

No. 715,255.

Patented Dec. 9, 1902.

E. GIBSON.
STEAM BLOWER.

(Application filed Mar. 7, 1902.)

(No Model.)

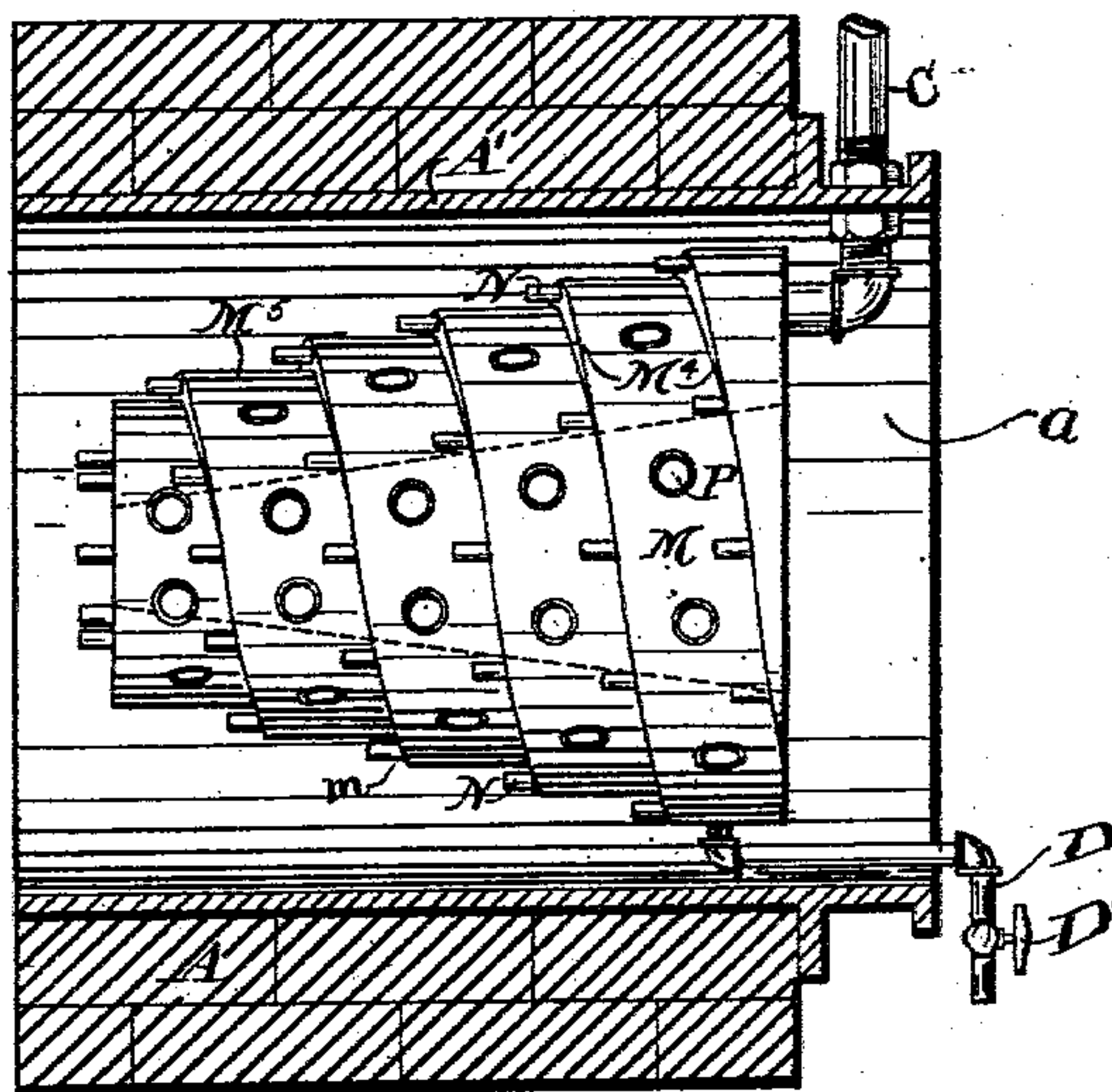


Fig. 1.

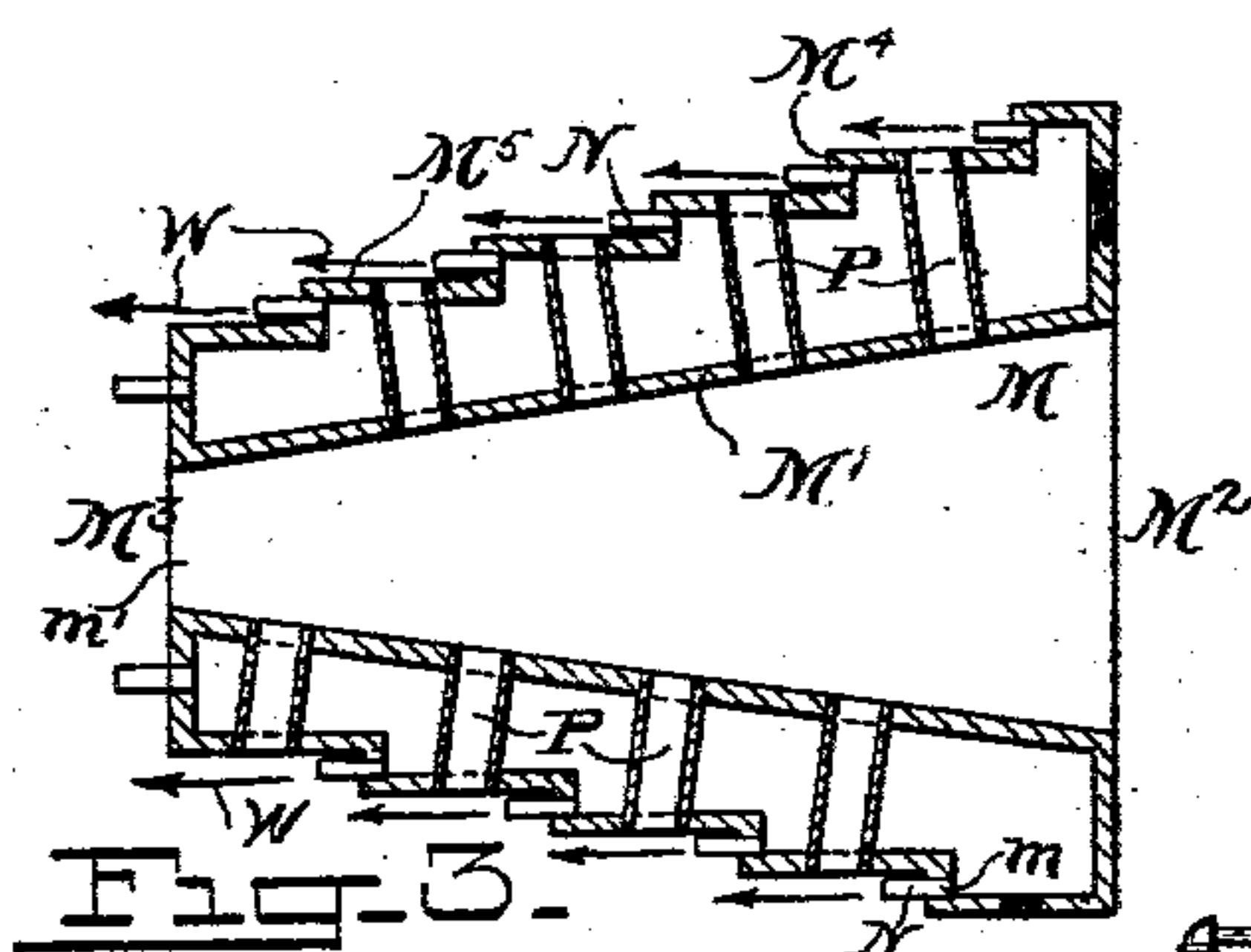


Fig. 3.

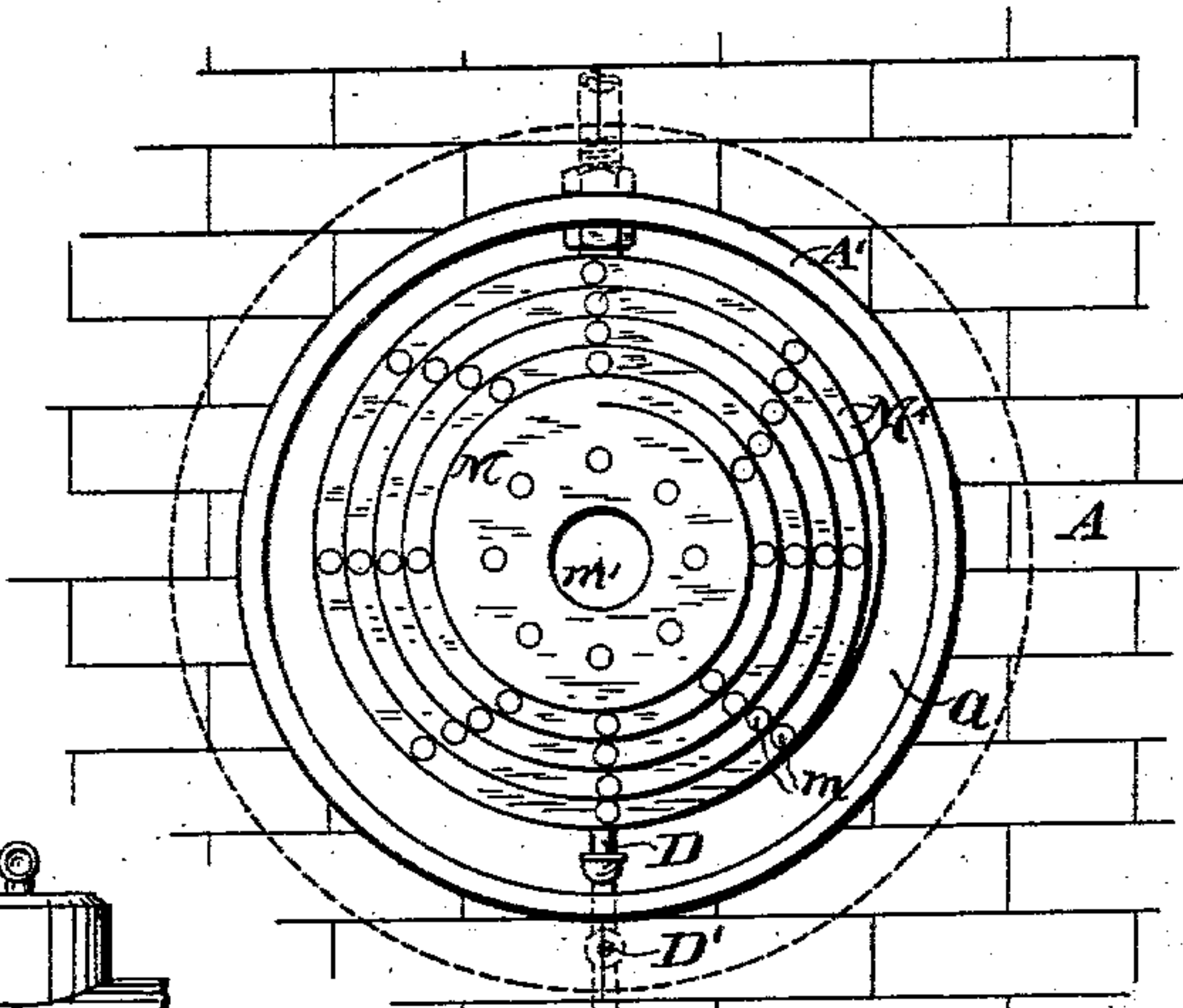


Fig. 2.

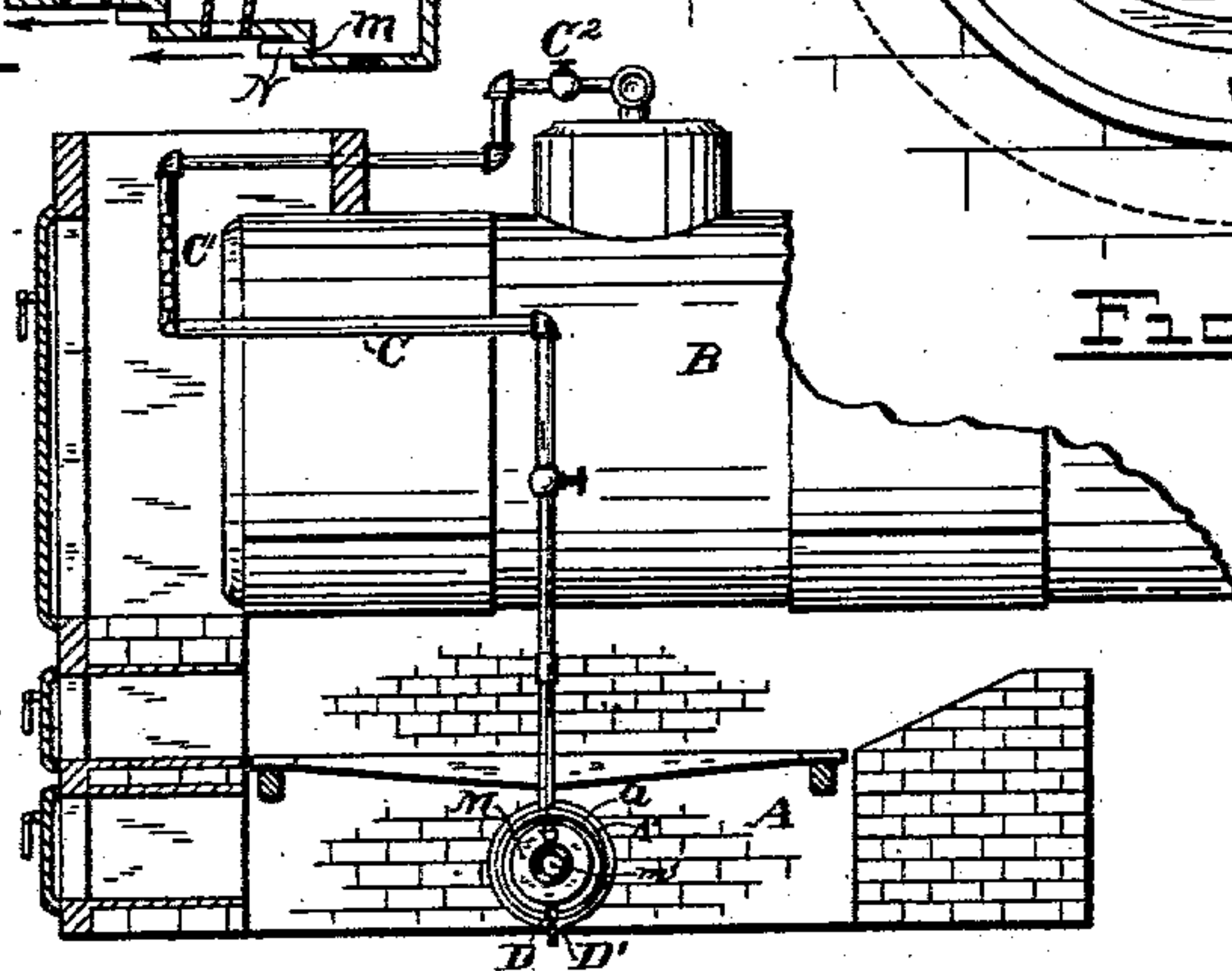


Fig. 4.

WITNESSES:

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STEAM-BLOWER.

SPECIFICATION forming part of Letters Patent No. 715,255, dated December 9, 1902.

Application filed March 7, 1902. Serial No. 97,089. (No model.)

To all whom it may concern:

Be it known that I, EDWARD GIBSON, a citizen of the United States, residing in Jersey City, in the county of Hudson, in the State of New Jersey, have invented a certain new and useful Improvement in Steam-Blowers, of which the following is a specification.

The improvement applies to all that class of blowers in which steam or other fluid at strong pressure is allowed to escape in small jets at a high velocity and to drag along the air in the vicinity of the jets by its frictional action thereon. This mode of operating is particularly desirable in blowing air to support combustion in furnaces, because for some reason not perfectly understood the steam becoming absolutely dry and superheated is found to contribute to the clearness of the fire and the completeness of the combustion.

I will describe my invention as applied to blow air into the space below the grates in a steam-boiler furnace.

My blowing device is made to correspond to an aperture into which it is introduced in the front or in any other portion of the furnace (I will show it as a side) and supplied with steam from the boiler.

It has been before proposed to introduce a pipe coiled in what might be called a "tapering helix," technically a snail form, with a liberal connection to the boiler to supply steam to the large end and a line of perforations in the snail allowing jets of steam to escape in substantially parallel directions, the air being received freely from the exterior of the furnace-wall and caused by the action of these jets to move inward through the space in the wall not occupied by the snail and maintain a sufficiently-increased pressure in the ash-pit to properly supply and stimulate the fire. It is difficult with such device to supply the steam at the proper high pressure at the inner end of the snail. The escape of the steam through the apertures near the large end reduces the pressure. If the pipe is made of large diameter, the pipe itself becomes an obstruction to the free flow of the air. I have discovered that it is possible to attain a form of apparatus in which the same arrangement of the jets is realized, thereby securing the same approximately even distribution of the action over the whole area of

the aperture in the wall with freer provision for the flow of steam to the inner and smaller end of the apparatus and without any serious obstruction of the movement of the air. I have embodied such form in a practical construction, which will be set forth below. In brief, I supply a reservoir of tapering annular form properly arranged, which gives liberal space for the flow of the steam and allows the jets to deliver with equal force from all the apertures without appreciably obstructing the air. In the form shown, which I esteem preferable, the jets are delivered from a spiral offset in the generally tapering exterior.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation of my blower with a vertical section of the adjacent wall. Fig. 2 is an end view of my device seen from the left in Fig. 1. Fig. 3 is a central vertical section through the principal portions with a slight modification. Fig. 4 is on a smaller scale. It is a general side elevation of an ash-pit and furnace and a portion of a boiler with my blower attached.

The drawings show the novel parts with so much of the ordinary parts as is necessary to indicate their relation thereto.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the wall, having a circular aperture *a* of such area as to allow the entrance of sufficient air under the impulse of the jets only slightly obstructed by the presence of my blowing device.

C is a pipe bringing steam from the boiler B through a series of convolutions C', immersed in the hot gases escaping from the furnace. This pipe, controlled by a valve C², supplies superheated steam to my blower, the main body of which is approximately two hollow cones with high-pressure steam between.

I will use the letter M to designate the main body of the blower, with supernumerals, as M' M², distinguishing certain portions thereof. The whole is preferably in a single casting of iron. M' is a generally conical in-

terior part, M^2 the outer junction, and M^3 a corresponding but much smaller inner junction. The exterior part is composed of a winding-offset, which I will sometimes refer to as a
 5 "way" M^4 and connecting metal M^5 . In the offset M^4 are holes m , in which are tightly set nozzles N . The steam escaping through these nozzles produces the desired action on
 10 the air, with the result to carry a strong flow of mingled steam and air into the space below the grate, from whence it is distributed to the fire in any ordinary or suitable manner.

The greatest diameter of my casting is so much less than that of the hole a that air is
 15 allowed to flow through the annular space. A considerable orifice m' at the inner end allows air to be also delivered there. A series of tubes P , which may be each a short length of gas-pipe of sufficient size, allow the air
 20 to flow outward from the conical space in the interior to the space outside of the device between it and the lining metal A' of the wall-aperture a .

A pipe D , connected to the lowest point in
 25 my casting M , leads away the water of condensation. This may be done through any ordinary form of steam-trap (not shown) or it may be regulated by hand at intervals by the stop-cock D' . It is important to allow the
 30 water to escape and at the same time to avoid any waste of steam.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. I prefer to
 35 make the entire casing M in a single casting, but it may succeed in many pieces of different materials. The space between the inner truncated cone M' and the outer offset portion M^4 M^5 may be greater or it may be some-
 40 what less than shown.

The pipes P , which carry the air across from the space interior to that exterior of the whole, may be larger or smaller or they may be greater or less in number. I prefer to ar-
 45 range these as indicated in the elevation Fig. 1, so that the several lines of nozzles N and the corresponding steam-jets W issuing therefrom range between the lines of air-pipes P ; but this may be varied. Some may prefer to
 50 set them "joggled." They may be set irregularly. Fig. 2 shows them thus set. I can, if preferred, have each series of pipes P in the plane of a series of nozzles N . Such is the slight modification shown in Fig. 3.

There may be two or more of my blowers in one furnace and even in one wall of a furnace. In such case they may be simply duplicates of the one here shown, with duplicate connections for maintaining the pressure of
 55 steam therein and for allowing the escape of the condensed water.

The bends or convolutions C' for superheating the steam may be omitted, and the steam may be brought in as direct a line as
 65 practicable from the boiler to the casing M , the drain-passage D , with its controlling means D' , providing for the discharge of any

entrained water which the steam may bring from the boiler and also for any condensation which takes place from the current of
 70 cold air bathing and moving actively past the blower.

I claim as my invention—

1. A steam-blower having two tapering shells or tubes one within the other with a
 75 liberal space between, the outer shell being provided with small orifices so arranged as to direct jets of steam toward the small end in lines nearly parallel to the axis, and means for supplying steam to the space between the
 80 shells, all substantially as herein specified.

2. A steam-blower having two tapering shells or tubes one within the other with a liberal space between, the outer shell being provided with small orifices and nozzles on
 85 such orifices so arranged as to direct jets of steam toward the small end in lines nearly parallel to the axis, and means for supplying steam to the space between the shells, all substantially as herein specified.

3. A steam-blower having two tapering shells or tubes one within the other, with a liberal space between, the outer shell being provided with small orifices distributed on the exterior and nozzles on such orifices, so ar-
 90 ranged as to direct escaping jets of steam toward the small end in lines nearly parallel to the axis, a series of short tubes or thimbles nearly radial in the space, between the shells, and means for supplying steam to such space,
 95 all arranged to serve substantially as herein specified.

4. A steam-blower having two tapering shells or tubes one within the other with a liberal space between, the outer shell being provided with small orifices distributed on the exterior arranged to direct escaping jets of steam toward the small end in lines nearly parallel to the axis and nozzles on such orifices, a series of short tubes or thimbles nearly radial in the space between the shells and means for supplying steam to such space, and a drain-pipe D with controlling means D' , all arranged to serve substantially as herein
 100 specified.

5. A steam-blower having two tapering shells or tubes one within the other cast integral with a liberal space between, offsets M^4 on the exterior shell M^5 , the orifices m and nozzles N in such offsets, a connection for
 105 supplying steam to the space between the shells, and provisions for separating water in such blower and discharging it through the drain-pipe D with controlling means D' , arranged in an aperture a in the wall A so as
 110 to serve with a steam-boiler B , substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

EDWARD GIBSON.

Witnesses:

J. B. CLAUTICE,
 M. F. BOYLE.