

No. 607,793.

J. T. & T. R. BRIEN.

Patented July 19, 1898.

HOT AIR FURNACE.

(No Model.)

(Application filed Sept. 13, 1897.)

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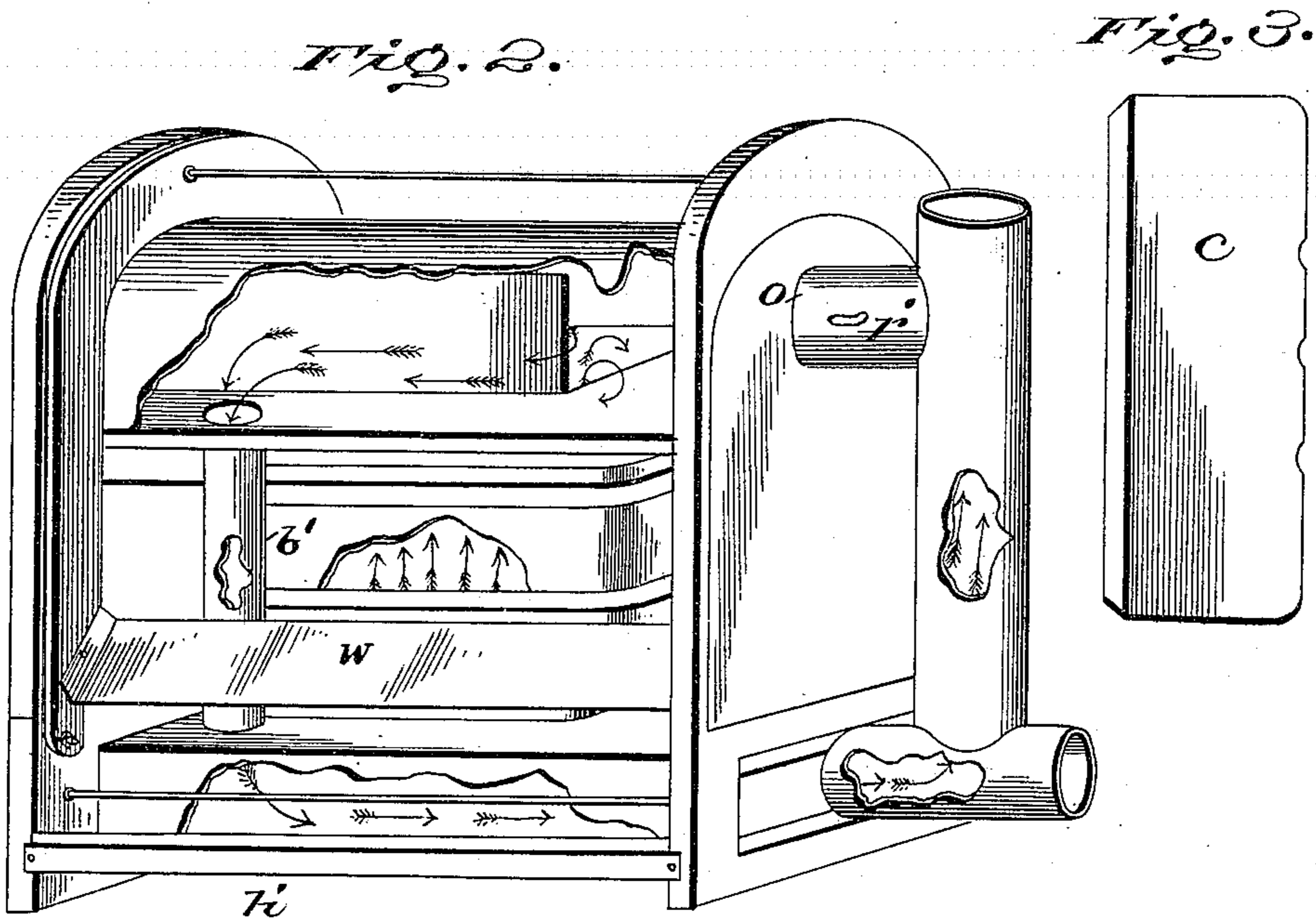
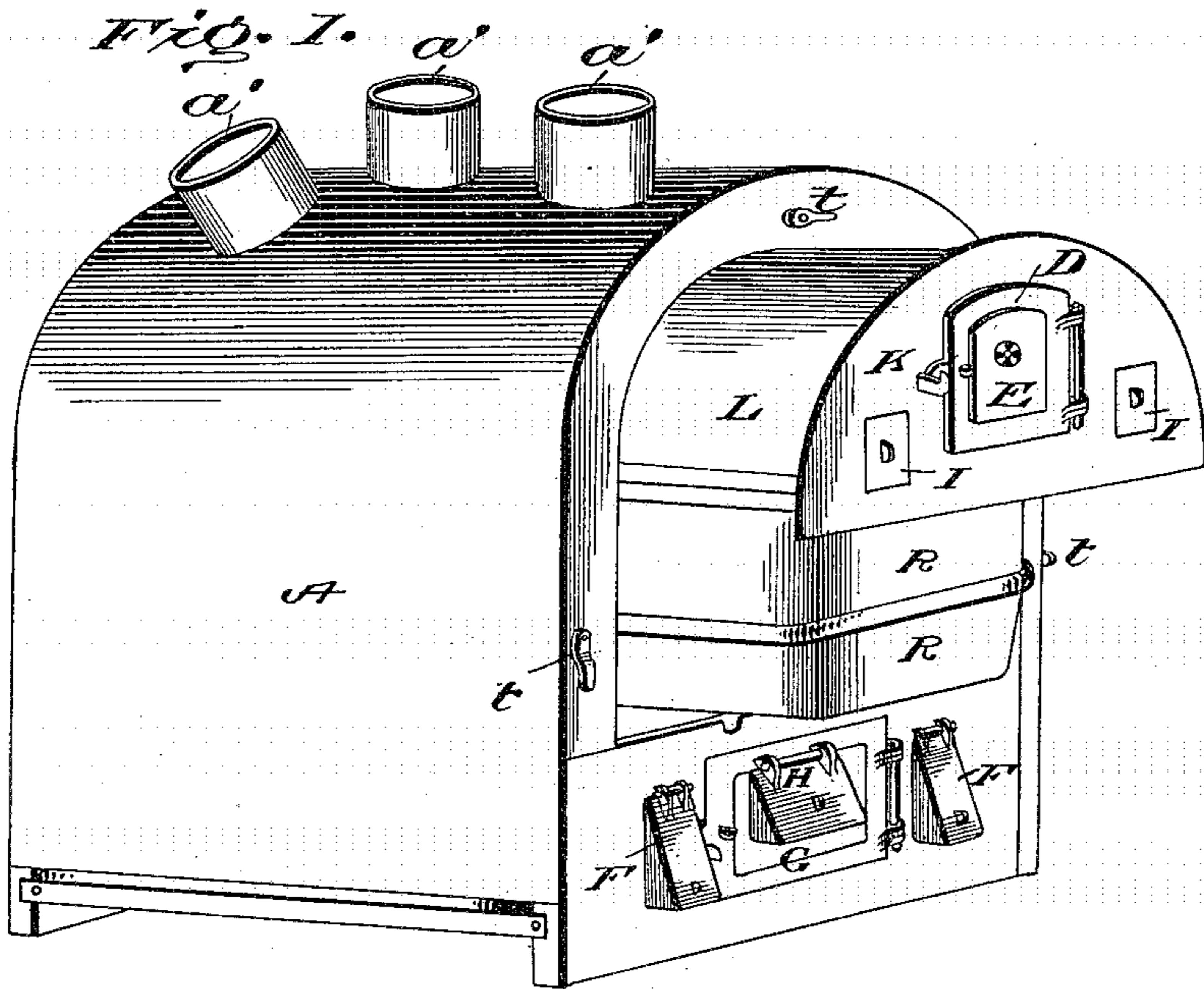
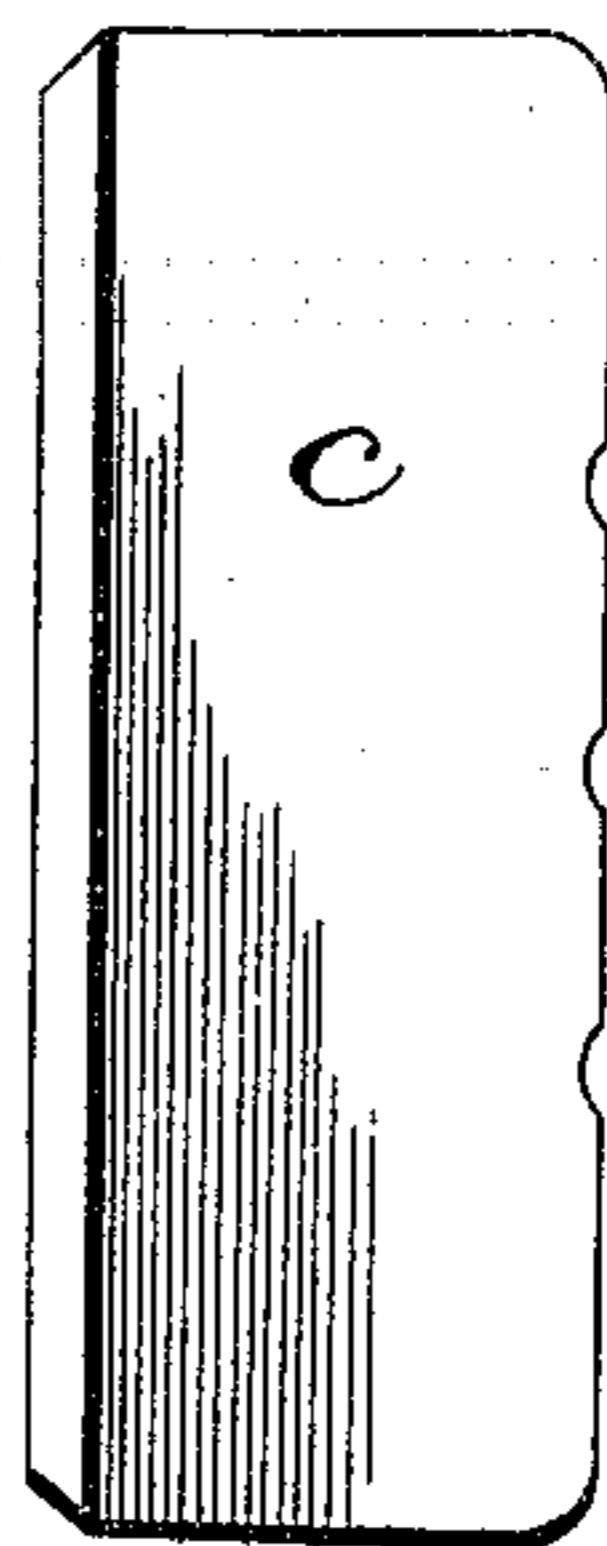


Fig. 3.



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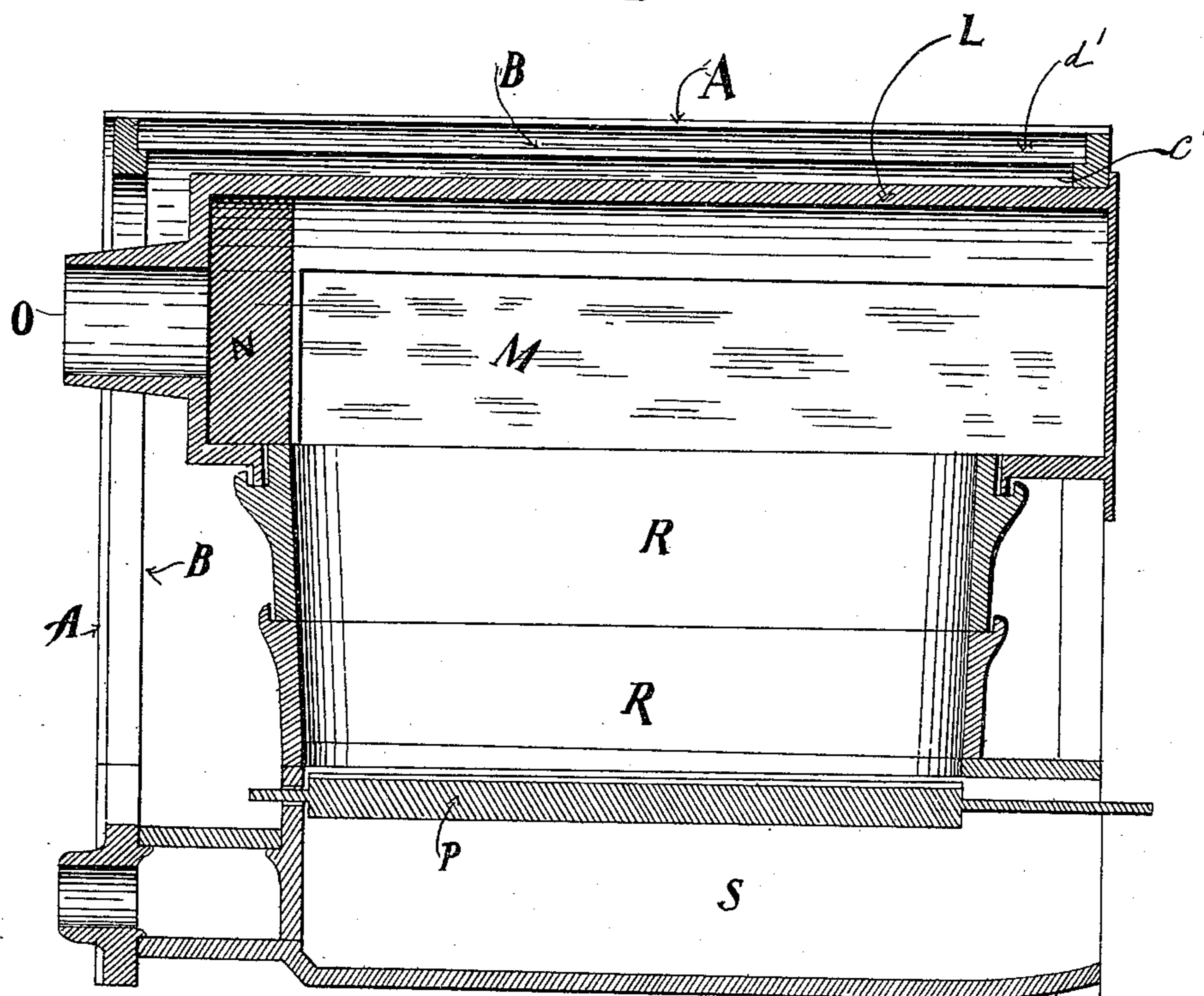
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Fig 4



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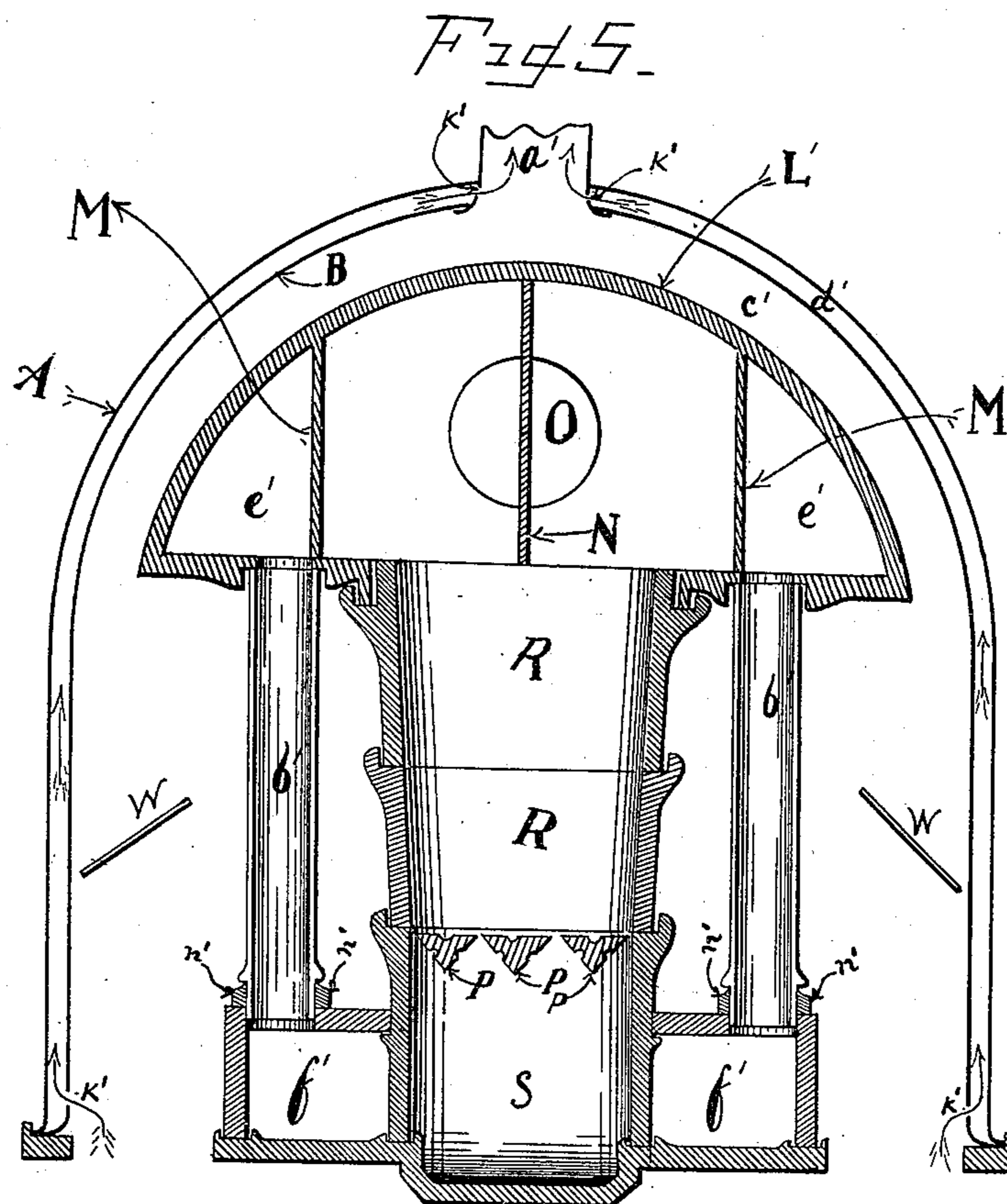
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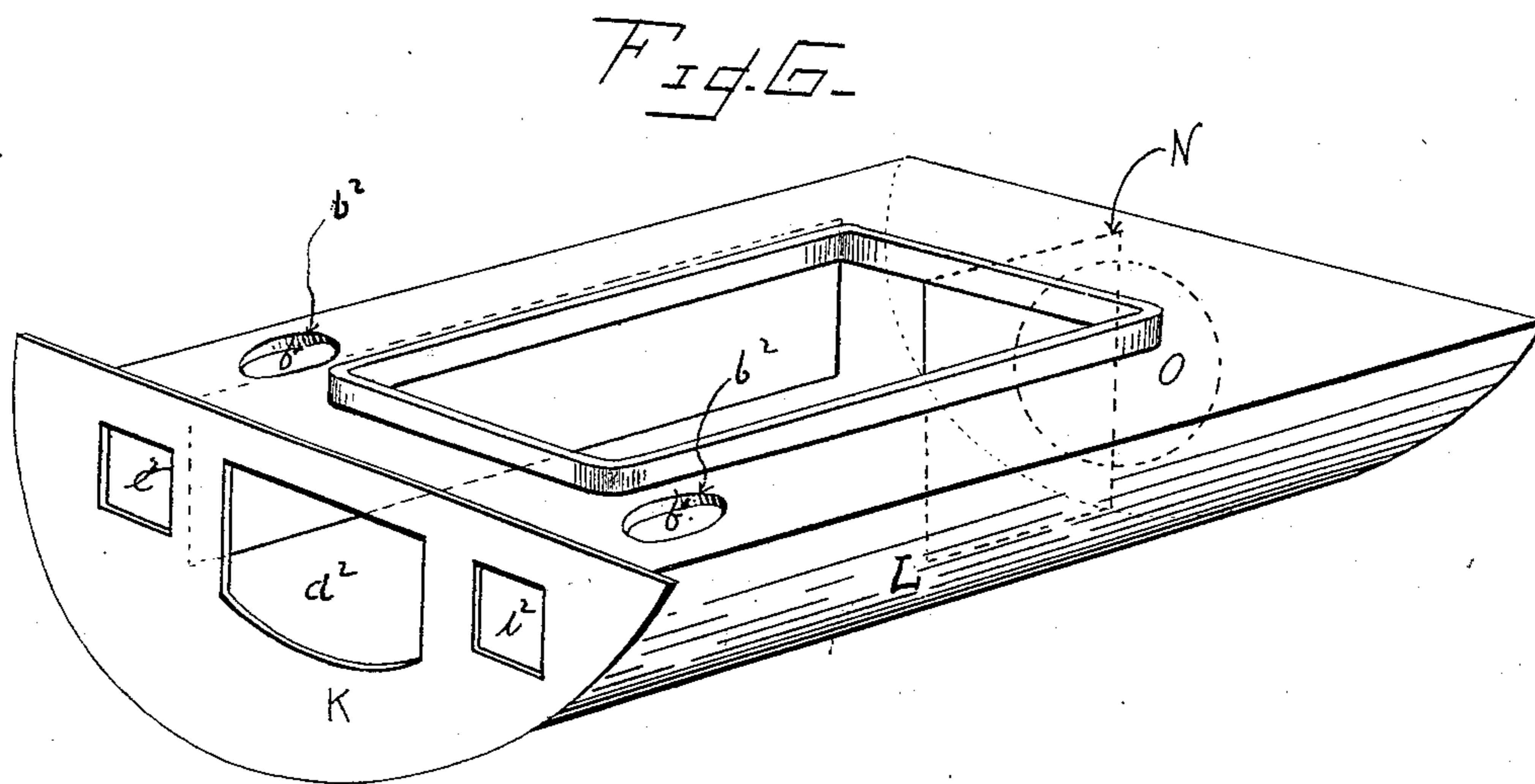
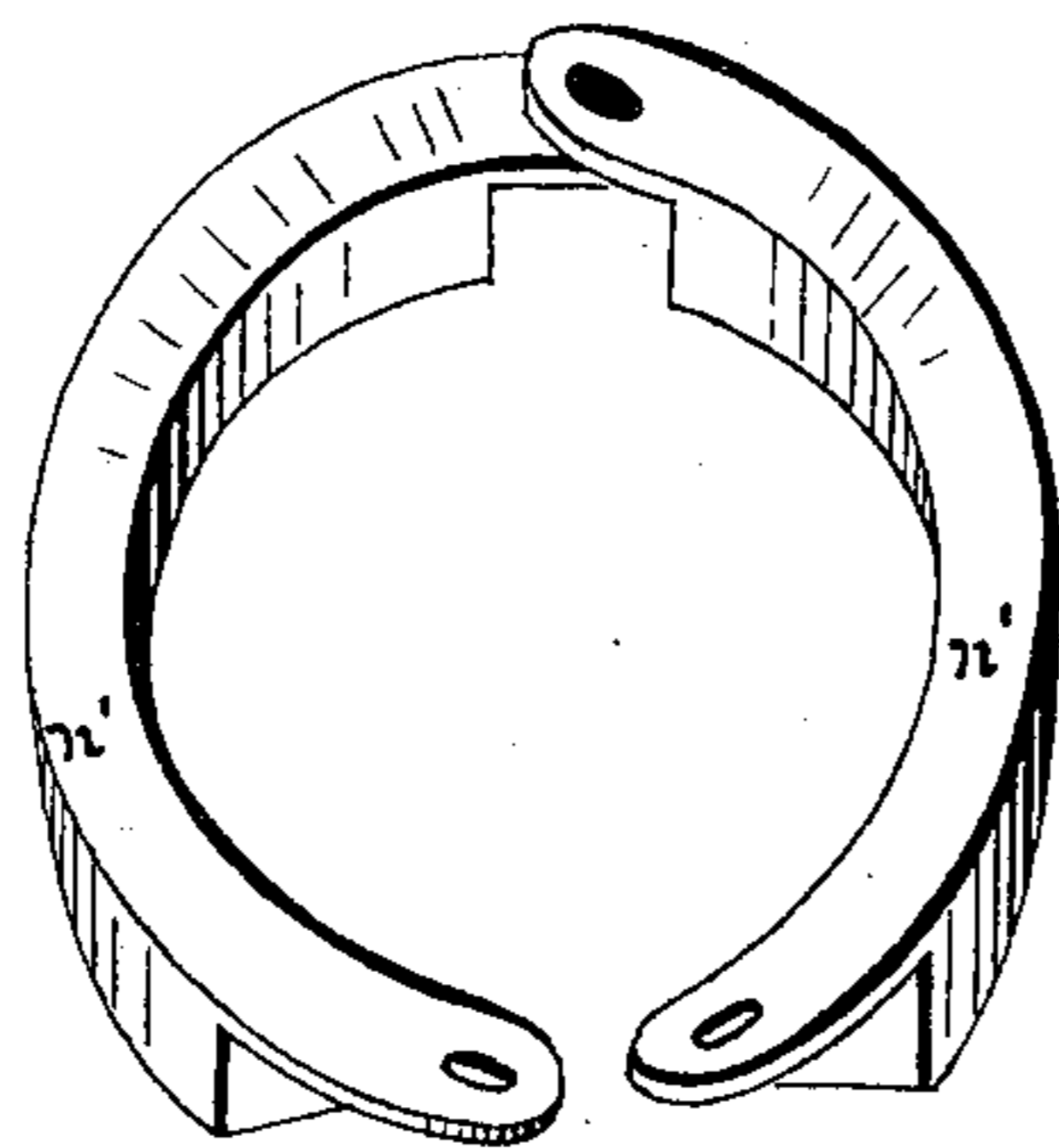


FIG. 8.



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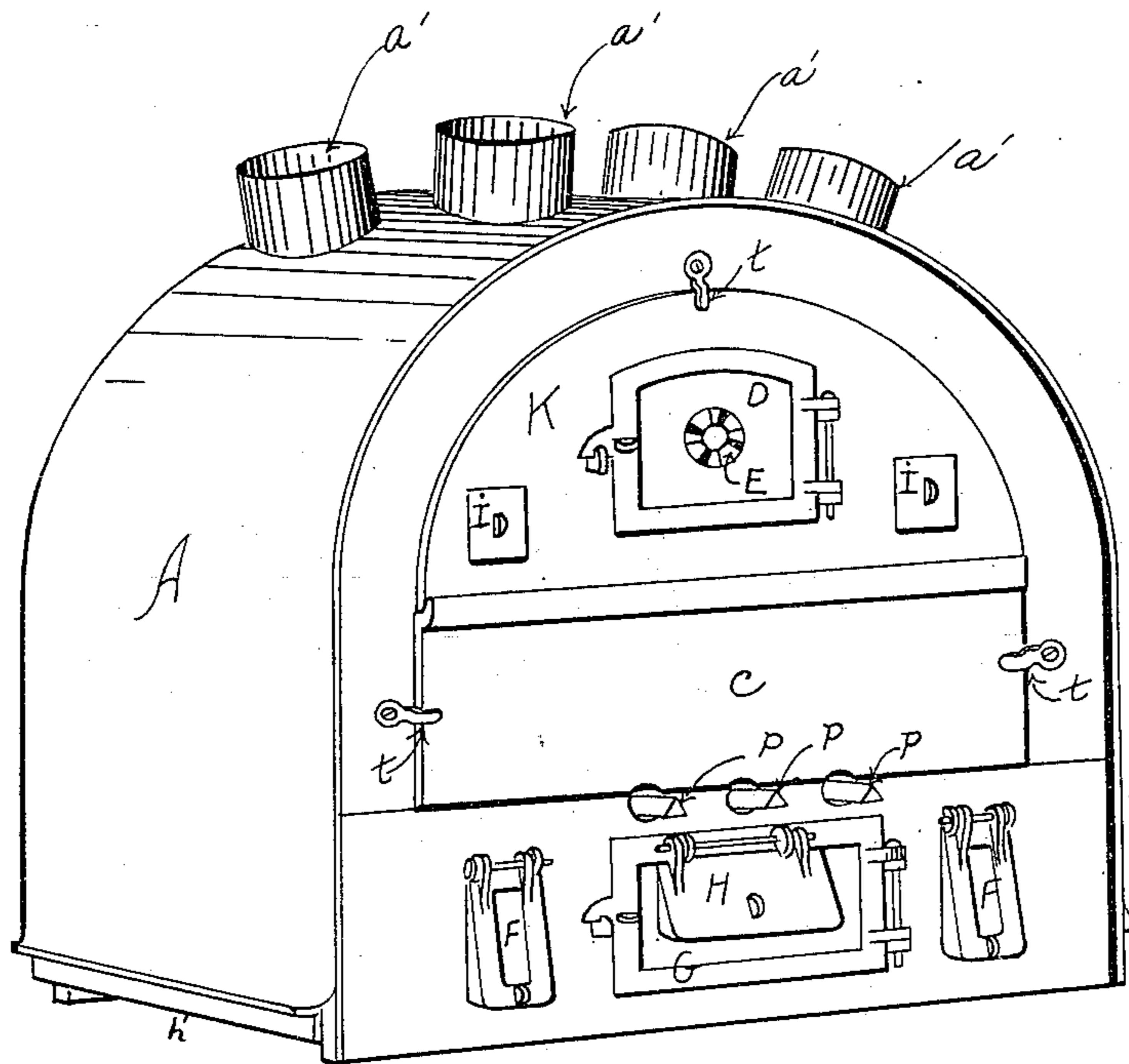


FIG. 7.

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UNITED STATES PATENT OFFICE.

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ASSIGNORS OF ONE-HALF TO HENRY W. STONE, OF SAME PLACE.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 607,793, dated July 19, 1898.

Application filed September 13, 1897. Serial No. 651,470. (No model.)

To all whom it may concern:

Be it known that we, JAMES T. BRIEN and THEODORE R. BRIEN, citizens of the United States, residing at Hoosick Falls, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Hot-Air Furnaces, of which the following is a specification.

This invention consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures.

Figure 1 of the drawings is a view in perspective of our improved furnace, showing the upper flue-box and fire-pot sections partly removed through the front aperture in the casing. Fig. 2 is a view in perspective showing the rear end of the furnace, the casing being removed and parts broken away for convenience of illustration. Fig. 3 is a view of the front locking-plate. Fig. 4 is a central vertical longitudinal section of the furnace. Fig. 5 is a central vertical transverse section of the same. Fig. 6 is a view in perspective of the removable upper flue-box inverted. Fig. 7 is a view similar to Fig. 1, showing the furnace complete and ready for use. Fig. 8 is a view in perspective of a clamping split ring for supporting a vertical flue-pipe.

The object of our invention is to produce a hot-air furnace of simple construction and of maximum capacity in proportion to size and one that can be easily and quickly cleaned and repaired.

Referring to the drawings, S represents the ash-pit, P the grate, R R the fire-box, and A the outer casing, of the furnace.

The ash-pit is formed of iron castings in connection with the flues $f' f'$ in the base of the furnace, said flues extending horizontally from front to rear of the furnace on opposite sides of the ash-pit. The fire-pot is also formed of iron castings in sections resting one upon the other, the lower section resting upon the base-casting.

L is the upper flue-box, which is formed of

a single iron casting having a cylindrically-arched top, a flat bottom, and partitions M and N, extending approximately from front to rear of the box to form flues extending from front to rear parallel with the lower flues $f' f'$. The flue-box and fire-pot sections are nested together by means of interengaging flanges, as shown in Fig. 5, the flange on the bottom of the flue-box surrounding a bottom aperture therein which communicates with the interior of the fire-pot and forms a passage-way for the gases of combustion to escape from the fire-pot into the flue-box. The flue-box is considerably wider than the fire-pot and overhangs the same along the sides, the overhanging portions being provided with apertures adapted to communicate with the upper ends of the vertical flue-pipes b and b' , which communicate at their lower ends with the lower base-flues $f' f'$.

The side portions of the casing are vertical, and the top of the casing is cylindrically arched and parallel with the top of the upper flue-box. The front of the casing is provided with an aperture approximately the size of the cross-section of the upper flue-box and fire-pot sections, and the lower fire-pot section is permitted to rest loosely upon the base-casting, whereby the flue-box and fire-pot sections can be drawn out through the front aperture in the casing when it is desired to have access to the interior of the furnace for cleaning or repairs. The flue-box is provided on its front end with a flanged head adapted to close the upper part of the front opening in the casing when the flue-box is fully inserted. The lower part of such opening is closed by the locking-plate C, which has a flange on its upper edge adapted to overlap and engage the lower edge of the flanged head K of the flue-box. The parts are locked in position by the buttons t , as shown in Fig. 7. By means of this form of construction we are able to remove the flue-box and fire-pot and have access to the interior of the furnace with the greatest facility and without interfering with the grate or base portions of the furnace.

The head of the flue-box is provided with an aperture closed by door D for the introduction of fuel into the fire-pot. The door

D is provided with a damper or valve E for admitting cold air when desired. The head of the flue-box is also provided with small hand-holes closed by doors or valves I, where-
 5 by access may be had to the interior of the upper flues.

The gaseous products produced by the combustion of fuel in the fire-pot pass upwardly from the fire-pot into the upper-flue
 10 box, where they are divided by the central partition or flue-plate N, the divided currents of gas passing around the rear ends of the partitions or flue-plates M M, thence downwardly through the vertical flue-pipes
 15 into the base-flues $f' f''$. The gases, having thus passed over an extended area of metal in the various flues, are largely deprived of their heat and are permitted to escape from the base-flues into a smoke-pipe at the rear
 20 of the furnace, which leads to a chimney in the usual manner.

The rear end of the upper-flue box is provided with an aperture O, which communicates with an upper branch of the smoke-
 25 pipe when the flue-box is inserted within the casing. This upper branch of the smoke-pipe is controlled by a valve or damper r' , Fig. 2, which when open permits the gases to pass directly into the smoke-pipe from the
 30 flue-box without passing through the vertical flue-pipes or the base-flues. When the valve r' is closed, the gaseous currents are caused to pass through all the flues on their way to the smoke-pipe. The flue-surfaces thus be-
 35 come highly heated, and the air inclosed between the casing and the fire-pot and flues is raised to a high temperature by contact with the heated surfaces and rises through the distributing-pipes a' , whence it may be
 40 conducted to desired points.

The distributing-pipes a' connect with the top of the casing and may be as many in number as desired within the capacity of the fur-
 45 nace. Air at a comparatively low temperature is supplied to the interior of the casing through the inlets h' , which extend along the bottom of the sides of the casing. A short distance above the inlets h' we provide de-
 50 flectors W, arranged obliquely within the casing and converging at the top toward the fire-pot, whereby the entering currents of air are directed against the fire-pot and under the overhangingsides of the upper flue-box, caus-
 55 ing them to traverse an irregular path and bringing practically all of the air into contact with the most highly-heated parts of the apparatus.

When desired, the casing may comprise an

inner wall B in connection with the outer wall A, the two walls being separated by an in- 60
 closed air-space d' , the inner wall B being provided with inlet-apertures K' at the bot-
 tom and outlet-apertures K' at the top to per-
 mit circulation of air in the inclosed air-space
 65 d' . The inclosed air-space d' prevents loss of heat from the furnace by acting as a non-conducting shield. The vertical flue-pipes are supported at their lower ends by clamp-
 ing split rings n' , which prevent the disar-
 70 rangement of said pipes by the withdrawal or insertion of the upper flue-box.

F F are doors closing apertures leading into the base-flues, which have the function of cold-air drafts and also permit access to the interior of the base-flues when it is desired
 75 to clean the same.

What we claim as new, and desire to secure by Letters Patent, is—

1. In a hot-air furnace, the combination with a base and lower horizontal flues extend- 80
 ing from front to rear on opposite sides of the ash-pit in the base, and a casing mounted upon the base and provided with a front aperture; a fire-pot; and vertical flues connecting at the
 85 lower end with the base-flues; of an upper flue-box located within the casing and removable through the front aperture therein and having flues extending from front to rear and provided with bottom apertures communicat-
 90 ing respectively with the fire-pot and the upper ends of the several vertical flues, substantially as described.

2. In a hot-air furnace, the combination with a fire-pot; a base provided with horizontal flues; vertical flue-pipes communicating 95
 at their lower ends with the base-flues; an inclosing casing having a front aperture; a smoke-pipe at the rear of the casing having an upper branch, and a lower branch com-
 100 municating with the base-flues; and a damper in the upper branch of the smoke-pipe; of an upper flue-box removably inserted in the front aperture in the casing and provided with flue-partitions, an aperture in the rear end and
 105 apertures in the bottom communicating respectively with the upper branch of the smoke-pipe, and the fire-pot and upper ends of the vertical flue-pipes, when the flue-box is inserted within the casing, substantially as de-
 scribed.

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