

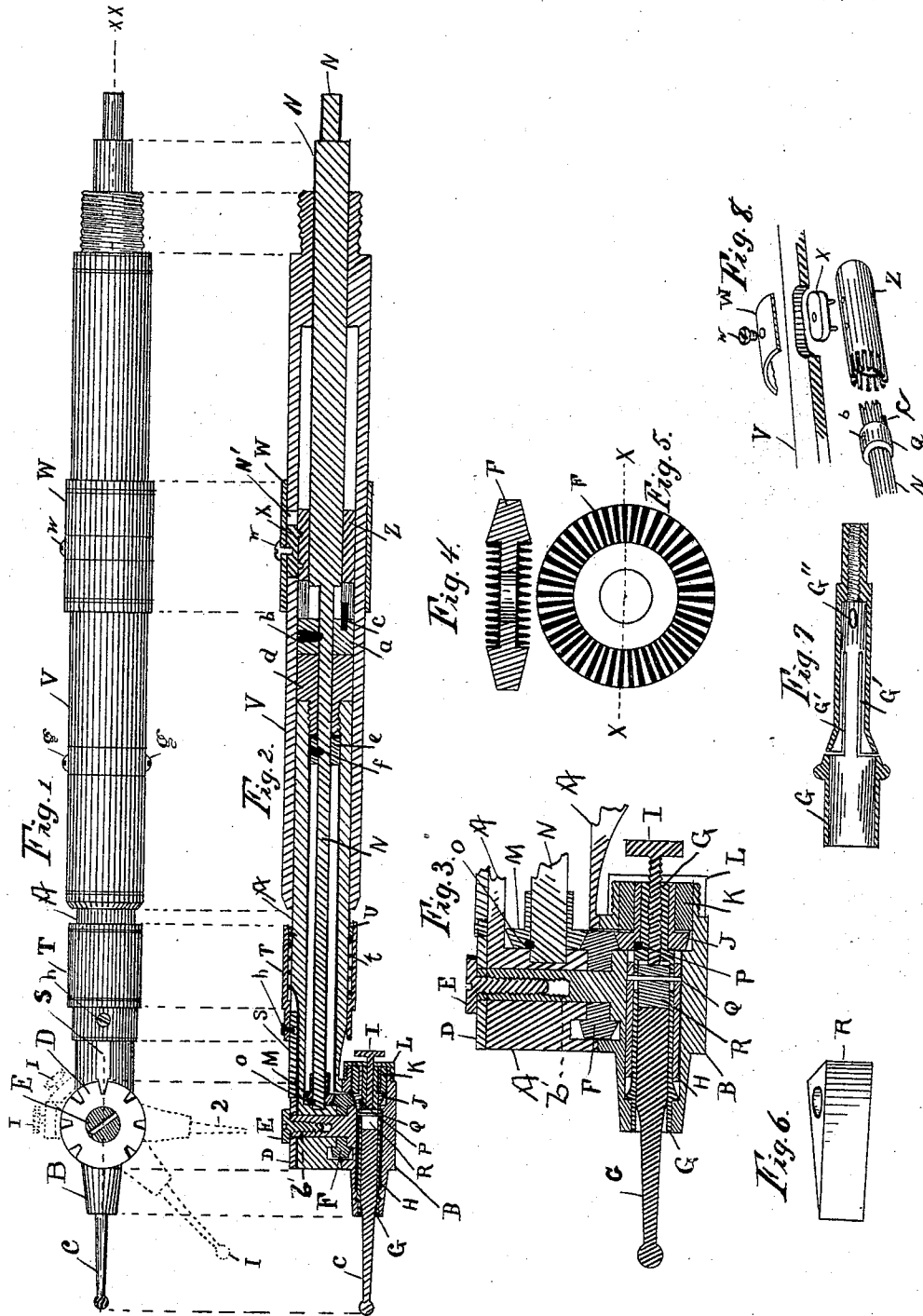
(Model.)

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ADJUSTABLE ANGLE ATTACHMENT FOR DENTAL HAND PIECES.

No. 513,178.

Patented Jan. 23, 1894.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES L. FURMAN AND GEORGE E. HOLLAND, OF PEORIA, ILLINOIS.

ADJUSTABLE ANGLE ATTACHMENT FOR DENTAL HANDPIECES.

SPECIFICATION forming part of Letters Patent No. 513,178, dated January 23, 1894.

Application filed September 8, 1890. Serial No. 364,289. (Model.)

To all whom it may concern:

Be it known that we, CHARLES L. FURMAN and GEORGE E. HOLLAND, citizens of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented a new and useful Adjustable Angular Dental-Engine Handpiece, of which the following is a specification.

Our invention relates to an improved dental-engine-handpiece, in which a rotating head, at the extremity of the said handpiece, said head carrying the rotating drill or burr, enables the operator controlling the same to reach any angle in drilling, and also to drill straight with one and the same handpiece, and the same drill or burr, without removing the same from the engine, making it possible to use this improved handpiece for the old style straight hand-piece, and also for the various different angular hand-pieces now in common use, thus dispensing with several tools. It is also noticeable that, with our improved handpiece, the drill may be operated at any angle with the driving shaft by simply adjusting it to the desired angle, and releasing the pushbar or bolt for that purpose, by this means retaining it in any desired position, and thus enabling the operator to reach cavities and surfaces out of the reach of any one of the appliances now in use, thus saving valuable time, that would otherwise be spent in changing tools not to mention the great saving in outlay for several tools to do the same service. We attain these objects, by the mechanism illustrated in the accompanying drawings, in which—

Figure 1, is a top-view of our improved adjustable angular dental-engine handpiece, showing the adjustable drill-head, adjusted at two different angles, and with the head set in place and fastened in place for a straight handpiece. Fig. 2, is a longitudinal section of Fig. 1, through the dotted line ($x-x$) ($x-x$). Fig. 3 is an enlarged sectional view, through the same line, showing particularly the construction of the adjustable head, the drill-chuck and a portion of the body-piece, within which the main-shaft shown in Fig. 2 is fastened. Fig. 4 is a sectional view of the intermediate beveled gear-wheel, shown in Fig. 5, through the line (X) (X). Fig. 5 is a top view of the said intermediate beveled

gearwheel. Fig. 6 is a detailed view of the chucking wedge which insures a rotary movement to the drill. Fig. 7 is a detailed view of the chuck-sleeve, showing the same in section, also showing the slots in the same, through the medium of which, the said drill is retained in position, against the said chucking wedge, and Fig. 8 is a detailed view of the braking mechanism, whereby the main-shaft and drill shaft are retained in a rigid position for the purpose of removing or replacing a drill.

Similar letters refer to similar parts throughout the several drawings.

The hand-piece proper herein consists of the body-piece (A) and the shell-piece or covering (V), which pieces in combination form the journals or bearings (by means of the central bore thereof) for the main or driving-shaft (N), which is attached to any ordinary dental engine flexible shaft. The said shell piece (V) is fastened to and retained in its proper place on the said bodypiece (A) by the screws (g) (g). The said shell piece (V) has the brake-sleeve or collar (W), directly beneath which is the longitudinal slot (N'), within which is the sliding lug (X), which is attached to and controlled by the said sliding brake-collar; loosely encircling the said main-shaft (N) at this point is the notched sleeve (Z), into which the pins of the lug (X) engage, and hence is controlled by the same; the said notches of the said collar, when it is desired to apply the brake, by moving the brake collar (W) engage with a pin (c) of the collar (a), which is rigidly fastened to the main-shaft by the set-screw (b), and hence revolves with it. By this means the rotation of the said mainshaft is controlled by the said collar (W). The said bodypiece (A) heretofore referred to, has its central bore of sufficient size to permit the introduction of the driving gearwheel (M) which is rigidly fastened to the main driving shaft (N) near its extremity, by the lug or pin (O); at the end of said bore is a smaller bore of proper size to form a bearing for the end of the said main driving-shaft (N), which forms a further brace for the said shaft (N). At the other end of the said bodypiece (A), *i. e.*, at the extremity nearest the brake mechanism heretofore mentioned, is the bushing (d), screwed into the inter-

nally threaded bore of the said body-piece (A) to and against the collar (e), rigidly fastened to the driving shaft (N) by the set-screw (f). By this means it will be observed, the said body-piece is retained firmly in its proper position on the said main-shaft and the said mainshaft is amply journaled throughout its length, and longitudinal displacement avoided. The body-piece (A) is encircled by the collar (T), which said collar carries the push-bar (S), fastened to it by the screw (h), the purpose of which pushbar will be explained farther on. Within said collar and bearing against a shoulder thereof and against the smaller collar (U) is the spring (b) which tends to force the said collar and pushbar in a direction away from the shell-piece (V) heretofore referred to. The particular feature of the bodypiece (A), however, is the enlarged circular head, integral therewith, and adjacent to which is located the driving gear wheel (M) near the inner end of the main driving shaft (N). This circular head is centrally bored at right-angles to the longitudinal bore of the bodypiece to form a bearing for the retention and rotation of the drill-head hereinafter referred to, and likewise has a circular recess for the purpose of retaining in its proper position of engagement with the driving gear wheel (M) the intermediate gearwheel (F).

The rotating head (B) has the lug or stud the center of which is bored and internally threaded for the reception of the screw (E) which said lug protrudes through the circular bore of the bodypiece (A) before referred to, and forms the axis upon which the head rotates; it also forms the bearing for the intermediate gear wheel (F). The said head (B) has a circular slot in its side adjacent to the lower end of the circular head of the body-piece, and forms with the circular slot therein, an annular groove wherein is seated the gear-wheel (F), having its bearing on said lug or stud and in engagement with the gears (M) and (J), mounted respectively on the shafts (N) and (G). The lug of the rotating head (B) protruding through the bodypiece (A) is encircled by the notched washer (D) to which it is firmly fastened by the screw (E). It will thus be seen that the washer rotates with the said rotating head, and that the push-bar (S) heretofore referred to engaging in the notches thereof will retain the said rotating head in any desired position, to change which position it is only necessary to slip back the collar (T), thereby disengaging the notched washer, whereupon the head may be placed in any desired position and the pushbar released, thereby locking the head in the desired position. It will also be seen that whatever the position of the drill-head may be, the intermediate gear-wheel will sustain the same relation to the driving and driven gear wheels respectively, for the reason that the bearing of the said intermediate gearwheel and the axis of rotation of the said head are common,

and the said driving and driven gearwheels are on opposite sides of the said intermediate gearwheel. The said rotating head (B) is longitudinally bored to permit the introduction of the drill-chuck or shaft, a shoulder of which rests against a shoulder of the said head. The drill-driving gear-wheel (J) is then slipped over the said drill shaft and over the lug (P). The collar (K) then slips over the hub of the drill driving shaft (G) filling up the recess within which the cap (L) retains the whole mechanism. It will thus be seen, that the drill driving gearwheel (J) is ever retained in its proper position of engagement with the intermediate driving gearwheel and against the shoulder and lug of the drill shaft.

The drill chuck consists of the shaft (G) longitudinally bored to form a sleeve for the drill-shank at one extremity and at the other extremity is counter-bored and internally threaded to receive the screw (I), which being screwed into the same, bears upon the wedge R within said sleeve. Said sleeve is of a cone shape, the cone terminating in a shoulder which rests against the body of the head, retaining the drill-shaft in its proper position. Encircling the said cone (which is slotted to permit its being contracted against the sides of the drill, thereby gripping it) is the chuck sleeve (H), near the extremity (nearest the gear-wheel (J)) of which, is the pin (Q) passing through the said sleeve, through the slots (G'') of the drill-shaft and through the said wedge (R) against which the screw (I) presses. It will then be seen, that, upon the said screw (I) being forced against the wedge (R), by rotation, the said chucksleeve (H) will be forced over the cone, thereby pressing the sides of the cone against the drill, in this manner gripping it and retaining it while the wedge causes its absolute rotation, the side of the drill being fitted between the side of the said wedge and that side of the drill shaft or chuck.

The peculiar form of the intermediate gear wheel F will be noticed particularly, the cogs or teeth being cut on the sides, in order to enable the driving and driven gear-wheels respectively to always operate with equal facility, no matter what the position of the drill head may be.

At the extremity of the shell or covering piece (V), is cut a thread, to enable the tool to be screwed to the covering of a flexible shaft, for attaching the device herein, to whatever engine it is desired to use in operating it. The main-shaft (N) may be soldered, brazed or otherwise attached to the cable of any of the devices now in common use for the purpose of driving dental drills.

The device herein termed a "brake" is not intended to either retard or stop the momentum of the driving device, but is introduced for the purpose of enabling the operator to more easily adjust a drill in the handpiece, by reason of the drill-driving shaft being held stationary by this device, and consequently

held against rotation, which would otherwise result from the turning of the chucking screw.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. An adjustable angular dental engine handpiece having the body-piece (A); the shell-piece (V); both longitudinally bored for the reception of the main driving shaft (N); the main driving shaft (N); the collar (a), rigidly fastened to the mainshaft (N) by screw (b); the brake-collar (W) the lug (X) working within a slot in the said shell-piece and fastened to the said brake-collar (W) by screw (w); and the notched sleeve (Z) encircling mainshaft (N) and engaging with lug (X) and adapted to slide on said shaft to engage said collar (a) and the lug or pin c thereon. All as and for the purposes hereinbefore set forth.

2. An adjustable angular dental engine handpiece having the body-piece (A) bored for the reception of the mainshaft (N) and driving-gearwheel (M), the extremity of the said bore forming a bearing for the said shaft; the main-shaft (N); the collar (e) rigidly fastened to said mainshaft (N) by screw (f); and the bushing (d) screwed into the internally threaded bore of said bodypiece. All as and for the purposes hereinbefore set forth.

3. In an adjustable angular dental engine handpiece, the combination with the body-piece (A) having a longitudinal bore and provided at its inner end with an enlarged circular head, centrally bored at right angles to said longitudinal bore, said head having also a circular recess concentric with its bore, the main shaft (N), mounted in the longitudinal bore of the bodypiece, and the driving gear-wheel (M) on said shaft, of the rotatable drill head (B) provided with a longitudinal bore and a stud integral therewith, whereby said head is revolvably mounted in the vertical bore of the bodypiece said drill head being also provided with a circular recess concentric with its stud to coincide with the recess in the head of the body-piece, means for retaining the stud in place; the intermediate gear wheel (F) constructed as described, mounted on said stud to have its seat in the groove of

the rotatable head and recess of the circular head of the bodypiece and in engagement with said drive wheel, the shaft (G) mounted in the bore of the drill-head, the driven gear wheel (J) mounted thereon in engagement with said wheel (F), and means for rigidly securing said wheel (J) on its shaft, whereby, whatever the position of the drillhead, a constant engagement of the gear-wheels is maintained.

4. In combination in a dental engine handpiece, the drill-shaft and slitted sleeve (G), having the longitudinal slits (C') and the slot (C'') and longitudinally bored and internally screw threaded; the wedge (R) within said sleeve; the encircling and cone-contracting sleeve (H) the lug or pin passing through the sleeve (H), the slot (G'') and the wedge (R); and the chucking screw (I), screwed into the threaded longitudinal bore of said drill-head (G). All as and for the purposes hereinbefore set forth.

5. In an angular dental engine handpiece, the combination with the longitudinally bored body-piece (A), provided at its forward end with an enlarged circular head bored at right angles to the main body thereof and having a longitudinal slot in the exterior thereof adjacent to said head; a collar (u) secured thereon in rear of said slot; a coiled spring surrounding said bodypiece and bearing against said collar; a sliding ring on said collar and provided with a shoulder to engage the spring; a push-bar (S), seated to slide in said slot and secured to the sliding ring at its forward end; of a drill-head provided with a stud projecting at right angles thereto, whereby it is adapted to be rotatably mounted in the bore of the circular head; a notched washer (D), secured on said stud in normal engagement with the spring-held push-bar, whereby the drill-head may be held at any desired angle with reference to the body-piece, as and for the purpose specified.

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Attest:

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