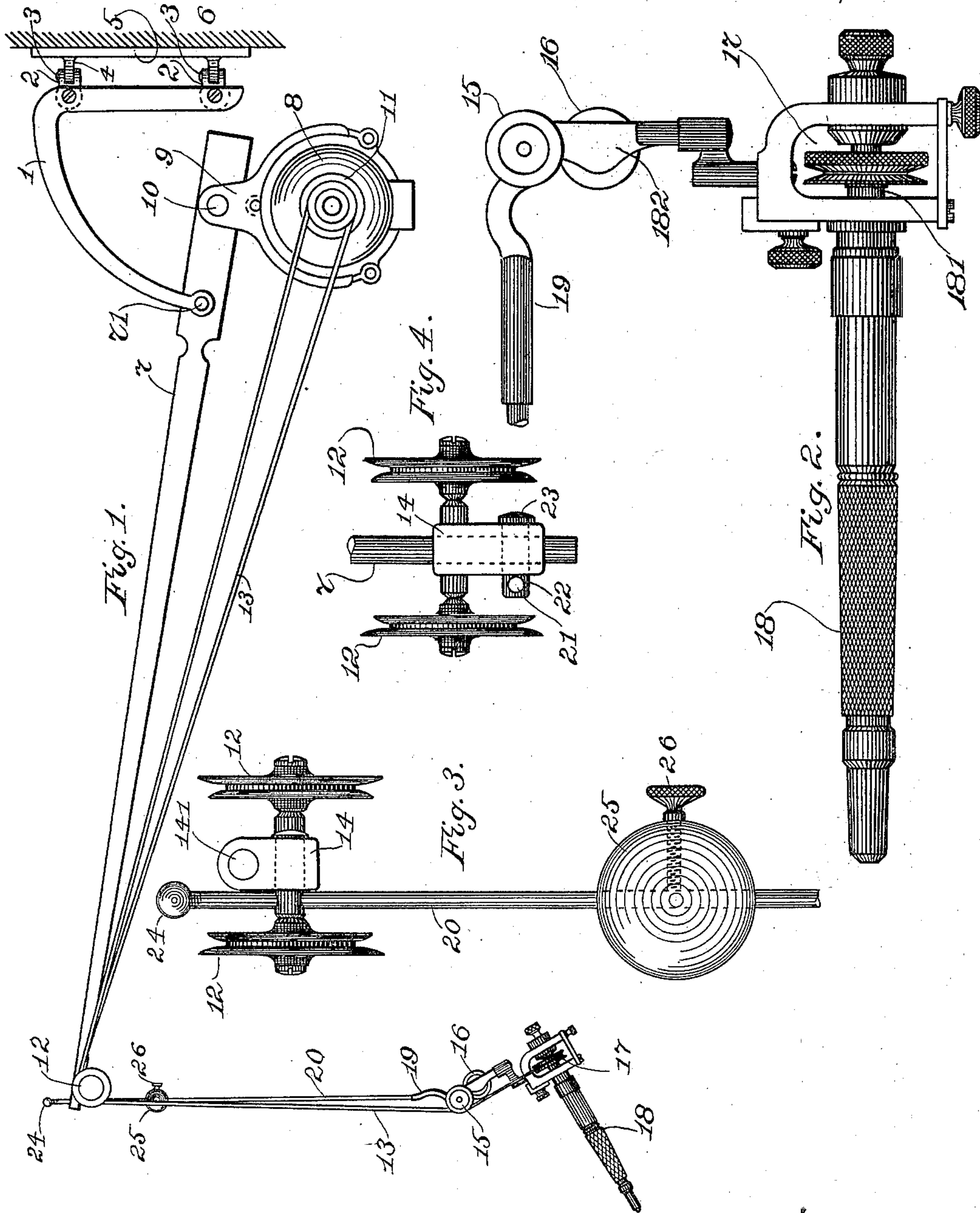


(No Model.)

L. T. E. METHOT  
DENTAL ENGINE.

No. 600,924.

Patented Mar. 22, 1898.



Witnesses  
Oscar F. Gill  
Robert Wallace.

Inventor  
Louis T. E. Methot.  
by Macleod Calver & Raudall  
Attorneys.



# UNITED STATES PATENT OFFICE.

LOUIS T. E. METHOT, OF BOSTON, MASSACHUSETTS.

## DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 600,924, dated March 22, 1898.

Application filed March 5, 1897. Serial No. 625,951. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS T. E. METHOT, a citizen 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, of which the following is a specification, reference being had therein to the accompanying drawings.

My present invention is designed more particularly as an improvement upon the invention which is shown, described, and claimed in Letters Patent of the United States No. 533,073, granted to me January 29, 1895.

The object of my invention is to provide means which shall facilitate the use, in connection with certain of the features which are presented in my former patent, of handpieces differing in character from that which is presented in my said Letters Patent—such, for example, as the well-known "Doriot" handpiece.

The invention will be described first with reference to the accompanying drawings, in which latter I have represented the best embodiment thereof which I have yet contrived, after which the distinguishing characteristics will be particularly pointed out and distinctly defined in the claims at the close of this specification.

Figure 1 of the drawings shows inside elevation a dental engine embodying my present invention. Fig. 2 is a view in side elevation of the form of handpiece which my present invention enables me to employ in connection with certain of the features shown in my former patent. Fig. 3 is a view in elevation of certain of the details of my improved dental engine, looking from the left in Fig. 1. Fig. 4 is a view in plan showing certain of the parts which are included in Fig. 3.

In dental operations the instruments that are employed require to be directed by the hands of the operator and also to be applied and used with exceedingly great delicacy and care. Their position requires frequently to be changed, and it is indispensable that they should be freely movable. It readily will be understood that in a dental engine the power required to actuate the instrument requires to be supplied properly, while at the same

time the hand of the operator must be relieved from all constraint, and the weight, strain, or resistance requiring to be sustained by him or to be overcome in effecting the necessary movement of the instrument in use must be reduced to a minimum. Not only should the operator not be subjected to any muscular strain, but it is essential that the instrument should be allowed the utmost freedom of movement and be made capable of being used in any position. I have been guided by these considerations in devising and embodying the present improvement, and believe that I have conformed fully thereto, while attaining the particular object which has been set forth at the outset herein.

Referring to the drawings, 1 designates a pivoted supporting-bracket.

2 designates lugs or projections of the said bracket.

3 designates vertical pivots that are applied to the said lugs or projections 2.

4 designates lugs or projections to which the lugs or projections 2 are joined by the pivots 3.

5 designates a base or plate on which the said lugs or projections 4 are formed or to which they are applied.

6 designates a wall or other support to which the said base or plate 5 is secured.

7 designates a lever that is pivoted at the outwardly and downwardly curved arm of the bracket 1.

8 designates an electric motor and its casing.

9 designates an upwardly-projecting portion of the casing of the said electric motor.

10 designates a pivot joining the said upwardly-projecting portion 9 to the rear end of the lever 7.

11 designates a pulley on the shaft of the motor.

12 designates pulleys journaled at the free end of the outer arm of the lever 7.

13 designates the driving-band for the instrument, the said band passing around and receiving motion from the pulley 11 and being guided by the pulleys 12 to and from the handpiece. From the pulleys 12 the driving-band 13 extends down to the handpiece in the form of a loop or bight.



14 designates a cross-piece or block which is applied to the tip of the outer arm of the lever 7 and supports the pulleys 12.

The foregoing parts are or may be substantially as indicated in my prior Letters Patent above mentioned.

18 designates the handpiece in its entirety, it comprising, essentially, a rigid casing within which is mounted to turn freely a shaft 181, by means of which in practice the instrument to be used is actuated, the said shaft having applied thereto a band-pulley 17, which receives the loop or bight of the driving-band 13, the said shaft 18 and instrument 15 actuated thereby thus being driven.

182 designates an upward extension of the handpiece 18, such extension constituting a portion or attachment of the framework of the said handpiece.

15 16 designate guide-pulleys for the driving-band 13, which guide-pulleys may be of any suitable character or arrangement and may be of any desired number, they being journaled in usual manner upon the extension 182.

19 designates a piece which is jointed to the extension 182 on a horizontal pivot and usually is formed with a tube or socket constituting one member of a slip-point and enabling it to be detachably connected with the rod by means of which in practice the handpiece is supported. For convenience I retain the said tube or socket, although the particular construction of the handpiece forms no 35 part of the present invention.

As shown, the handpiece is supported by the depending loop or bight of the driving-band 13, and in accordance with my present invention the weight of the said handpiece 40 is sustained by the said loop or bight of the driving-band, and the said handpiece is left free to move toward and from the adjacent end of the lever 7 as the driving-band draws up or slackens in the movements of the various parts which accompany the use of the engine. I have described the motor 8 as connected pivotally at 10 to the rear arm of the lever 7. This pivotal connection is employed by me in order that the motor may swing 50 freely from the said arm of the said lever and through the influence of gravity be caused to depend vertically from the said arm in all positions of the lever. This causes its weight to be exerted upon the rear arm of the lever 7 55 more nearly at the same distance from the pivot or fulcrum of the lever for all positions of the said lever than would be the case if the motor and its casing were fixedly attached to the lever. In the latter case the 60 motor would swing with the lever and move in an arc whose extremes would vary considerably in their effective distance from the pivot or fulcrum 71 of the lever 7. This would render quite variable the counterbalancing effect of the motor and its casing, whereas through having the motor and its casing pivotally connected a more uniform

counterbalancing effect is secured. In consequence, however, of the pivotal connection of the motor and its casing with the rear arm 70 of the lever 7 it follows that when the lever 7 is swung up or down the relative movement of the motor and its casing about the pivot 10 will slacken or tighten the driving-band 13. It is necessary to compensate for this 75 variation in the tension of the driving-band in order that it may not incommode the operator or interfere with the proper working and use of the instrument which is carried by the handpiece. It is necessary also that the 80 engine should contain provisions whereby the position of the framework of the handpiece as it hangs suspended from the outer arm of the lever 7 may be controlled, so that the said handpiece normally shall occupy a 85 convenient position at the lower end of the depending loop or bight of the driving-band 13 and also shall be withheld from overturning in consequence of a lack of balance with relation to its point of support. To these 90 ends I utilize a rod 20, to the lower end of which in practice the framework of the handpiece 18 is applied. The connection between the rod 20 and the said framework may be 95 effected in any suitable and convenient manner; but in practice I have secured good results by utilizing an ordinary slip-joint, of which the piece 19, with its tube or socket, constitutes a member. The rod 20 is loosely or movably connected with the lever 7, so as to 100 leave the same free to move vertically with reference to the said lever in response to variations in the tension of the driving-band, the said rod gravitating or being forced downward normally with a force which holds the 105 band 13 taut, but yielding to any strain which may be transmitted to the band as the electric motor and its casing swing around the pivot 10. The weight of the rod may be sufficient to secure the desired tension of the 110 driving-band. This, however, is not deemed by me to be best, inasmuch as too much weight then would be presented at and adjacent to the handpiece and would offer too much inertia or resistance to permit of free 115 and unhampered movements by the operator. A weight is the most acceptable means of applying sufficient force to the rod 20, so far as I have yet ascertained, and I have found that the best results are secured by locating the 120 same closely adjacent to the outer arm of the lever 7. Thus at 25 in Figs. 1 and 2 I have shown a ball-shaped weight secured to the upper end of the rod 20 by means of a clamping-screw 26. The said weight 25 is shown 125 located below the lever 7; but excellent results are obtained when the said weight is located above the lever 7.

It will be apparent that to a certain extent a spring would be an equivalent of a weight; 130 but the use of a spring is attended by the disadvantage that its action varies in proportion as it is extended or compressed, and an increase in the tension thereof would impede or



interfere with the free swinging movements of the electric motor and its case about the pivot 10 as the lever 7 moves up and down. Therefore I prefer to employ a weight.

5 A preferred mode of connecting the rod 20 with the lever 7 so as to retain all possible freedom of movement for the handpiece is illustrated in the drawings, in which latter the said rod 20 passes through a hole 21 in a pin 10 22, the said pin passing horizontally through a hole in the block 14 and being headed, as at 23, on the side of the said block opposite to that at which the hole 21 and rod 20 are located for the purpose of preventing acci- 15 dental dislodgment of the said pin.

24 is a ball-shaped head that is applied to the upper end of the rod 20 for the purpose of preventing the rod and parts applied there- to from falling and becoming injured, the 20 said head or ball preventing disengagement of the rod from the lever 7.

I do not limit myself to the use of the particular form of handpiece that is illustrated in the accompanying drawings, and while my 25 invention is intended particularly for application to dental engines I wish it to be understood that I regard it as capable of being employed in engines or machines which are employed for other than dental work.

30 I claim as my invention—

1. In combination, the lever 7, the motor pivotally connected with one arm of the said lever, as at 10, and serving to counterbalance the other arm of the said lever and the weight 35 which is supported by such other arm, the driving-band 13 actuated by a pulley which is driven by the said motor, guides carried by outer arm of the said lever and over which the said driving-band passes, a loop or bight 40 of the said band depending from the said guides, a handpiece containing a shaft to ac-

tuates an instrument and provided with a pul- ley to receive the said driving-band, whereby the said handpiece is supported by the said 45 loop or bight, and its shaft is driven, and a rod, as 20, connected with the said hand- piece and loosely connected with outer arm of the said lever, the said rod having freedom of vertical movement relatively to the said 50 lever to accommodate variations in the ten- sion of the driving-band, substantially as de- scribed.

2. In combination, the lever 7, the motor pivotally connected with one arm of the said lever, as at 10, and serving to counterbalance 55 the other arm of the said lever and the weight which is supported by such other arm, the driving-band 13 actuated by a pulley which is driven by the said motor, guides carried by outer arm of the said lever and over which 60 the said driving-band passes, a loop or bight of the said band depending from the said guides, a handpiece containing a shaft to ac- tuate an instrument and provided with a pul- ley to receive the said driving-band, whereby 65 the said handpiece is supported by the said loop or bight, and its shaft is driven, a rod, as 20, connected with the said handpiece and loosely connected with outer arm of the said lever, the said rod having freedom of vertical 70 movement relatively to the said lever to accommodate variations in the tension of the driving-band, and the weight 25 applied to the upper end of the said rod adjacent to the lever 7, substantially as described. 75

In testimony whereof I affix my signature in presence of two witnesses.

LOUIS T. E. METHOT.

Witnesses:

CHAS. F. RANDALL,  
WILLIAM A. COPELAND.