

No. 712,716.

Patented Nov. 4, 1902.

O. H. & A. F. PIEPER.

DENTAL ENGINE.

(Application filed Aug. 8, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

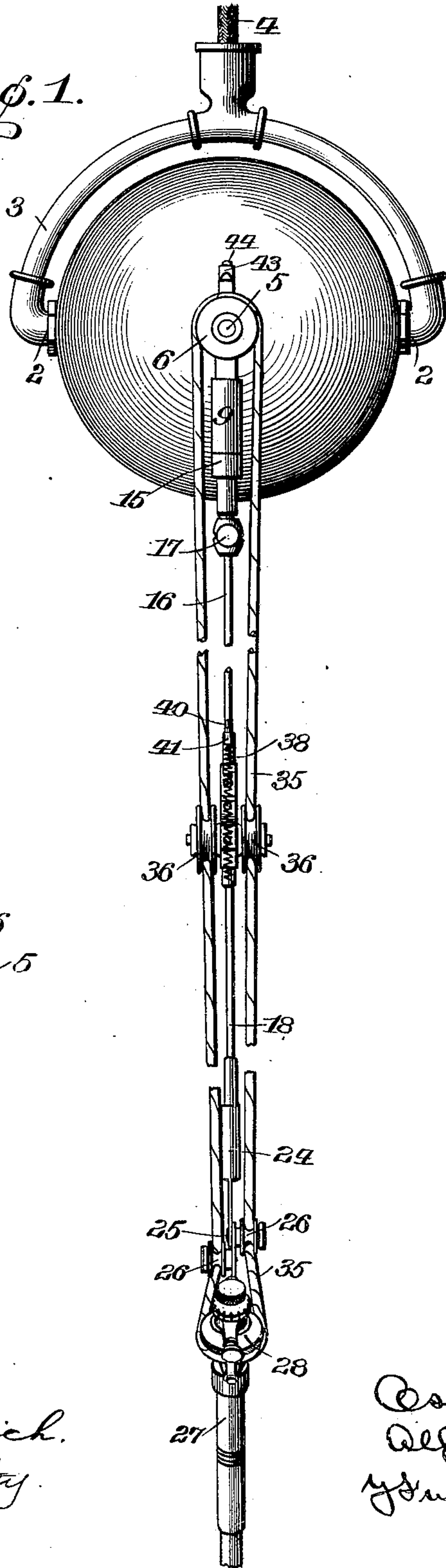


Fig. 8.

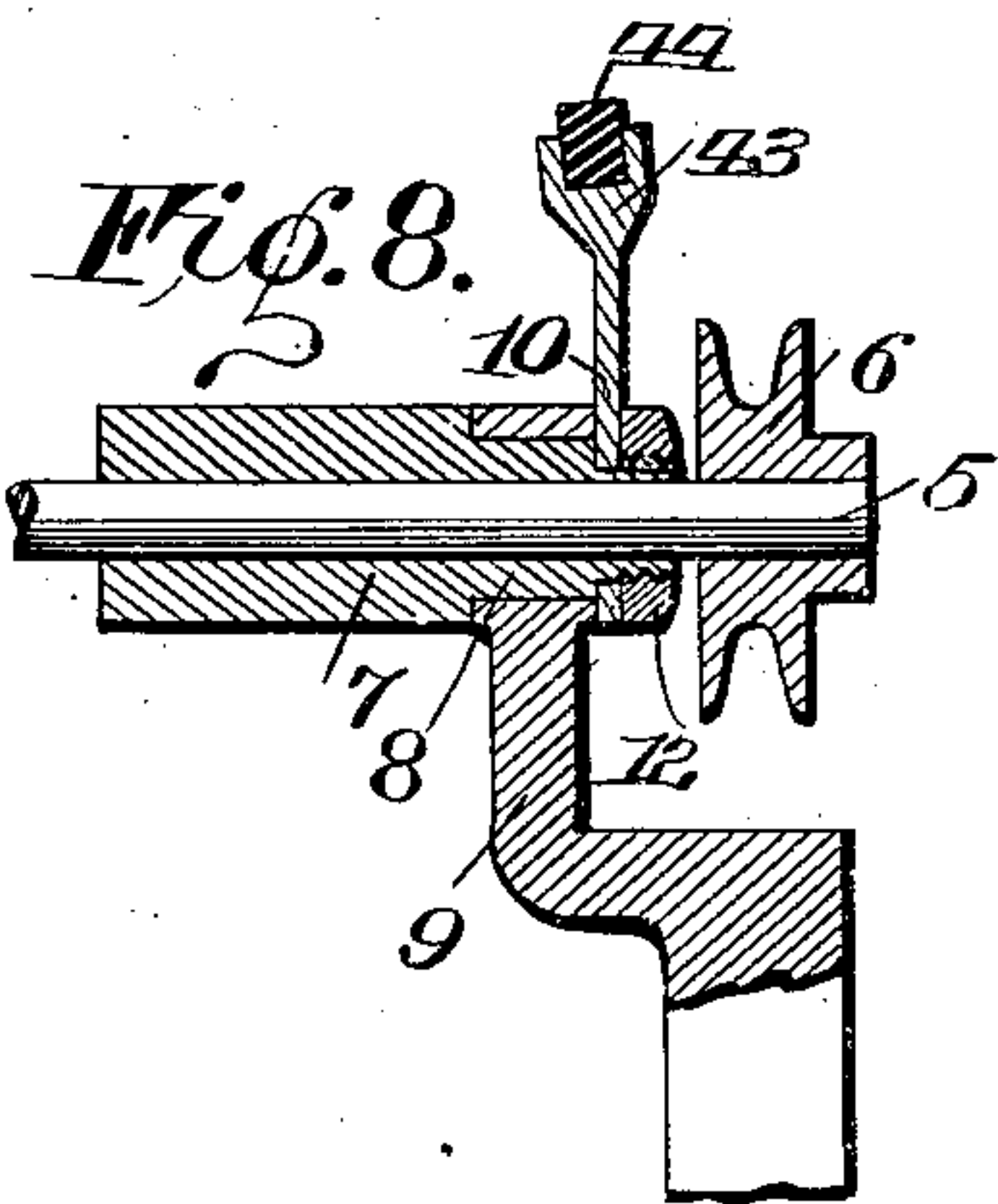
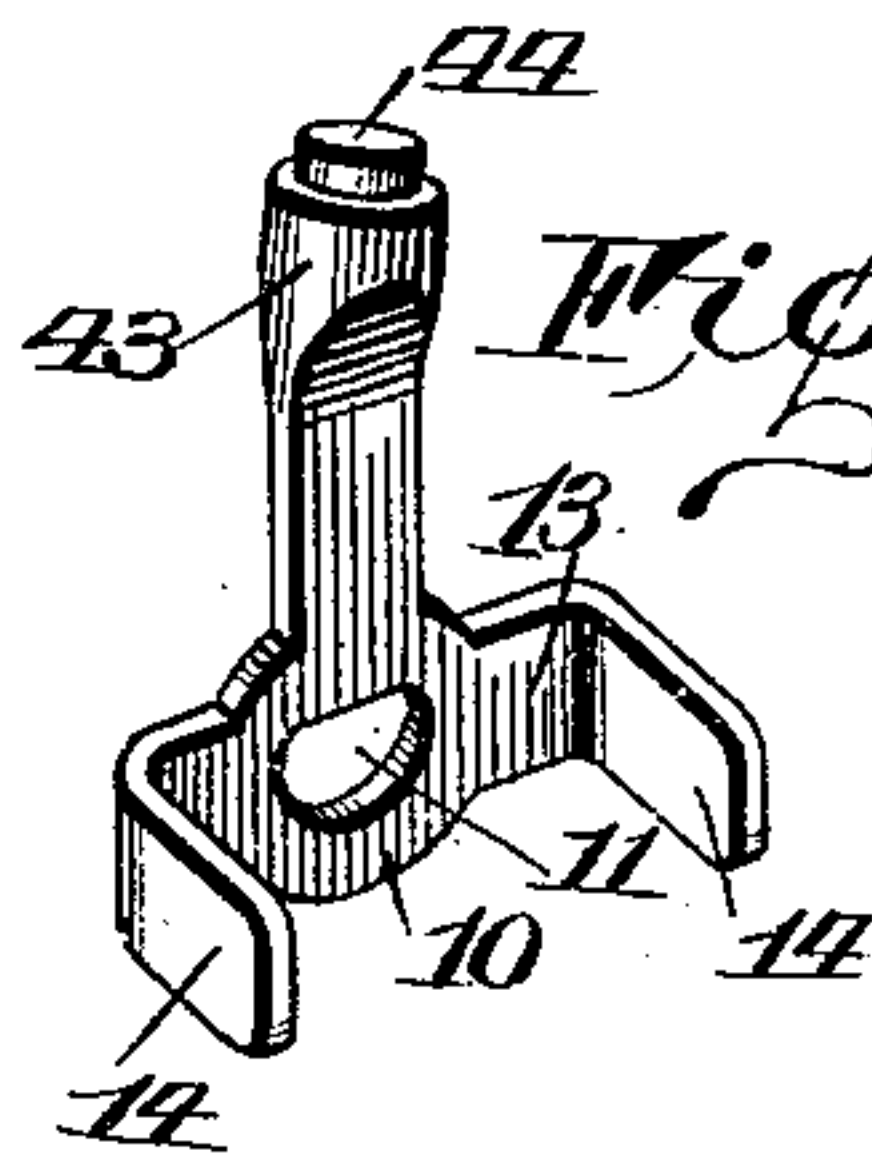


Fig. 9.



Witnesses.

G. Willard Rich.
Frank A. Rostky.

Inventors

Oscar H. Pieper
Alfonse F. Pieper
Y. S. Church
Their Attorney

No. 712,716.

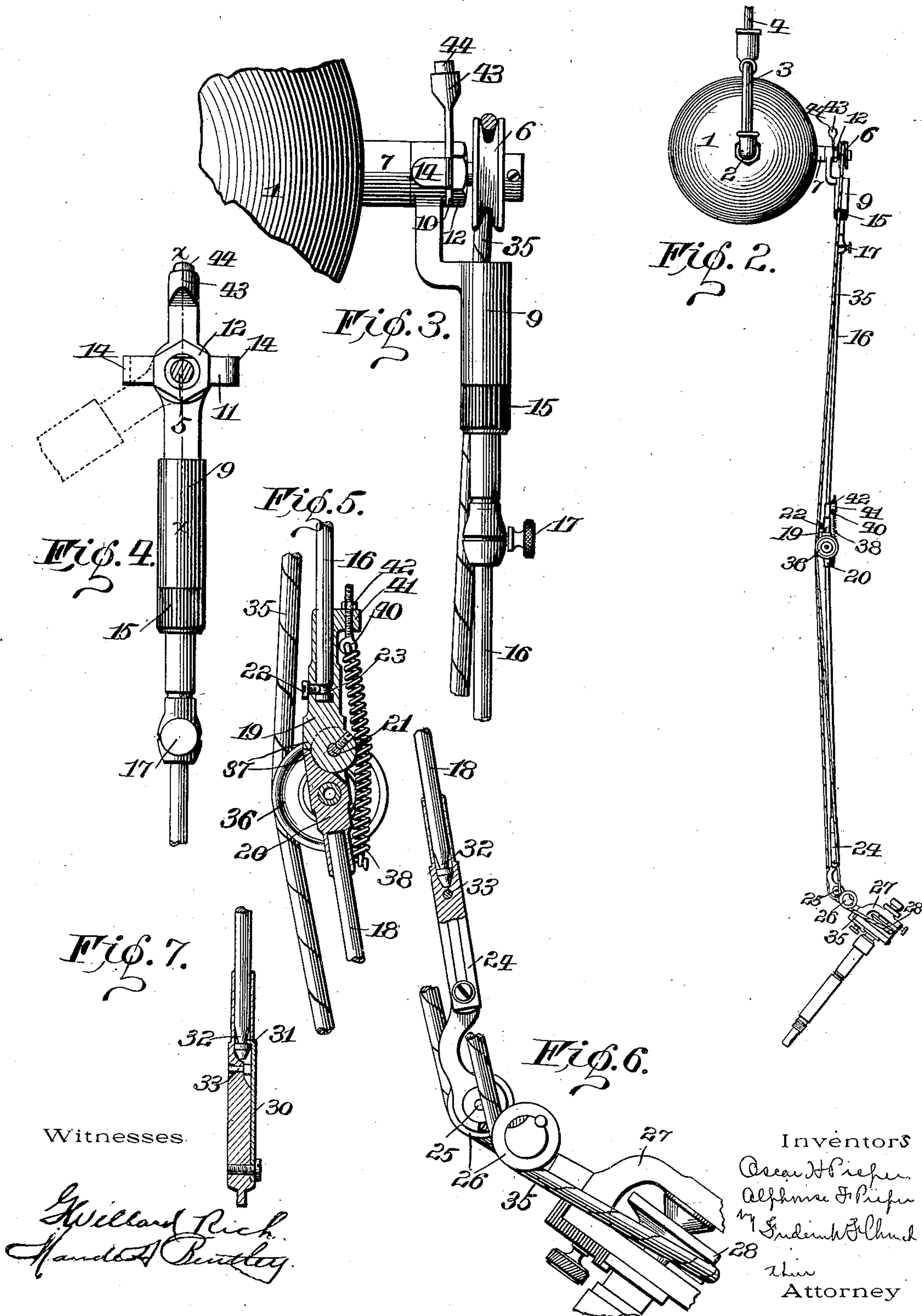
Patented Nov. 4, 1902.

O. H. & A. F. PIEPER.
DENTAL ENGINE.

(Application filed Aug. 8, 1901.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses

Willard Rich.
Hendrick Bentley.

Inventors

Oscar H. Pieper
Alfred F. Pieper
by E. J. Schuch
Attorney

UNITED STATES PATENT OFFICE.

OSCAR H. PIEPER AND ALPHONSE F. PIEPER, OF ROCHESTER, NEW YORK.

DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 712,716, dated November 4, 1902.

Application filed August 8, 1901. Serial No. 71,345. (No model.)

To all whom it may concern:

Be it known that we, OSCAR H. PIEPER and ALPHONSE F. PIEPER, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Dental Engines; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

Our present invention relates to dental engines, and particularly to that class embodying a suspended and freely-movable motor device and a handpiece or tool-holder; and it has for its object to provide a form of connection or support for the latter whereby the tool-holder may be operated from the motor by means of a driving belt or cord and permitted a universal movement relative the motor without interfering with the movement of the driving-belt and having the parts thereof so arranged that the weight of the instrument carried in the operator's hand is reduced to the minimum.

To these and other ends the invention consists in certain improvements in construction and combinations of parts, all as will be hereinafter fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings, Figure 1 is a front elevation of a dental engine constructed in accordance with our invention. Fig. 2 is a side elevation thereof. Fig. 3 is a similar view, enlarged, showing a portion of the motor and the upper end of the connection or support. Fig. 4 is a side elevation thereof. Fig. 5 is an enlarged view of the middle joint of the connection or support. Fig. 6 is a similar view of the lower end of the support, showing a portion of the tool-holder. Fig. 7 is a sectional view of one of the detachable swivel connections. Fig. 8 is a sectional view on the line *x x* of Fig. 4, and Fig. 9 is a perspective view of the stop-plate.

Similar reference-numerals in the several figures indicate similar parts.

In illustrating our device we have shown it supporting a handpiece of a well-known construction in connection with a suspended and freely-movable motor, such as shown in re-

sue Letters Patent No. 11,920, granted to us July 2, 1901. The motor is pivotally mounted upon trunnions 2 on a frame 3, which is suspended by a cable 4, thereby affording a rotary movement to the motor, while it is also free to move in its supporting-frame. The motor is provided with an armature, having a driving-shaft 5 projecting at one side between the trunnions 2 and carrying a driving-pulley 6, and said end of the shaft is mounted in a bearing 7, at the outer end of which is provided an extension or sleeve 8, on which is journaled an arm 9, forming a portion of the connection or support carrying the handpiece, an offset being provided therein to bring the support opposite the pulley 6, as shown. The arm 9 being thus journaled concentric with the driving-shaft and with the pulley thereon, it may be revolved about the shaft; but as such a movement is not required in the successful operation of the device we provide a stop for limiting the movement of the arm upon each side of the shaft, consisting of a plate 10, having a central aperture 11, flattened at one side, as shown, adapted to engage a corresponding surface on the end of the bearing 7 to prevent it from turning thereon and secured by a nut 12. Arms 13 on the plate extend on opposite sides of the bearing, and their ends 14 are bent to extend in the path of the arm and form a stop to limit its swinging movement. The lower end of the arm 9 is separated from the upper end by interposing between the parts a section of insulating material, as indicated at 15, and said portion of the arm is provided with an aperture in which a rod 16 of the support is inserted and removably secured by a thumb-screw 17. A similar rod 18 is hinged to the rod 16 by a rule-joint or hinge composed of the members 19 and 20, secured together by the pintle 21, the latter member being rigidly attached to the rod 18, while the former is journaled on the rod 16 and revolvably connected thereto by means of a screw or pin 22, the inner end of which engages in an annular recess 23 in the rod. At the lower end of the rod 18 is provided a handpiece or tool-holder embodying the socket-piece 24, revoluble or axially attached to the rod, and a wrist-piece journaled to the socket-piece at 25 and carrying the idlers or pulleys 26 and pivotally connected

to the handpiece or tool-holder 27, the latter being provided with a shaft or arbor having a driving-pulley 28. The various joints between the parts permit the free manipulation of the handpiece in any direction, and to allow the latter and the whole swivel-head to be removed from the support the socket-piece 24 is provided with a spring-catch 30, having the inwardly-extending end 31, engaging an annular recess 32 in the end of the rod 18, and to permit the disengagement of the catch a pin 33 is provided on the spring, whereby the latter may be moved outwardly until its end is disengaged from the recess.

The driving belt or cord 35 passes around the pulley 6 on the motor driving-shaft, over the idlers 26 on the swivel-head and the driving-pulley 28 to operate the shaft or arbor of the handpiece. Intermediate idlers 36 are carried on the hinge member 20 to guide the belt irrespective of the relative positions of the rods 18 and 16, and in order that the rods when adjusted may always move toward each other on the same side of their pivot we provide shoulders or stops 37 upon the members 19 and 20 at their rear sides, which are adapted to abut and limit the movement of the rods, preventing them from assuming a straight line when in their outermost position. Extending between the hinge members and on the inner side of the joint is arranged a spring 38, of sufficient strength to nearly counterbalance the weight of the handpiece. In order, however, to increase or decrease the tension of the spring, as may be desired by the operator, we provide a means for adjusting the spring, consisting of a post 40, provided at its lower end with an eye, into which one end of the spring is hooked, passing through a lug 41 on the member 19 and provided on its upper end with a nut 42, whereby it may be adjusted and the tension of the spring regulated as desired.

In applying our support for belt-driven handpieces to suspended motors it is necessary to counterbalance the weight of the support and the mountings thereon, so that it will normally hang in a vertical position when not in use, and this is accomplished by locating the supporting-trunnions on the frame 3 at one side of the true center of the motor, as shown in Fig. 2. This arrangement permits the engine to tilt, moving the driving end of the armature-shaft upward as the handpiece is raised, and to limit this movement we provide a stop 43, formed by an arm extending from the top of the plate 10, carrying at its extremity a buffer 44, of rubber or similar material, adapted to engage the frame 3.

The journal-bearings between the various portions of the support readily allow the rods 16 and 18 to revolve, so that the middle joint will operate quickly into a position to close in whichever direction the handpiece may be raised. The adjustable spring between the sections of the support also serves to relieve from the hand of the operator the weight

of the tool-holder and the support, and the motor, which is free to move in either a horizontal or vertical direction and counterbalance the weight of the support, provides a support for the belt or driving-cord, which has a universal movement, operating freely and with the minimum of weight in the operator's hand.

We claim as our invention—

1. The combination with a motor having a driving-shaft and a handpiece, of a support for the latter embodying a rod attached to the motor and a rod carrying the handpiece, a jointed connection between said rods, and stops limiting the movement of the rods in one direction, a tension device between the rods, a driving-belt between the handpiece and the driving-shaft and pulleys on the rods to guide the belt substantially as described.

2. The combination with a motor having a driving-shaft, a handpiece, and a support for the latter journaled on the motor, of a joint in said support having a limited opening movement, an adjustable tension device connecting the support at opposite sides of its pivot, a belt connecting the driving-shaft and the handpiece, and guiding-pulleys for the belt arranged on the support at one side of the joint substantially as described.

3. The combination with a motor having the driving-shaft, the bearing supporting the latter provided with the extensions, and an arm journaled on said extension, of a stop on the bearing coöperating with the arm to limit its pivotal movement on the bearing, a handpiece on the arm, and driving connections between shaft and handpiece substantially as described.

4. The combination with a supporting-frame, a motor pivotally mounted therein having a driving-shaft arranged between the pivots, and a bearing therefor, of a handpiece, a support for the latter journaled on the bearing, a plate secured to the latter limiting the pivotal movement of the arms, a stop on the plate adapted to engage the supporting-frame to limit the movement of the engine therein, and driving connections between the shaft and handpiece substantially as described.

5. The combination with the freely-suspended supporting-frame, of a motor pivoted therein to swing in a vertical plane and having an operating-shaft extending in a plane perpendicular to the motor-axis, an arm swinging in a plane concentric with the shaft, a handpiece supported on the arm and having a rotary arbor thereon and a driving-belt extending from the handpiece-arbor to the motor-shaft, the pivot of the motor in the frame being arranged relative the handpiece and connected parts so that the parts will be counterbalanced and the weight distributed to maintain the motor-shaft in a substantially horizontal position.

6. The combination with a motor provided with a driving-shaft having its operating end

projecting at one side, a handpiece, a support therefor attached to the engine in proximity to said end of the shaft, and driving connections between the shaft and handpiece, of a supporting-frame, pivotal connections between the latter and the motor, arranged in rear of the operating end of the driving-shaft whereby the motor and the parts supported thereby will be balanced in the frame substantially as described.

7. The combination with a motor having a shaft provided with a driving-pulley, a bearing for the shaft, an arm journaled on the bearing having an offset lower end, and a rod attached to said end extending in line with the pulley, of a handpiece, a rod axially attached thereto, and a joint member carried on said rod, a second joint member hinged to the first and revolubly connected to the other rod, stops on the joint members limiting the movement of the rods and preventing their assuming a straight line when in the normal position, and a tension device tending to close the joint, a driving-belt extending from the

driving-pulley to the handpiece, and the idlers for guiding the belt substantially as described.

8. The combination with a motor having a shaft provided with a driving-pulley, a bearing for the shaft, an arm journaled on the bearing provided with an offset lower end extending in line with the pulley, and a handpiece, a rod attached thereto, of pivoted joint members arranged between the arm and rod, a tension device to close the joint when the rod is elevated in operative position, a driving-belt connecting the driving-pulley and handpiece, and idlers on the joint members guiding the belt, a supporting-frame for the motor pivotally connected thereto, and a stop on the motor engaging the frame for limiting its rotary movement therein substantially as described.

OSCAR H. PIEPER.

ALPHONSE F. PIEPER.

Witnesses:

F. F. CHURCH,

MAUDE A. BENTLEY.