No. 682,317. Patented Sept. 10, 1901.

M. N. CALLENDER.

DENTAL ENGINE.

(Application filed Nov. 27, 1900.)

(No Model.)

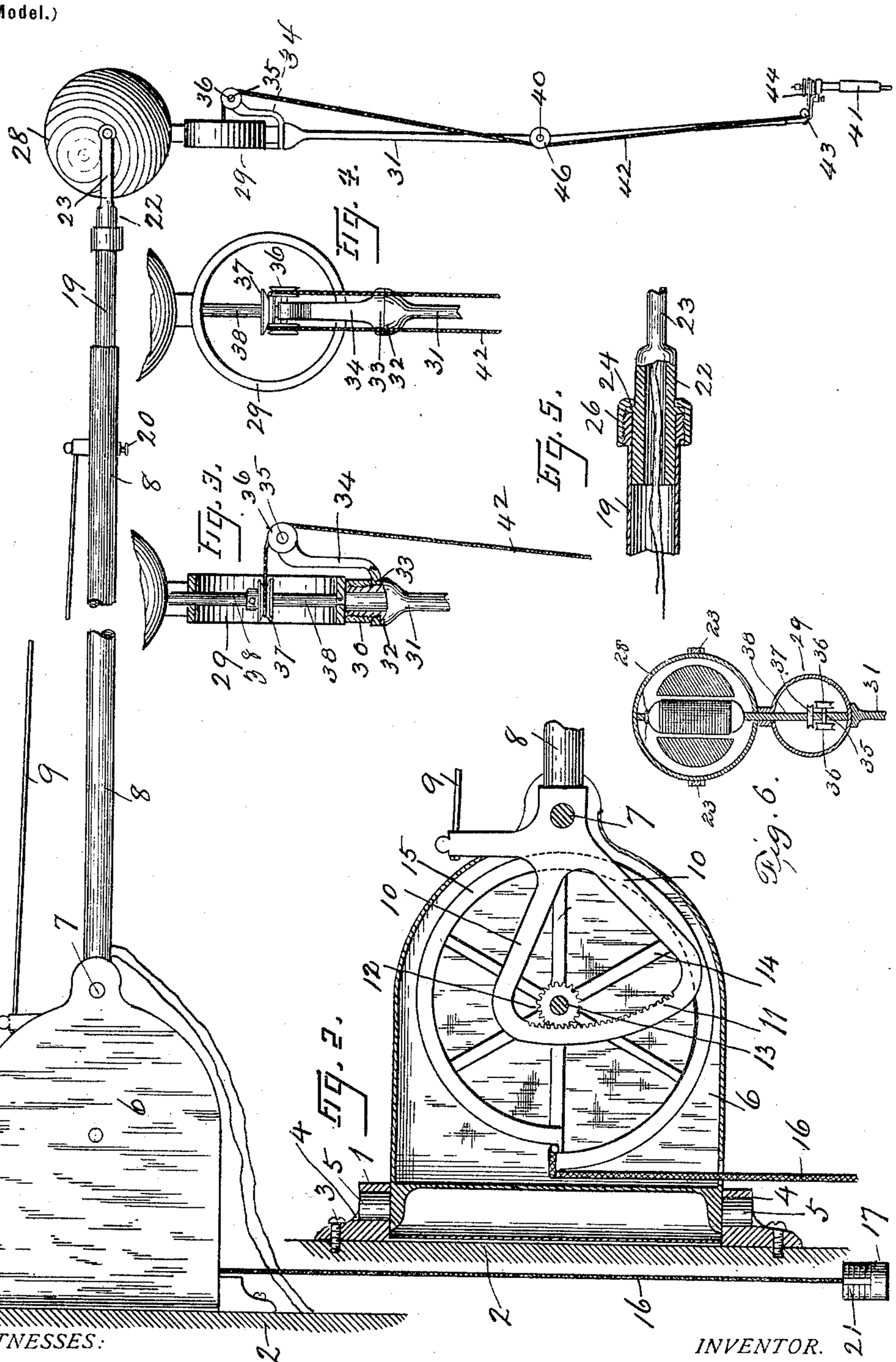

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

WITNESSES:

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DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 682,317, dated September 10, 1901.

Application filed November 27, 1900. Serial No. 37,917. (No model.)

To all whom it may concern:

Be it known that I, MONROE N. CALLENDER, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Dental Engines, of which the following is a specification.

My invention relates to improvements in dental engines, the object of my invention being to provide an apparatus of this character in which the parts shall be arranged in such a manner as to avoid friction, so that a smaller electromotor can be used to obtain the same effective result, one by means of which the dental instrument can be handled with greater ease and with greater advantage than with those heretofore in use, and which shall be neat and attractive in appearance and show very few working parts.

My invention therefore resides in the novel construction, combination, and arrangement of parts for the above ends hereinafter fully specified, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved apparatus. Fig. 2 is an enlarged side elevation of the mechanism for counterbalancing the swinging arm. Fig. 3 is an enlarged side view of the connection of the depending rod and the motor-case. Fig. 4 is a similar front view of the same. Fig. 5 is a longitudinal section of the connection of the extended member of the swinging arm and the gimbal-frame; and Fig. 6 is a vertical section of the motor-casing, showing the operative connection of the motor and the shaft driven thereby.

Referring to the drawings, 1 represents a bracket or support for the engine secured to the wall 2 of the operating-room by means of screws 3. Said bracket is formed with upper and lower bearings 4 for the pivot-pins 5 of the casing 6. In the outer end of said casing is mounted a pivot-pin 7, upon which is pivoted a tubular arm 8, braced by a tie 9. Extending from said arm behind said pivot are two radiating bars 10, supporting an internal segmental gear 11. Said gear meshes with a pinion 12 on a shaft 13, pivoted in the casing, and said shaft also carries the radiating arms 14 of a spiral pulley 15. To said pulley is attached a cord 16, carrying a counterbalance-weight 17. By means of this construction when the arm 8 is swung downward from the position shown in Fig. 1 the segment-gear 11 will rotate the pinion 12, and will thereby also rotate the large spiral pulley 15, thereby raising the counterbalance-weight. It will be seen that by reason of the spiral form of the pulley the cord 16 is brought nearer to the shaft 13 when the arm 8 is depressed. Thereby the leverage of the counterbalance-weight 17 is reduced proportionately to the decrease in the leverage of the arm 8 and the motor supported thereon due to the inclined position of said arm. In the arm 8 is telescoped a tubular member 19, which is fixedly secured in the desired extended position by means of a set-screw 20, and in order to compensate for the increased leverage exerted by said arm, due to an increase in its length, additional weights 21 may be added to the counterbalance-weight 17. The free end of said member 19 carries the stem 22 of a gimbal-frame 23, said stem having a shoulder 24 abutting against the end of said member, said stem entering the end of said member and being retained therein by means of a ring 26, screwed onto the threaded outer end of said member. In the gimbal-frame 23 is supported an electromotor 28, the wires for which are preferably carried in the interior of the arm 8 and member 19. Secured to the frame of the motor is a ring-frame 29, carrying at its lowest portion an internally-threaded tube 30, and in said tube is secured the upper end of a rod 31, having an annular shoulder 32. Between said shoulder and the lower end of said tube is clamped a ring 33, supporting an upwardly-extending arm 34, in the upper end of which is pivoted a transverse shaft 35, upon which are loosely mounted two pulleys 36. A horizontal pulley 37 is also mounted upon the motor-shaft 38, which extends downward through the ring-frame 29 from the motor. The rod 31 is jointed at 40 and carries at its lower end the dental handpiece 41. An endless band or cord 42 travels around pulleys 43 44 on said handpiece, also around pulleys 46, mounted at the joint 40, around the two pulleys 36 upon the arm 34, and also around the horizontal pulley 37, driven by the motor-shaft. Thus the rotation of said shaft is imparted to the hand-

piece by means of said pulleys and band. It will be observed that by this construction the motor is allowed free rotary movement about two axes at right angles to one another, so that rod 31 may be turned in any direction, and this movement is independent of the angle which the arm 8 makes with the horizon.

The above construction is preferable to that in which the rotary motion of the electromotor is transmitted by means of resilient flexible shafting, as it avoids the backlash and the excessive vibration incident to the latter construction. It provides a steady rotation of the drill or other instrument while allowing complete freedom of movement to the operator. Moreover, this construction of cord-engines brings the power nearer to the work, shortens the length of the cord, and reduces the friction, so that a smaller electromotor may be used to do the same amount of work as heretofore.

I claim—

1. In a dental engine, the combination of a fixed bracket, a horizontally-swinging casing pivotally carried by said bracket, an arm pivoted on a horizontal axis on said casing, a counterbalance therefor, an electromotor on the end of said arm, a ring-frame secured to said motor, the motor-shaft being revolubly supported in said frame, a rod having its upper end secured to said frame, pulleys carried by said rod, a pulley carried by said motor-shaft, a driving-cord around said pulleys, and a dental instrument driven by said cord, substantially as described.

2. In a dental engine, the combination of a swinging arm having a rearward extension carrying a segment-gear, a pinion meshing therewith, a spiral pulley rotated by said pinion, a cord secured to said pulley, and a counterbalance-weight carried by said cord, substantially as described.

3. In a dental engine, the combination of an electromotor, a pivotal support for the same, a ring-frame secured to said motor, the motor-shaft being revolubly supported in said ring-frame, a pulley within said ring-frame on said motor-shaft, an upper rod secured at its upper end to said ring-frame, pulleys carried at the upper end of said rod, a lower rod jointed to said upper rod, pulleys at said joint, a driving-cord around the above pulleys, and a dental instrument at the lower end of the lower rod and driven by said cord, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

MONROE N. CALLENDER.

Witnesses:

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