J. B. MORRISON.

DENTAL ENGINE.

No. 111,667. Patented Feb. 7, 1871,

Fig. 1.

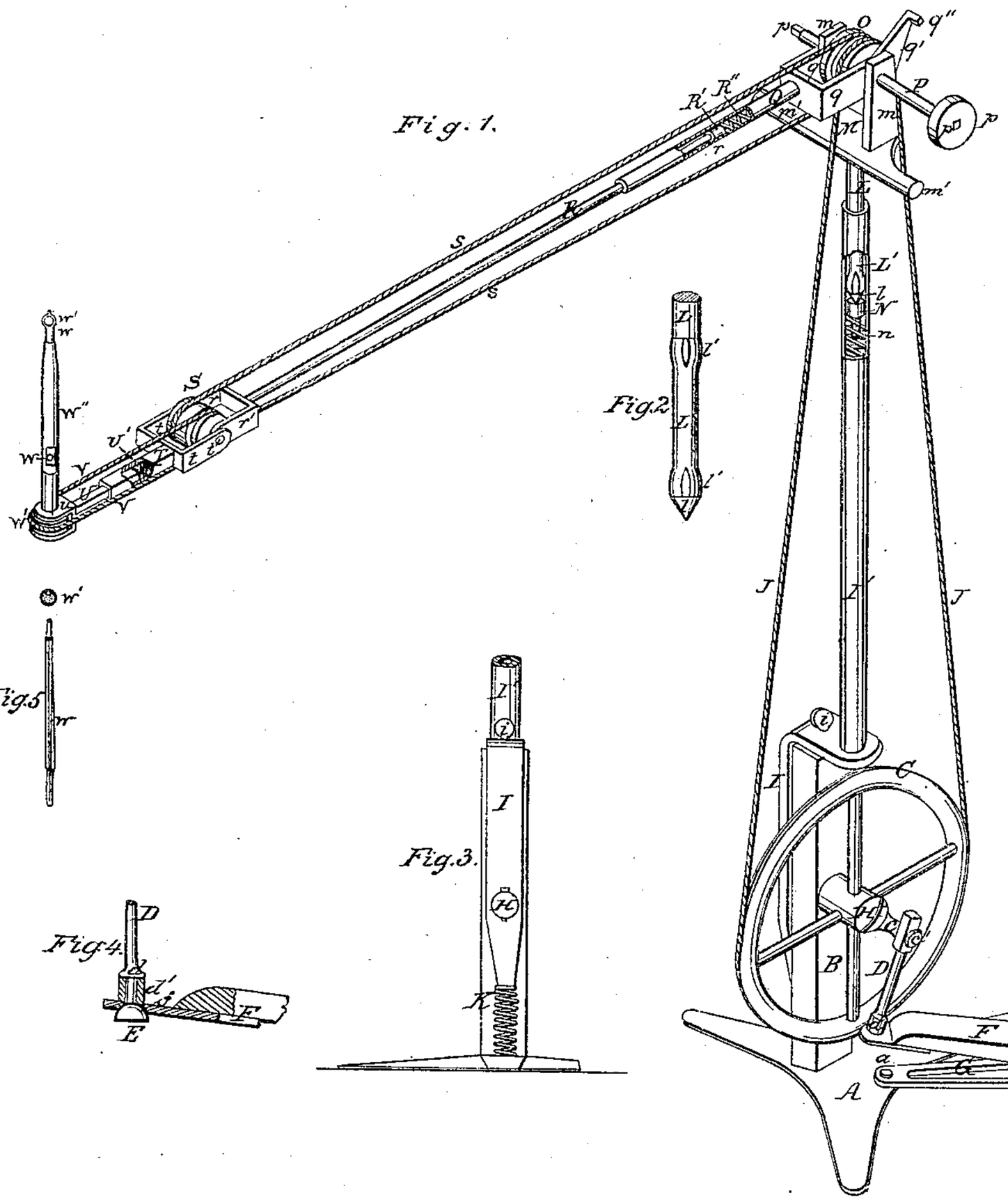

Fig. 2.

Fig. 5.

Fig. 3.

Fig. 4.

Witnesses

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JAMES B. MORRISON, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN DENTAL ENGINES.

Specification forming part of Letters Patent No. **111,667**, dated February 7, 1871.

To all whom it may concern:

Be it known that I, JAMES B. MORRISON, of St. Louis, in the county of St. Louis and State of Missouri, have invented a certain new and useful Dental Engine, of which the following is a specification:

The first part of my invention consists in an arrangement by which the power from a treadle may be conveyed to a tool which has universal motion, the arms being swiveled and kept extended lengthwise by springs, so as to hold the belts at an equal tension as the swivels are turned. The second part of my invention consists in pivoting the upwardly-extending staff to the fixed standard, and connecting its lower end to the base by a spring, which tends to keep the upwardly-extending arm in a vertical position. The third part of my invention consists in an arrangement of treadle, the said treadle being hinged to a frame that is pivoted to the base at a point vertically below the central position of the crank-wrist, so that the treadle can be thrown around and worked in any position. The fourth part of my invention consists in a ball-and-socket joint between the pitman and the treadle, to allow the treadle to be readily operated in any position. The fifth part of my invention consists in the construction of the burr, whose head is made separate and distinct from the spindle or shank, so as to admit of reversal thereon, and of replacement when worn out. The engine is intended chiefly for operating on teeth, and other dental uses.

Figure 1 is a perspective view of my machine. Fig. 2 is a somewhat enlarged view, in elevation, of the spring-sleeve of the pintle on which the head turns. Fig. 3 is a view, in elevation, of the lower part of the upwardly-extending swinging staff. Fig. 4 is a sectional view of the moving end of the treadle through the ball-and-socket joint. Fig. 5 shows the spindle or shank and the burr detached, to exhibit the construction of the same.

A is a tripod-stand, and B a vertical standard fixed thereon. C is a pulley, having a crank, *c*, which receives a pitman, D. At the lower end of the pitman is a hemispherical knob, E, beneath the end of the treadle F, and whose curved side is upward and fits the concave lower portion or countersink of the hole *f* in the treadle. Upon the pitman is a collar, *d*, and surrounding the pitman, between this collar and the treadle, is a ring, *d'*, of india-rubber, which acts as a spring to keep the treadle in contact with the knob E, and prevent rattling. The treadle is hinged at *g* to a frame, G, and the frame G is pivoted by a stud, *a*, upon the stand A. The stud *a* is vertically beneath the wrist-pin *c'* of the crank *c*, when the crank stands vertically, so as to keep the treadle in the proper operating position, however much it may be thrown around to the right or left (which may be freely done by the foot of the operator without requiring to loosen any other screw, or by other means to permit such adjustment.) The ball-and-socket joint E *f* allows the treadle to operate at any angle to the plane of the pulley C. H is an arbor, which is screwed fast into the standard B, and forms the journal of the pulley C and the fulcrum-pivot of the staff I. This arrangement allows the oscillation of the staff I without affecting the tension of the belt J. The staff I is bent over the top of the standard B, so as to bring its upper part, I', directly over the pulley C, and the bent portion has a vertical hole which receives a pin, *i*, that passes through the staff and enters the top of the standard, to hold the staff in a vertical position when desired. The lower end of the staff I is connected to the stand by a spring, K, (see Fig. 3, where it is shown as a spring of spiral wire,) which spring tends to raise the staff to, and to hold it in, a vertical position. The upper portion, I', of the staff is tubular, and receives the pintle L of the head M. The lower end of the pintle has a center, *l*, stepped in a block, N, consisting of two cylindrical portions, the lower and smaller of which enters a spiral spring, *n*, by which the head is raised to preserve the equal tension of the belt J as the head is turned on the pintle, (which turning acts to twist the belt and depress the head.) The portion of the pintle L within the socket of the shaft I I' is enveloped in a tight-fitting sleeve, L', whose ends *l'* are split and bent outward, so as to form springs resting against the interior of the socket, to prevent rattling. An enlarged view of the sleeve is given in Fig. 2. The belt J passes over a double-grooved pulley, O, whose shaft P has journal-bearings in standards *m* of the head M. The shaft P has squared portions *p*, for the

reception of a grindstone or emery-wheel, *p'*, or a chuck, &c., and the head has extension *m'*, forming rests to be used in conjunction with the grindstone, &c. Pivoted upon tubular bosses forming portions of the journal-bearing of the shaft P is the forked end *q q'* of the arm Q. The outer portion of the arm Q is tubular, and receives the pintle R. The pintle R ends in a center, *r*, turning in a center socket of a sliding block, R', similar to N, and like it thrust outward by a spiral spring, R'', for a similar object, namely—preserving the equal tension of the belt during the turning of the pintle. The pintle R ends in a fork, *r' r'*, to which is pivoted a similar fork, *t t*, of an arm, T, whose square socket receives a square bar, U, the end of which impinges against a spiral spring, U', to keep the belt V tight. *s* is a belt passing around the pulley O and around the pulley S, which turns on the arbor *t'* that forms the pintle of the forks *r' r'* and *t t*. The bar U ends in a fork, *u*, in which is journaled the socket-piece W, into which the shank *w* of the burr *w'* is inserted. (In place of a burr any other tool, such, for instance, as a drill, may be used.) The socket-piece or spindle carries a pulley, W', which receives and is turned by the belt V, and is enveloped by a sleeve, W'', which is attached to one side of the fork *u*, and, beside giving journal-bearing to the socketed end of W, gives bearing to the outer end of the tool-shank *w*, and serves as a handle by means of which the tool is directed in use.

Burrs (globular files used by rotary motion) have heretofore been made in one piece with the shank, so that when the outer portion of the burr became worn smooth, the whole, both head and shank, was rendered worthless. I make the shank *w* and the burr *w'* in separate and distinct pieces, the burr being perforated to receive the end of the shank, which construction admits of the inversion of the burr upon the shank when the outer and most-used portion becomes smooth, and also the replacement of a worn burr by a new one when worn out, and without casting aside the shank.

q' is an extension of one side of the fork *q*, and having an out-turned end, *q''*, which comes in contact with the standard *m* when the arm Q is thrown upward, and a little past the vertical, and holds the said arm in a nearly vertical position.

I have explained my preferred mode of constructing the machine, but do not wish to confine myself to the exact means shown to accomplish the result. For instance—in my experiments I have conveyed the power from the crank-pulley C to the pulley W' by a single belt, the advancing and returning sides of which passed over separate loose pulleys at the points of flexure. I have also anticipated conveying power from the shaft P to the pulley W', or socket-piece or spindle W, by means of shafts turned by friction or spur gearing at the points of flexure; and in the case of friction-gears I have proposed to use an extension-joint similar to U U' T, to keep the friction-gears in proper contact, the journal-bearings of the gear-shafts being connected by non-rotating but oscillating arms.

I propose in some or most cases, to envelop the moving parts, or especially the belts, in a covering of leather or other substance.

I claim as my invention—

1. A tool-head, as *u* W'', having universal rotary and flexible motion at the extremity of one or more pivoted, pulley-carrying and extensible arms, substantially as described.

2. In combination with a swiveled shaft, a spring applied substantially as shown, namely, maintaining the proper extension or elongation of the said shaft, and permitting one end of it to be turned on its axis.

3. The oscillating shaft I I', turning on a center in line with the axis of the pulley C, and connected to the stand by a helical or other spring, K, substantially as and for the purpose described.

4. The treadle F, hinged to the frame G, the said frame being pivoted to the stand, substantially as and for the purpose described.

5. The construction of the burr-tool in two separate parts, consisting, respectively, of the perforated removable head, and spindle or shank, substantially as and for the purposes set forth.

In testimony of which invention I hereunto subscribe my name.

JAMES B. MORRISON.

Witnesses:
SAM. KNIGHT,
STEPH. BERNARD.