

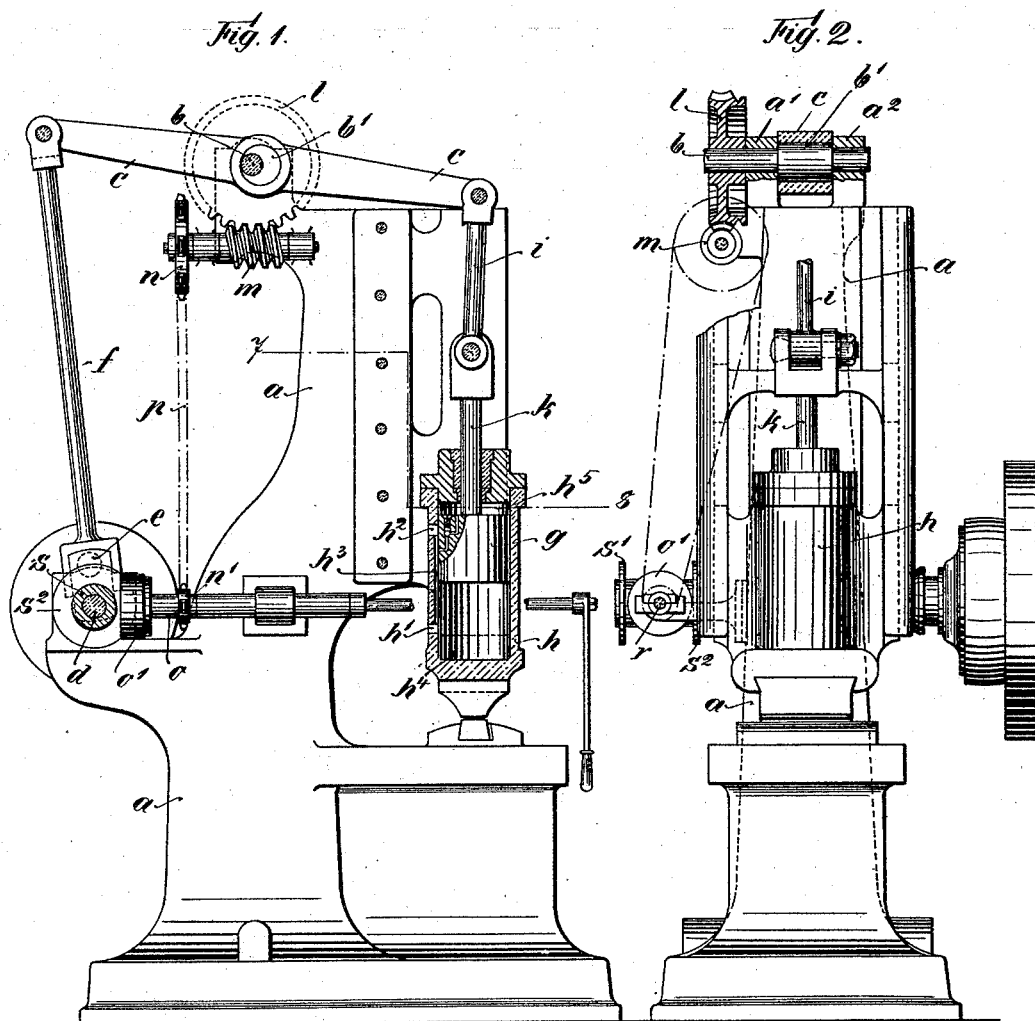
(No Model.)

2 Sheets—Sheet 1.

J. BÊCHÉ.  
PNEUMATIC HAMMER.

No. 526,606.

Patented Sept. 25, 1894.



Witnesses  
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(No Model.)

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Fig. 3.

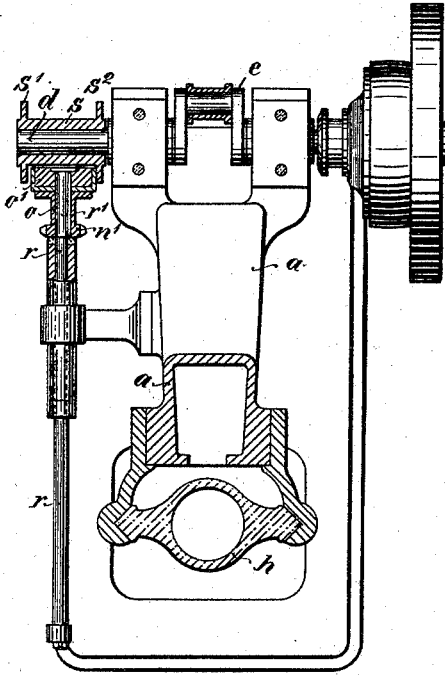


Fig. 4.

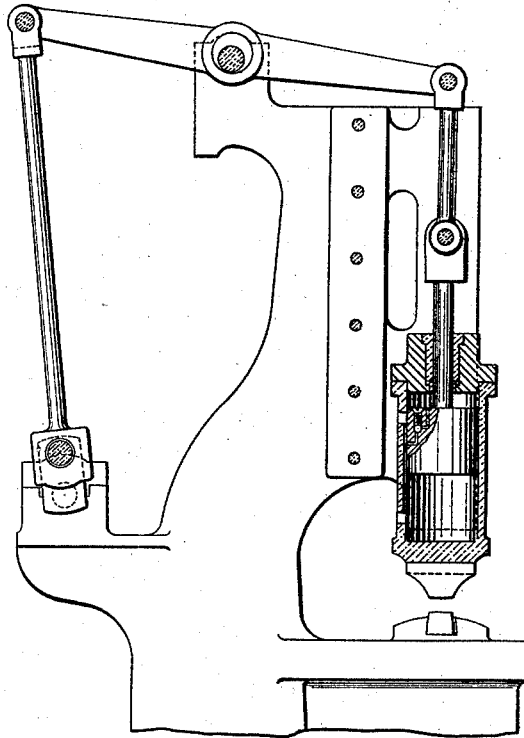


Fig. 5.

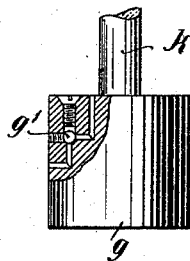
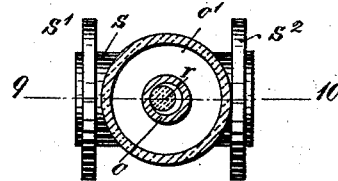


Fig. 6.



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# UNITED STATES PATENT OFFICE.

JEAN BÉCHÉ, OF HÜCKWESWAGEN, GERMANY.

## PNEUMATIC HAMMER.

SPECIFICATION forming part of Letters Patent No. 526,606, dated September 25, 1894.

Application filed January 30, 1894. Serial No. 498,537. (No model.)

*To all whom it may concern:*

Be it known that I, JEAN BÉCHÉ, engineer and manufacturer, a subject of the King of Prussia, German Emperor, and a resident of Hückeswagen, in the Province of the Rhine, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Pneumatic Hammers, of which the following is a specification.

10 This invention refers to pneumatic hammers, in which the hammer-head proper is formed by a heavy cylinder containing a piston, and in which this latter is employed for operating said cylinder or hammer-head; and  
15 my improvements in such pneumatic hammers relate to means for altering the height of stroke of the head, and also to means for automatically replacing the air for the upper air-cushion, if the quantity of the air of this  
20 cushion has become a too small one, or has entirely been supplanted.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts  
25 throughout the several views, and in which—

Figure 1 is a side-view of my improved pneumatic hammer, the cylinder or head being in section, and being shown in its lowest position, or resting on the anvil. Fig. 2 is a  
30 front-view of the machine; the beam, the worm-wheel and the two bearings for the shaft holding those two parts being in section. Fig. 3 is an upper-view, partly in section; the section of the frame being taken  
35 on line 7—8 of Fig. 1; the section of the friction-device being taken on line 9—10 of Fig. 6; the parts held by the removed part of the frame being also removed, together with the piston and the cylinder-cover. Fig. 4 is a side-  
40 view of the upper part of the machine, the head being lifted. Fig. 5 is an enlarged view of the piston, partly in section. Fig. 6 is a front-view of the friction-device above mentioned (Fig. 3).

45 The frame *a* of the pneumatic hammer (Figs. 1 to 3) holds on its top the shaft *b* in the two bearings *a'* *a''*. Said shaft has an eccentric *b'* carrying the beam *c*. This beam may be oscillated from shaft *d* by means of crank *e*  
50 and connecting-rod *f*, and transfers its motion to the piston *g* within cylinder *h* by means of

connecting-rod *i* and piston-rod *k*. In order to turn eccentric *b'*, or, in other words, in order to raise or lower the beam *c* by means of said eccentric, the shaft *b* has been provided with a worm-wheel *l* gearing with a  
55 worm *m*. This latter is firmly connected with a chain-wheel *n*, and may be turned from a sleeve *o* by means of chain-wheel *n'* and chain *p*. Sleeve *o* is arranged on the eccentric end  
60 *r'* of a shaft *r*.

The left-hand end of shaft *d* carries a sleeve *s* with two flange-like friction-disks *s'* *s''*, the rotations of which latter may be transferred on sleeve *o* by the broad, disk-like end-  
65 piece *o'* of said sleeve *o*, so that by causing contact of disk *o'* with one or the other of the disks *s'* *s''* the worm-wheel *l* may be turned in one or the other direction, and the beam may, thus, be raised or lowered, just as required  
70 for a heavier or slighter blow of the hammer head.

The differences in the height of the hammer-head caused by another position of the eccentric *b'* may well be seen from a comparison of Figs. 1 and 4; Fig. 1 showing the eccentric in its middle position, and Fig. 4 showing  
75 the same in its highest one.

The interior space of cylinder *h* communicates with the outer air by means of two ap-  
80 ertures *h'* *h''* connected at the inside of the cylinder by a groove or channel *h'''*. The said apertures are situated some distance apart from the bottom and the cover, so that spaces *h<sup>4</sup>* *h<sup>5</sup>* are formed, in which some air may be  
85 kept back and compressed for forming cushions. If, now, the hammer moves with but slow speed, the air contained in space *h<sup>5</sup>* could by and by escape, as the head then moves with the same velocity as the piston. If, there-  
90 after, a greater speed is chosen, a vacuum would arise above the piston, which, as a matter of course, can be of very injurious effect. To avoid this, an automatic valve formed by  
95 a ball *g'* (Fig. 5) has been arranged in the piston, said valve acting in such a manner, that it allows the entrance of air into said space *h<sup>5</sup>*, but hinders said air from escaping out of that space, so that, therefore, neither  
100 a vacuum nor even a rarefaction of air can happen.

Having thus fully described the nature of

this invention, what I desire to secure by Letters Patent of the United States is—

1. In a pneumatic hammer, in which the head is formed by a cylinder and is moved by a piston arranged therein, the combination with a beam *c* adapted to transfer the movement of the main shaft *d* onto said piston (*g*), of an axle *b* having an eccentric *b'* and holding said beam by means of said eccentric, the latter being adapted to be turned from a shaft *o* by means of chain-wheel *n'*, chain *p*, chain wheel *n* and worm *m*, and being adapted to raise or lower said beam, for the purpose as described.

2. In a pneumatic hammer in which the head is formed by a cylinder, and is moved by a piston arranged therein, the combination with a beam (*c*) adapted to transfer the movement of the main-shaft (*d*) to said piston (*g*), of an axle (*b*) having an eccentric (*b'*), and holding said beam (*c*) by means of said eccentric (*b'*), said main shaft (*d*) having a sleeve (*s*) with two friction-wheels (*s'* *s''*) adapted to turn a third friction-wheel (*o'*) situated between them in one or the other direction, said third friction-wheel (*o'*) being connected with a chain-wheel (*n'*), and a worm (*m*) gearing with a worm-wheel (*l*) on

shaft (*b*) being connected with a chain-wheel (*n*), the latter being driven from wheel (*n'*) by a chain (*p*), for the purpose as described.

3. In a pneumatic hammer in which the head is formed by a cylinder, and is moved by a piston arranged therein, the combination with a beam (*c*) adapted to transfer the movement of the source of force to said piston, of an axle (*b*) having an eccentric (*b'*), and holding said beam (*c*) by means of said eccentric (*b'*), the latter being adapted to raise or lower said beam and piston, the piston containing an automatic ball-valve (*g'*) adapted to admit air to the space (*h<sup>5</sup>*) of the cylinder (*h*) above the piston, said cylinder (*h*) having apertures (*h'* *h''*) connected by a channel (*h<sup>3</sup>*) said channel being adapted to admit air to the space above the piston through said automatic ball-valve, for the purpose as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JEAN BÊCHÉ.

Witnesses:

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