

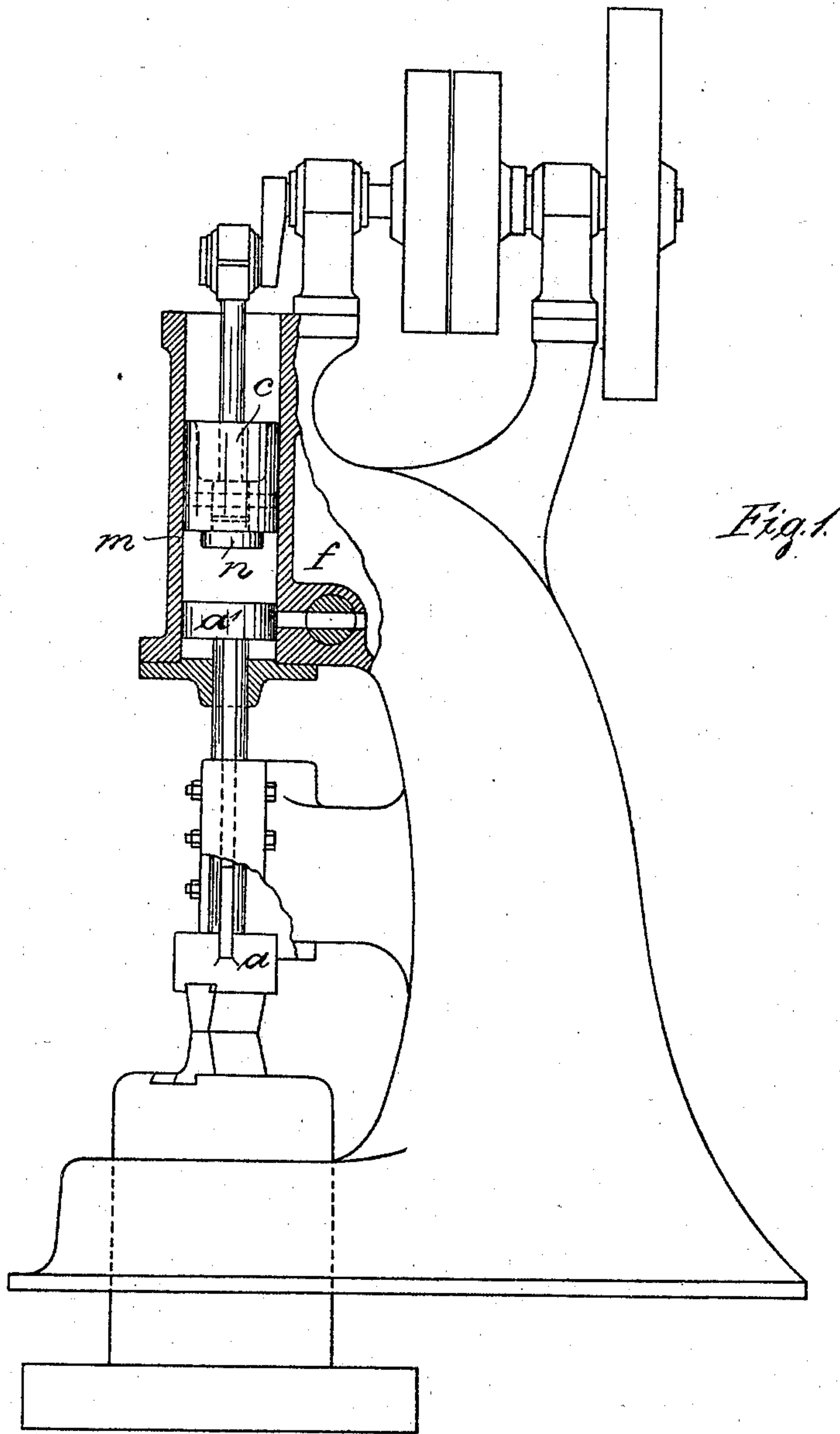
No. 683,374.

Patented Sept. 24, 1901.

J. BÉCHÉ.  
PNEUMATIC HAMMER.  
(Application filed June 18, 1901.)

(No Model.)

2 Sheets—Sheet 1.



*Fig. 1.*

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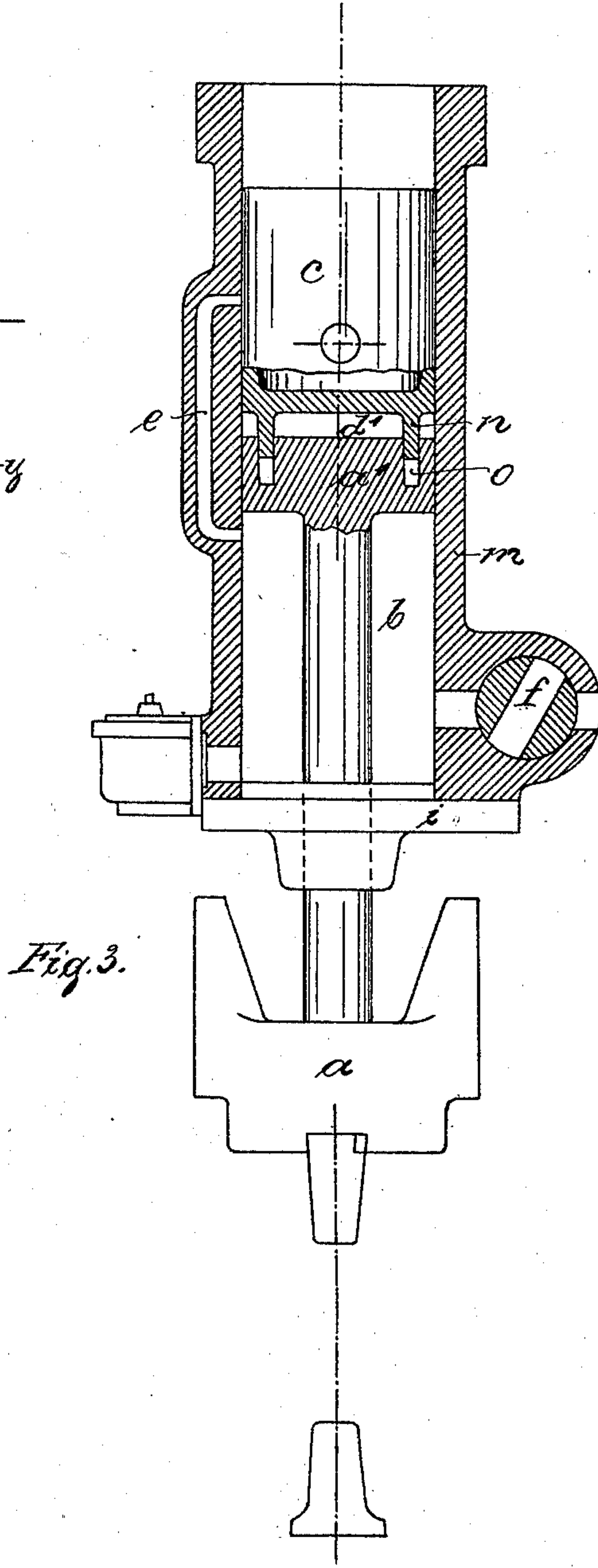
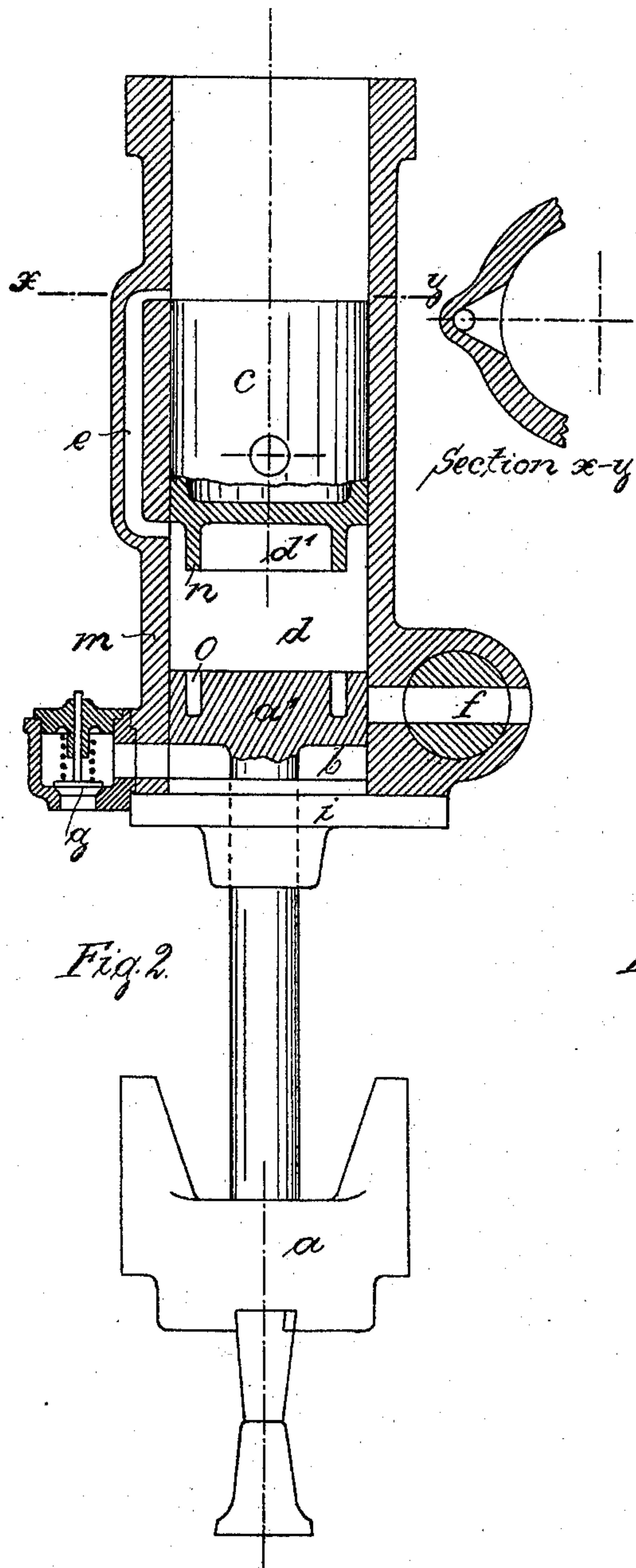
Patented Sept. 24, 1901.

J. BÉCHÉ.  
PNEUMATIC HAMMER.

(Application filed June 13, 1901.)

(No Model.)

2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

JEAN BÊCHÉ, OF HÜCKESWAGEN, GERMANY.

## PNEUMATIC HAMMER.

SPECIFICATION forming part of Letters Patent No. 683,374, dated September 24, 1901.

Application filed June 13, 1901. Serial No. 64,445. (No model.)

*To all whom it may concern:*

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

My invention relates to such pneumatic hammers in which the striking-block is lifted by the vacuum between the hammer-piston and the operating-piston and is dropped down by the air-pressure arising between said pistons owing to the reversed movement of the operating-piston. In such pneumatic hammers it is always a great disadvantage that owing to the different heights of the welding or forging pieces the air volume between the hammer-piston and the operating-piston changes continually. In order to remedy this evil, I provide an arrangement by means of which it is attained that at the moment at which the striking-block is in its lowest position the space between the hammer-piston and the operating-piston has atmospheric-air pressure. I attain this object by means of the arrangement illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the pneumatic hammer. Fig. 2 shows the parts by means of which the effect of the invention is attained. Fig. 3 shows the same parts in another position.

The operating-piston *c* is moved upward and downward in the cylinder *m* by means of a crank rotated in the well-known manner. In the same cylinder *m* the hammer-piston *a'* is arranged, which piston is connected in the well-known manner by means of a connecting-rod with the striking-block *a*. In Fig. 2 the operating-piston and the hammer-piston are shown in their lowest position. The space *d* between the pistons *c* and *a'* is connected by means of a channel *e*, provided in the wall of the cylinder *m* with the space above the piston *c*. The upper opening of the channel *e* is preferably constructed in the form of a horizontal slot, as shown by the section on line *x y*, Fig. 2. By means of the arrangement of the channel *e* it is attained that in the moment the operating-

piston *c* reaches its lowest position the space *d* is connected with the atmosphere, so that atmospheric-air pressure will always be restored between the two pistons in whatever position the hammer-piston *a'* may be. The space *b* underneath the piston *a'* is connected by means of a cock *f* and a valve *g* with the outer atmosphere. In case the cock *f* is opened the hammer-piston *a'* will follow the upward and downward movement of the operating-piston *c*. If the cock *f* is closed, the piston *a'* will be raised upward by the vacuum, and air will enter into the space *b* through the valve *g*. Now this valve *g* is constructed in such way that the air is allowed to enter into the room *b*, but not leave the same. Hereby is attained that if the cock *f* is closed the piston *a'*, and at the same time the striking-block *a*, remain in their upper position by the piston *a'* resting upon the air-cushion inclosed in the space *b*. Now in case very tall pieces are to be forged, so that the movement of the striking-piston is reduced, the danger arises that the two pistons *c* and *a'* touch one another, as in this case only a small quantity of air is contained in the space *d*. This danger is still augmented by the arrangement of the channel *e*, by means of which it is attained that no higher pressure than the pressure of the atmosphere can be attained between the two pistons when the same are in their lowest position, so that the quantity of air between the two pistons cannot be enlarged by compressing the same. In the position shown in Fig. 2 it will be seen that the air contained in the space *d* will leave this space through the channel *e* in case the piston *a'* is raised, so that in case a tall forging-piece is situated under the striking-block the upper surface of the piston *a'* and the lower surface of the piston *c* will nearly touch and will touch surely as soon as the operating-piston *c* begins to work. In order to prevent the two pistons from touching one another, the piston *c* is provided on its lower surface with an annular projection *n*, while the hammer-piston *a'* is provided with a corresponding annular groove *o*. Now in case the pistons *c* and *a* approach one another an air-cushion will always arise within the space *d'*—that is to say, within the space surrounded



by the annular projection *n*. By means of this air-cushion a touching of the two pistons is made perfectly impossible.

In case flat pieces are to be forged—as, for instance, scythes, shovels, pans, or the like—a different striking force arises sometimes by the striking-block being rebounded, so that unequal strokes arise and a good forging is impossible. In order to prevent this, the cock *f* is arranged a small distance above the cylinder-bottom *i*. Hereby it is attained that in forging very flat pieces the piston *a* enters the space between the opening of the cock *f* and the cylinder-bottom *i*, whereby an air-cushion is formed in the space. The inertia of the striking-block is by means of the arrangement of this air-cushion rendered partly ineffective a moment before the striking-block touches the piece to be forged, whereby it is attained that the striking-block moves always equally and a sure and even effect of the same takes place.

Having thus fully described the nature of my said invention, what I desire to secure by Letters Patent of the United States is—

1. In pneumatic hammers, consisting of a cylinder with two pistons, one of which is moved upward and downward by the vacuum and air-pressure arising by the movement of the other piston, the arrangement of a channel within the cylinder-wall, the upper opening of which channel is situated directly above the spot at which the operating-piston stands in its lowest position, the other end of which is connected with the space between the two pistons, substantially as set forth.

2. In pneumatic hammers, the combination with a cylinder, two pistons situated within the same, a channel provided within the cylinder-wall, said channel being adapted to connect this space between the two pistons with the atmosphere in the moment in which the upper operating-piston stands on its lowest point, of an annular projection provided

on the lower surface of the upper operating-piston, and an annular groove corresponding to this projection in the lower hammer-piston, substantially as set forth.

3. In pneumatic hammers, the combination with a cylinder, two pistons situated within the same, a channel provided within the cylinder-wall, said channel being adapted to connect the space between the two pistons with the atmosphere in the moment, in which the operating-piston stands on its lowest point, an annular projection provided on the lower surface of the upper operating-piston, and an annular groove corresponding to this projection in the lower hammer-piston, of a cock connecting the cylinder with the atmosphere, and situated a short distance above the cylinder-bottom, substantially as set forth.

4. In pneumatic hammers, the combination with a cylinder, two pistons situated within the same, a channel provided within the cylinder-wall, said channel being adapted to connect the space between the two pistons with the atmosphere in the moment, in which the upper operating-piston stands on its lowest point, an annular projection provided on the lower surface of the upper operating-piston, an annular groove corresponding to this projection in the lower hammer-piston, a cock connecting the cylinder with the atmosphere and situated a short distance above the cylinder-bottom, of a valve situated directly above the cylinder-bottom, said valve being adapted to allow the atmosphere to enter but not to leave the space below the piston, substantially as described.

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

JEAN BÉCHÉ.

Witnesses:

OTTO KÖNIG,  
T. A. RITTERSHAUS.