



# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN DENTAL ENGINES.

Specification forming part of Letters Patent No. **189,409**, dated April 10, 1877; application filed February 13, 1875.

*To all whom it may concern:*

Be it known that I, **BASIL M. WILKERSON**, of the city of Baltimore, State of Maryland, have invented an Automatic Dental Engine; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My improvements relate in part to dental engines, which are automatically driven by water, steam, compressed air, or other motive power; and they consist in a means for supplying or cutting off at will a fine stream of water to wet or cool the operative part of the tool when it becomes heated; in novel devices for fastening and releasing the tool to and from its stock or shaft; in a device for preventing the pushing back of the water-wheel against the face of its inclosing box when pressure is made upon the end of the tool; in the manner of applying the apparatus to a dental stand; and in other details hereinafter mentioned.

In the drawings, which represent a dental instrument or engine having my improvements applied thereto, Figure 1 is a sectional view, with an enlarged detail view, showing some of the smaller parts detached; Fig. 2, a dental stand adapted for and having my improved engine applied thereto; Fig. 3, a modification of the cooling-pipe and its connections; Fig. 4, an end view of the wheel box or case.

A is the shaft of a dental engine. B represents a tool-stock removably affixed thereto, and to be rotated when the shaft is driven; C, a water-wheel, of any appropriate and desired construction, firmly secured to the end of shaft A, and inclosed within a case, D, which is provided with an inlet-tube, E, and an outlet-tube, F, these tubes being flexible, and the exit or outlet tube being the larger to facilitate the more ready discharge of the water from the case after it has passed through the same to drive the wheel. The inlet is so located that the incoming stream shall operate upon the paddles near their outer ends, and hence with the most leverage and to the best advantage, the case being so shaped at

this portion at its periphery as to guide the current always in the same direction. The exit for the water is at the center of the rear face of the box.

In order to make the box water-tight at the point where the shaft is inserted, I pass it through a packing-box made as follows: On the forward face of the wheel-case is a hub or box, *g*, for the shaft to pass through, and which is screw-threaded on its inside to receive a threaded sleeve, *h*, which forms the bearing for the shaft. Beneath this sleeve and around the shaft is inserted a packing of rubber or any appropriate material, and when the sleeve is screwed down it compresses the packing and makes the parts water-tight, so that there is no leaking around the shaft of the water from the wheel-case. This sleeve also, by means of its screw-thread, receives and holds to place the hand-piece I which surrounds the shaft, this hand-piece being screwed thereon, as shown at *k*. The sleeve has a groove, *l*, and a hole, *m*, through it, to admit of oiling the shaft. This groove and hole also facilitate the screwing on and off of the sleeve by means of any device in the nature of a pipe-tongs, or which may take a good hold aided by the hole or groove.

In order to prevent the wheel being pushed back against the face of its case when the implement is in use, and its end is pressed upon, I employ a collar, *n*, adapted to be slidden upon the shaft and to be secured in the desired position on the shaft by means of a set-screw. But to make the purchase or hold positive I make a short spiral groove in the shaft, and in adjusting the collar cause the tip of the screw to enter this groove, and I tighten it at any desired point on the shaft to accord with any change of position of the sleeve *h*, which gives a certain security against slipping, such as it would be subject to if the shaft were smooth and ungrooved at this portion. When adjusted the collar abuts against the end of the packing-sleeve *h*, and it revolves with and as a part of the shaft.

To wet and cool the tool, disk, or implement, I utilize a small portion of the water from the wheel-case, and which has ample pressure for the purpose, to cause a fine jet or stream to

be automatically thrown upon the tip or part of the tool which is apt to become heated by use. To effect this, I make a minute orifice, *q*, in the forward face of the wheel-case, and this communicates with a small passage, *r r*, which terminates in an annular cavity or chamber, *s*, made in the top of the hub *g*. A very delicate tube, *t*, secured upon or within the hand-piece or outer covering I of the apparatus has its inlet at the rear end of this hand-piece, and its outlet *v* near its other end, and directed toward the tip or more heated part of the operating tool.

When the part I is screwed to its place upon the sleeve, its inlet is within the annular cavity *s*, so that there shall always be direct and ready communication between the annular chamber and the tube, to permit the flow of water through the tube *t*, whenever it is required.

An appropriate packing makes the joint between I and the hub water-tight. To regulate and control at will the supply of water to this tube *t*, a screw-plug, *x*, is used, fitting in a screw-socket, *y*, and adapted to compress or to release an elastic or other pad or packing, *z*, and which thus serves either to open or close, as may be desired, the inlet-orifice *q*, and thus to allow or to cut off the flow of water through tube *t*.

My devices for fastening and releasing the tool-stock B to and from the shaft A are as follows: the tool-stock, at its end which is inserted in the end of the shaft, has a notch or nick, *b'*, and has one side flattened, as at *c'*, to guide it into the proper position to be fastened, the bore of the shaft having a cross-pin about tangential to the bore, to guide this flattened side, so that the nick shall come in line for the spring-catch now to be described. This spring-catch *d'* is held near its rear end by a single screw, *e'*, to the shaft, which is flattened where the spring is applied to it. This catch at its forward end has an incline or bevel, *l'*, on its under side, and at its rear end it has an incline or bevel, *i'*, at its upper side, and its forward end is provided with a tooth or projection, *f'*, adapted to engage with the nick *b'* of the tool, to fasten it to place.

A loose sleeve, *g'*, surrounding the shaft, has a longitudinal slot, narrowing toward its forward end, and in which lodges the spring *d'*. The forward end of this slot is adapted to permit the incline *l'* of this spring-catch to ride up and over the edge of the metal composing the sleeve when the latter is drawn backward, thus lifting the tooth *f'* out of the nick *b'* of the tool and releasing it, so that it may be withdrawn, and the inclined or arched rear end *i'* of the catch is adapted to pass under the sleeve at the rear end of the same slot.

The object and function of these bevels or inclines are as follows: when it is desired to unfasten the tool from its shaft, the sleeve is by the operator pulled backwards, an opening

in the hand-piece I allowing easy access to it for this purpose. The forward end of the slot in the sleeve, as the latter is moved back, rides under the bevel *l'* on the spring, and lifts it up enough to release its tooth from the nick in the tool-stock, which may then be withdrawn. Upon letting go of the sleeve the power of the spring, which is a stout one, acts by means of its forward incline to return the sleeve back to its normal position, and the rear incline *i'* on the sleeve serves to hold these parts so as to prevent rattling when the engine is in operation, and also to lock the tool to place by means of the projection and notch as above stated. Inclines may be made also at the forward and rear ends of the slot in the sleeve, the better to facilitate this locking and unlocking action.

Instead of the opening *K'* in the side of the hand-piece I, a movable pin, moving in a slot in the hand-piece, may be employed, and by means of which the sleeve may be slid back.

As a modification of the wetting and cooling device, the tube *t* may have a spring, *p'*, operating to keep the valve closed, the opening of the valve to admit water into the tube being effected by simply pressing the thumb or finger on the tube and pushing it forward, it being held in eyes or guides *q'* of a band, *q'''*, for this purpose, as shown in Fig. 3.

My apparatus is preferably applied to a dental stand or fountain spittoon-stand, substantially as shown in Fig. 2. I secure it to the post *r'*, so that it may be revolved therein, a stop-cock, *s'*, serving to let on or shut off the water, as desired. In the stand are two metal tubes, one within the other, the larger one connecting with the larger flexible outlet tube, and the inner and smaller one connecting with the smaller or inlet flexible tube, and having a stop-cock to check or cut off the flow of water when needed. Part of the waste water, when desired, is passed through the spittoon-stand, keeping it washed clean.

By detaching the hand-engine from the elastic tubes I may attach a dental plugger, driven by water or steam, through the same elastic tubes, giving blows in the same manner as the piston of a horizontal steam-engine would, the valve being under control of the fingers, so as to give the blows when desired.

It will be evident that compressed air or steam may be used to drive the wheel and engine, but water is preferred.

I claim—

1. In combination with the water-wheel and its tool-driving shaft, the case D, having an attachment at its rear face of two flexible tubes, the smaller one for conveying water or fluid, to drive the wheel and engine, and the larger one to convey the waste water from the wheel, substantially as shown and set forth.

2. In combination with the stock or stem A, the movable slotted sleeve *g'*, and the

spring *d'* and its inclines and tooth, the combination operating substantially as and for purpose set forth.

3. In combination with a dental engine, adapted to be driven by water, the small watering-tube *t*, extending to the forward end of the hand-piece I, and provided with a cut-

off valve or stop-cock, substantially as shown and described.

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Witnesses:

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