

(No Model.)

J. H. BRUCE.

PUMP.

No. 387,138.

Patented July 31, 1888.

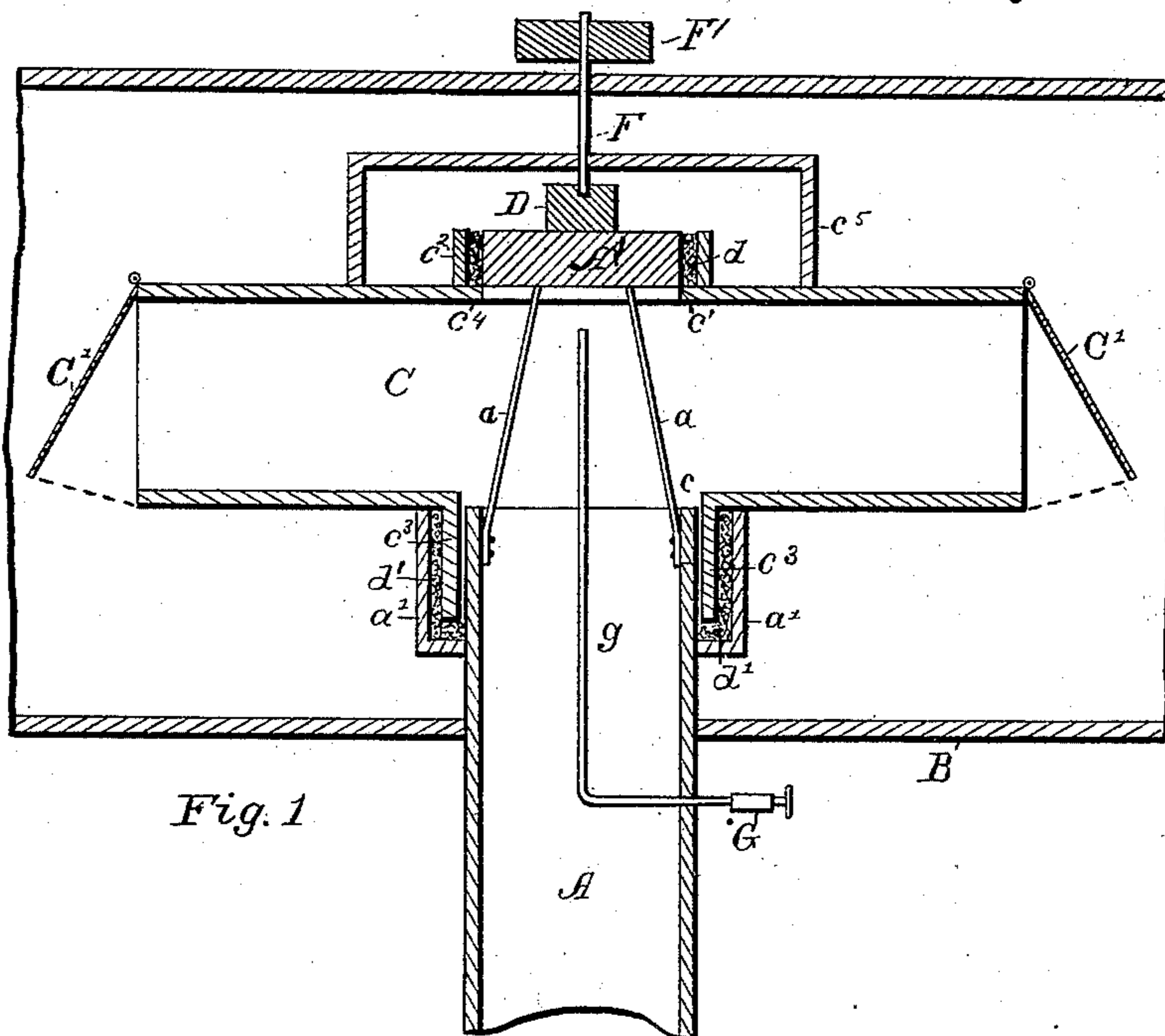
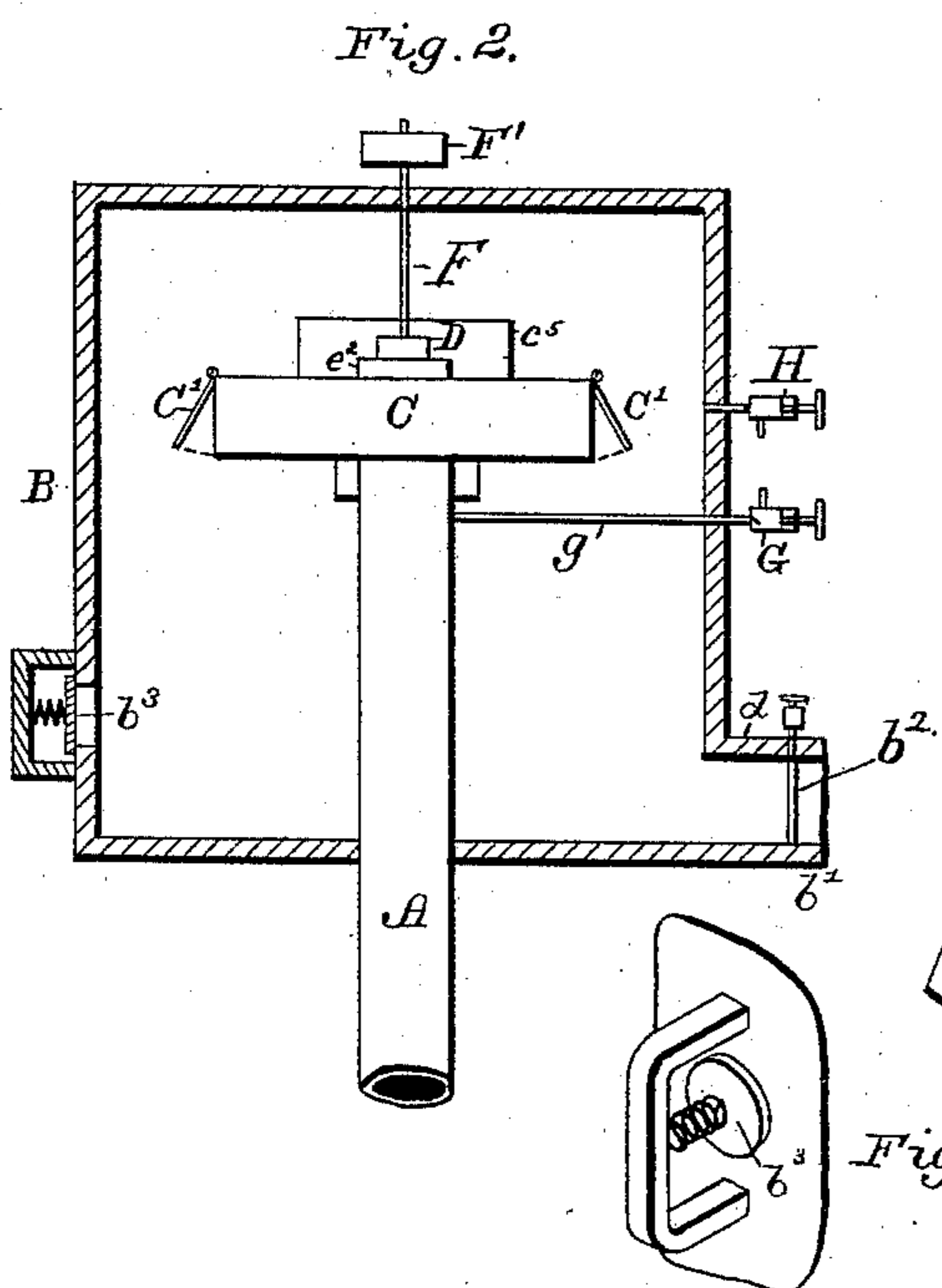
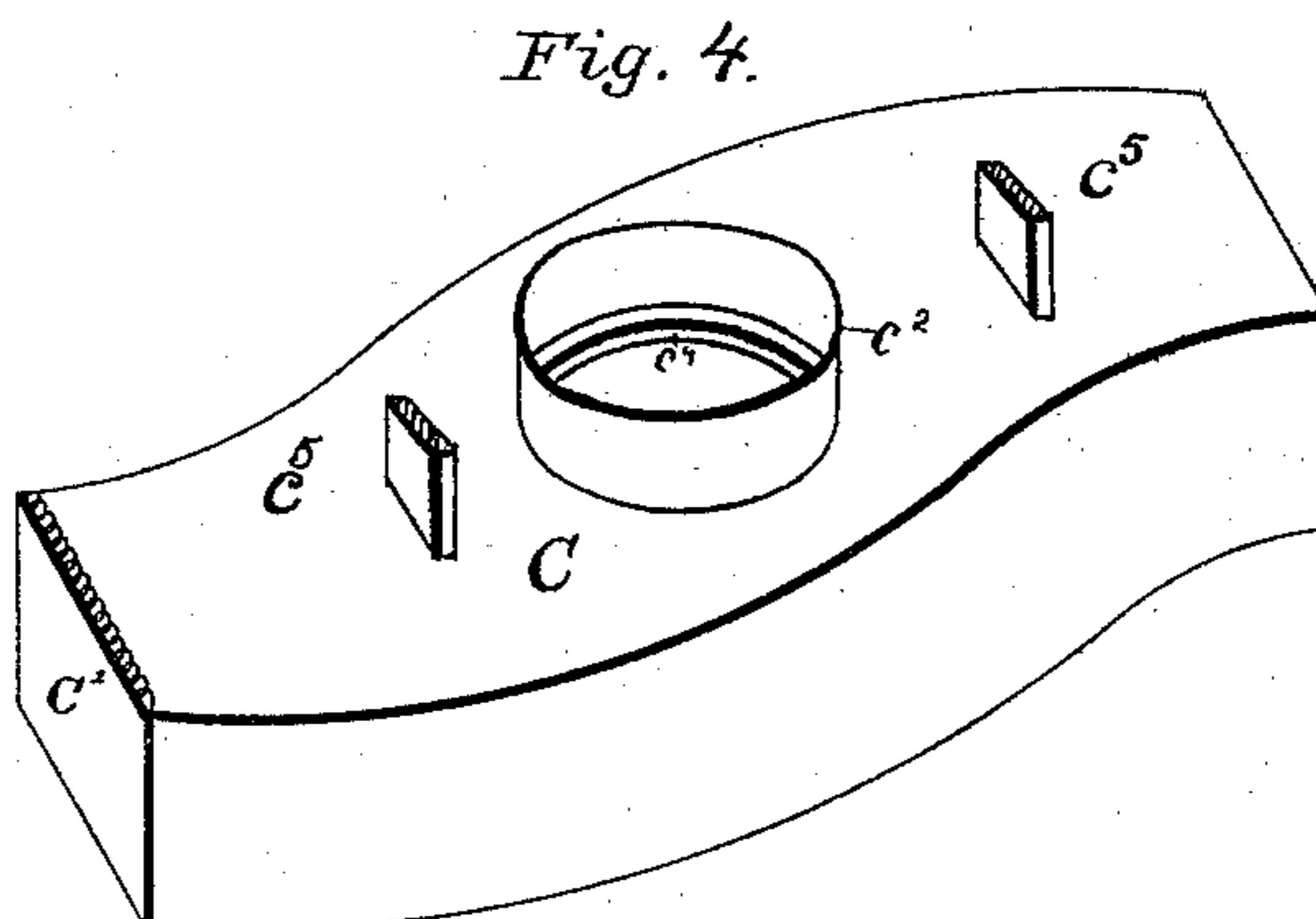


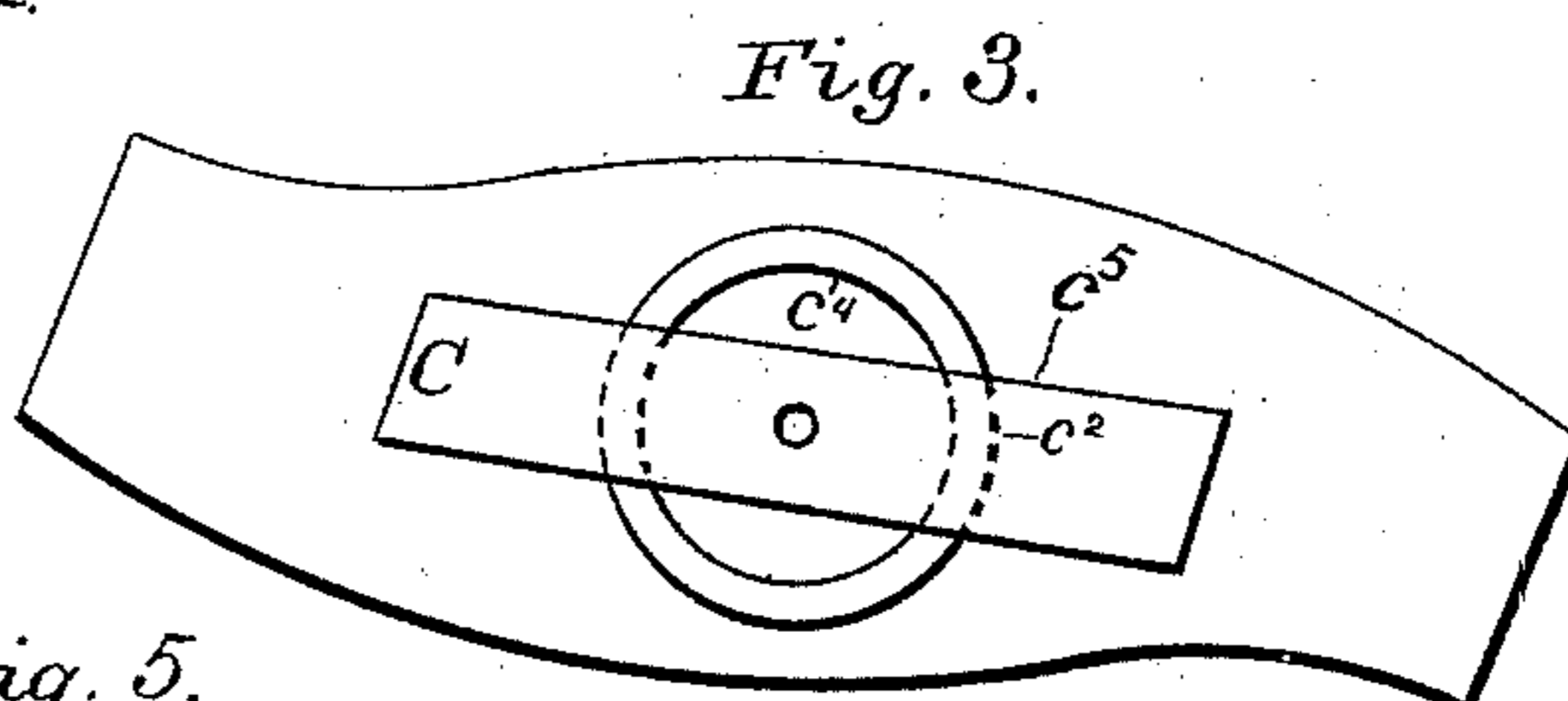
Fig. 1



*Fig. 2.*



*Fig. 4.*



*Fig. 3.*

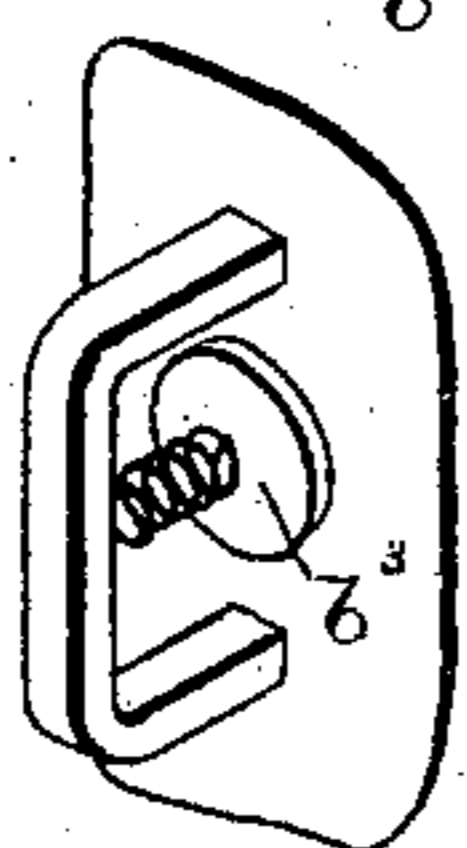


Fig. 5.

*Witnesses;*

L. F. Fischer,  
Theo. J. Fischer.

*Inventor.*

Inventor.  
Joseph H. Bruce  
By his Attorney L. Deane.

# UNITED STATES PATENT OFFICE.

JOSEPH H. BRUCE, OF ELBERTON, GEORGIA.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 387,138, dated July 31, 1888.

Application filed June 1, 1886. Serial No. 203,836. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH H. BRUCE, a citizen of the United States, residing at Elberton, in the county of Elbert and State of Georgia, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a vertical central section of this device. Fig. 2 is a view, partly in section and partly in elevation, showing the hollow and revolving part in position in the case. Fig. 3 is a top plan view of the revolving part or arms. Fig. 4 is a perspective view of the same part; Fig. 5, a detail showing side outlet-valve of the case.

This invention is an improvement in pumps, more particularly that class called "centrifugal;" and the novelty consists in the construction, combination, and arrangement of the several parts, all as will now be more fully described and claimed, reference being had to the accompanying drawings.

In the drawings, A denotes an upright pipe or tube fixed in an air-tight casing, B. This tube communicates at its lower end with the water. Directly over its upper end the cap A' is secured by the rods *a*, which are fastened at their respective ends to the pipe and cap. The hollow part or arms C, by means of the central cylindrical openings, *c c'*, at top and bottom, are adapted to be fitted over and upon the upper end, A', of the pipe A, constructed as aforesaid, and to be revolved thereon. These openings *c c'* are flanged, as shown at *c<sup>2</sup> c<sup>3</sup>*, for a purpose to be hereinafter stated. This part C in top plan is preferably thickest in the center, its sides curving thence in opposite directions and contracting somewhat toward their ends, where are attached the flap-valves C', which are hinged to it at their upper edges. In vertical height this part C is the same throughout its length; but, while I prefer the form or shape as shown, this mere shape may be very considerably altered without in any essential degree changing the function of this part of my device. The upper central circular opening, *c*, of this part C, flanged at *c<sup>2</sup>*, will be fitted to and on cap A' of pipe A air-tight by packing *d* between it and the cap A' resting on the horizontal flange *c<sup>4</sup>* around the opening *c* of the part C. The lower central

flanged opening, *c'*, of the part or arms C is a little larger in diameter than pipe A, and its downward flanges *c<sup>3</sup>* fit into the seat or bearing *a'* about the upper part of the pipe A, which bearing is secured on and to said pipe in any suitable way or manner. It is provided with packing *d'*, so as to make the joint air-tight and afford at the same time ease of movement for the arms or part C. On the upper side of cap A' is fixed a block, E, which forms the bearing or seat for the vertical shaft or spindle F, which passes through and is fixed to the support or arch *c<sup>5</sup>* on the upper side of the part C. On the upper end of the spindle is the pulley F', to which a band from any convenient power is attached. By this means the part C can be revolved around the top of the pipe at any desired speed; or, instead of the pulley, a cog-wheel can be placed on the upper end of the shaft and power communicated by gear-wheels; but this is merely the mechanical equivalent of what has been above described.

The exit or discharge pipe *b'* in the lower part of the case B is provided with a valve, *b<sup>2</sup>*. To start the pump into operation, this valve is closed and the air compressed in the case by the compressor H in its upper part, operated in any convenient way. The air-pump G, placed in any convenient location relative to pipe A and communicating therewith by pipe *g* and operated in any convenient way, is then set in motion and exhausts the air from the pipe A. The water is thus caused to rise in said pipe and fill the arms. The arms, being now put in motion and given a sufficient speed, cause the water to pass through the valved openings in the arms and into the case or tank and will be discharged thence by opening the valve *b<sup>2</sup>* in the pipe *b'*.

In the side wall of the casing B is an automatic valve, *b<sup>3</sup>*, which, being actuated by the pressure of the water inside of the case, will always keep the water below the revolving part or arms C.

This structure is very simple, cheap, and durable and very efficient in its operations. It will be noted that the upper end of the pipe or tube as formed by its cap passes entirely through the hollow or revolving part, thereby equalizing the pressure on the outside of the hollow part when the air is withdrawn from

the inside—that is to say, while the higher the water is lifted the more power it will take to do the work, yet the weight of the revolving part on the bearings will not increase with the height of the column of water, since every portion of the revolving part is subject to the same pressure. This feature in my invention is of large consequence, since the varying degrees of pressure will sometimes be very great. It is consequently very necessary that the movable parts shall be able to work with the greatest possible ease, not only when the pressure is small, but also when it is as great as it can be made, and this result, as has been found by practice, has been attained in my invention.

Having now described my invention, what I consider new, and desire to secure by Letters Patent, is—

1. In a pump, a water pipe or tube provided at its upper end with a part or arms having valved ends and flanged upper and lower central openings, and supported by and revolving on a cap which is supported upon the upper end of said pipe by rods which pass entirely through the revolving part, combined with an air pump or exhaust, the whole surrounded by an air-tight case or tank, substantially as and for the purposes set forth.

2. The combination of the vertical pipe A, having a cap, A', supported above its upper end, the hollow and revolving part or arms C, having two central openings, *c* and *c'*, embracing, respectively, the upper end of said pipe and cap, and provided at its outer ends with the flap-valves C', the air-exhaust G, and the case B, substantially as described.

3. In a centrifugal pump, the revolving part C, having horizontal arms with valved outer ends, and having openings at its top and bottom between said arms, in combination with the pipe A, which enters the lower opening in the said revolving part, and the cap A', sup-

ported upon said pipe A and closing the upper opening in the revolving part, said part being supported upon said cap, substantially as described.

4. In a pump, the hollow and revolving part C, thickest from side to side at the middle and of uniform vertical height, its arms or ends curving in opposite directions and tapered or contracted and provided with valves, and having a supporting part on its upper side, combined with a spindle fixed to said supporting part, and a pulley and the pipe A and cap supported thereon above its end and in line therewith, upon which said spindle rests, an air-exhaust, and an air-tight case, substantially as described.

5. In a pump, the air-tight casing B, the pipe A, having at its upper end the cap A', supported by rods attached to said pipe, the hollow part C, placed directly over the upper end of pipe A and having valves at its ends and flanged central openings to fit it upon said pipe and cap and its connections, and means for revolving said hollow part, substantially as described.

6. In a centrifugal pump, the case B, having a safety-valve and provided with an air-exhaust and an air-compressor, the water-pipe A, having cap A', supported above its end, the hollow part C, revolving on the upper end of said pipe and having valved ends and flanged central openings, and the spindle F, fixed to the support or arch *c*<sup>5</sup> of said part C and resting on said cap and revolved as described, all substantially in the manner and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH H. BRUCE.

Witnesses:

JNO. H. CRAIG,  
W. M. WILCOX.