

No. 711,853.

Patented Oct. 21, 1902.

W. P. HARTFORD.  
HOT AIR HEATER.

(Application filed May 31, 1902.)

2 Sheets—Sheet 1.

(No Model.)

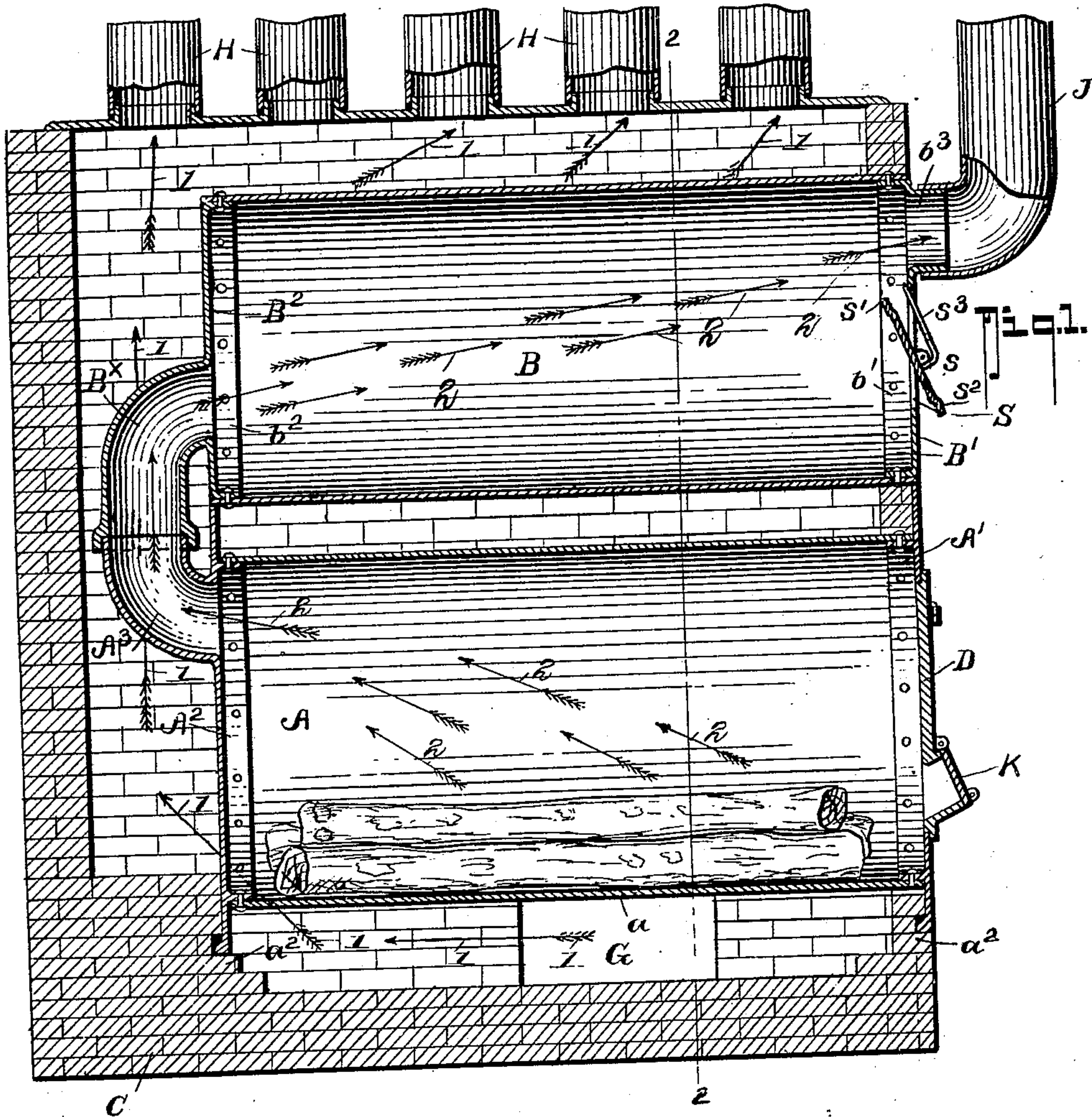
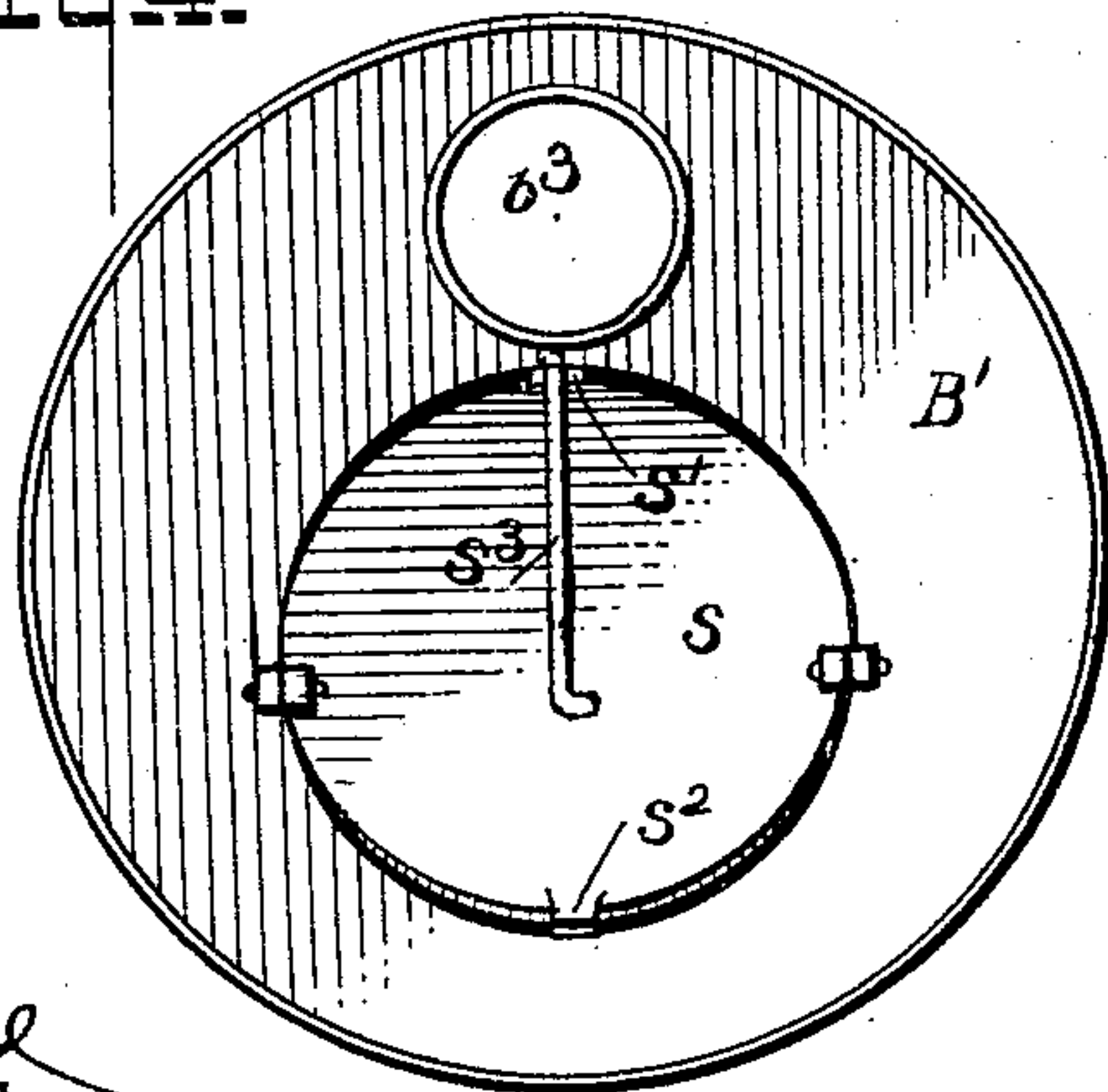


Fig. 1.



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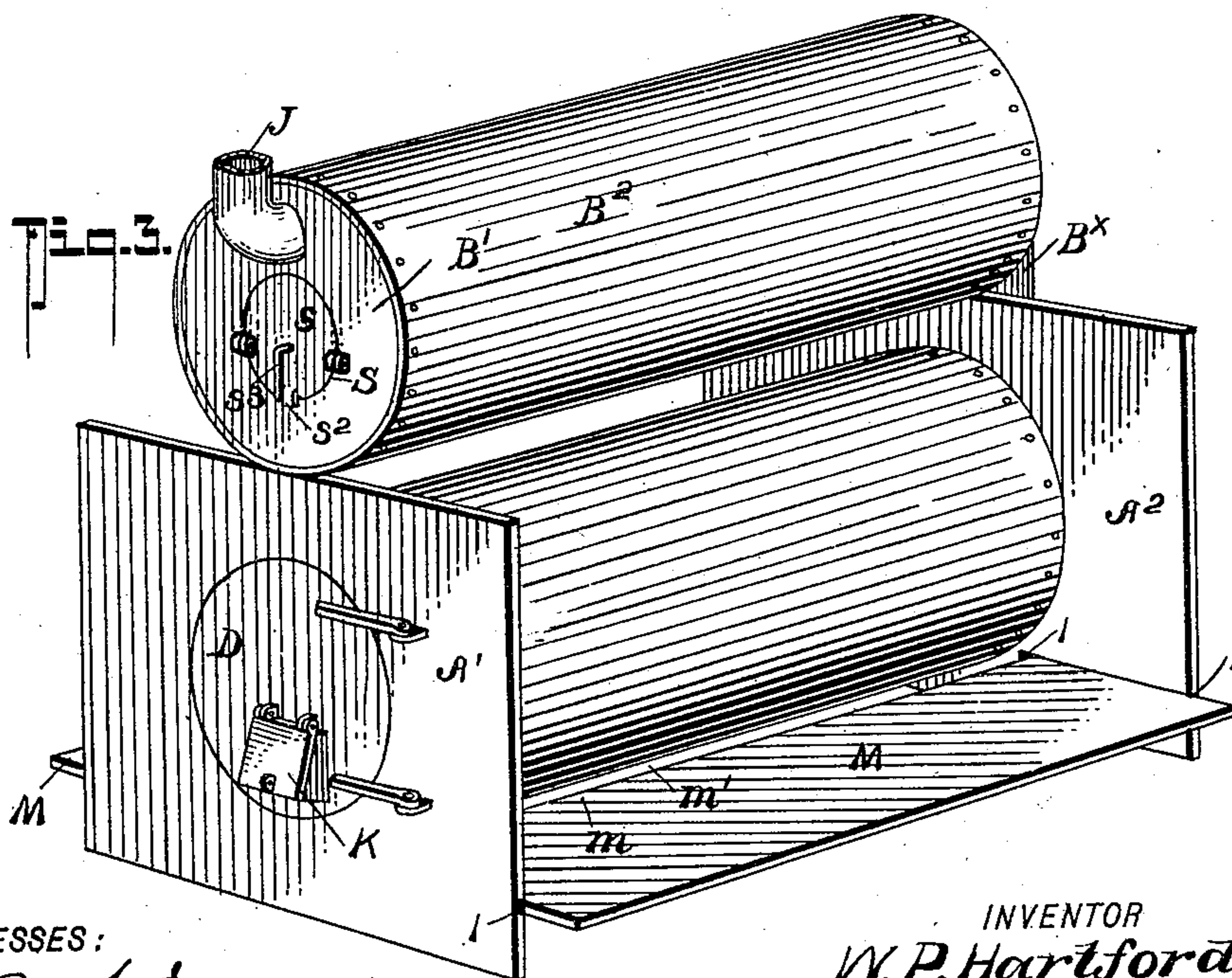
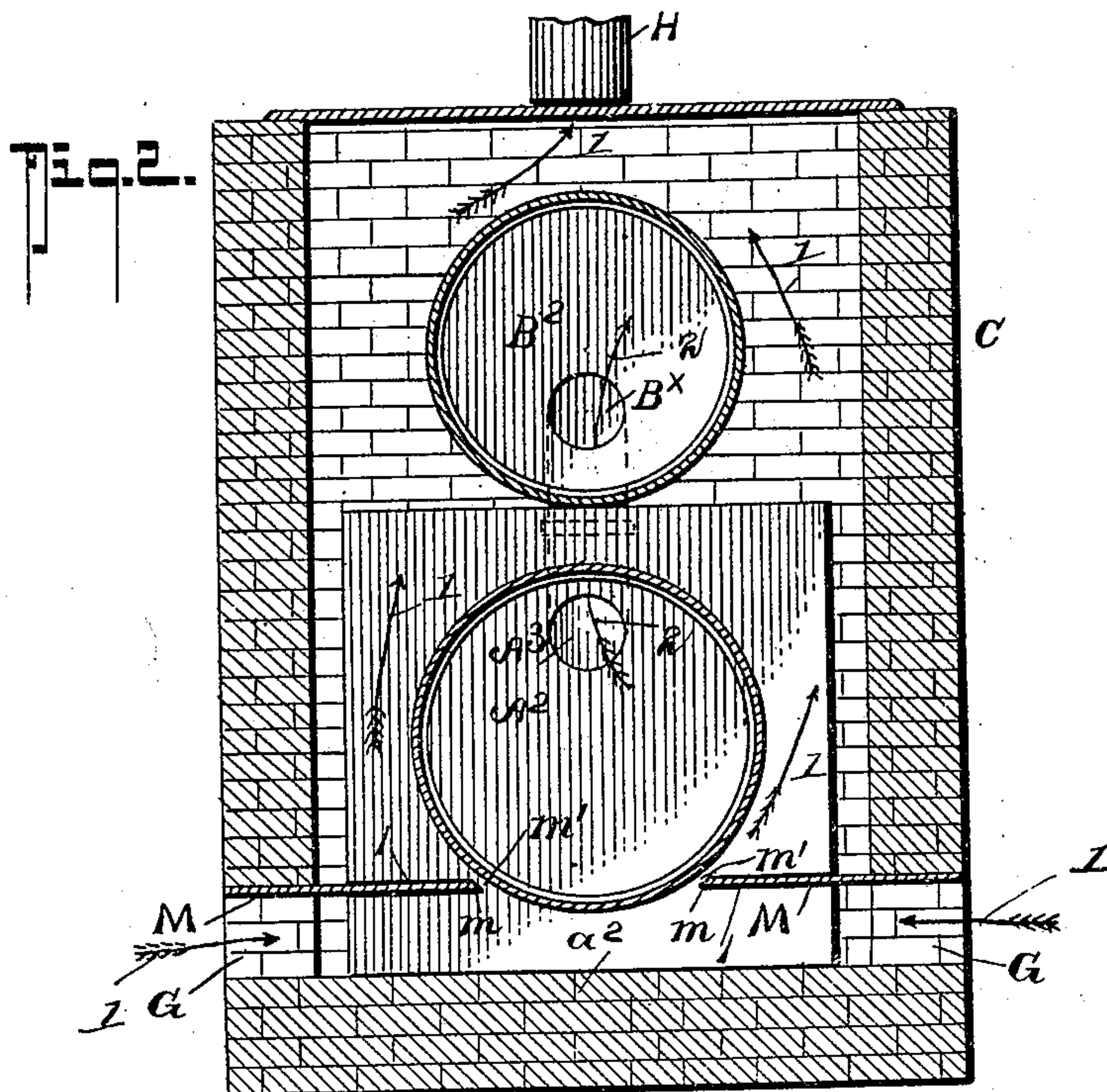
Patented Oct. 21, 1902.

W. P. HARTFORD.  
HOT AIR HEATER.

(Application filed May 31, 1902.)

2 Sheets—Sheet 2.

(No Model.)



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# UNITED STATES PATENT OFFICE.

WILLIAM PRESTON HARTFORD, OF CASSVILLE, WISCONSIN.

## HOT-AIR HEATER.

SPECIFICATION forming part of Letters Patent No. 711,853, dated October 21, 1902.

Application filed May 31, 1902. Serial No. 109,695. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM PRESTON HARTFORD, residing at Cassville, in the county of Grant and State of Wisconsin, have invented certain new and useful Improvements in Hot-Air Heaters, of which the following is a specification.

My invention relates to that class of hot-air heaters or furnaces more particularly adapted for burning wood and in which the draft means is especially arranged to provide for automatically maintaining a substantially uniform draft through the combustion-chamber irrespective of the varying drafts in the chimney, and it specifically provides for certain improvements in the form of furnace disclosed in my Patent No. 689,078, dated December 17, 1901.

Primarily my invention seeks to provide certain improvements in the general construction of my patented furnace referred to whereby to cheapen the cost of building the same, reduce the weight thereof, and render the packing of the parts the more compact for shipping, and, further, to materially increase the heating capacity thereof with a minimum cost of fuel.

Among other features my present invention comprehends a new and improved construction of automatically-operating check-draft device whereby the same will be caused to tip quicker and recover more promptly than is possible in the use of the type of check-draft device shown in my patent referred to.

In its more complete nature my present invention includes a novel arrangement of baffle-plates for cooperating with the combustion-chamber in creating a strong draft and discharging the cold air against the heater-body in such manner as to prevent the said body becoming overheated and also for heating a larger amount of air than is possible in my other form of heater or furnace by reason of spreading the same in a uniform manner over the entire length of the heating-surface.

In its more subordinate features my invention consists in certain details of construction and peculiar combination of parts, all of which will hereinafter be fully described, and especially pointed out in the appended claims, ref-

erence being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of my improved heater. Fig. 2 is a transverse section thereof on the line 2 2 of Fig. 1. Fig. 3 is a detail perspective view illustrating the general arrangement of the combustion-cylinder and the superheating-drum. Fig. 4 is a detail view illustrating the gravity-closed automatically-operating check-damper and its locking-detent.

In the accompanying drawings the arrows 1 indicate the source and flow of the fresh air, and the full lines, arrows 2, indicate the direction of the heat and gas generated in the furnace.

The combustion-chamber A in my present invention is formed of a cylindrical shell  $a$ , suitably bolted or riveted to the front and rear head-plates  $A'$   $A^2$ , as clearly shown in Fig. 1, by reference to which it will also be noticed the shell  $a$  is mounted on the piers  $a^2$   $a^2$  of the brickwork of casing C, and the front head-plate  $A'$  has a door D hinged thereto and provided with the direct-draft door K, which is arranged the same as in my patented construction. The rear head-plate  $A^2$  has an integral or otherwise fixedly held offtake pipe-section  $A^3$ , the purpose of which will presently appear.

G G designate fresh-air inlets that open under the combustion-chamber A, one of said inlets being disposed at each side of the said chamber, and in the practical arrangement of my heater the said inlets may communicate with the cellar-room or through the usual form of air-ducts with the outer atmosphere.

B designates the smoke-drum or supplemental heater, which in my present construction is of a smaller diameter than that of the combustion-chamber A, such correlative arrangement of the parts A and B being provided to facilitate the nesting of the heater parts for shipping. The drum B has its ends riveted or otherwise made fast to the head or back plates  $B'$   $B^2$ , which have flanges  $b'$   $b^2$  for such purpose, as clearly shown in Fig. 1, and the back plate  $B'$  also has a pendent elbow or intake portion  $B^x$ , whose entrant end is suitably formed to make a smoke-tight connection



tion with the offtake  $A^3$  of the combustion-chamber A.

J designates the smoke-pipe, which joins with the discharge-opening  $b^3$  in the outer end of the front plate  $B'$ , and H H designate the hot-air offtakes that lead to the several rooms or apartments to be heated.

M M designate baffle-plates, which are horizontally disposed one at each side of the combustion-chamber and over the cold-air inlets or spaces G. As will be noticed from the drawings, the plates M extend the full length of the combustion-chamber A and have their inner ends  $m$  disposed close up to the sides of the chamber A, whereby to provide a narrow throat or air-passage  $m' m'$  at each side for the passage of the air into the heating-space that surrounds the chamber A and the drum B. The baffle-plates M consist of thin metal sheets slipped into slots  $l l$  in the end castings or head portions  $A' A^2$ , and the said plates are of a width to extend into the brick casing or walls, as shown. By providing the baffle-plates M, arranged as shown and described, a much larger amount of air is heated and delivered to the rooms above than is possible in my patented furnace, for the reason that the air cannot in my present construction pass up over the sides of the heating-surfaces in a mass or bulk, as the plates spread said air out evenly the whole length of the furnace, except when in some part of the combustion-chamber the fire is hotter. Then that part of the furnace will cause a stronger draft and more air to strike against the said hot portion, which action will, as it were, automatically keep the furnace-body at substantially the same temperature throughout, and thereby prevent the said body from burning out or warping.

The check-draft device in my present construction is mounted in the vent or opening S in the superheating-drum B, which opening to secure the best results is disposed close up to the lower edge of the smoke-outlet J. The check-valve  $s$  is hinged at about its center—it may be slightly below the same, as shown—in such manner that it will swing easily, as conditions may require, and it is also provided with lips  $s' s^2$  at the upper and lower ends to prevent its upper end swinging too far outward. The lower half of the valve is weighted to cause it to normally gravitate to its closing position, and the said valve carries a rod  $s^3$ , centrally pivoted on the outside thereof, which rod is arranged to swing around so as to either act as an adjustable counterpoise when turned down, as indicated in Fig. 1, or as a detent or lock to hold the valve S open when it is turned up to the position shown in Fig. 4. By arranging the check-draft in the manner shown close up to the smoke-outlet J it is obvious that the same will be very sensitive to the slightest changes in the suction-draft created in the drum B. The upper edge of the check-valve is comparatively close to the smoke-pipe, thus

causing a difference in the pressure on the upper and lower parts of the valve, and by reason of the adjustable rod  $s^3$  the counterpoise or weight of the valve can be easily increased, and when desired the valve can be held open by simply turning the rod up, as before stated.

From the foregoing description, taken in connection with the accompanying drawings, the complete structure, the manner of operation, and the advantages of my improved heater, it is believed, will be readily apparent to those skilled in the art to which it appertains.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a furnace of the character described, a combustion-chamber, a hot-air casing surrounding the same, having the usual offtakes, cold-air inlets at a point below the combustion-chamber, and baffle-plates over the said inlets extending the full length of the combustion-chamber and having their inner edge disposed close up to the sides of the said combustion-chamber, whereby to provide a restricted air-passage at each side of the said combustion-chamber and extending the full length thereof, as set forth.

2. In a furnace of the character described, the combination with the combustion-chamber A, including its head portions  $A' A^2$ , and a hot-air casing surrounding the same having the usual offtakes; of a cold-air space at each side of the combustion-chamber and extending lengthwise under the said chamber, said spaces having inlets, baffle-plates mounted in the casing-walls, one at each side of the combustion-chamber, said baffle-plates extending over the fresh-air spaces and having their inner edge extended close up to the sides of the combustion-chamber, whereby to provide a restricted air-passage extending the full length of the combustion-chamber, the inner ends of said baffle-plates being supported in the head-plates of the combustion-chamber, all being arranged substantially as shown and described.

3. In a furnace of the character described, the combination with the drum or chamber B, having the usual smoke-outlet  $B^3$  and joined with the combustion-chamber, as shown, said drum also having a vent-opening adjacent the smoke-discharge; of the gravity pivoted valve  $s$  operating in the opening S, said valve having a pivoted rod, said rod being swingable to act as a counterpoise when in one position, and as a detent for holding the valve open when swung to the other position, all being arranged substantially as described.

4. The hereinbefore-described improved hot-air furnace, comprising in combination, a combustion-chamber, including the cylindrical body  $\alpha$ , the front and rear heads  $A' A^2$ , the front head having a direct draft-opening, the rear head having an upwardly-extending



offtake-pipe section, a drum mounted length-  
wise over the combustion-chamber A, said  
drum having a pendent intake adapted to be  
detachably connected with the offtake of the  
5 combustion-chamber, said drum B having a  
smoke-outlet at its front end, a vent-opening  
adjacent the said outlet, a gravity-closing  
valve in the said outlet governed by the suc-  
tion from the smoke-outlet, the baffle-plates  
M, and the surrounding casing, all being ar- 10  
ranged substantially as shown and for the  
purposes described.

WILLIAM PRESTON HARTFORD.

Witnesses:

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