(No Model.)

L. T. E. MÉTHOT.

DENTAL ENGINE.

No. 533,073. Patented Jan. 29, 1895.

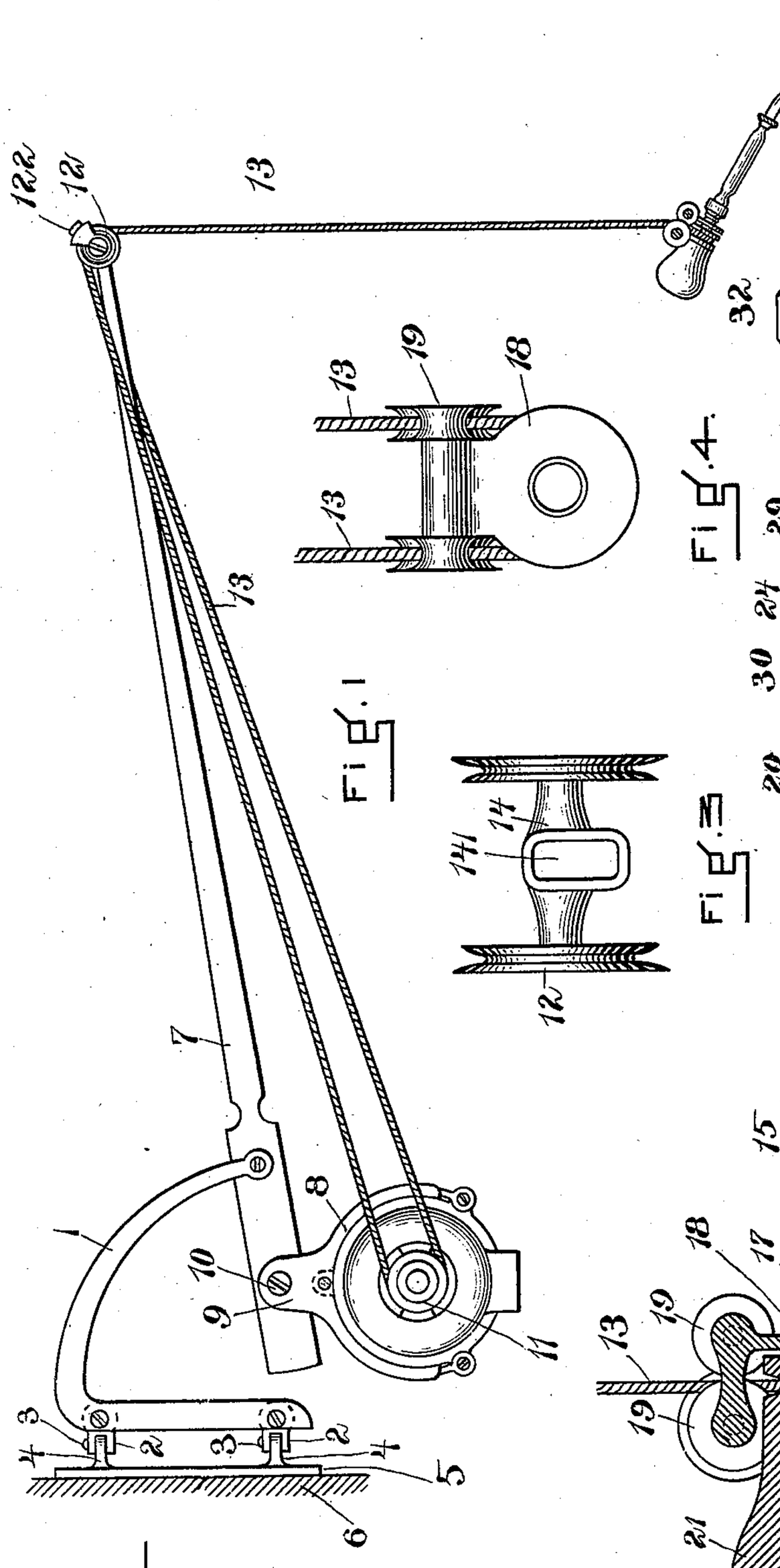

Fig. 1.

Fig. 4.

Fig. 3.

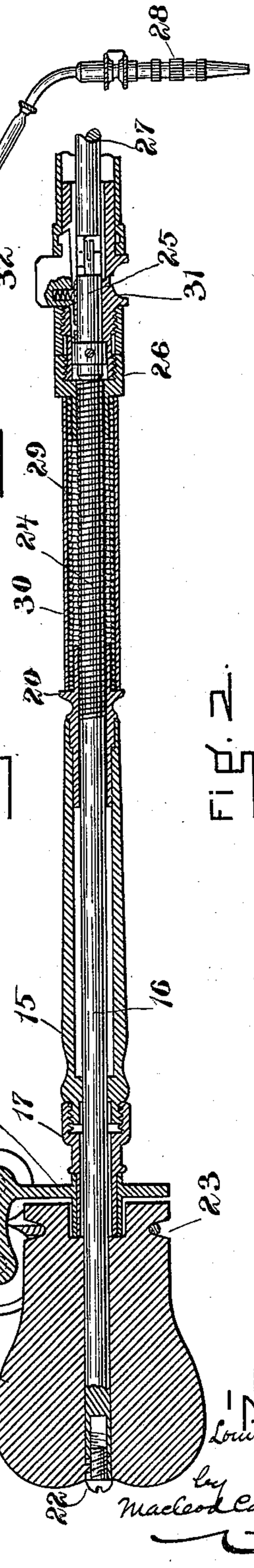

Fig. 2.

WITNESSES

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DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 533,073, dated January 29, 1895.

Application filed February 20, 1894. Serial No. 500,868. (No model.)

To all whom it may concern:

Be it known that I, LOUIS THELESPHOR EBENS MÉTHOT, a subject of the Queen of Great Britain, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Dental Engines, &c., of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object to provide an improved machine by means of which tools, such, for example, as dental instruments may be actuated. It is fully set forth in the following description, and its novel features are pointed out in the claims which are appended hereto.

I have shown the best form of my invention now known to me in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a central lengthwise section of the tool-driver. Figs. 3 and 4 are views of details hereinafter referred to.

I have shown my invention as embodied in a dental engine and I will describe the illustrated embodiment thereof.

In dental operations the instruments employed usually require to be directed by the hand of the operator and with very great care. Their position requires frequently to be changed. It is therefore important in a dental engine that the power required to actuate the instrument be supplied properly, while at the same time the strain or weight exerted upon the hand of the operator and requiring to be sustained by him, or overcome in effecting the necessary movement of the instrument in use, must be reduced to a minimum. The strain, or weight, if possible, should not exceed that of the usual hand-instruments, in order that the operator may not be subjected to any unusual muscular strain. It is also essential that the mechanism employed for operating the instrument be so constructed as to allow the utmost freedom of movement, so that the instrument may be used in any position, and also so that when not in use the whole device may be readily moved to a position where it will not be in the way, and, when desired, may be readily swung into operative position again. These objects I have attained by means of my present invention, which is of simple construction, and will be readily understood from the following description.

A pivoted supporting bracket is shown at 1, said bracket being provided with lugs 2 for the reception of vertical pivots 3, by means of which latter it is secured to the projections 4 of the base 5, which last is secured by screws or other well-known means to a wall or other support 6. The pivoted bracket 1 has an outwardly and downwardly curved arm at the lower end of which is pivoted a lever 7, which may be of wood or other suitable material and has depending from the short end thereof an electric motor inclosed in a casing 8. The casing 8 is provided with an upwardly projecting portion 9 by means of which the motor is suspended on the lever 7 from a pivot 10, so that as the lever 7 swings the motor and its case will maintain substantially a vertical position. The shaft of the motor projects through the case and is provided exteriorly thereof with one or more grooved driving pulleys 11. The long end of the lever 7 is provided with guide pulleys 12 which are grooved, and which serve as guide pulleys for the driving band 13. The pulleys 12 are loosely mounted at each end of a suitable cross-piece or bearing 14, the latter being formed with a socket or opening 141 which fits on the end of lever 7. A loop or bight of the driving cord 13 extends downwardly from the guide pulleys 12 a sufficient distance to bring the tool which is to be operated in convenient proximity to the work which is to be done when the lever 7 is in a substantially horizontally position.

A suitable retaining device 122 secured to the outer end of one of the journals on the cross-piece 14 is constructed and arranged to extend across the grooved edges of the pulleys 12, 12, and serves to prevent the driving cord from flying out of the grooves thereof.

The mechanism by means of which the tool or instrument is directly actuated is shown more clearly at Fig. 2 and consists of a cylindrical casing 15 through which a spindle 16 passes. One end of the casing 15 is exteriorly threaded to receive an internally threaded sleeve 17 upon which is loosely mounted a bracket 18 which supports the guide pulleys 19. At the other end of the cas-

ing 15 a sleeve 20 is provided, which slides into the end of the casing 15 and is held in place by frictional contact with said casing. The sleeves 17 and 20 serve as bearings for the spindle 16, and the space inside said casing 15 and around said spindle may be packed with an absorbent material which will hold a lubricant so that the device may be used a considerable time without additional lubrication. One end of the spindle 16 is provided with a head 21 which is preferably of metal or some heavy material, and which is rigidly secured to said shaft in any well-known manner, as by the use of a set screw 22. The inner end of the head 21 is grooved as shown at 23 to constitute a pulley which receives the loop of the driving cord 13. The employment of a relatively heavy pulley or head 21 is advantageous because of the resulting momentum obtained. The two portions of the driving cord 13 are passed between the pairs of guide pulleys 19, which are journaled in the upper portion of the bracket 18 as shown in Figs. 2 and 4, the said cord passing between one pair of said guide pulleys, thence around the head 21 in the groove 23 therein, and thence between the pair of guide pulleys on the opposite side of the bracket 18. The end of the spindle 16 which is nearest the sleeve or bearing 20 is secured to a flexible shaft 24, and which is of well-known construction. The other end of the flexible shaft 24 is secured to a short spindle 25 which is mounted in a sleeve 26, the end of said short spindle 25 being shaped to engage the proximate end of the shaft 27 of the tool holder 28. The proximate ends of the sleeve 20 and the sleeve 26 are secured together by means of a flexible connection 29, of similar construction to that of shaft 24, and which serves to protect the shaft while at the same time permitting it to yield in any desired direction. The covering 29, which is of spiral wire, is in turn covered with a layer of thin leather 30 or similar suitable material which serves as a protection and finish. The sleeve 26 is provided with a thimble 31 which is screwed into said sleeve 26 and serves as a bearing for the short shaft 25. A spring-catch 32 is pivoted to the thimble 31 and serves to secure the tool-holder 28 in place when it is slid into connection with the said thimble 31. The flexible shaft 24 and all the parts connected therewith, including its covering, and the sleeve 26, thimble 31, and the tool-holder 28, are old and well-known, and will not require a more detailed description.

The bracket 1 may be swung laterally, thus providing for lateral movements of the device, and through having the lever 7 pivoted to the support 1 provision is made for the vertical movements thereof. The floating tool-driver shown in Fig. 2, being suspended by means of a loop of the cord 13 from the guide pulleys 12, is free to be swung in any direction at the end of the said loop. The long arm of the lever 7 is so proportioned to the short arm thereof that the weight of the motor and its case is just sufficient to balance the weight of the floating tool-driver and its attached parts, so that if there were no friction at the pivot of the lever 7 said lever would assume naturally a horizontal position. There is preferably a slight friction at the fulcrum of the lever 7, so that while the lever may be swung freely vertically it will stay at any point at which it may be left within a considerable distance of the horizontal position and will not of itself return to a horizontal position. The floating tool-driver is so mounted and balanced in the loop of the driving cord 13 that when the tool-holder 28 is removed therefrom or when the weight of the tool-holder 28 is sustained by the hand of the operator, the tool-driver will assume a horizontal position. It will therefore be seen that when the operator is at work there is no weight or strain whatever on the tool-holder 28 which he holds in his hand, and he therefore is not subjected to any unusual strain in the use of the machine.

As the weight of the holder and floating tool-driver which are shown in Fig. 2 may be comparatively slight, the driving band or cord 13 will slip if the instrument becomes accidentally engaged in the napkin or rubber in the mouth of the patient, thus stopping the tool and avoiding all danger from accidental injury. The motor which is mounted in the case 8 is connected in the well-known manner by means of wires with a source of electricity and by means of a rheostat, the switch of which is operated by a foot-lever in convenient proximity to the foot of the operator so that the motor may be conveniently started or stopped, or the speed thereof increased or decreased. The electrical connections, as also the rheostat and its operating switch, are not shown, as they are of well-known construction and are familiar to all skilled in the art.

When the tool or instrument is not in use it may be instantly moved up to one side out of the way.

My device takes up no floor space, is compact and inexpensive, and is so readily put into operation when required that a considerable saving is effected in the time of the operator by its use.

It will be understood that for dental purposes the machine may be used to operate a variety of dental instruments which require to be rotated, as also to drive brushes, grinding devices, and the like. It is therefore applicable to a large variety of mechanical operations which are carried on by dentists and others and I do not desire to limit myself in the use of my invention to a dental engine, as many mechanical operations which are carried on in connection with various industries are very similar in character to the mechanical operations which are carried on by dentists, and the device, therefore, may be applied to a great variety of uses other than

those which come within the scope of a dentist's work.

What I claim is—

1. In combination, an electric motor, a driving band passing around a pulley driven by the said motor, a guide around which said band passes after leaving the said pulley and from which guide a loop of the band depends, a floating tool-driver having a pulley engaged in the depending loop of the said driving band, whereby not only to rotate the said pulley but to sustain the tool-driver, and means for supporting the said motor and guide and maintaining the parts in equipoise, the motor counterbalancing the other movable parts and vice versa, substantially as described.

2. In combination, a lever, means for supporting said lever an electric motor supported from one end of the said lever and constituting a counter-balance for the weight at the other side of the fulcrum of the said lever, a driving band or cord passing around a pulley driven by the said motor, a guide at the opposite end of the said lever over which the said driving band or cord passes and from which the latter depends in a loop, and a floating tool-driver having a pulley engaged in the said loop whereby not only to rotate the said pulley but to sustain the said tool-driver, substantially as set forth.

3. In combination, a supporting bracket mounted with capacity for lateral movement, a lever pivoted to the said bracket with capacity to move vertically relatively thereto, an electric motor suspended from one end of the said lever and serving as a counter-balance for the weight at the other side of the fulcrum of the lever, a driving band or cord passing around a pulley on the shaft of the said motor, guide pulleys at the opposite end of the said lever over which said driving band or cord passes and from which the said cord depends in a loop, a floating tool-driver comprising a spindle having a pulley engaged in the said loop whereby not only to rotate the said pulley but to sustain the tool-driver, and a flexible connecting shaft intermediate the said spindle and the tool which is driven thereby, whereby the position of the tool may be changed while it is in operation, substantially as set forth.

4. In combination, a lever, a motor applied to one end of the said lever and serving as a counter-balance for the weight at the other side of the fulcrum of the lever, a driving band or cord passing around a pulley driven by the said motor, a directing guide at the opposite end of said lever over which said driving band or cord passes and from which the latter depends in a loop, a floating tool-driver comprising a cylindrical casing, a spindle passing therethrough, a bracket journaled on said casing, guide pulleys for the driving band or cord journaled on said bracket, and a pulley fast on one end of the spindle and engaged in the depending loop of the driving band or cord, the weight of said floating tool-driver being equally disposed on each side of the point at which the driving band engages the said pulley, whereby the said floating tool-driver is balanced on said driving band and all weight or strain is removed from the tool-holder, substantially as set forth.

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

LOUIS THELESPHOR EBENS MÉTHOT.

Witnesses:
WM. A. MACLEOD,
ROBERT WALLACE.