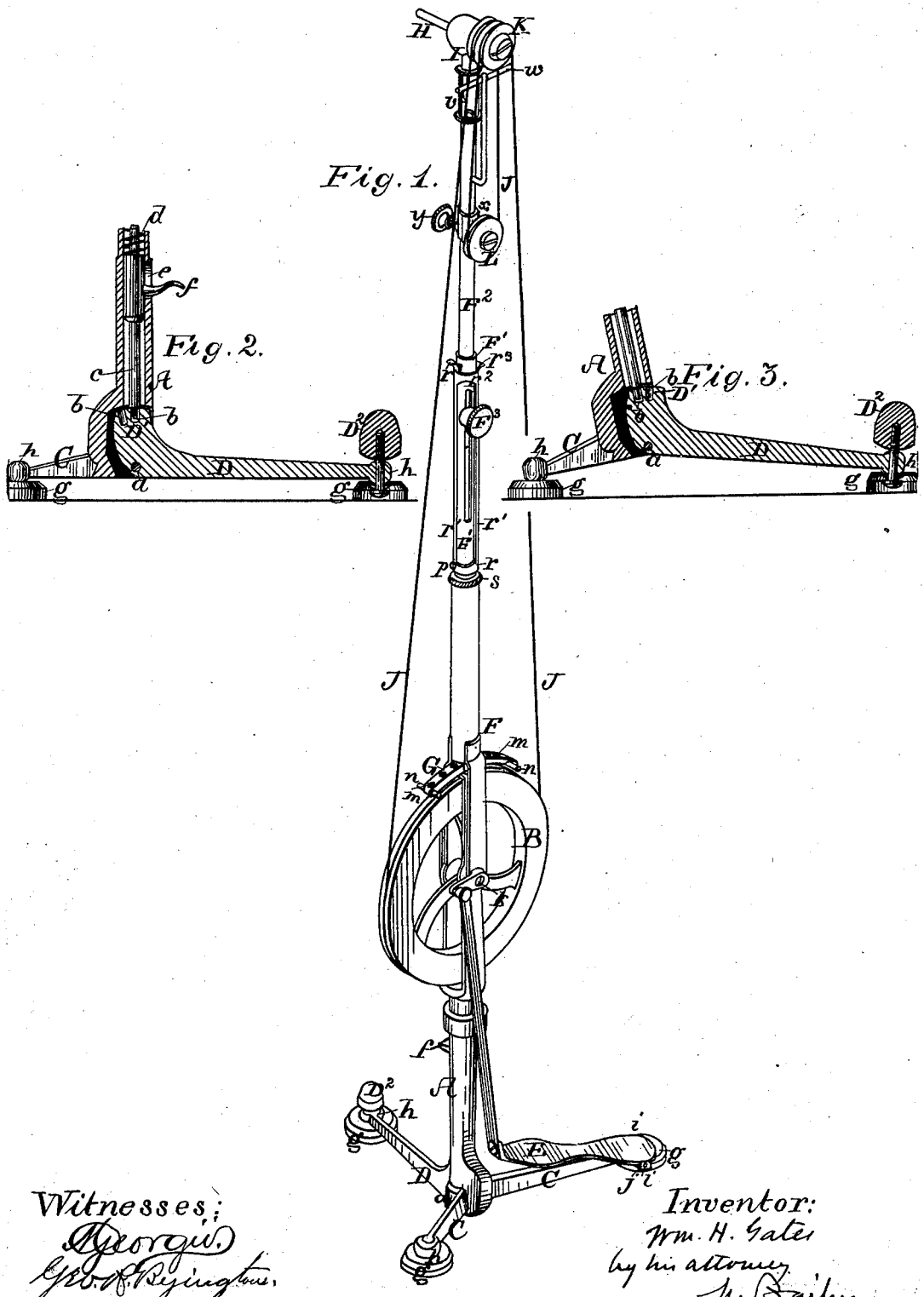
2 Sheets—Sheet 1.

W. H. GATES.

Dental-Engine.

No. 216,321. Patented June 10, 1879.



Witnesses;
Geo. H. Remington.

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by his attorney
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2 Sheets—Sheet 2.

W. H. GATES.

Dental-Engine.

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Fig. 4

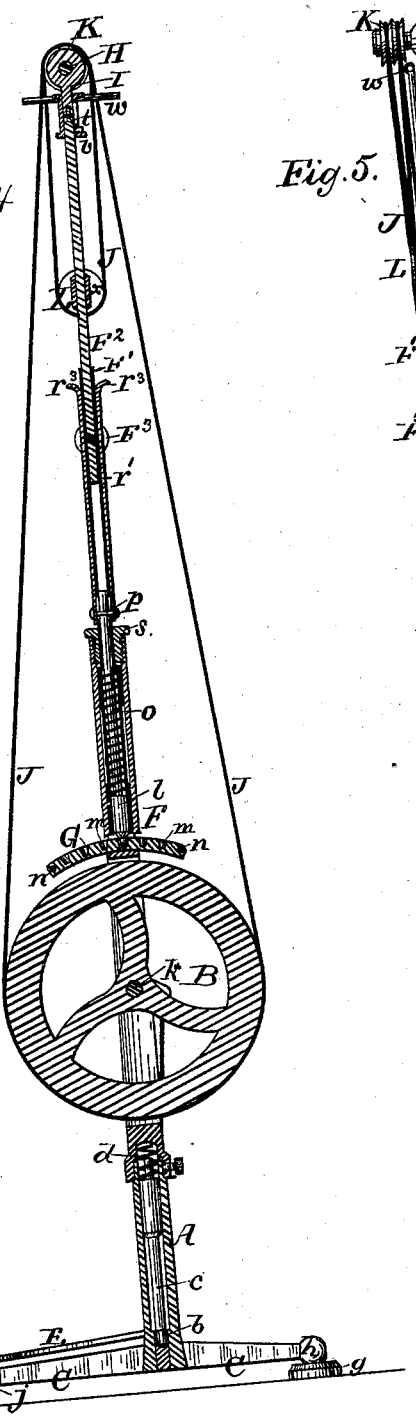


Fig. 5.

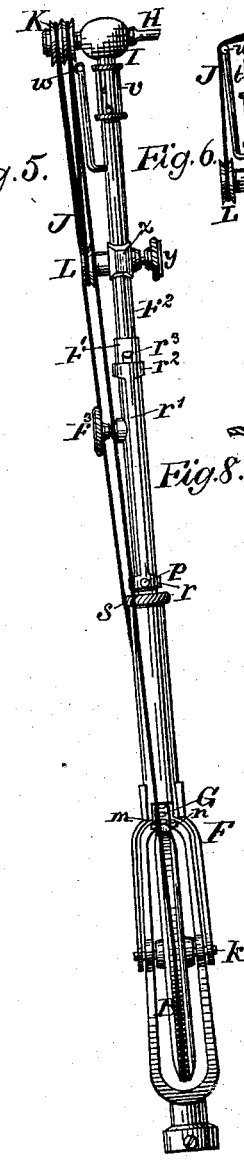


Fig. 6.

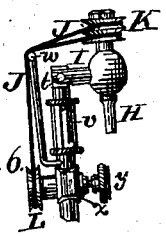


Fig. 7.

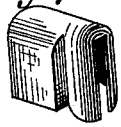
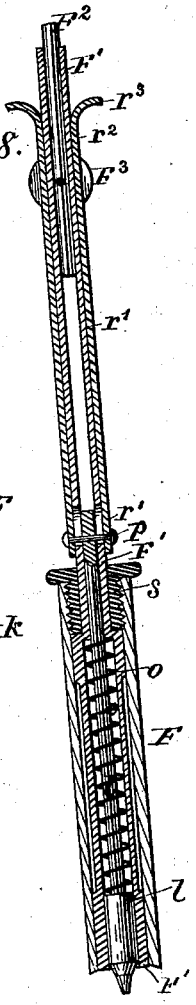


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM H. GATES, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN DENTAL ENGINES.

Specification forming part of Letters Patent No. **216,321**, dated June 10, 1879; application filed March 14, 1879.

To all whom it may concern:

Be it known that I, WILLIAM H. GATES, of Philadelphia, Pennsylvania, have invented certain new and useful Improvements in Dental Engines, of which the following is a specification.

The first portion of my improvements is intended to make provision for tilting or inclining the body of a dental engine to one side or the other of the perpendicular.

To this end I combine with the base or pedestal of the engine one or more supporting-legs, which are attached to said base by a horizontal hinge or pivot, on which they move to permit the engine body or pedestal to be tilted or inclined; and for the purpose of holding the pedestal in any position to which it may be brought, I combine with said hinged leg or legs a locking device, which will hold all parts rigidly together in any desired position.

This portion of my improvements is illustrated fully in Figures 1, 2, and 3 of the accompanying drawings.

Fig. 1 is an isometrical perspective view of an engine embodying the various features of my invention. Figs. 2 and 3 are vertical central sections on an enlarged scale of the engine base or pedestal in a plane passing longitudinally through the hinged supporting-leg.

The pedestal or base A may be of any approved construction. It carries the fly or driving wheel B, and is supported on legs C C D. Only one of the legs is hinged or jointed in the present instance. This leg is shown at D. It is jointed to the pedestal at *a* by a horizontal hinge or pivot, and is provided with a sector-like head, D^1, which lies in a recess in the pedestal, and is provided at the top with a series of sockets, *b*, to engage the locking-bolt *c*, arranged to move vertically in the pedestal, and pressed downward by a spring, *d*. Through a slot, *e*, in the side of pedestal projects the handle or pedal *f*, attached to the locking-bolt, and serving as a means whereby the bolt may be lifted to release the leg D.

The position occupied by the parts when the pedestal is perpendicular is shown in Fig. 2.

When it is desired to incline the pedestal from the perpendicular, the bolt *c* is raised, so as to lift it out of that socket *b* in which it may happen to be seated, and the engine can then be inclined to any desired extent, as shown in Fig. 3. When thus adjusted it can be secured in position by releasing the bolt *c*, which, by the action of its spring, will be forced down into that one of the sockets *b* which may happen to be beneath it.

The sector D^1 may be of any size desired, and may be so arranged and combined with the pedestal as to permit the latter to be tipped to either side of the perpendicular.

There may be as many sockets *b* also as found necessary to secure the desired range of adjustment for the engine.

As an offset to the weight of the upper overhanging end of the engine, the leg D may be provided or formed with a counterbalancing-weight, as shown in the drawings, where it is shown with a counterbalance-weight, D^2, on its outer end. This will tend to steady the engine and assure its position.

In order that the legs may take a square, even, and broad bearing on the floor, whether the pedestal be tilted or not, I provide each of them with a foot, *g*, of dished or cup form, turned bottom upward and hung on a pin projecting from the leg, as shown.

The cup around the pin has a concavity, which fits upon a correspondingly convex knob or projection, *h*, on the under side of the leg.

By this means the engine will at all times have a square, even bearing, the feet being united to the legs by what is tantamount in this case to a universal joint.

The treadle E is jointed to one of the legs C, as indicated at *i*, and is connected by a pitman spring or rod to the fly-wheel crank, in the usual way. The hinge or joint *i* is in a box or trough-like receptacle, *j*, on the leg, which can receive sponge or other absorbent adapted to hold oil or other material suitable to lubricate the joint.

Any suitable means other than the handle or pedal *f* can be used to lift the bolt. For instance, the part *f* may be a mere laterally-projecting pin, and a lifting-lever pivoted to the pedestal may be employed, with one of its ends projecting under the pin, and the other end constituting a handle or pedal, by depress-

ing which the end under the pin will be elevated, and so caused to lift the pin, and with it the bolt.

The next portion of my improvement is directed to the standard of the engine, and is intended to provide means whereby it may be tilted or inclined from the perpendicular, independently of the pedestal, and locked or permanently held in such inclined position. This feature of my invention is illustrated in Figs. 1 and 4 of the drawings, the latter figure being a vertical central section of the engine in the plane of the fly-wheel.

The standard F is forked, in the usual way, at its lower end, and its legs at this end are hung or pivoted so as to turn on the axis *k* of the fly or driving wheel B. The standard can thus vibrate back and forth on the hinge *k* as an axis. In order to hold it at any desired angle of inclination suitable locking mechanism may be employed. The mechanism I here show in illustration of my invention resembles the pedestal-lock already described. It consists of a vertically-movable locking-bolt, *l*, arranged within the bore of the standard, with its lower end projecting therefrom at the point where the standard is divided and forked. Directly under the bolt, and in line with the path of movement of the standard, is a curved plate, G, attached to standards rigidly connected with the pedestal, and provided with a series of sockets or holes, *m*, for the bolt to enter. Laterally-projecting stop-pins *n*, at the ends of the plate limit the range of movement of the standard. The bolt, by a spring, *o*, is pressed downward and forced to enter that one of the sockets which may be under it, with the result of locking the standard immovably in any position to which it may be inclined or tilted. To release or unlock the standard, any suitable means whereby the bolt can be lifted by the operator against the stress of the spring may be employed. In the present instance, in order to bring the releasing device to a position where it may conveniently be taken hold of by the operator, I provide the upper end of the stem of the bolt with a pin, *p*, which projects laterally from both sides of the standard, through vertical slots formed therein, to permit the necessary range of vertical movement. The pin *p* is connected with a sleeve, *r*, on the outside of the standard, attached by straps r^1 to an upper sleeve, r^2, provided with laterally-projecting ears r^3. By taking hold of the standard around the sleeve r^2 and under the ears r^3, the operator can with one hand both raise the bolt and tilt the standard to any required angle. When this is done a slight relaxation of the hold of the hand on the standard or the sleeve r^2 will permit the locking-bolt to spring into that one of the sockets beneath it, and the standard will then be locked in place.

When, as in the present instance, the pedestal is made tilting, I prefer that the plane in which the standard proper tilts should be at right angles to that in which the pedestal tilts. The tilting of the latter affects the position of the whole engine, including the standard, while the tilting of the standard proper does not affect the pedestal.

The remaining features of my invention have reference to instrumentalities whereby the working length of the standard can be increased and decreased at pleasure, whereby the head, or part which carries the operating or tool shaft, can be turned on a vertical axis, whereby the said part can be turned down when not in use, so as to fold said shaft against or alongside of the standard and out of the way, and whereby the driving-belt can be kept taut under any and all conditions of use. These portions of my invention are fully illustrated in Figs. 1, 4, 5, 6, and 8.

Fig. 5 is a side elevation of the fly-wheel and standard of the engine detached from the pedestal, showing the head and the tool-shaft in position for use, and Fig. 6 is a like elevation of the upper part of the standard with the head and tool-shaft turned down and out of the way. Fig. 8 is a section of the standard detached, similar to the section in Fig. 4, but on an enlarged scale, in order to show more clearly the arrangement of the various parts.

In order to render the upper part or head of the engine capable of rotary or oscillatory movement upon or around the longitudinal axis of the standard, I divide the standard into two parts, and unite the two by means of an externally screw-threaded swivel thimble or sleeve, *s*, which screws tightly into the lower part of the standard, and forms a bearing-sleeve, in which the upper part can swivel or turn.

For the purpose of increasing or decreasing the working length of the standard, I provide it at the upper end with an extension-stem, F^2, which fits and slides vertically in the tubular part F^1 of the standard, and is held in place by a set-screw, F^3, which passes into the stem through a vertical slot in the tubular part F^2, as shown.

To permit the rotary tool or cable shaft H to be turned or folded down alongside of the standard when not required for use, I joint the shaft frame or bearing I to the stem F^2 at *t*, as shown, and provide the stem F^2 with a slotted sliding sleeve, *v*, which, when the part I is raised, covers the joint *t*, and is held in place by a pin-and-slot connection, after the manner of a bayonet catch or fastening.

When it is desired to uncover the joint, the sleeve is turned so as to bring the vertical portion of its slot in coincidence with the pin on the stem, and it can then be slid down on the sleeve far enough to uncover the joint, thus permitting the head I to be turned down, as seen in Fig. 6. The driving-belt J, when the head is in this position, bends down over a transverse bar, *w*, arranged under the cable-shaft pulley or pulleys.

In order to keep the driving-belt taut under any conditions of use, I employ, in conjunc-

tion with a double pulley, K, on the shaft H, a vertically-adjustable pulley, L, mounted in bearings on a sleeve, *x*, fitting around and vertically movable on the stem F^2, and provided with a set-screw, *y*, by which it may be held in place. The sleeve and pulley may be weighted, so as to keep the belt under tension, even though the set-screw be dispensed with. The belt from the fly or driving wheel passes up over one part or groove of the double pulley K, thence down under the adjustable or tension pulley L, thence up around the other part or groove of the double pulley, and thence back to the driving-wheel. This device, which may be made use of at all times as a means of keeping taut the driving-belt of a dental engine, is of particular advantage in connection with a standard adapted to be lengthened and shortened, or with a hinged head, or with both of the instrumentalities last named.

I have found it advantageous on some accounts to provide the head I with a hood to cover the driving-pulley on the revolving shaft, in order to prevent it and the belt from catching, for instance, the hair or whiskers of the operator, who oftentimes, particularly in using a short cable, has his face in close proximity to the head I. Such a hood is shown in Fig. 7. It can be readily fitted to and removed from the head I, and effectually covers the moving parts carried by the head.

In conclusion, I would state that I do not here claim, broadly, a dental engine whose base or pedestal is adapted to be tilted or inclined, and held in a normal position of inclination; nor do I here claim a tilting dental engine standard or upright adapted to be set in a normally-inclined position; nor again do I here claim the combination, broadly, of these instrumentalities. The said broad claim I have made the subject of a separate application for Letters Patent, which I have filed in the United States Patent Office, and which is in interference with the applications of other parties directed to the same broad subject-matter. I here claim, so far as the features above specified are concerned, only the particular instrumentalities and arrangements of devices employed by me, as hereinbefore described, and as shown in the accompanying drawings. I shall therefore state my claim as follows:

1. The combination, with the base of a dental engine, of a hinged or pivoted leg provided above its hinge with a socketed head situated in a recess in the base, and mechanism to engage and lock said head in any position of adjustment, substantially as and for the purposes set forth.

2. A tilting standard having its pivot or hinge coincident with the axis of the fly or driving wheel, in combination with a locking-bolt carried by the standard, and a socketed plate carried by the engine-base, and provided with a series of bolt-receiving sockets, substantially as and for the purposes set forth.

3. The combination, substantially as set forth, of the base, the hinged leg provided with a socketed head working in a recess in said base, the leg-locking mechanism, the standard hinged to the base on a line coincident with the axis of the fly or driving wheel, the locking-bolt carried by the standard, and the socketed bolt-receiving plate attached to the base, these parts being arranged to operate substantially as set forth.

4. The standard consisting of two parts, the upper swiveled in or on the lower, in combination with an extension-stem mounted in or on and carried by the upper swiveled section of said standard, substantially as set forth.

5. In combination with the fly-wheel and the extensible standard, and means for positively adjusting it vertically, the rotary tool or cable shaft, the double pulley thereon, the vertically-adjustable pulley, and the driving belt or band extending from the fly or driving wheel over the double pulley and around the adjustable pulley, substantially as set forth.

6. The hinged shaft-carrying head and its supporting-standard, in combination with the fly or driving wheel, the rotary shaft and its double pulley, and the vertically-adjustable pulley, substantially as set forth.

7. In a dental engine whose pedestal or base is provided with legs, one or more of which are hinged to it, substantially as described, the combination, with the pedestal-supporting legs, of jointed feet automatically adjustable in all directions, in order to adapt themselves to the various angles of inclination of the engine, and maintain, under all conditions, a firm, flat, even bearing on the floor or other support on which the engine rests, substantially as set forth.

8. In a dental engine, the combination, with the standard and the base formed or provided with a lubricating trough or receptacle, of a treadle which has its bearings in said trough, substantially as set forth.

9. In combination with the engine base or pedestal and the leg hinged thereto, a counterbalance-weight attached to or forming part of said leg, to offset the weight of the overhanging portion of the engine when the latter is inclined from the perpendicular, substantially as set forth.

In testimony whereof I have hereunto set my hand this 12th day of March, 1879.

W. H. GATES.

Witnesses:
FRANK R. STEVENSON,
F. A. WALKER.