted in the groove H′, which is made deeper for that purpose, thereby holding the screw threaded collar B^5 so the head C may be rotated independently and screwed upon the collar for the purpose of taking up any lost motion, or for bringing the beveled teeth of the gears closer together, in order to compensate for wear.

The angle between the axis of the tool and the axis of the spindle B′, when held in the position indicated by solid lines in Fig. 1, will be equal to a right angle minus the angle formed by the axes of the two wheels B^2 and B^8, and when the tool is held in the position shown at G, Fig. 1, it will form an angle with the hand piece equal to a right angle plus the angle formed by the axes of the wheels B^2 and B^8 but in both cases with the axis of the tool in the same vertical plane as the axis of the hand piece. The number of notches F^3 can, however, be increased in order to allow the head C to be held at different angles from those I have described and indicated in the drawings. The attached end of the blade spring F′ is preferably held by being loosely inserted in a socket prepared for it upon the hand piece, but it can obviously be attached by any other known means, such as screws, which would allow it to be removed to allow access through the deepened portion of the groove F at H′ to the notch H in the screw threaded collar B^5.

When the head C is offset or held in the position with reference to the tubular sleeve A as represented in Fig. 10, a pressure applied upon the end of the tool will tend to rotate the sleeve A and unscrew it from the hand piece and I therefore lock the sleeve A, as well as the head C by means of the latch F′, which is held by the hand piece B and inserted in the groove F of the sleeve A. The head C is closed by a cap D, provided with a central opening D′ in alignment with the hollow tool carrying spindle C^3; the opening D′ forming a bearing for the tool E, which causes any side strain, or pressure, upon the tool to be received by the cap instead of the hollow spindle.

I am aware that an angle attachment provided with elbows coupled together, by which the angle of the tool may be varied is not new, and I do not claim such broadly.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an angle attachment, the combination with a hand piece, of a tubular sleeve carried by said hand piece and bent obliquely thereto and provided with an external annular groove, a screw threaded collar head in said groove and adapted to rotate therein and a head provided with a screw thread engaging said collar and having a bearing for a tool holding spindle, whereby said head is adapted to rotate around said bent sleeve and of adjustment on said screw threaded collar, substantially as described.

2. In an angle attachment, the combination

with a hand piece, of a sleeve attached thereto, said sleeve being bent at an oblique angle to said hand piece, a head adapted to rotate about said sleeve and a drill spindle carried in said head, whereby said drill spindle can be placed at an acute or an obtuse angle with said hand piece and in the same vertical plane therewith and means by which said head is held from rotation, substantially as described.

3. In an angle attachment, the combination of a hand piece, a sleeve attached to said hand piece and bent at an oblique angle thereto, a rotating driving spindle and a bevel gear attached to said spindle and inclosed in said sleeve, a head adapted to rotate about said sleeve, a drill spindle journaled in said head, a bevel gear attached to said drill spindle, and an intermediate cylinder journaled with its axis at an oblique angle to said driving spindle and provided with gear teeth engaging the gears on said driving spindle and said drill spindle, substantially as described.

4. In an angle attachment, the combination of a hand piece B, sleeve A attached to said hand piece and having a groove F, a tool carrying head journaled upon said sleeve and provided with notches, said sleeve being bent at an oblique angle to said hand piece, a blade spring attached at one end to said hand piece and adapted to be pressed into said groove and said notches by a sliding ring and a ring arranged to slide over said blade spring and crowd it into said groove against the tension of the spring, substantially as described.

5. The combination of the sleeve A, provided with an annular groove B^4, of a screw threaded collar B^5 capable of turning within said groove and provided with a notch H to allow the collar to be held from rotation, a head C carried by said screw threaded collar, a tool spindle journaled in said head, a driving spindle journaled within said sleeve and intermediate gearing by which the rotation of said driving spindle is communicated to said tool carrying spindle, substantially as described.

6. The combination of the head C, rotating tool spindle C^3, cap D, provided with an opening D′ concentric with the axis of said drill spindle, a latch plate D^3 pivoted upon said cap and having a notch D^4 and an elastic prong bent at right angles to said latch and having a projection D^6 adapted to engage an indentation in the side of the head C, substantially as described.

CHARLES H. DAVIS.

Witnesses:
RUFUS B. FOWLER,
EMMA KESTER.