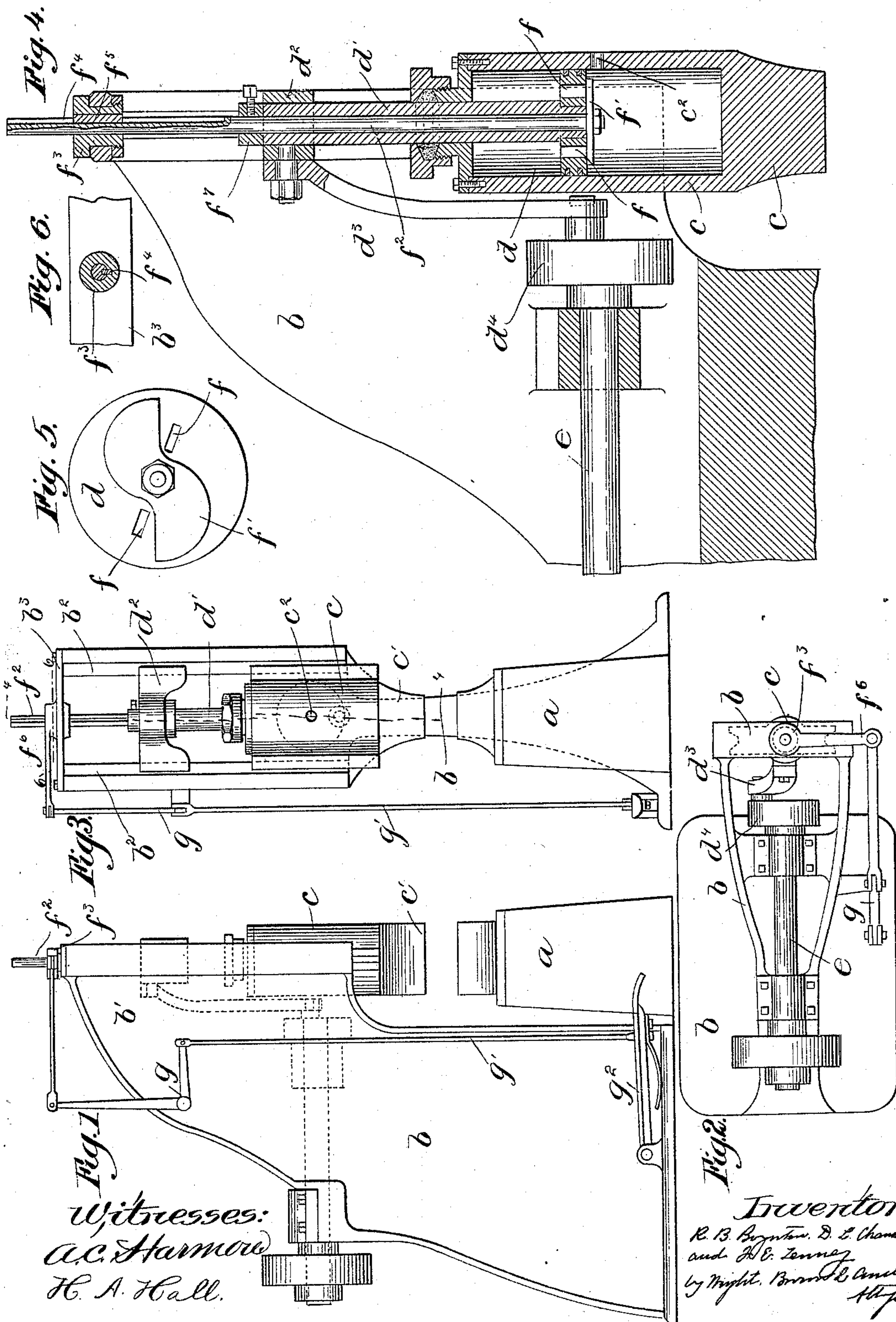


(No Model.)

R. B. BOYNTON, D. L. CHANDLER & F. E. TENNEY.  
POWER HAMMER.

No. 540,140.

Patented May 28, 1895.



Witnesses:  
A. C. Harmon  
H. A. Hall.

Inventors:  
R. B. Buxton, D. E. Chandler  
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Attys.



# UNITED STATES PATENT OFFICE.

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AND FRANK EVERETT TENNEY, OF AYER, MASSACHUSETTS; SAID CHANDLER  
ASSIGNOR TO SAID BOYNTON.

## POWER-HAMMER.

SPECIFICATION forming part of Letters Patent No. 540,140, dated May 28, 1895.

Application filed May 18, 1894. Serial No. 511,684. (No model.)

*To all whom it may concern:*

Be it known that we, ROYAL BULLARD BOYNTON, of West Townsend, and DANIEL L. CHANDLER and FRANK EVERETT TENNEY, of Ayer, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Power-Hammers, of which the following is a specification.

This invention relates to that class of power hammers in which the driving power is transmitted to the hammer-head through the medium of compressed air, a cylinder and piston being employed, and the hammer-head being carried by one of said parts while the power is applied to the other. The compressed air, besides acting as a cushion, constitutes an agent which can be so controlled as to vary the force of the stroke of the hammer-head.

The object of our invention is to simplify the means for controlling the compressed air, and to this end the invention consists in a power hammer which comprises a cylinder and piston, a hammer-head carried by one of said parts, means for reciprocating the other part, and a restricted passage affording communication from one side of the piston to the other throughout the piston's stroke.

The invention also consists in other novel constructions and arrangements of parts hereinafter described and claimed.

The accompanying drawings illustrate a construction by which the invention may be carried out.

Figure 1 shows a side elevation of the hammer. Fig. 2 shows a top plan view of the hammer. Fig. 3 shows a front elevation of the hammer. Fig. 4 shows a section on line 4 4 of Fig. 3. Fig. 5 shows a bottom view of the piston. Fig. 6 shows a section on line 6 6 of Fig. 3.

The same letters of reference indicate the same parts in all the figures.

In the drawings, the letter *a* designates the anvil, and *b* the supporting frame of the machine, which has a bifurcated portion *b'* overhanging the anvil, and its two branches having vertical slide-ways *b<sup>2</sup>*.

A cylinder *c* is provided with grooved ribs which engage said slide-ways, and said cyl-

inder is extended at the lower end to form the hammer-head *c'*. The cylinder has an open port *c<sup>2</sup>* centrally located in one side. A piston *d* fits the bore of the cylinder, and is carried on the end of a tubular rod *d'*, which extends through a stuffing-box in the upper end of the cylinder, and is fastened to a cross-head *d<sup>2</sup>* fitting the ways *b<sup>2</sup>*. A pitman *d<sup>3</sup>* connects said cross-head with a crank *d<sup>4</sup>* on a driving-shaft *e*. Through these means the piston is reciprocated.

The piston is formed with two restricted passages *f* extending through it, and a valve *f'* in the form of a winged plate, fits against the under side of the piston and controls said passages. The said valve is carried on the lower end of a rod *f<sup>2</sup>* which extends through the tubular piston-rod and beyond the same through a cross-piece *b<sup>3</sup>* at the top of the frame *b*. A collar *f<sup>3</sup>* is supported in said cross-piece so as to turn therein, and the rod *f<sup>2</sup>* has a groove *f<sup>4</sup>*, which is engaged by a feather *f<sup>5</sup>* on the said collar.

An arm *f<sup>6</sup>*, projecting from the collar, is connected with one arm of a bell-crank lever *g* pivoted to the frame *a* and connected by a rod *g'* with a treadle *g<sup>2</sup>*. It will be seen that by depressing the treadle *g<sup>2</sup>* the valve *f'* will be turned. The valve-rod *f<sup>2</sup>* is prevented from moving longitudinally in the tubular piston-rod by a collar *f<sup>7</sup>* fastened to the valve-rod and bearing against the upper end of the piston-rod.

In the operation of the hammer, the reciprocations of the piston impart the stroke to the hammer-head through the air compressed between the piston and the ends of the cylinder, the port *c<sup>2</sup>* admitting air alternately on opposite sides of the piston to relieve the side opposite that where the compression takes place. With the passages *f* in the piston closed by the valve *f'*, the maximum force of the hammer blow is obtained. When a lighter blow is desired, the operator, by pressing on the treadle *g<sup>2</sup>*, turns the valve *f'* and opens the passages *f* more or less, and the air in the cylinder will not be compressed in the same degree as before. It will be observed that this is a very simple construction for accom-



plishing the desired end. By locating the port centrally, as shown, a check-valve is dispensed with, and the construction thereby further simplified.

5 It is evident that variations may be made in the structure shown, without departing from the invention. For example, the arrangement could be reversed by operatively connecting the cylinder with the reciprocating power and rigidly connecting the hammer  
10 with the piston, the hammer of course being then a separate part from the cylinder.

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

15 1. A power-hammer comprising in its construction a cylinder and piston, a hammer-head carried by one of said parts, means for reciprocating the other part, and a restricted  
20 passage affording communication from one side of the piston to the other throughout the piston's stroke.

25 2. A power-hammer comprising in its construction a cylinder and piston, a hammer-head carried by one of said parts, means for reciprocating the other part, a restricted passage affording communication from one side of the piston to the other throughout the pis-

ton's stroke, and a valve controlling the area of said passage.

3. A power-hammer comprising in its construction a cylinder and piston, a hammer-head carried by one of said parts, means for reciprocating the other part, a restricted passage extending through the piston, and a  
35 valve adjustable to cover said passage or to leave it uncovered throughout the piston's stroke.

4. A power-hammer comprising in its construction a cylinder having a centrally-located  
40 atmospheric port, a piston, a hammer-head carried by one of said parts, means for reciprocating the other part, and a restricted passage affording communication from one side of the piston to the other throughout the piston's stroke.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 15th day of May, A. D. 1894.

ROYAL BULLARD BOYNTON.

DANIEL L. CHANDLER.

FRANK EVERETT TENNEY.

Witnesses:

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