

E. MOREAU & S. W. DENNIS.  
Motor for Dental-Pluggers.

No. 205,289

Patented June 25, 1878.

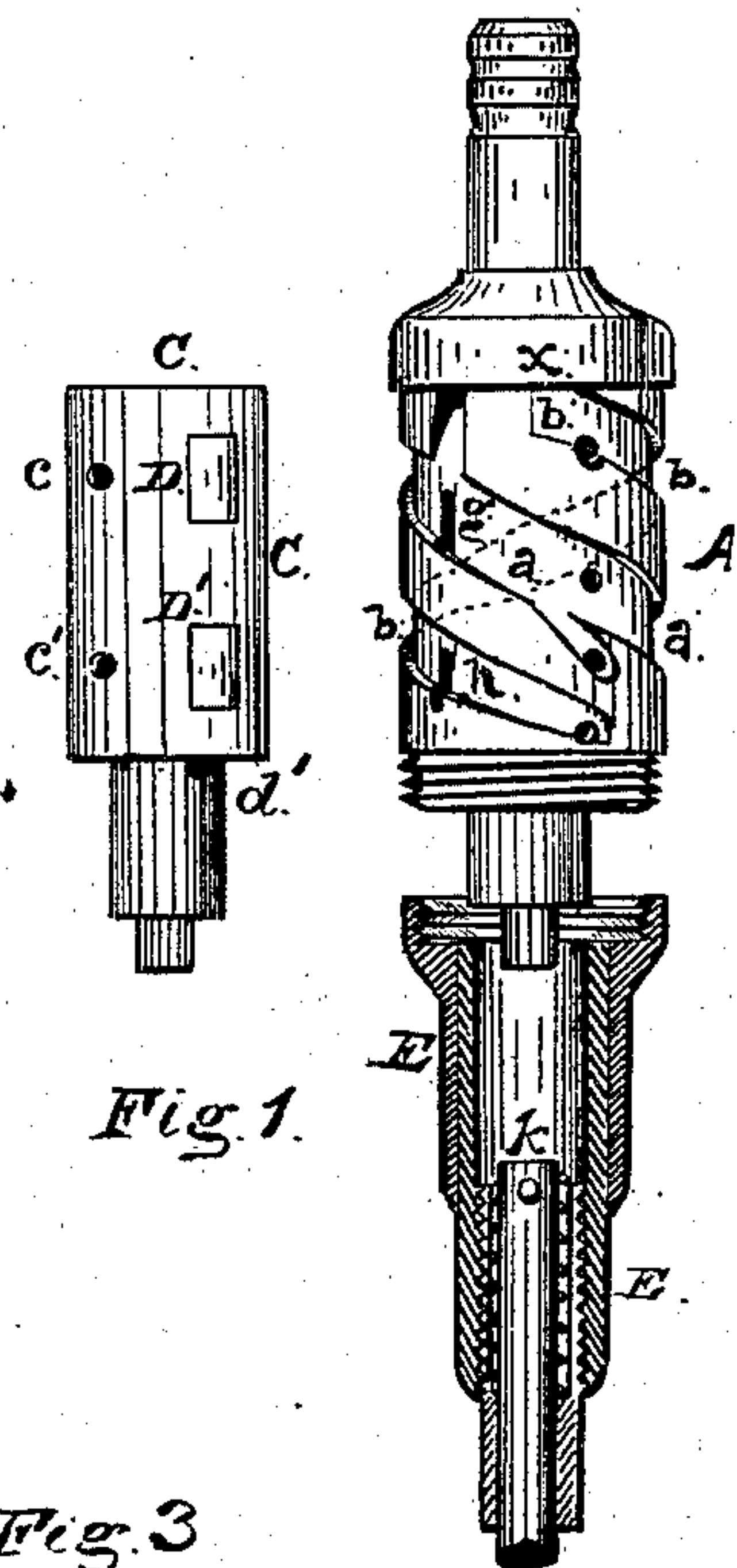


Fig. 1.

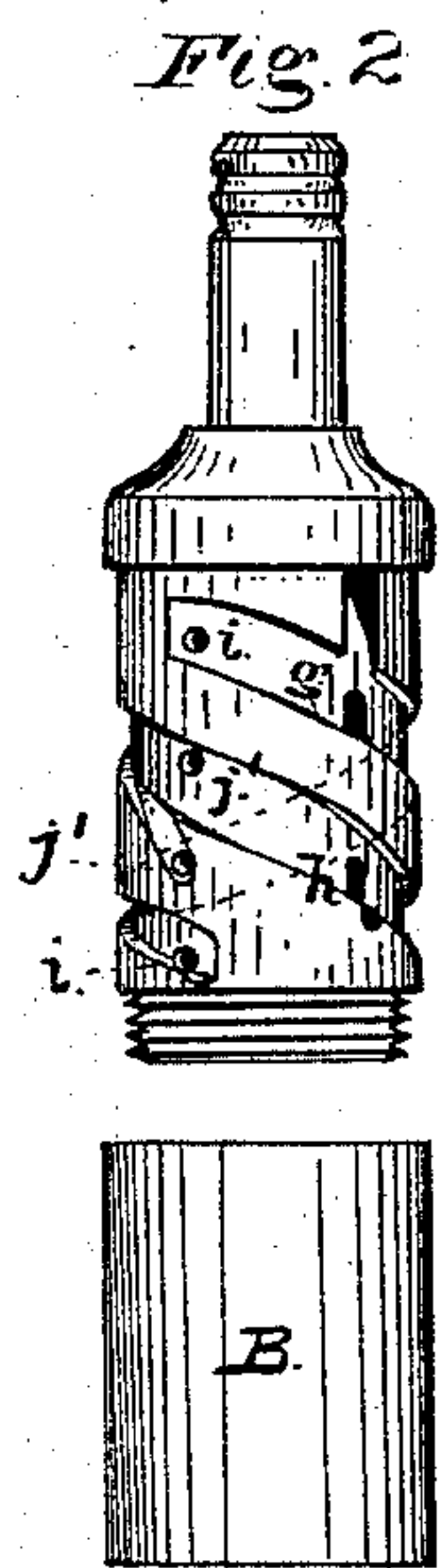


Fig. 2.



Fig. 3.

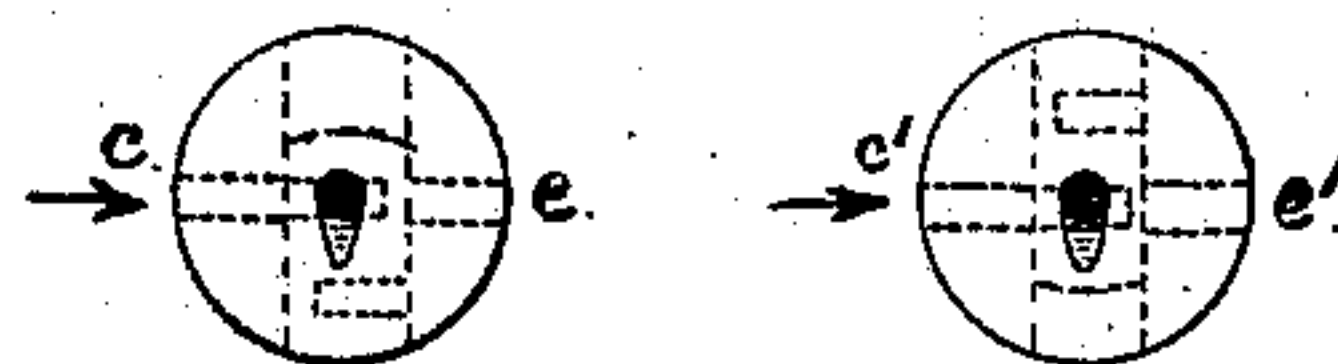


Fig. 4.

Fig. 5.

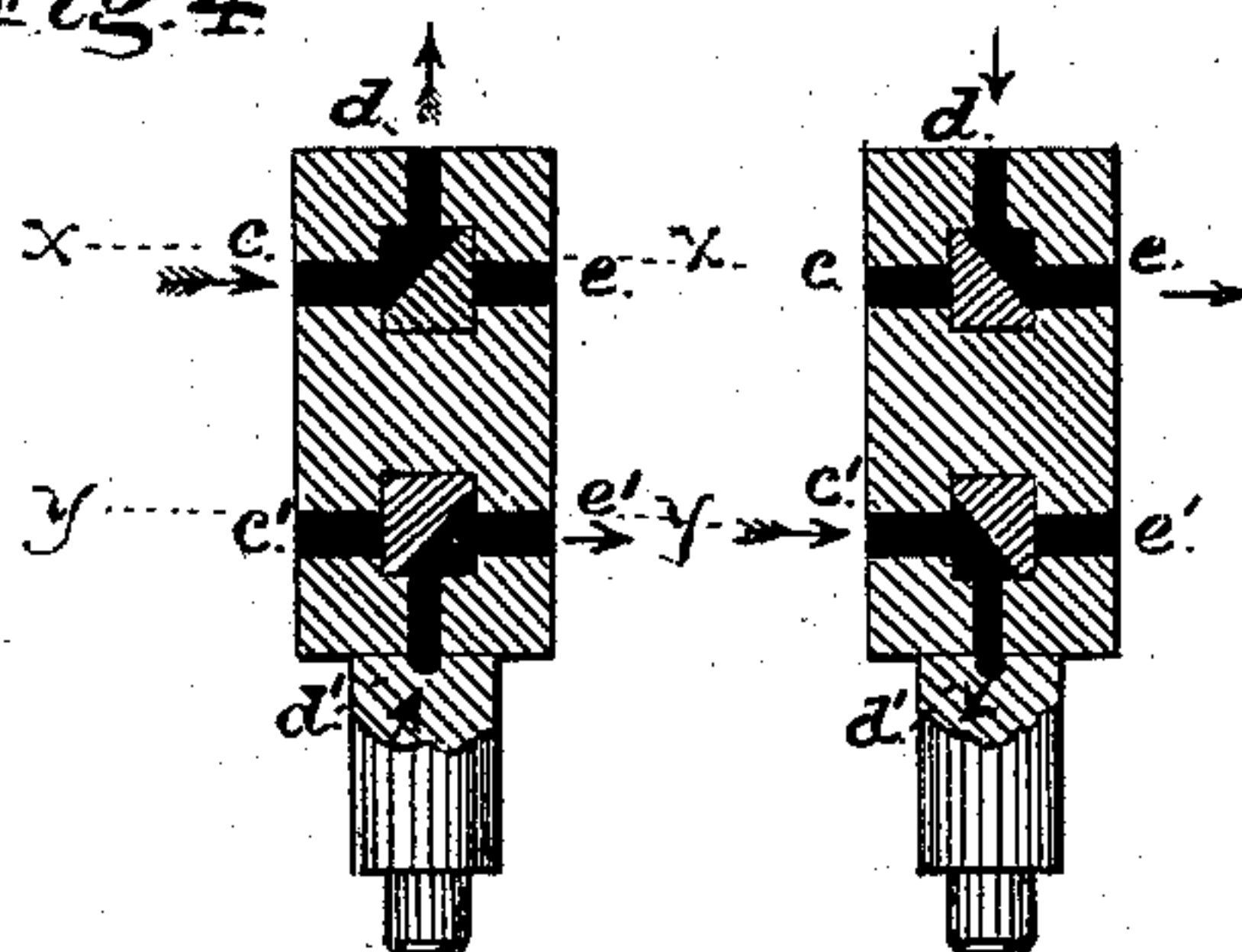
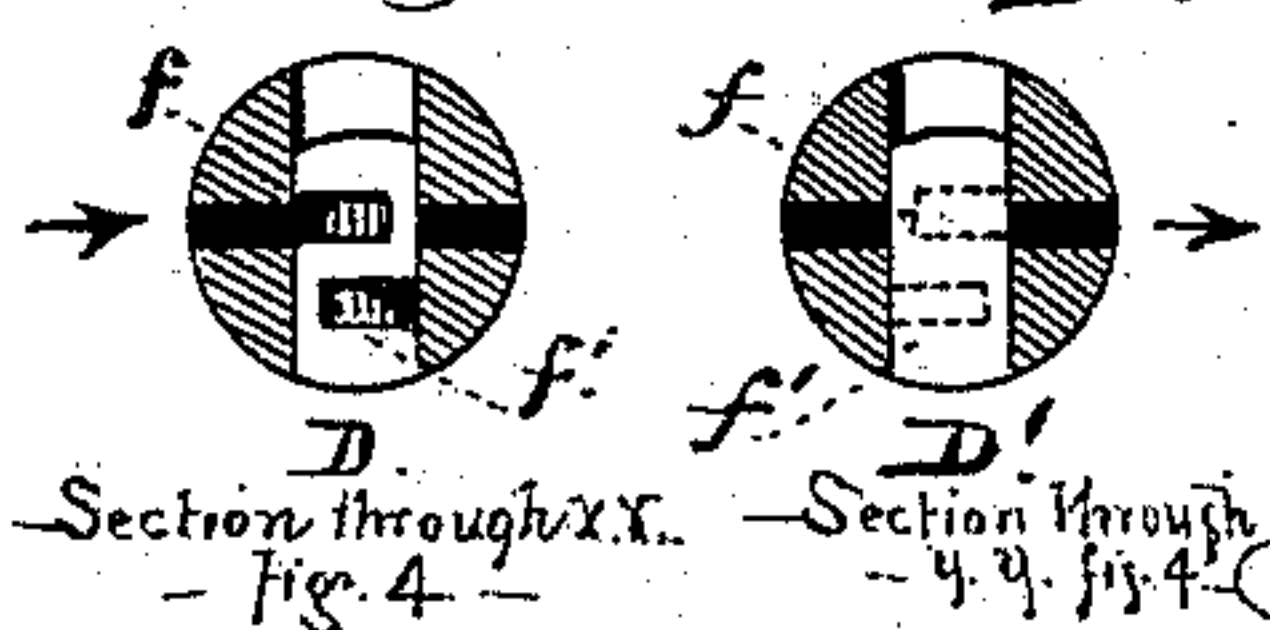


Fig. 6.

Fig. 7.



Section through X-X.  
- Fig. 4 -

Section through  
- Y-Y, fig. 4 -

Witnesses:  
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# UNITED STATES PATENT OFFICE.

EUGÈNE MOREAU AND SAMUEL W. DENNIS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNORS, BY MESNE ASSIGNMENTS, TO SAID DENNIS AND JOHN B. REYNOLDS, OF SAME PLACE.

## IMPROVEMENT IN MOTORS FOR DENTAL PLUGGERS.

Specification forming part of Letters Patent No. **205,289**, dated June 25, 1878; application filed October 10, 1877.

*To all whom it may concern:*

Be it known that we, EUGÈNE MOREAU and SAMUEL W. DENNIS, both of the city and county of San Francisco, in the State of California, have made and invented certain new and useful Improvements in Pneumatic Motors for Dentists' Tools and Instruments, which invention is fully set forth in the following specification and accompanying drawings.

In the said drawings, Figure 1 is a view of the cylinder or chamber, with its jacket or outer shell removed to show the arrangement of the ports and passages in and through the cylinder-shell. A detached view of the piston is also shown at the side of the cylinder. Figs. 2 and 3 are detail views of the piston-chamber, with the outer jacket removed to show the form and position of the ports and passages for conducting the air to and leading it from the interior of the cylinder, both above and beneath the piston. Fig. 4 shows the piston with its valves in position to lead and introduce the air above it, and Fig. 5 shows a similar position of the parts when admitting air below the piston. Fig. 6 is a sectional view through the piston at the valve-seat in the line *x x*, Fig. 4; and Fig. 7 is a section through the line *y y*, Fig. 4.

Similar letters of reference indicate like parts in all the drawings.

Our invention consists in the construction and arrangement, within a suitable cylinder or chamber, of a piston provided with a set of valves of peculiar construction, which act to control the admission and exit of the air at both ends of the cylinder, and thus produce a rapid reciprocation of the piston within the chamber; also, in the construction of the cylinder or chamber with a series of channels or passages between its inner and outer shell, and with ports of induction and exhaust for both the piston and its valves, whereby the movements of the parts are produced automatically by the pressure of the air led into and out through the passages, and without the employment of any auxiliary mechanism.

The object of our invention is the construction of an instrument for dentists' use that shall deliver blows of greater or less force and rapidity upon the head of the tool secured to

and upon its end, and in which the piston giving the blows shall be driven automatically and by the action of the air alone, introduced at both ends of the cylinder, all of which will be more fully set forth hereinafter.

The cylinder or chamber is formed in two parts, with a jacket or outer shell, B, and the main shell A within it, in the surface of which the inclined passages or channels *a b* are formed. These lead from the top of the cylinder around and down to the bottom, the one, *a*, communicating with the tube at the top of the cylinder, and forming the induction-passage, and the other one, *b*, leading to the outer air through the opening *x* in the jacket, and constituting the exhaust. C is the piston, formed of a solid cylinder, and made to fit and work smoothly within the chamber A. It has ports through it at the sides, and others communicating with them through the top and bottom ends.

The passages *c c'* conduct the air from the ports in the cylinder-shell and lead it to the ports *d d'* in the top and bottom of the piston, through which the air passes into the cylinder, and the passages *e e'* at the opposite side of the piston lead the air from within the cylinder at the proper time and discharge it into the exhaust passage or channel *b*.

The ports *d d'* in the ends of the piston C thus act alternately as induction and exhaust ports, according as they are brought into line with the passages *c c'* on the one side, or those *e e'* on the other side, through the medium of the valves D D'.

This arrangement of the ports and passages *c c' d d' e e'*, and the valves controlling and putting them in communication with each other is clearly shown in the section view of the piston, Figs. 4, 5, 6, and 7.

The valves D D' travel in the piston in seats cut transversely through it, and they are thus carried within it and brought into working position with the ports in the cylinder-shell, through which the air has its admission and exit; but the valves travel at a right angle to the movement of the piston, and are not affected by its reciprocations. They are provided with inclined passages or slots *f f'*, which are alternately brought, by the action of the air



upon the ends of the valve, into line with the valves  $d d'$ , and thus they put these ports first into communication with the inlets  $c c'$ , and afterward in connection with the exit-passages  $e e'$ .

The movements of these valves with reference to each other are such that when the port  $d$  at one end of the piston is brought in line with the inlet-passage  $c$  to admit the air, the opposite port  $d'$  is put in connection with the outlet-passage  $e'$  at the other end, to exhaust the air from behind the piston, and so with reference to the passages  $c c'$ , which constitute the inlet and outlet passages, respectively, to move the piston in the opposite direction.

The inclined channels or passages  $a b$  are provided with suitable ports or openings into the cylinder in proper position to admit the air and to lead it from within the cylinder. The larger openings  $g g$  admit the air whenever the passages  $c c$  in the piston are in line with them, and the others,  $h h$ , exhaust the air from within the cylinder under similar conditions through the passages  $c' e'$ . These channels have also smaller openings  $i i'$ , for admitting air to the ends of the valves at one side and exhausting it at the proper times, and other openings,  $j j'$ , at the opposite side of the cylinder, for moving the valves back or in the opposite direction.

When the air is admitted to one valve at one end or side through the opening  $i$  or  $j$ , it is exhausted from behind it at the opposite side through the exhaust  $i'$  or  $j'$ .

The detail view, Fig. 2, shows the arrangement of the induction-channel  $a$  and its ports and openings, and the view, Fig. 3, shows the exhaust-channel  $b$  and its ports.

It will be readily understood from the above that the air is admitted alternately above and below the piston to produce its reciprocation, and at the same time it is exhausted from that end opposite to which it is introduced; also, that the piston acts as a valve to open and close the larger openings, or to interrupt the flow of the air into and out through them; and that the valves  $D D'$  act to regulate the passage of the air into and out from the cylinder through the piston-ports  $d d'$ .

The cylinder  $A$  has a tube for attaching the air pipe or conductor to it, and a hollow stem or sleeve,  $E$ , is screwed or otherwise secured to the opposite end, within which sleeve the rod or spindle  $k$ , having the tool or operating-point in its end, is held. This rod or spindle has a reciprocating motion within the sleeve when struck by the piston, its reaction against the blows on its head being produced by a coil-spring situated within the sleeve acting against a fixed pin or collar on the rod, as will be readily understood. This sleeve  $E$  is detachable from the instrument, and is designed to hold tools and points of various shapes, for use in the different operations of excavating, plugging, drilling, and burnishing in dentistry.

This arrangement renders the machine automatic, and produces a rapid vibration of the piston within the cylinder without the use of springs or other auxiliary mechanism, for, when the piston is at the end of its stroke at one end of the cylinder, the ports and valves at that end are in position to admit the air upon the piston, while the ports and valve at the other end are in line to exhaust the air from behind the piston. The force and rapidity of the blows are governed by the amount and density or pressure of the air conducted and admitted to the cylinder from the reservoir or other source.

Having thus fully described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. The combination of the following parts or elements, viz: first, a cylinder or chamber having induction and eduction passages or channels  $a$  and  $b$  between its outer and inner shell, and ports or openings  $g g h h i i j j'$  in these passages, communicating with the interior of the cylinder; second, a piston within the cylinder, provided with ports  $d d'$  and passages  $c c' e e'$ ; third, the valves  $D D'$ , located within and carried by the piston, traveling at a right angle to or across the line of movement thereof, and controlling the admission and exit of the air to and from the cylinder.

2. The combination of the piston  $C$ , provided with ports  $d d'$ , each of which acts alternately as induction and eduction ports, and the passages  $c c'$ , with the two valves  $D D'$ , having passages, and reciprocating within said piston at right angles to the travel or momentum thereof, and acting to disconnect and connect in a regular manner the passages  $c c$  from and with the ports  $d d'$ , substantially as and for the purposes set forth.

3. In motors for operating dentists' instruments, the combination, with the chamber  $A$ , of the piston  $C$ , valves carried by such piston, and moving at right angles to the reciprocation of the same, and ports operating in connection with the valves to admit and exhaust compressed air into and from the cylinder at both ends of the piston, substantially as described.

4. In dentists' drills or pluggers, the chamber  $A$ , piston  $C$ , valves carried by the piston, and moving at right angles to the reciprocation of the same, and ports operating in connection with the valves to move the piston in both directions by compressed air, in combination with the rod or spindle  $k$ , forced forward by the piston and retracted by a spring, substantially as described.

In testimony that we claim the foregoing we have hereunto set our hands this 7th day of September, 1877.

EUGÈNE MOREAU.  
SAMUEL W. DENNIS.

Witnesses:

EDWARD E. OSBORN,  
WILLIAM HARNEY.