(No Model.) 3 Sheets—Sheet 1.

J. HOOD & S. H. REYNOLDS.

DENTAL ENGINE.

No. 381,783. Patented Apr. 24, 1888.

Fig. 1.

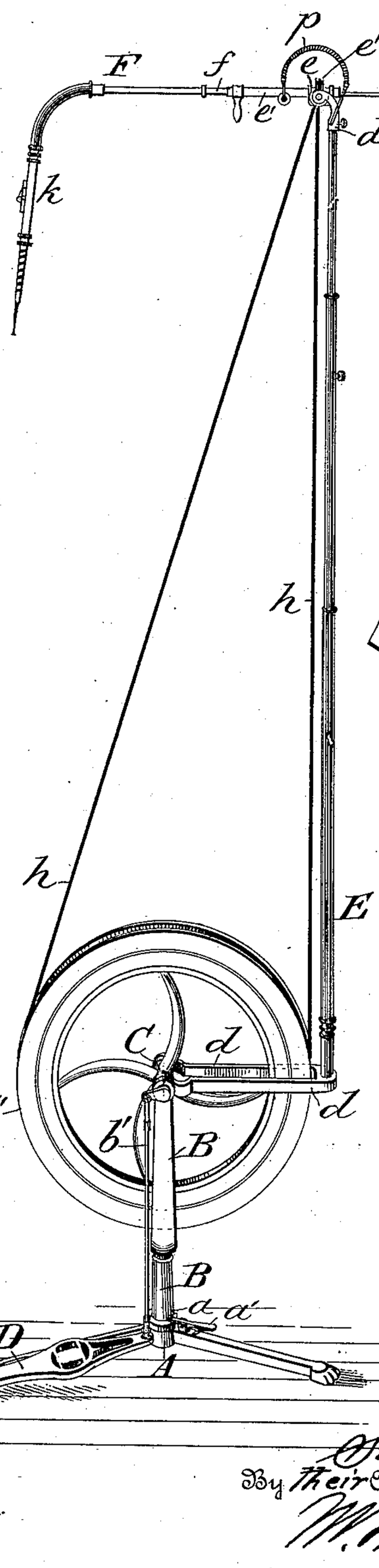
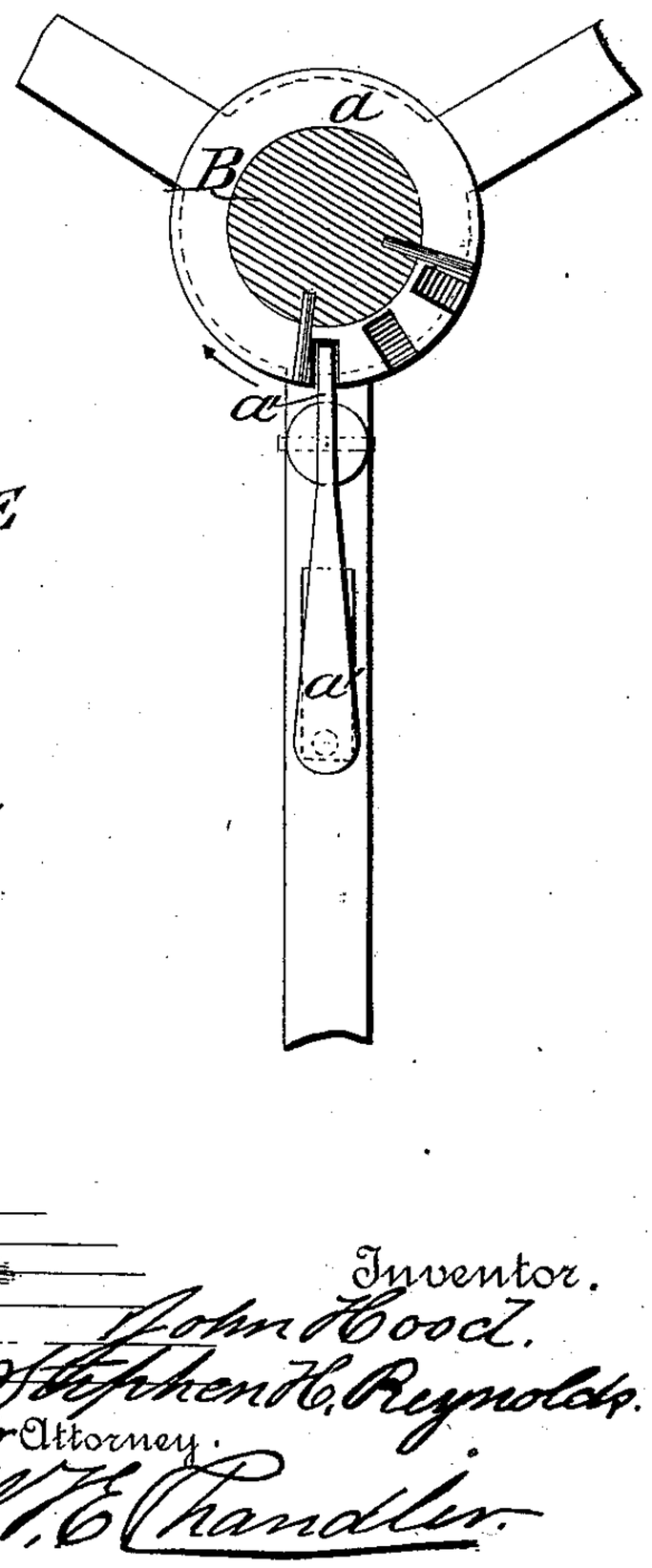


Fig. 2.



Witnesses
F. H. Schott
W. Burroughs.

Inventor.
John Hood.
Stephen H. Reynolds.
By their Attorney.
W. E. Chandler.

(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

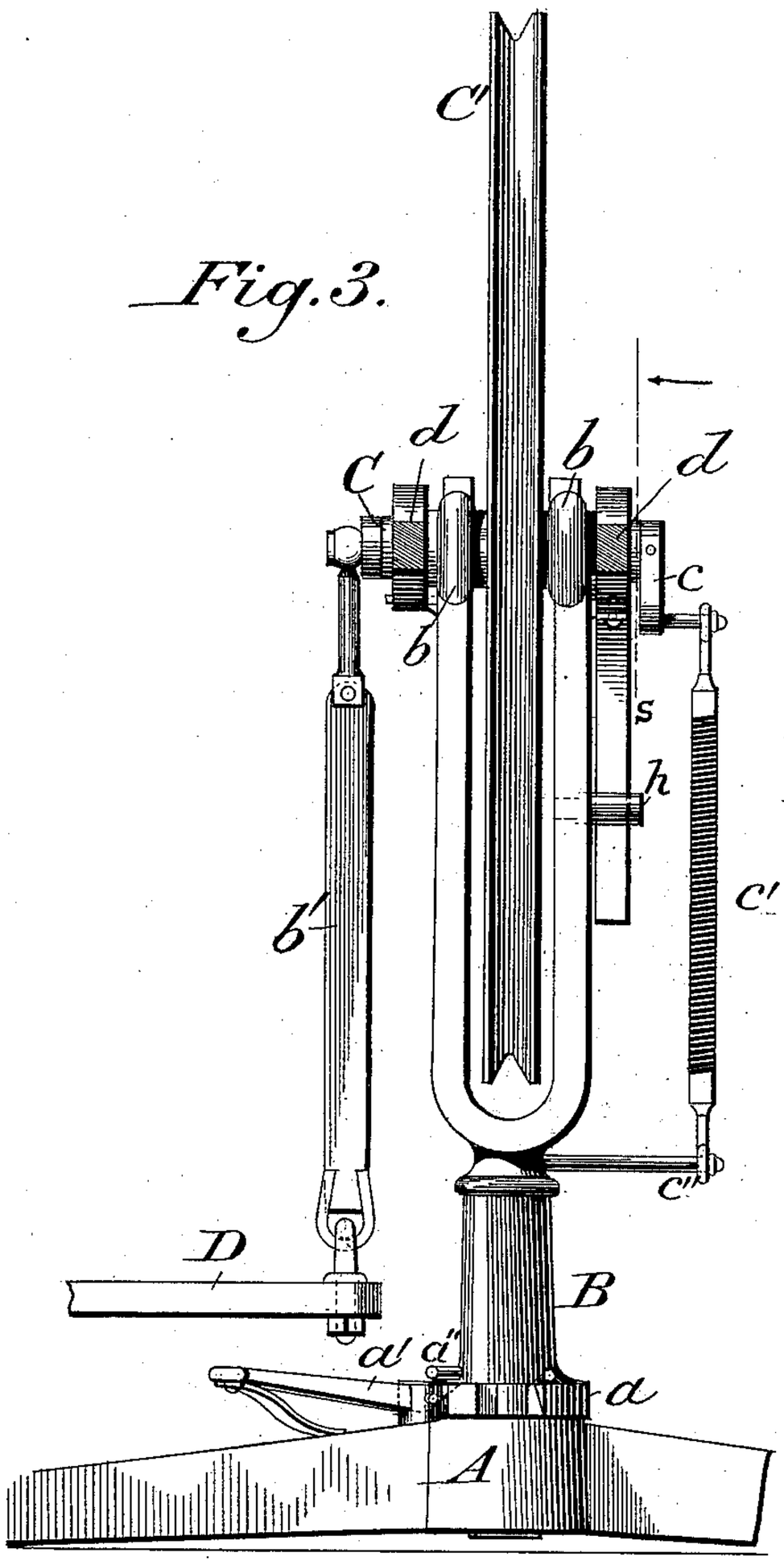


Fig. 3a.

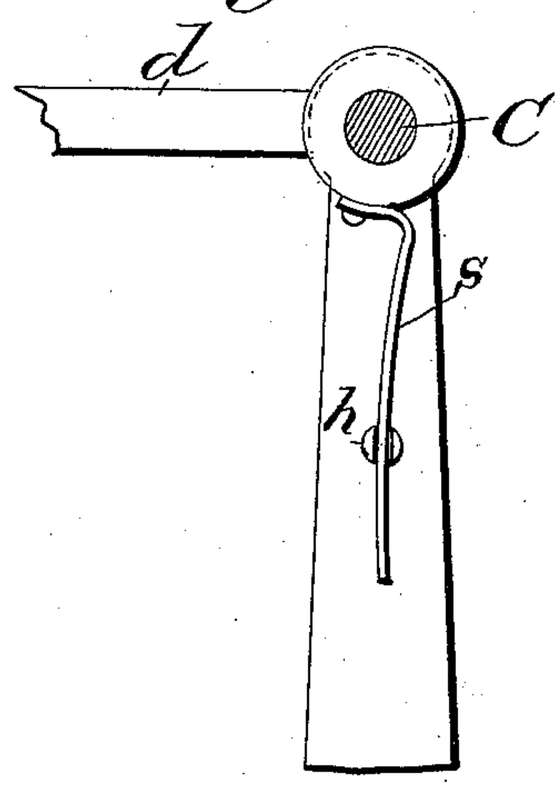
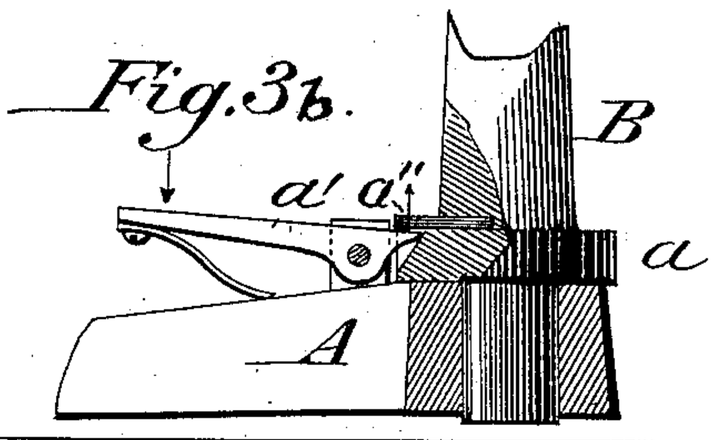


Fig. 3b.



Witnesses.

F. H. Schott.

G. Burroughs.

Inventor.

John Hood.

Stephen H. Reynolds

By Their Attorney.

W. E. Chandler,

(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

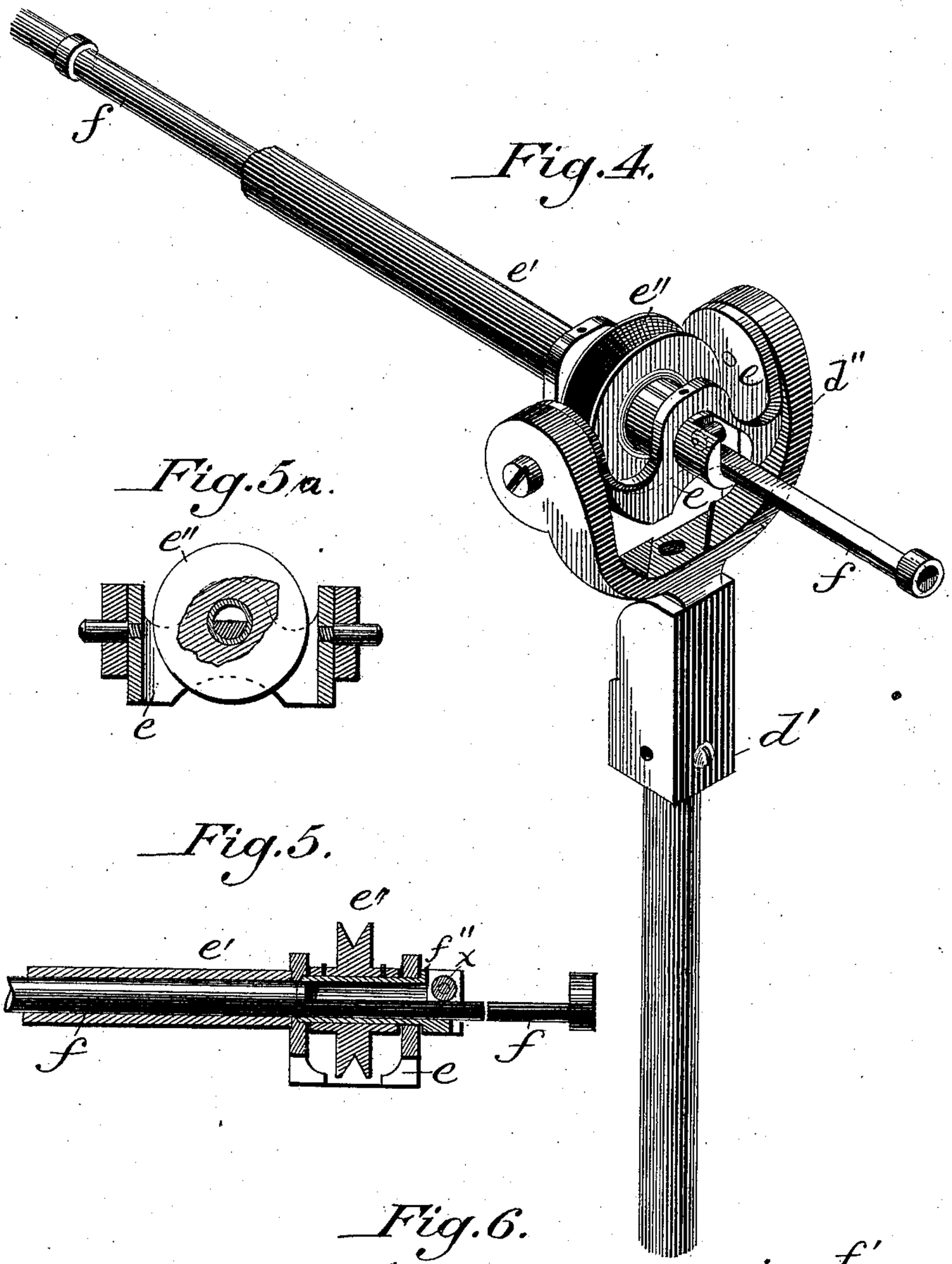
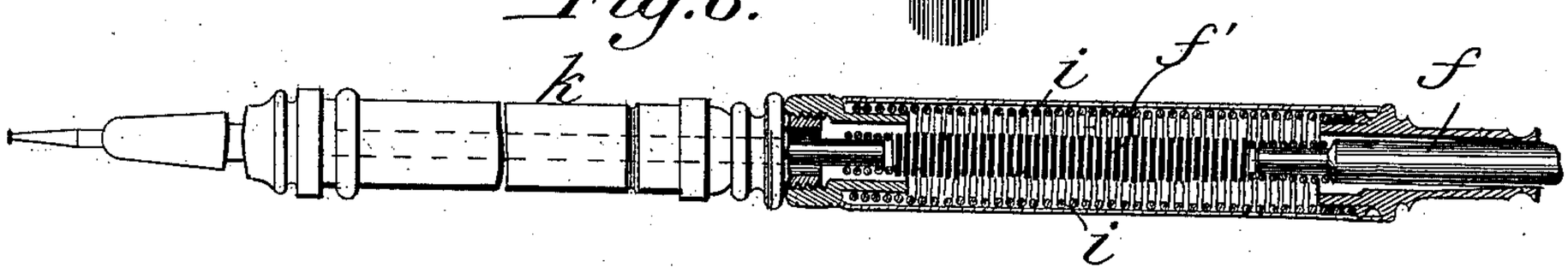


Fig. 5a.

Fig. 5.

Fig. 6.



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F. H. Schott.

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Inventor.

John Hood

Stephen H. Reynolds.

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W. E. Chandler.

UNITED STATES PATENT OFFICE.

JOHN HOOD AND STEPHEN H. REYNOLDS, OF BOSTON, MASSACHUSETTS.

DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 381,783, dated April 24, 1888.

Application filed November 4, 1887. Serial No. 254,289. (No model.)

To all whom it may concern:

Be it known that we, JOHN HOOD and STEPHEN H. REYNOLDS, citizens of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Dental Engines; and we do 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 the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in that class of machines known as "dental engines," in which rotation or other movement of the instrument used in preparing a cavity in the teeth (for filling or plugging the same after preparation) is produced by the foot of the operator acting upon a treadle, the object being to simplify the general construction of the machine and add to its efficiency by so arranging the arm which carries the operating-instrument that it may be extended or shortened to suit the work in hand.

The general construction of the machine is as follows: A triangular base or stand is provided having at the junction of its three arms a socket which receives and supports a bifurcated standard, but which turns easily in the socket or the base, and is provided with means for holding it in any desired position. Journaled on the upper ends of the bifurcation of the standard is a crank-shaft carrying a fly-wheel with a grooved periphery. In order to give motion to this fly-wheel its treadle is pivoted to the extremity of one of the arms of the base, the free end of said treadle being connected by a suitable rod with the crank upon the shaft of the fly-wheel, and the opposite end of said shaft with a spiral spring, which causes the crank to always stop half-way between the centers when the wheel is at rest, so that a movement of the treadle will at once start the wheel. Journaled upon the crank-shaft outside its bearing upon the standard, and embracing the fly-wheel, are the two arms of the forked bar which carries the operating-shaft. This bar is bent at right angles at the point where its arms come together outside of the wheel, and extends upward from this point to a sufficient height to bring the arm carrying the extension-shaft into a proper position for use. To retain this bar in an upright position when not diverted therefrom in use, a plate-spring is secured at one end in the slot of an arm attached to the standard, and its opposite end to one of the horizontal arms of the bar near the point where it is journaled upon the crank-shaft. This allows the bar to be easily rocked upon the shaft to any useful degree, and to instantly return to its vertical position when left free. The upper end of this bar terminates in a fork and carries the journals of the tubular supporting-arm, within which rotates the shaft which operates the instrument. Motion is imparted to this shaft from the fly-wheel by a belt, which enters the groove in its periphery and passes around a grooved pulley mounted upon the operating-shaft. This shaft is preferably rectangular in cross-section and slides freely through its supporting-arm and the pulley by which it is rotated. To one end of this shaft is attached a coil-spring, the opposite end of which connects with the tool-holder at the extremity of the hand-piece, thus forming a flexible shaft connecting the two, the space occupied by this coiled spring between the shaft and hand-piece being covered by a sheath composed of closely-coiled wire surrounded by an outer covering of leather or other suitable material to prevent injury to the hands of the operator by contact with the swiftly-rotating flexible shaft. A spring-support is attached to the upright bar, which serves as a rest for the movable arm and sliding shaft, if desired, when the instrument attached is not in immediate use.

In the accompanying drawings, in which similar letters of reference indicate like parts in the different figures, Figure 1 is a perspective view of the engine complete. Fig. 2 is a plan view of the base and lower part of the standard, showing how the latter may be adjusted in any desired position with relation to said base. Fig. 3 is a front elevation of the standard, fly-wheel, and a part of the rocking bar with their connection. Fig. 3^a is a side view showing the construction of the spring which controls the rocking bar. Fig. 3^b is a side view, partly in section, of the base, stand-

ard, and their connections. Fig. 4 is an enlarged perspective view of the upper end of the rocking bar, extension, the oscillating arm, the shaft revolving in said arm, and its driving-pulley. Fig. 5 is a longitudinal sectional view through the oscillating arm, showing the construction of the journal-bearings within the same by which the sliding shaft is supported. Fig. 5ª is a transverse section through the yoke which carries the oscillating arm and pulley. Fig. 6 is a longitudinal section through the flexible shaft, showing its construction.

In the several figures, A represents the base upon which the operative parts of the machine are carried. This base consists, preferably, of three arms extending radially from a center, in which center is formed the socket which receives the lower end of the standard B, which standard is provided with a flange, *a*, just above the base, said flange having a series of notches in its periphery to receive one end of the spring foot-lever *a'*. A pin, *a''*, is also provided. This pin enters a hole in the standard above the flange and projects over the end of the foot-lever, thus preventing the turning of the standard in its socket. When it is desired to change the position of the standard, it may be accomplished by withdrawing the pin *a''*, stepping on the lever *a'*, thus withdrawing its end from the recess it occupies in the flange, then turning the standard into the desired position, in which it is retained by the end of the lever entering another of the series of recesses in the flange, and placing the pin *a''* in position to secure it.

The upper part of the standard B is bifurcated, each arm carrying at its upper end a journal-box, *b*. In these journal-boxes is placed the crank-shaft C, carrying the fly-wheel C'. This fly-wheel rotates between the arms of the standard, and is put in motion by the connecting-rod *b'*, which consists of a flat metallic plate to give the needed elasticity, connecting a crank on one end of said shaft with the treadle D, pivoted upon one of the arms of the base A.

The connections between the rod *b'* and the treadle are formed by two eyes or loops engaging with each other in such a manner that the standard and wheel may be turned partly around without disturbing the connections between the rod and treadle.

Upon the opposite end of the crank-shaft C from the crank is placed a small disk, *c*, in which is inserted a pin at right angles to the crank. To this pin is attached one end of the spiral spring *c'*, the opposite end of the same being secured to the arm *c''*, projecting from the standard B at a point below its bifurcation. It will be apparent that the action of the spring *c'* will be to draw down the pin in the disk *c*, to which it is attached, thus causing the crank to occupy a position at right angles to the rod *b'* whenever the fly-wheel is at rest, in which position it will be instantly acted upon by the rod and caused to rotate said fly-wheel if the foot of the operator is placed upon the treadle.

Journaled upon the crank-shaft C outside the arms of the standard are the horizontal arms *d d* of the supporting-bar E. These arms embrace the fly-wheel and rock or oscillate upon its shaft. They are united just outside its periphery, forming the bar E, which extends upward at right angles to the arms *d*. This bar is preferably made tubular and in two or more sections, so that it may be lengthened or shortened at will, the parts being retained in the desired position by set screws. Secured to the under side of one of these arms *d* is the spring S, its lower end passing through a slot in the stud *h*, projecting from the standard. The tendency of this spring is to retain the bar E in an upright position and turn it to that position when displaced therefrom. The upper end of this bar carries an adjustable cap, *d'*, which cap is furnished with upwardly-projecting arms *d''*, between which is pivoted the rocking support or yoke *e* for the tool-carrying arm F. This arm consists of a metallic tube or sleeve, *e'*, having suitable bearings on its inside at each end, through which bearing and the tube passes the rod or shaft *f*, provided with a suitable knob at its extremity to prevent it from being drawn through the tube. In order to give motion to this shaft *f*, a grooved pulley, *e''*, is placed at the end of the tube or sleeve *e'* within its rocking support or yoke E, and is held in this position by set-screws or other suitable means upon a sleeve, *f''*, by which it is connected with the shaft *f*, so as to rotate the same. This shaft is preferably semicircular in cross-section where it passes through the sleeve *f''*, said sleeve being provided with a roller, *x*, at one end, which, while it allows the shaft to move endwise, prevents it from turning without the sleeve. The cord or belt *h* passes around the fly-wheel and around this pulley *e''*, thus rotating the latter when the fly-wheel is turned. The shaft or rod *f* slides freely through the pulley, but is rotated by it. Instead of this sliding movement through the pulley, if desired, the pulley and the sleeve *f''* may be connected with the shaft *f* by a set-screw passing through the sleeve and bearing against the shaft, thus allowing adjustment of the pulley on said shaft. Connecting with one end of this rod or shaft *f* is a closely-coiled wire forming a flexible shaft, *f'*, that conveys motion from said shaft through the hand-piece *k* to the instrument operated. This flexible shaft *f'* is covered by a sheath of coiled wire, *i*, connected to the hand-piece, and both being in an outside covering of kid or other suitable flexible material to form a proper outer surface. The hand-piece *k* may be of any proper construction that shall allow the ready change of one instrument for another, and shall otherwise be easily and readily managed by the operator. A spring-support, *p*, for the arm F is attached to the adjustable cap *d'*, and serves as a rest for said arm when not in immediate use.

Among the advantages possessed by this engine over those now in use may be enumer-

ated the facility with which the operative parts may be turned upon the base without disturbing the latter end and the rocking motion of the extension-bar upon the standard, together with the means by which it is caused to automatically return to an upright position after having been forced therefrom.

Having thus described our invention, we claim as new, and desire to secure by Letters Patent, the following:

1. In a dental engine, the base provided with a socket adapted to receive the lower end of the standard, said standard being provided with a recessed flange, a spring foot-lever engaging with said recess, and pin entering holes in the base and preventing said lever from escaping from the recesses in the flange, all combined and arranged substantially as described, to allow the standard to be turned and secured, as set forth.

2. In a dental engine, the base A and bifurcated standard B, having recessed flange *a*, in combination with the spring foot-lever *a'*, adapted to hold said standard in position upon the base, as specified.

3. In a dental engine, the turning standard and crank-shaft, in combination with the bifurcated extension-bar, said bifurcation being bent at right angles to the body of the bar, embracing the wheel and oscillating upon the crank-shaft, substantially as set forth.

4. In a dental engine, the combination of the standard and extension-bar E, with its bifurcated lower end extending at a right angle to said bar, with a spring secured at one end to the bar and its opposite end passing through a slot in a stud projecting from the standard, and adapted to automatically return said bar to an upright position whenever it is forced therefrom, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN HOOD.
STEPHEN H. REYNOLDS.

Witnesses:
L. W. HOWES,
LOUISE E. RAMSEYER.