(No Model.)

# J. D. SMITH.

## DENTAL ENGINE.

No. 598,295. Patented Feb. 1, 1898.

Fig. 4.

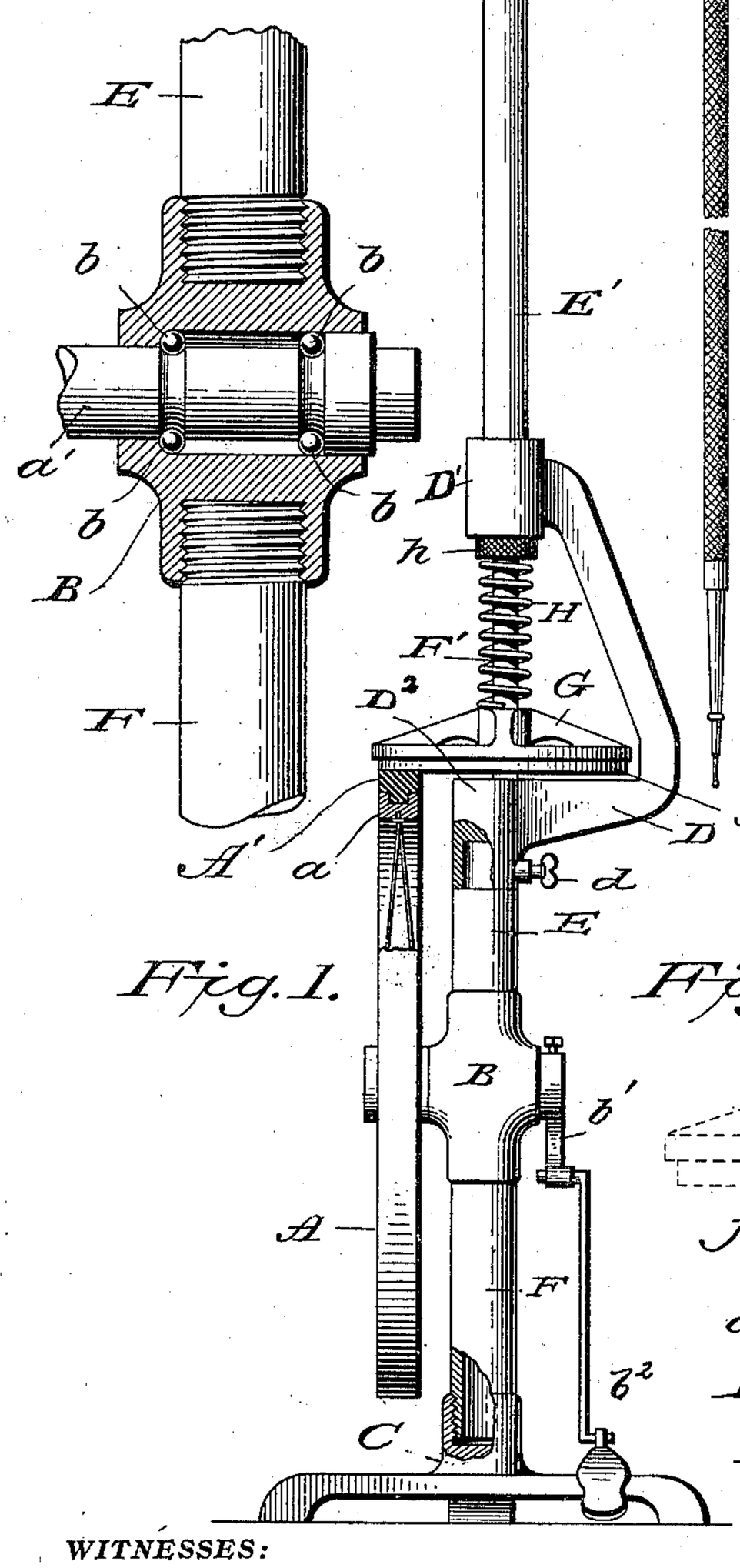


Fig. 1.

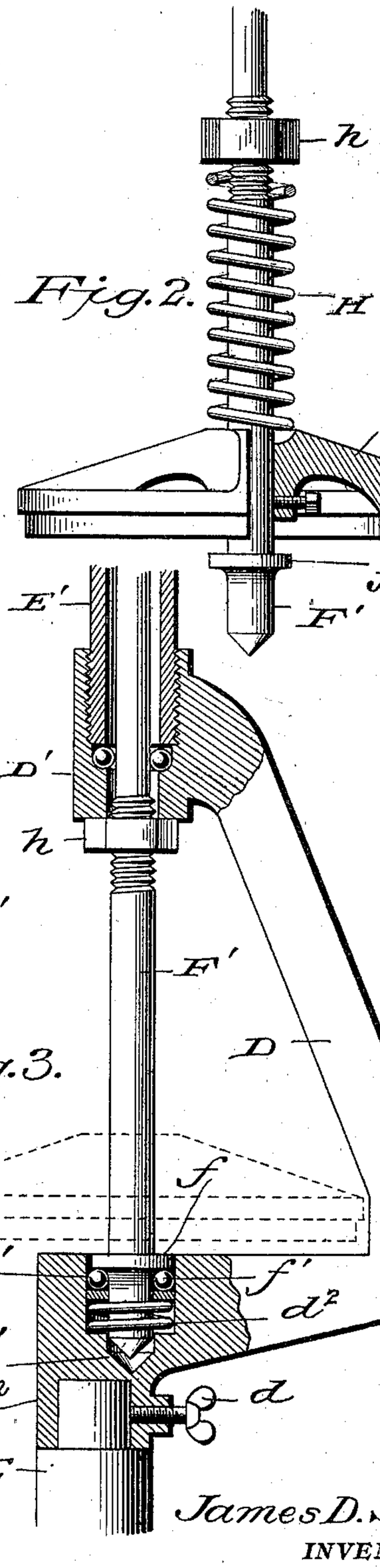


Fig. 2.

Fig. 3.

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# UNITED STATES PATENT OFFICE.

JAMES D. SMITH, OF CANANDAIGUA, NEW YORK, ASSIGNOR OF ONE-FOURTH TO JOHN S. ANDREWS, OF SAME PLACE.

## DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 598,295, dated February 1, 1898.

Application filed April 24, 1897. Serial No. 633,740. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES D. SMITH, a citizen of the United States of America, residing at Canandaigua, in the county of Ontario and State of New York, have invented certain new and useful Improvements in Dental Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in dental engines, the object thereof being to provide a dental engine with a driving-wheel the major portion of the weight of which is located at the periphery or rim thereof and to provide means for changing the point of contact of the driven wheel with the driving-wheel; also, to provide means for varying the contact or pressure of the driven wheel upon the driving-wheel, a further object of the invention being to simplify the construction and reduce the cost of manufacture of this class of engines.

The invention consists in the novel means for supporting the shaft upon which is mounted the driven wheel, so that the position of the driven wheel can be changed by moving a bracket which is mounted on its support out of line with the shaft.

The invention further consists in the construction and combination of the parts, as will be hereinafter fully set forth, and specifically pointed out in the claims.

In the accompanying drawings, which illustrate my invention, Figure 1 is a side elevation, partly in section, showing a dental engine embodying my improvements. Fig. 2 is a side elevation, partly in section, of the driven wheel and its shaft. Fig. 3 is a side elevation, partly in section, of the bracket, which is eccentrically mounted upon the standard; and Fig. 4 is a detail view.

A represents the driving-wheel, which may be made very much after the manner of a bicycle-wheel, as to the spokes, and it is provided with a heavy metallic rim $a$ and a solid rubber tire A'. The hub of the driving-wheel is suitably connected to a shaft $a'$, which has either grooves or collars to receive balls $b$, the shaft being adapted to run on ball-bearings, and is journaled in the section B of the standard. The section B of the standard consists of a hollow casting providing a ball-chamber and journal-bearings, wherein is journaled the horizontal shaft $a'$, provided with grooves forming a raceway for the balls $b$, located in said chamber. The standard, composed of the sections B, E, and F, is seated in a hollow internally-screw-threaded projection on the base C, the section B having vertically-disposed internally-screw-threaded sockets for connection with the sections E F, as clearly shown in Fig. 4. The upper end of the section E of the standard is reduced in size to form a shoulder and pivot-post, on which is pivotally seated a bracket D. To one end of the shaft $a$ is attached a crank-arm $b'$, which is suitably connected to a treadle mounted on the base or foot-piece of the standard.

The bracket D is connected to the tubular section E, so as to be capable of a partial rotary movement thereon, and it may be locked in a set position by a thumb-screw $d$. The upper part of the bracket D has a shaft-bearing, with bearings for rollers or balls, and the recess therein is internally threaded to receive the tubular section E', through which the driven shaft passes. The bearing D' at the upper end of the bracket D forms a support for the driven shaft, and its lower end rests in a conical bearing $d'$, consisting of a conical recess, adjacent to which are shoulders, and upon said shoulders rests a spring which engages with a washer loosely mounted on the shaft F', said shaft having above the washer a collar $f$, which is suitably attached to the shaft, said collar $f$ being concave on its lower face to engage with balls $f'$, which not only impinge against the collar and washer, but also against the side walls of the recess in the bracket.

The shaft F' has mounted thereon a driven wheel G, the lower face of which is provided with two or more rubber rings or bands $g$ $g'$, which are adapted to engage with the perimeter of the driving-wheel. The wheel G is made of very light material, and upon the shaft, above the wheel, is a coiled spring H, one end bearing upon the upper surface of the wheel, while the other engages a collar

or thumb nut *h*, which can be turned or adjusted upon the shaft, the turning of the nut tightening or loosening the spring, the nut engaging with the under side of the upper bearing.

The lower end of the shaft F′ is supported by the spring $d^2$, which is of sufficient strength to sustain the weight of the shaft and the driven wheel, the adjustment of the spring H governing the pressure of the wheel G upon the driving-wheel.

It will be particularly noted that bearings for the shaft F′ are eccentric to the pivot-post carried by the tube E, so that by turning the bracket the position of the driven wheel with relation to the driving-wheel will be changed, such construction providing for a changeable speed, which can be quickly effected. I consider this a very desirable feature of my improvement, as in practice an operator soon acquires a regular pedaling or treadle movement, and therefore the driving-wheel will rotate uniformly, and when it is desired to have a low rate of speed the bracket is turned so as to bring the periphery or outer ring of the driven wheel in engagement with the rim of the driving-wheel, and when a high rate of speed is desired the bracket D is turned, so that the inner band or ring will engage with the wheel.

To the upper end of the vertical shaft F′ is attached a flexible shaft, the other end engaging with a suitable instrument or tool or the handpiece thereof. This flexible shaft, which is of the usual type, is reinforced by a suitable coiled spring or wire.

The standard of a dental or other engine of the same type can be cheaply constructed and readily taken apart for transportation and provides an effective means for changing the speed at which the tool is driven. The spring supporting the ball-cup of the driven shaft is of such strength that it will support the weight of the shaft and parts carried thereby, and the pressure of the driven wheel on the perimeter of the driving-wheel can be adjusted or regulated through the coiled spring and nut.

Heretofore, as far as I am aware, the driving-gear of a dental engine was so constructed that where friction-wheels were employed such wheels either engaged a flat side of such wheel or a beveled edge, and when such gearing was employed the tendency has been to throw the balance or driving wheel to one side, which causes unnecessary friction and an uneven wearing of the parts, and such construction does not provide for a change of speed by simply moving the bracket upon its supporting-standard. With my improved construction the driving-wheel is provided with a stub-shaft and ball-bearings, and the pressure is direct on the periphery or perimeter of the driving-wheel.

I claim—

1. The combination in a dental engine, of a standard-support and driving-wheel supported thereby, of a bracket mounted on the standard-support, a shaft mounted in bearings in said bracket eccentric to the bracket-support, a wheel mounted on the shaft carried by the bracket so as to frictionally engage the driving-wheel, substantially as shown and for the purpose set forth.

2. In a dental engine, a standard-support having a horizontal bearing and a pivot-post, a shaft journaled in the bearing, a driving-wheel carried by the shaft, in combination with a bracket movably connected to the pivot-post of the standard-support and provided with shaft-bearings which are out of line with the pivotal support for said bracket, a vertical shaft carried by the bearings of the bracket, and a horizontal wheel mounted on said shaft, substantially as shown and for the purpose set forth.

3. The combination in a dental engine, of a standard-support having a horizontal bearing, a shaft journaled in said bearing, a wheel mounted on the shaft, a bracket carried by the standard-support, said bracket having bearings, a vertical shaft journaled in the bearings of the bracket, a wheel carried by the vertical shaft, a fixed collar on the shaft below the wheel, a spring-supported disk positioned in the lower shaft-bearing of the bracket, and balls which engage with a fixed collar and disk, substantially as shown and for the purpose set forth.

4. In a dental engine, a standard-support, a horizontal shaft journaled therein and a driving-wheel mounted on said shaft in combination with a bracket carried by the standard-support and movably connected thereto, a vertical shaft journaled in the bracket, a driven wheel mounted on the vertical shaft above the driving-wheel, a spring-support for the vertical shaft in the lower journal-bearing of the bracket and a spring located on the shaft to act against the first-mentioned spring to force the driven wheel in contact with the driving-wheel and means for adjusting the latter spring, substantially as shown.

5. As an improved article of manufacture a supporting-frame for a dental engine comprising a base provided centrally with an upwardly-projecting portion having internal threads, a tubular section for engagement therewith, a hollow forging presenting horizontal journal-bearings and vertical sockets, a section for engagement with the forging, said section having a pivot-post and a bracket having a socket for engagement with the pivot-post, the support and bracket carried thereby providing supporting means for the movable or operative parts of the engine, substantially as shown.

6. In a dental engine the combination with a standard-support and driving-gear constructed substantially as shown, of a bracket pivoted upon the standard-support and having journals which are eccentric with the

pivotal point of connection of the bracket with the supporting-standard, and a vertical shaft mounted in said journals, a wheel having bands or rings for engagement with the wheel of the driving-gear and means for adjusting the bracket upon its support to effect an engagement of either one of the bands or rings with the perimeter of the driving-wheel, substantially as shown and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES D. SMITH.

Witnesses:
HERBERT G. FITCH,
HARRY I. DUNTON.