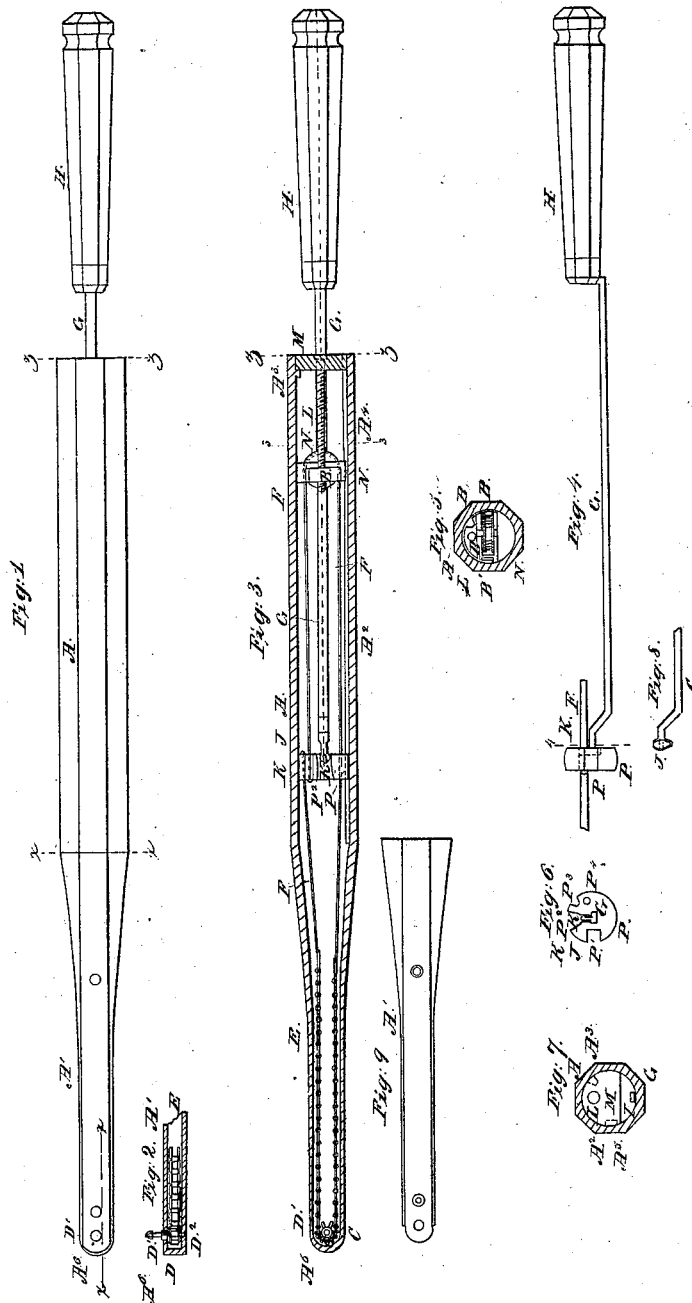


*K. Spencer,*  
*Motor for Dental Drills.*  
*No 5,866.                      Patented Oct. 17, 1848*



# UNITED STATES PATENT OFFICE.

KIRBY SPENCER, OF ATHENS, GEORGIA.

## DENTIST'S DRILL.

Specification of Letters Patent No. 5,866, dated October 17, 1848.

*To all whom it may concern:*

Be it known that I, KIRBY SPENCER, of the town of Athens, in the county of Clark and State of Georgia, have invented a new and useful instrument to be used in the science of dentistry, for excavating or cutting or drilling teeth in various angles with their surfaces in places hitherto considered inaccessible by the use of instruments ordinarily employed in dentistry, called "Kirby Spencer's dental motor for dental rose-drills, reamers, excavators," &c., which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1, is a plan of the instrument arranged for operating on the teeth at almost any required angle. Fig. 2, is a vertical section of ditto on the dotted line  $x-x$  of Fig. 1, showing the position of an excavator or other cutting instrument in relation to the tube. Fig. 3, is a horizontal section of the instrument taken at the center of the same, showing the gear for propelling or turning the excavator or drill, first to the right and then to the left, as the handle of the instrument is moved back and forth, also the screw for sliding the box and pulley for tightening the band. Fig. 4, is a sectional view, showing the propelling rod, handle, piston, and a section of the propelling strap attached to the chain and piston, forming an endless belt for turning the pinion affixed to the hub containing the socket into which the shank of the excavator or drill or other instrument is inserted. Fig. 5, is a vertical transverse section of the instrument drawn on the dotted line 3, 3, of Fig. 3, looking toward the point of the tube, showing the sliding box and adjustive screw for moving the pulley-box to tighten the band and chain. Fig. 6, is a transverse section drawn on the dotted line 4, 4, of Fig. 4, looking toward the small end of the instrument, showing the piston with the grooves in its periphery for allowing it to move back and forth over the guide rail on the inside of the cylinder or chamber to admit it to move over the adjustive screw, and to pass over a cog (or pin) on the inside of the chamber, showing also the propelling rod, head and socket. Fig. 7, is a view of the end of the instrument, at the line  $z, z$  of Fig. 3, next the handle. Fig. 8, is a section showing the bent end of the propelling rod and the head affixed thereto, which enters the socket in

the piston, which allows the handle to be moved laterally, vertically, and obliquely, without moving the piston; and also longitudinally when the piston is moved by it. Fig. 9, is a plan of the cap or cover removed from the tapered end of the tube, in order to have access to the pinion, chain, &c.

Similar letters in the several figures refer to corresponding parts.

The steel tube A for containing the excavators, drills, &c., and the propelling gear and serving as a stock or handle by which the excavators, drills, &c., are held firmly to the place where the point of the tooth required to be excavated, and at the required angle with the surface or axis of the tooth, without injuring the mouth of the patient; is made exteriorly of an octagonal, or other form, about two-thirds its length, and tapered and flattened the remaining third, and shaped convexedly at the small end, so as to be passed around behind the back teeth at any required angle, or position without causing pain or inconvenience to the patient. It is bored cylindrically from the line  $z, z$ , to the line  $x, x$ , for the insertion of the box B, and piston P, and to allow the latter to play back and forth freely, and provide room for the strap, chain, rod &c.—the remainder of the bore or chamber being of a shape corresponding to that of the exterior of the tube in which are placed the pinion C, and hub D, and chain E, and strap F, for propelling the excavators, drills, &c., said tapered end of the tube being reduced in size as much as possible, consistently with the required size of the chamber in which the chain and pinion are to operate so as to produce the required motion. The section of the tube at A' is made in a separate piece forming a cap or cover, and is held by screws so that it may be easily removed in order to give ready access to the inside (interior) of the tube for any purpose that may be necessary. The pinion C is made of steel or any suitable material and contains any requisite number of leaves or teeth.

The hub is made of steel of the required diameter and is pierced in the center with an opening or socket to admit the end of the excavators, drills, &c., for excavating the teeth, which passes through the tube and hub or axle of the pinion, being secured therein by a pin or other means. The inner end D<sup>2</sup> of this hollow axle or hub (reduced in diameter) turns in a round recess

or bearing in the interior of the small end of the tube. The part D of the axle within the tube is larger than the part D<sup>1</sup> of the axle which passes through the tube, forming a shoulder to press against the interior of surface of the tube, when the pinion is revolving. Any required excavating or cutting instrument may be inserted into said bore of the hub and secured in the same manner, by a pin or otherwise. The bore of the hub may be square, or of some other shape and the shanks of the various excavators or cutting instruments may be made of a corresponding shape:—This pinion is caused to turn as rapidly as is wished, first to the right and then to the left, revolving the excavator or other cutter in the same manner for cutting the tooth, by means of an endless chain and band E, passed around the pinion C, a grooved wheel N, turning in the box B, near the opposite end of the tube,—the chain and band being moved by a reciprocating piston P, to which the chain and band is attached, and also, a propelling rod G projecting beyond the large end of the tube, and having a handle H affixed to it, by which it is moved longitudinally toward and from the dental motor, and laterally, in an opening I, in the end of the tube left for that purpose.

It is not necessary to have the whole length of the band in links, but only a section of it, where it passes around the pinion as represented in the drawing at E, Figs. 2 and 3. The rest of the endless band may be made of leather, or some other suitable flexible material. Its two extremities or ends are attached to the piston P in any convenient and suitable way. The links of the chain must be made to correspond with the teeth of the pinion.

The piston P for giving the endless chain or band its required reciprocating movement for propelling the excavators, drills, &c., is composed of a cylindrical piece of metal, Figs. 3, 4, and 6, attached to the end of the propelling rod G by means of an oval or other shaped head J, fastened to the end of the propelling rod G and inserted into a cylindrical recess or cavity K, in which it has room to play freely.

The head J, is so shaped that it can perform its office of moving the piston longitudinally back and forth without turning on its axis—having a lateral and vertical movement being made convex on its anterior and posterior faces.

The piston P, Fig. 6, has three notches in its periphery. The rectangular notch, marked P<sup>1</sup>, is for the purpose of admitting the guide-rail A<sup>2</sup> (Fig. 3,) formed on the inside of the tube A, over which the piston slides back and forth during the operation of the instrument, and thus removing the liability of its turning in the tube or getting

out of place. This notch is made as much larger than the guide-rail, as to furnish room for the chain or strap E, to play freely therein, during the movement of the piston. The semicircular notch P<sup>2</sup> is designed to allow the piston to slide to the end where the wheel and axle are placed, without coming in contact with the tightening screw L, (Fig. 7,)—said notch being in the same line with the said screw. The small notch P<sup>3</sup>, is merely to allow the piston to pass over the projection A<sup>3</sup> on the inside of the tube against which the segment head M, (Fig. 7,) is forced by the tightening screw L.

The round hole seen at P<sup>4</sup>, Fig. 6, is for the purpose of admitting the ends of the chain or strap, fastened therein. The center aperture is for the insertion of the small end of the propelling rod G (Fig. 4).

The guide rail A<sup>2</sup> Fig. 3, is reduced in size next the open end of the tube at A<sup>4</sup>, in order to admit of the insertion of a larger box for the pulley. This rail is still further reduced at the open end of the tube at A<sup>5</sup>, Fig. 7, so as to form a shoulder against which the segment head M is secured in the same manner that its opposite side is secured against the small projection A<sup>3</sup>, on the inside of the tube aforesaid, and to prevent said segment head from turning on its axis to the right or to the left, the rail A<sup>2</sup>, which enters the groove in the periphery of the head M, being fixed permanently to the inside of the tube A, and the convex surface of the head fitting the concave surface of the tube.

The sliding box B, Fig. 5, in which the grooved pulley N is placed and held, is made the segment of a circle, pierced with an oblong opening, in which is formed a female screw, into which is inserted the tightening screw L, that passes through and turns against the segment head M, Fig. 7. The portion of the box where this screw passes, is made of less thickness than where the pulley is inserted so as to require less length of female screw.

The semicylindrical cavities for the axle of the wheel, are made in the face of the box, next the open end of the tube. A notch or groove, B<sup>1</sup>, is made in the circumference of the box to allow it to slide back and forth over the guide rail A<sup>2</sup>, in moving it by the screw L, for tightening or loosening the chain and to prevent it from turning in the cylindrical bore of the tube.

The notch B<sup>2</sup> is to allow it to pass over the projection A<sup>3</sup>, in the tube (Fig. 3).

The head M, Fig. 7, is for a resistance for the head of the screw to turn in, when tightening or loosening the chain, and for closing a portion of the end of the bore of the tube; and is made in the form of a segment of a circle, the same diameter as the chamber, the portion of the bore below

the chord of the segment-head being left open to allow room for the propelling rod G, Fig. 4, to play freely in every direction. This head abuts against the projection A<sup>3</sup>,

5 Fig. 3, on the inside of the tube, and against the shoulder A<sup>5</sup>, formed next the outer end of the guide-rail. The head of the tightening screw L turns in a corresponding countersink in the outer face of the segment  
10 head M, Fig. 7. The screw turns in the female screw in the sliding box B, Fig. 3, when this screw is turned to the right, it causes the box to move toward the head, and causes the chain or band to become tight;  
15 and when turned to the left, it produces a contrary effect.

The propelling rod is bent in the manner represented in Fig. 4, for the purpose of bringing it into the segmental opening I,  
20 Fig. 7, at the end of the tube, so that it shall be free to move in different directions.

The end A<sup>6</sup> of the tube A, (Fig. 1,) should be reduced to the least possible size, so as to avoid filling the mouth of the person being operated on, and thereby preventing the due operation of the dental motor;  
25 for the smaller the point of the tube can be made consistently with the correct operation of the propelling gear within the same, in  
30 the same proportion, will the value of the instrument be enhanced.

The handle may be made of agate, or any suitable material, in the form represented in Fig. 4, or in any other form, and banded  
35 in the usual manner. An endless belt and pulleys may be substituted for the chain, and pinion to turn the excavators drills, &c.

I have thus described the general character of my invention and the manner of  
40 constructing and using the same.

I do not lay claim to be the inventor of instruments, or drills for excavating or cutting teeth angularly by universal bevel gear, as I believe this has heretofore been attempted. Before pointing out what I claim 45 I wish to be distinctly understood, that I do not limit myself to the precise form and construction of the various parts employed, nor to the precise arrangements described, as I consider the substitution of one me- 50 chanical equivalent for another for producing the same effect as coming within the limits of my invention, when the combinations and arrangements are substantially the same. 55

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

1. The combination of the hollow tapered tube A, as a protecting case for the said gearing, substantially as described and re- 60 sented.

2. I claim the combination of the endless chain or belt E, F, pulley N, pinion C, piston P, propelling rod G, segmental box B, and segmental head M with a hollow ta- 65 pered tube constructed in the manner above described, for revolving the excavators, or rose drills, &c. as above described, for the purpose of excavating teeth angularly, as herein set forth; but I do not claim tighten- 70 ing the gearing by means of a screw.

3. I claim the guide-rail A<sup>2</sup>, A<sup>4</sup> in combination with the tube A as described.

In testimony whereof I have hereunto signed my name before two subscribing wit- 75 nesses this 12th day of June A. D. 1848.

KIRBY SPENCER.

Witnesses:

JAMES R. CARLTON,  
SAML. FROST.