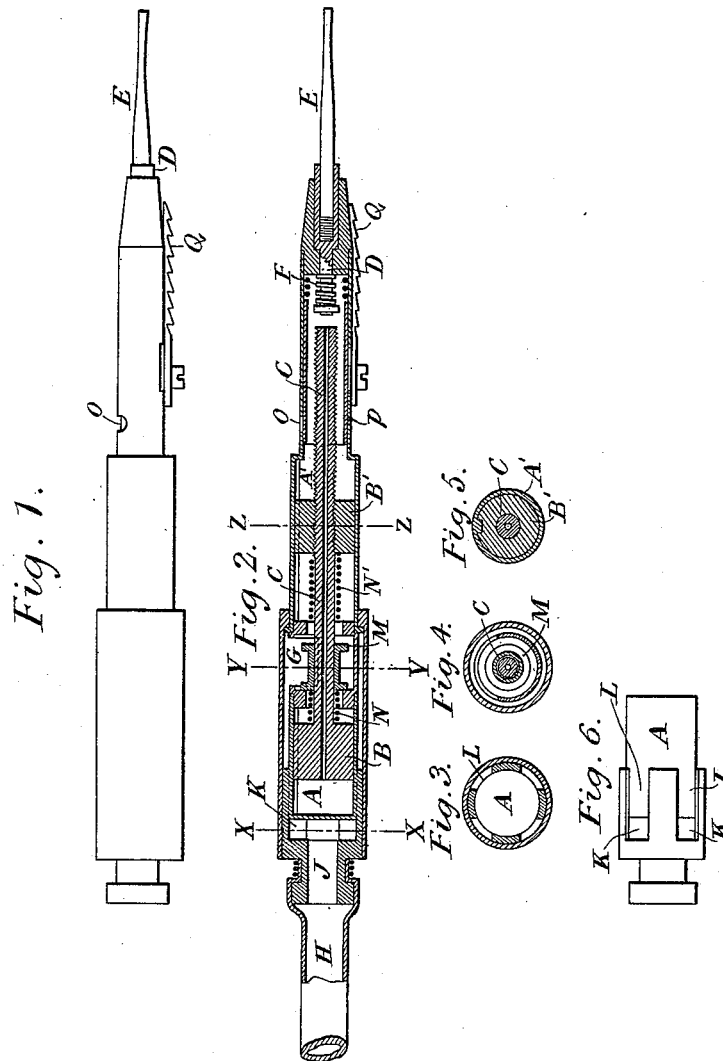


(No Model.)

F. E. THOMAS & R. P. LENOX.  
PNEUMATIC DENTAL PLUGGER.

No. 419,381.

Patented Jan. 14, 1890.



Witnesses  
Baltus D. Long.  
C. W. Brooke.

Inventors.  
Frederick Edward Thomas,  
Robert Broadfoot-Lennox,  
By their attys.  
Baldwin, Danderson & Wright

# UNITED STATES PATENT OFFICE.

FREDERICK EDWARD THOMAS AND ROBERT PROUDFOOT LENNOX, OF  
CAMBRIDGE, ENGLAND.

## PNEUMATIC DENTAL PLUGGER.

SPECIFICATION forming part of Letters Patent No. 419,381, dated January 14, 1890.

Application filed August 5, 1889. Serial No. 319,737. (No model.)

*To all whom it may concern:*

Be it known that we, FREDERICK EDWARD THOMAS, philosophical-instrument maker, residing at 7½ Jesus Lane, Cambridge, England, and ROBERT PROUDFOOT LENNOX, mechanical dentist, residing at 59 Corpus Buildings, Cambridge, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements in Pneumatic Dental Pluggers, of which the following is a specification.

This invention has for its object an improved percussive tool to be worked by pneumatic power and applicable as a dental mallet, and for other purposes.

In order that our said invention may be more fully understood and readily carried into effect, we will proceed to describe the drawings hereunto annexed.

Figure 1 is an elevation of an apparatus constructed according to our invention. Fig. 2 is a longitudinal section. Fig. 3 is a section on the line X X, Fig. 2. Fig. 4 is a section on the line Y Y, Fig. 2. Fig. 5 is a section on the line Z Z, Fig. 2. Fig. 6 is a side elevation of one of the parts.

A A' are the two cylinders in which work the pistons B B', which are fixed to a common piston-rod C, the end of which strikes against the holder D, which carries the tool E F, being a spiral spring which tends to bring the parts D and E back again. The cylinders are connected by an air-passage, in this instance shown as formed in the piston-rod C.

G is a valve-chamber, which is connected by the flexible tube H to bellows or other air-forcing apparatus. (Not shown in the drawings.) The air enters by the pipe J, passes along the radial passages K to the longitudinal passages L, formed between the outside of the cylinder A and the casing of the instrument to the valve-chamber G, in which works the valve M, sliding upon the piston-rod. The valve M is actuated by the spiral springs N N'. When the parts are in the position shown in Fig. 2, air is being admitted from the valve-chamber G into the cylinder A' and is tending to force the piston B' forward. As soon as the aperture O in the casing is opened by pushing forward the tube P by means of the serrated thumb-piece Q

fixed to it, the piston B' will move forward and the blow will be struck. Meanwhile the spring N will have been compressed and the spring N' relieved, so that the valve M will be shifted so as to cut off air from the cylinder A' and admit it to the cylinder A, when the reverse action takes place, the motion continuing so long as the opening O is uncovered by the tube, and the rapidity of the blows can be varied by more or less covering the opening O.

In the apparatus shown in the drawings the piston-rod is made hollow, so that the air from the cylinder A, as well as that from the cylinder A', escapes through the opening O.

As shown, the piston B' forms a nut upon the screw-threaded piston-rod, and is grooved, as shown in Figs. 2 and 5, to receive a feather upon the casing, so that by turning the casing the distance of the pistons apart can be varied. By thus adjusting the distance between the pistons the length of stroke may be varied, and by altering the length of the stroke the force of the blow and the speed of working are correspondingly changed.

What we claim is—

1. The combination, substantially as hereinbefore set forth, of two single-acting cylinders connected by an air-passage, a piston-rod, pistons on the rod and working within the cylinders, the percussive tool, and a valve controlling the admission of air to the cylinders.

2. The combination, substantially as hereinbefore set forth, of two single-acting cylinders connected by an air-passage, pistons working within the cylinders, a piston-rod on which both pistons are carried, the percussive tool, a valve interposed between the pistons and mounted on the piston-rod, and the springs interposed between the valve and the pistons.

3. The combination, substantially as hereinbefore set forth, of two single-acting cylinders, pistons working within the cylinders, a piston-rod having a passage through it connecting the outer ends of the two cylinders, the percussive tool actuated by the piston-rod, a valve upon the piston-rod between the pistons, and springs interposed between the pistons and the valve.

4. The combination, substantially as here-  
inbefore set forth, of two single-acting cylin-  
ders connected by an air-passage, pistons  
working within the cylinders, a piston-rod  
5 upon which both pistons are mounted, devices  
for adjusting the distance between the pis-  
tons, a valve upon the piston-rod between  
the pistons, and springs interposed between  
the valve and the pistons.

10 5. The combination, substantially as here-  
inbefore set forth, of two single-acting cylin-  
ders, pistons working within the cylinders, a  
piston-rod, devices for adjusting the distance

between the pistons, said piston-rod being  
formed with a passage connecting the outer 15  
ends of the two cylinders, a valve on the pis-  
ton-rod between the piston, and springs in-  
terposed between the valve and the pistons.

FREDERICK EDWARD THOMAS.

ROBERT PROUDFOOT LENNOX.

Witnesses:

A. E. KING,

11 *Bond Street, Cambridge, Solicitor's Clerk.*

H. G. WEEKLEY,

3 *Wellington Terrace, Holland Street, Ches-  
terton, Cambridge, Solicitor's Clerk.*