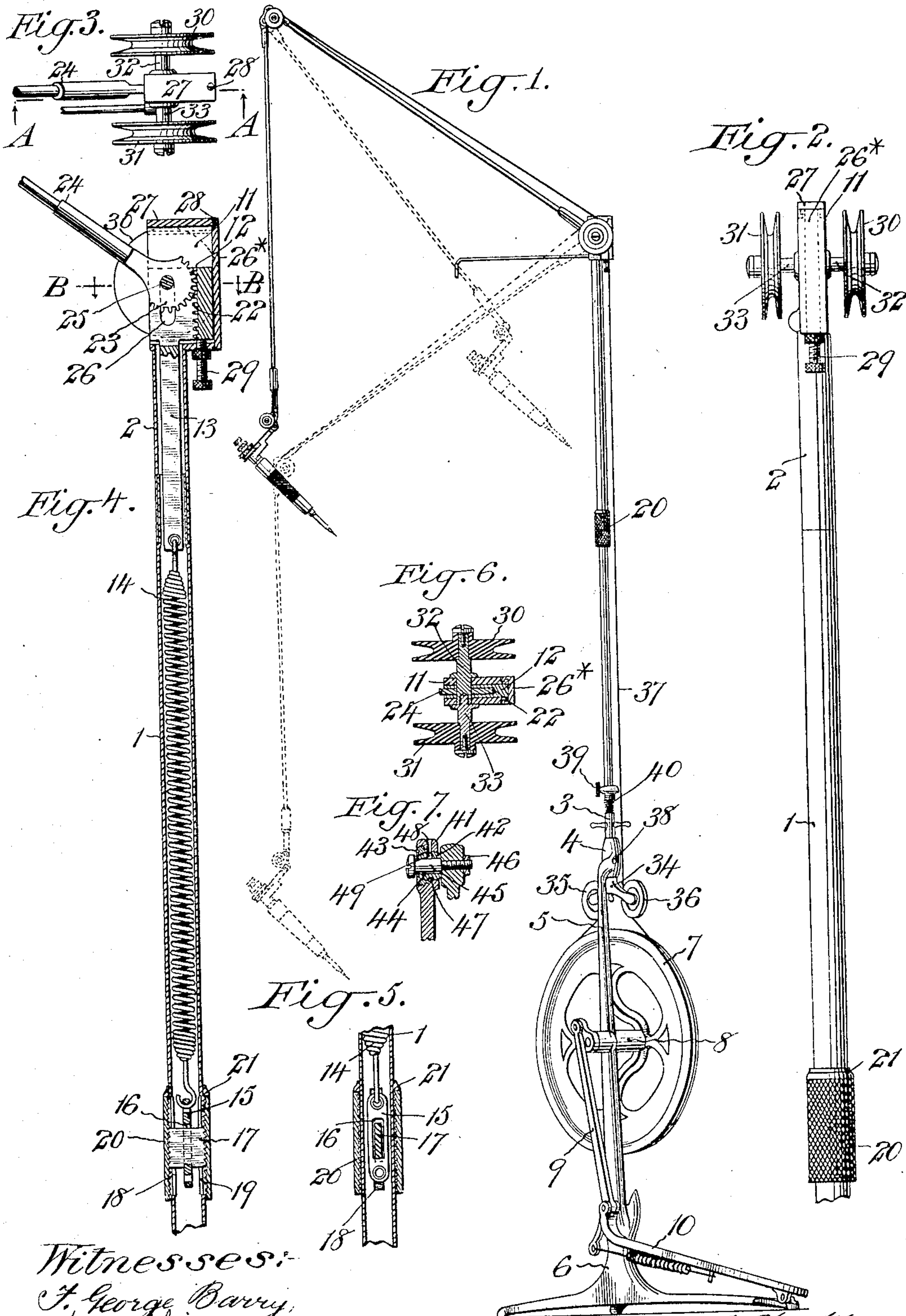


No. 869,562.

PATENTED OCT. 29, 1907.

J. F. HARDY.
DENTAL ENGINE.

APPLICATION FILED NOV. 23, 1906.



Witnesses:
J. George Barry,
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by attorney Howard

UNITED STATES PATENT OFFICE.

JAMES F. HARDY, OF NEW YORK, N. Y., ASSIGNOR TO CONSOLIDATED DENTAL MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

DENTAL ENGINE.

No. 869,562.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed November 23, 1906. Serial No. 344,732.

To all whom it may concern:

Be it known that I, JAMES F. HARDY, a citizen of the United States, and resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Improvement in Dental Engines, of which the following is a specification.

My invention relates to dental engines and more particularly to that type in which the arm and forearm are supported from a standard at the base of which the power is applied for operating a drill at the end of the forearm. My invention is not, however, directed to the particular structure and connections of the arm and forearm but is directed to the structure of the standard itself and the parts immediately connected therewith, with the object in view of providing simple and effective means for counterbalancing the arm and guiding the band at the base of the standard.

In the accompanying drawings, Figure 1 is a view of the engine in elevation as it appears when ready for use, Fig. 2 is an enlarged partial view of the standard in rear elevation, Fig. 3 is a top plan view of the same, Fig. 4 is a view of the same in vertical section in the plane of the line A—A of Fig. 3, Fig. 5 is a partial section in a plane at right angles to the plane in which the section, Fig. 4, is taken, Fig. 6 is a transverse section in the plane of the line B—B of Fig. 4, and Fig. 7 is a sectional view in detail showing the connection of the pitman with the crank pin of the drive wheel.

The standard is conveniently formed of two tubular sections denoted, respectively, by 1 and 2, the lower section 1 being made fast at its base to a foot piece 3 which enters and is locked in a socket 4 at the top of the base 5 which uprises from the pedestal 6. The socket 4 is offset from the vertical axis of the base 5 to receive in alinement with it or in the same vertical plane with it, the drive wheel 7 mounted in a suitable bearing 8 arranged transverse to the base 5, the said wheel 7 being driven by means of a pitman 9 connected with a foot treadle 10 as is usual.

On the top of the upper standard section 2 there is fixed a hollow head 11 here shown oblong rectangular in cross section and in this head a bifurcated slide 12 has a limited vertically reciprocating movement. The slide 12 has a shank 13 which extends downwardly within the tubular standard section 2 and has connected with its lower end a coil spring 14, which spring extends downwardly in the tubular section 1 and is connected at its lower end with a link 15 through a slot 16 into which there extends a key 17, the said key being of sufficient width to project through the wall of the tubular section 1 in slots 18 and 19 formed therein. The outer edges of the key 17 are screw threaded, as shown, to engage with the interiorly screw threaded sleeve or nut 20 which embraces the tubular section 1.

A bead 21 extending around and fixed to the tubular section 1, forms an abutment for the upper end of the sleeve nut 20 to prevent it from sliding upwardly under the tension of the spring 14. The slide 12 has a rack bar 22 located between its sides at the back thereof and this rack bar is engaged by a toothed sector 23 on the inner end of the arm 24. The inner end of said arm is pivotally secured concentric with the toothed sector between the opposite sides of the bifurcated slide by means of a pivot 25 which passes through a vertically elongated slot 26 in the sides of the slide 12 and through the side walls of the head 11. I find it convenient, in constructing the head 11, to make the back 26* of the head slide onto the sides by means of a dove tailed connection, as clearly shown in Fig. 6, and lock the back 26* to the top 27 (which, in like manner, slides into position by a dove tailed groove in connection with the upper edges of the sides of the head) by means of a screw 28 which passes through the end of the top 27 in the back.

In order to limit the upward throw of the arm 24, I provide a set screw 29 which passes through a screw threaded perforation in the bottom of the head 11 into position to engage and form a stop for the downward movement of the slide 12.

The pivot 25 on which the sector 23 of the arm 24 is mounted is extended on opposite sides of the head 11 to form axles for the guide pulleys 30 and 31 at the top of the standard. I find it convenient to construct this pivot in two parts, one part, for example the part 32, having an interiorly screw threaded engagement with the other part 33.

Intermediate the socket piece 4, at the top of the base 5, and the drive wheel 7, and in the plane of the drive wheel, I locate a yoke 34 which may be made fast to the downwardly projecting end of the foot piece 3 and in the branches of which the guide pulleys 35 and 36 are mounted so that the band 37 leading from the drive wheel 7 may be guided in the plane of the drive wheel immediately into proximity to the standard along which the parts of the band extend to the guide pulleys 30 and 31 at the top of the standard.

The foot piece 3 is made, in a well known manner, of telescoping sections connected with each other by a torsion spring 40. The lower or female section is made fast in the socket 4 by means of a set screw 38 while the upper or male section receives thereon the lower part of the standard, the latter being made fast in the desired vertical adjustment by means of a set screw 39.

In operation, the spring 14 is given such tension as may be required to support the arm 24 and the parts carried thereby by turning the sleeve nut 20 in the direction to draw the key 17 and the link locked thereto downwardly, the sleeve itself abutting in the meantime

against the bead 21. When sufficient tension has been applied to the spring to hold the parts suspended, the particular point at which it is desired that they shall be normally suspended is determined by adjusting the screw 29 to limit the downward motion of the slide 12. This having been determined, the arm 24 and parts carried thereby may be pulled downwardly against the tension of the counterbalance spring 14 at pleasure, the slide 12 moving upwardly within the head as the arm 24 is pulled downwardly thus increasing the tension of the spring 14 which, when the arm is set free, will promptly lift the arm to the limit of its elevated position and there hold it until it is desired to lower it for convenience in operating the engine.

To assemble the parts, the top of the head may be removed and the slide placed in position with the sector end of the arm 24 engaged with the rack on the slide and its center opposite the elongated slot 26 in the slide and the pivot 25 may then be inserted through the walls of the head. The top of the head may then be placed in position and locked to the back.

The spring 14 may have its upper end hooked into the end of the shank 13 and to the lower end of the spring the link 15 may be hooked and by means of a wire passing through a perforation in the lower end of the link and passing through the tubular section 1 of the standard, the said link 15 may be drawn down together with the spring through the tubular section 1 until the link 15 has its slot registering with the slots 18 and 19 in the walls of the section 1 when the key 17 may be passed through one or the other of the slots 18 or 19 and through the slot in the link into position shown in Fig. 4. The nut sleeve 20 may then be slid into position to engage the opposite edges of the key 17 and when its upper end reaches the bead 21 it will begin to exert tension on the spring 14 to lift the arm 24.

The pitman 9 conveniently has a slant outwardly from its connection at the top of the pedestal to its connection with the crank on the wheel shaft which rests in the bearing 8 and in order that it may work freely throughout the rotary path of the crank pin and still maintain its oblique position, I connect the pitman with the crank pin by means of a ball and socket joint as follows:—The upper end of the pitman 9 is provided with a female gland 41 which receives one side of a ball 42, the ball being held in position by the male gland 43 which screws into the female gland 41. Through the glands and through the ball there is a central bore 44 through which the crank pin 45 extends, the parts being held in assembled adjustment by means of a nut 46 screwed onto the end of the pin. The openings through the glands are sufficiently large to permit the pitman 9 to rock laterally to the slight extent required on the ball bearing during the rotary movement of the crank. A central groove 47 in the surface of the wall registers with a hole 48 in the gland 41 and distributes oil around the surface of the ball and through a hole 49 leading from the groove to the interior bore of the ball into engagement with the crank pin.

The structure as a whole is simple, convenient and attractive; it is strong and durable; it admits of being

compactly packed for shipment and the working parts, when set up, are well housed and protected from foreign matter.

What I claim is:—

1. The combination with a hollow standard, an arm pivotally secured thereto, of a counterbalance spring housed within the standard and a vertically movable slide housed within the standard and forming an intermediate connection between the arm and the spring.

2. The combination with a standard, an arm pivotally secured thereto, of a counterbalance spring and a vertically movable slide connected with the spring and having a toothed connection with the arm.

3. The combination with a standard and an arm pivotally secured thereto, of a counterbalance spring and a slide connected with the spring and having its upper end bifurcated to embrace the opposite sides of the end of the arm, the said slide and arm being provided with interengaging teeth.

4. The combination with a standard having a hollow head and an arm pivoted between the opposite sides of the hollow head of the standard and provided with a toothed sector at its end, of a vertically movable slide located between the opposite sides of said head and provided with a rack bar in position to engage the toothed sector and the arm and a counterbalance spring connected with said slide.

5. The combination with a tubular standard provided with a hollow head, of an arm provided with a sector at its end pivotally secured between the opposite sides of the hollow head of the standard, a slide located in the hollow head and having a toothed engagement with the sector, the said slide being provided with a shank extending downwardly within the tubular standard and a counterbalance spring connected to the hollow standard and connected with the slide.

6. The combination with a tubular standard and an arm pivotally secured thereto, of a counterbalance spring connected with the arm and extending downwardly within the standard, a nut mounted on the standard and a screw threaded piece connected with the spring and engaged with the nut for regulating the tension of the counterbalance spring.

7. The combination with a slotted tubular standard, an arm pivotally secured thereto and a counterbalance spring connected with the arm and extending downwardly within the standard, of a link connected with the spring, a key extending through the link and through a slot in the standard and provided with a screw threaded edge and a sleeve nut mounted on the standard and engaged with the key for adjusting the key and hence the tension of the spring.

8. The combination with a tubular standard made in sections, one of the sections being provided with slots through its walls, an abutment thereon, of an arm pivoted to the upper section, a slide engaged with the arm and extending within the upper section, a spring connected with the slide and extending into the lower section, a link connected with the spring, a key passing through the link and through the slots in the walls of the standard section, a sleeve nut mounted on the section in engagement with the key and with said abutment.

9. The combination with a standard, an arm pivotally secured thereto and a counterbalance spring for holding the arm elevated, of a vertically movable slide connected with the spring and with the arm and an adjustable stop for regulating the angle at which the arm shall be held with respect to the standard.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this twenty fifth day of October 1906.

JAMES F. HARDY.

Witnesses:

H. D. BALTMAN,
JAMES MURRAY.