

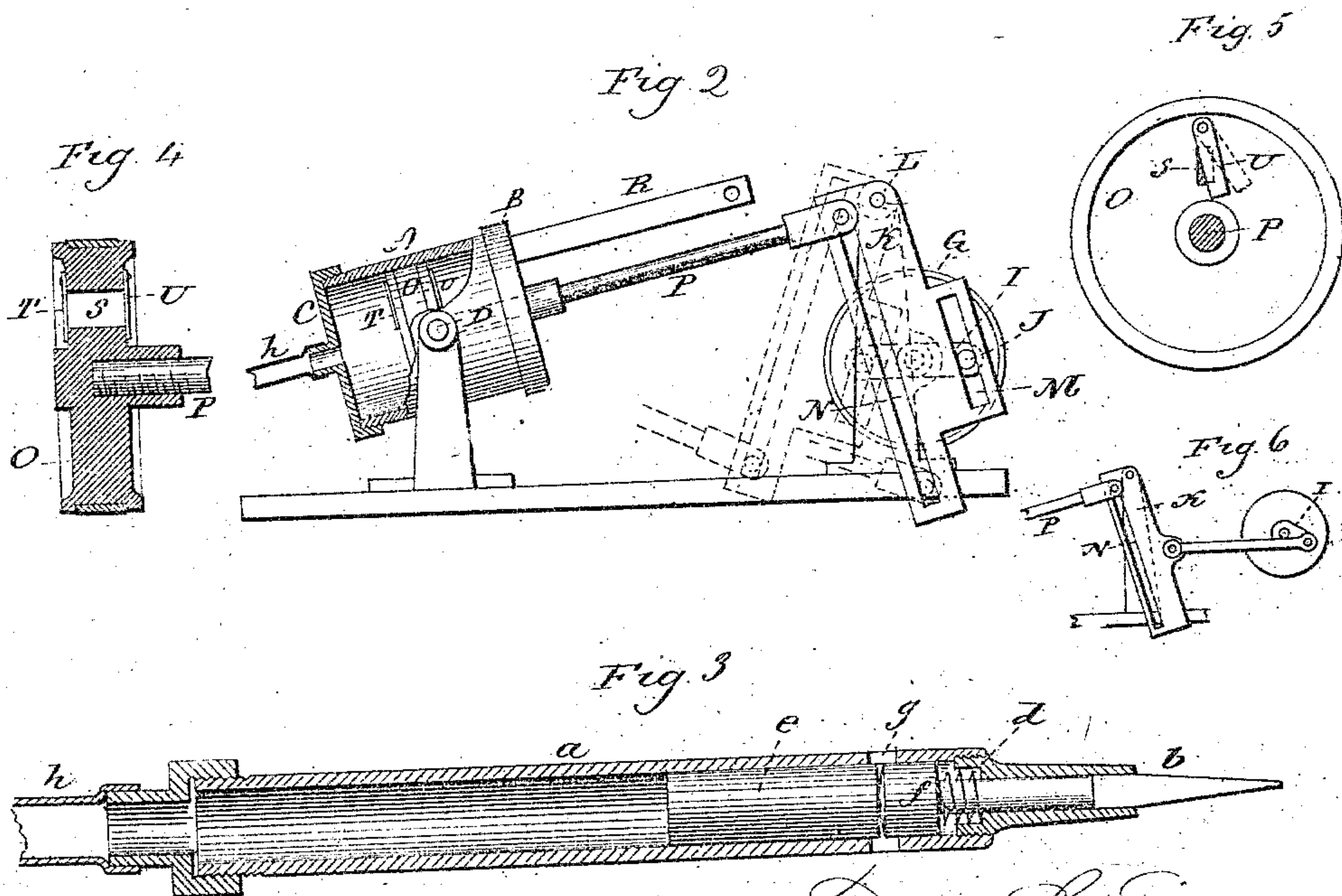
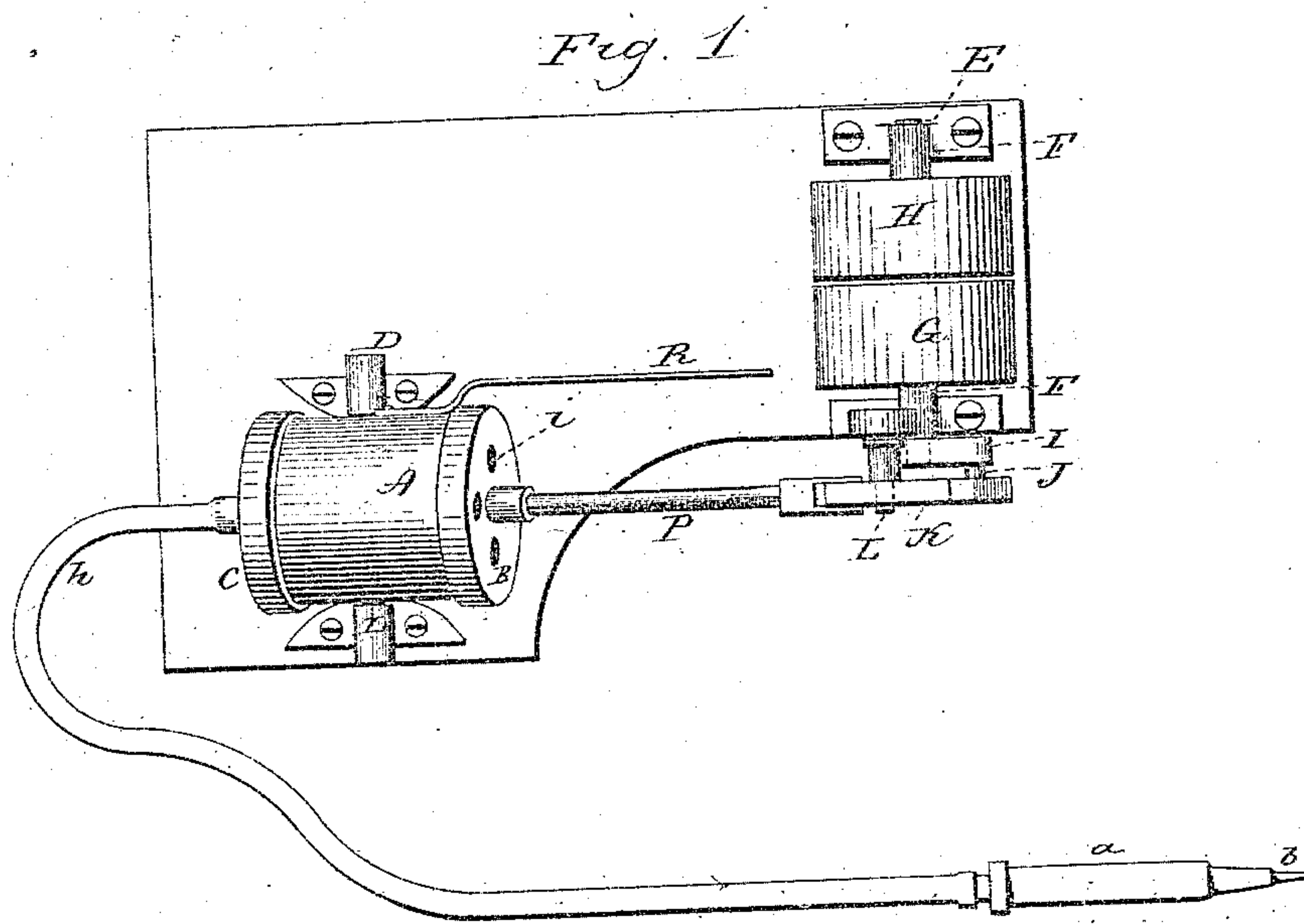
(No Model.)

F. L. EAGER.

PNEUMATIC OPERATOR FOR DENTAL PLUGGERS.

No. 412,025.

Patented Oct. 1, 1889.



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PNEUMATIC OPERATOR FOR DENTAL PLUGGERS.

SPECIFICATION forming part of Letters Patent No. 412,025, dated October 1, 1889.

Application filed June 28, 1889. Serial No. 315,941. (No model.)

To all whom it may concern:

Be it known that I, FRANK L. EAGER, of Meriden, in the county of New Haven and State of Connecticut, have invented a new Improvement in Pneumatic Operators for Dental and other Purposes; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a top or plan view of the apparatus complete, showing its connection with a dental plugger; Fig. 2, a sectional side view of the machine; Fig. 3, a longitudinal section of a dental plugger enlarged; Fig. 4, a longitudinal section of the piston cutting through the opening S therein; Fig. 5, a face view of the piston, showing the device for adjusting the opening through the piston; Fig. 6, a modification.

This invention relates to an apparatus for imparting a blow to instruments used by dentists in filling teeth, commonly called "pluggers," but applicable to use upon other instruments where a variable blow is desirable—as for engraving, chasing, carving, &c.—the object of the invention being to employ an air-pump for imparting the blow, and to give to the piston of the pump a variable length of stroke, whereby the force of the blow may be diminished or increased, as occasion requires; and it consists in the construction, as hereinafter described, and particularly recited in the claims.

A represents a cylinder provided at its respective ends with heads B C. The cylinder is best arranged upon trunnions in bearings D, and so as to oscillate freely therein.

E represents the shaft, supported in bearings F F and carrying a driving-pulley G, to which power is applied from any convenient source. Preferably a loose pulley H is also applied as a convenience for throwing the power into or out of engagement, as occasion may require.

The shaft E carries a crank I, having a crank-pin J. Outside the crank a plate K is hung upon a pivot L above the crank, and so as to vibrate in a plane parallel with the crank.

The plate is constructed with a vertical slot M, in which the crank-pin works, and so that in each throw of the crank a full vibration will be imparted to the plate K, as indicated in broken lines, Fig. 2. In the plate K is a long vertical slot N, extending from a point above the pivot downward, preferably to some distance below the throw of the crank.

In the cylinder A a piston O is arranged, from which a piston-rod P extends, and is hung in the slot N, and so that it may slide up and down therein, as indicated in broken lines, Fig. 2, and so that as the plate K vibrates under the action of the crank, as before described, it will impart a corresponding reciprocating movement to the piston O, and the length of the movement of the piston will depend upon the position in which the piston-rod stands in relation to the pivot L, on which the plate is hung—that is to say, if in the raised position, as seen in Fig. 2, the movement will be substantially nothing, or the minimum throw; but as the connection between the piston-rod and the plate is moved downward in the slot N, as to the position indicated in broken lines, then the length of throw of the piston will be increased accordingly, as indicated in broken lines.

A constant rotation is imparted to the crank, and while thus operating the cylinder may be turned by means of an arm R, attached thereto, or otherwise, so as to throw the connection with the piston-rod to different points in the length of the slot N, the movement of the piston varying accordingly, and the range of this variation of throw depends only upon the length of the slot N, it reaching its extreme throw at its most distant point from the pivot L, on which the plate K vibrates. The arm R may be in connection with a foot-pedal or operated by hand, as the case may be.

In Fig. 3 I represent a well-known construction of plugger, a representing the tubular handle; b, the instrument supported in the end of the handle upon a spring d. A hammer e is arranged in the tubular handle, and so as to slide freely up and down therein, and so as to strike the head f of the instrument. One or more apertures g are provided between the head f and the hammer, into

which air may enter the handle between the hammer and head.

From the end of the cylinder A a flexible tube *h* leads to the end of the handle *a*, and opening therein, as seen in Fig. 3. As the piston O is drawn from the head through which the tube *h* opens, it will suck or draw the air from the handle of the instrument above the hammer, causing the hammer to rise. Then on the return-stroke of the piston the air will be forced into the handle and drive the hammer onto the head of the instrument with a force corresponding to the force applied from the cylinder. If the stroke of the piston be very short, then the blow of the hammer will be correspondingly short. If, however, the stroke of the piston be increased, the power of the stroke of the hammer will be increased accordingly. The head of the cylinder opposite the end through which the tube *h* opens is constructed with one or more openings *i*, through which the air may freely enter or escape from that side of the piston, so as to permit the free operation of the piston.

While this apparatus is specially designed for dental purposes, it will be understood that it may be used to good advantage for other work, as for engraving, chasing, or carving in stone or other material.

As an auxiliary means for varying the force of the blow, the piston O is constructed with an opening S through it to both sides of the piston, and on the operating side of the piston a flap or other suitable valve T is arranged, which will open as the piston draws air through the tube *h*, and then will close as the piston moves in the opposite direction to impart the blow. To vary the size of this opening S on the side of the piston opposite the valve, an adjustable slide U is hung, so as to swing close upon the face of the piston and across the opening, as indicated in Fig. 5, so that the size of the opening may be varied. The result of this arrangement is that as the piston moves from the opening from the tube *h* it will draw air from the instrument, as before described; but at the same time it will permit air to pass through the opening S, the valve T opening for that purpose; but the opening S is so much less than the displacement by the movement of the piston that this opening for admission of air will only serve

to reduce the power of suction through the tube *h*. Therefore as the opening S is made larger or smaller the sucking-power of the piston through the tube *h* will be correspondingly diminished or increased. This opening is adjusted with relation to the work to be done, and, if desired, the slide may be thrown over the opening, so as to completely close it.

While I prefer to employ the crank and slot M as a means for communicating the vibratory movement to the plate K, that movement may be otherwise communicated—as by a pitman from the crank operating directly thereon, as seen in Fig. 6. I therefore do not wish to be understood as limiting the invention to the particular means for producing the vibratory movement of the said plate K.

I claim—

1. The combination of the cylinder A, piston O, arranged therein, plate K, hung to vibrate in a plane parallel with the axis of the cylinder, a slot in said plate in a line at substantially right angles to the axis of said cylinder, piston-rod P, extending from the piston and adjustably hung in the said slot N of the plate K, and mechanism, substantially such as described, to impart vibrating movement to said plate, with a tube leading from one end of the cylinder, substantially as described.

2. The combination of the cylinder A, vibrating plate K, constructed with the vertical slots M and N, a piston O in the cylinder, piston-rod P, extending from the piston and adjustably hung in said slot N, a revolving crank I, its crank-pin J working in said slot M of the plate K, with a tube leading from one end of the cylinder, substantially as described.

3. The combination of the cylinder A, the piston O therein, constructed with an adjustable opening S therein, provided with a valve on the operative side of the piston, the vibrating plate K, constructed with a slot N, piston-rod P, extending from the piston O and adjustably hung in said slot N, and mechanism, substantially such as described, for imparting vibratory movement to said plate, substantially as specified.

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Witnesses:

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