

No. 615,710.

Patented Dec. 13, 1898.

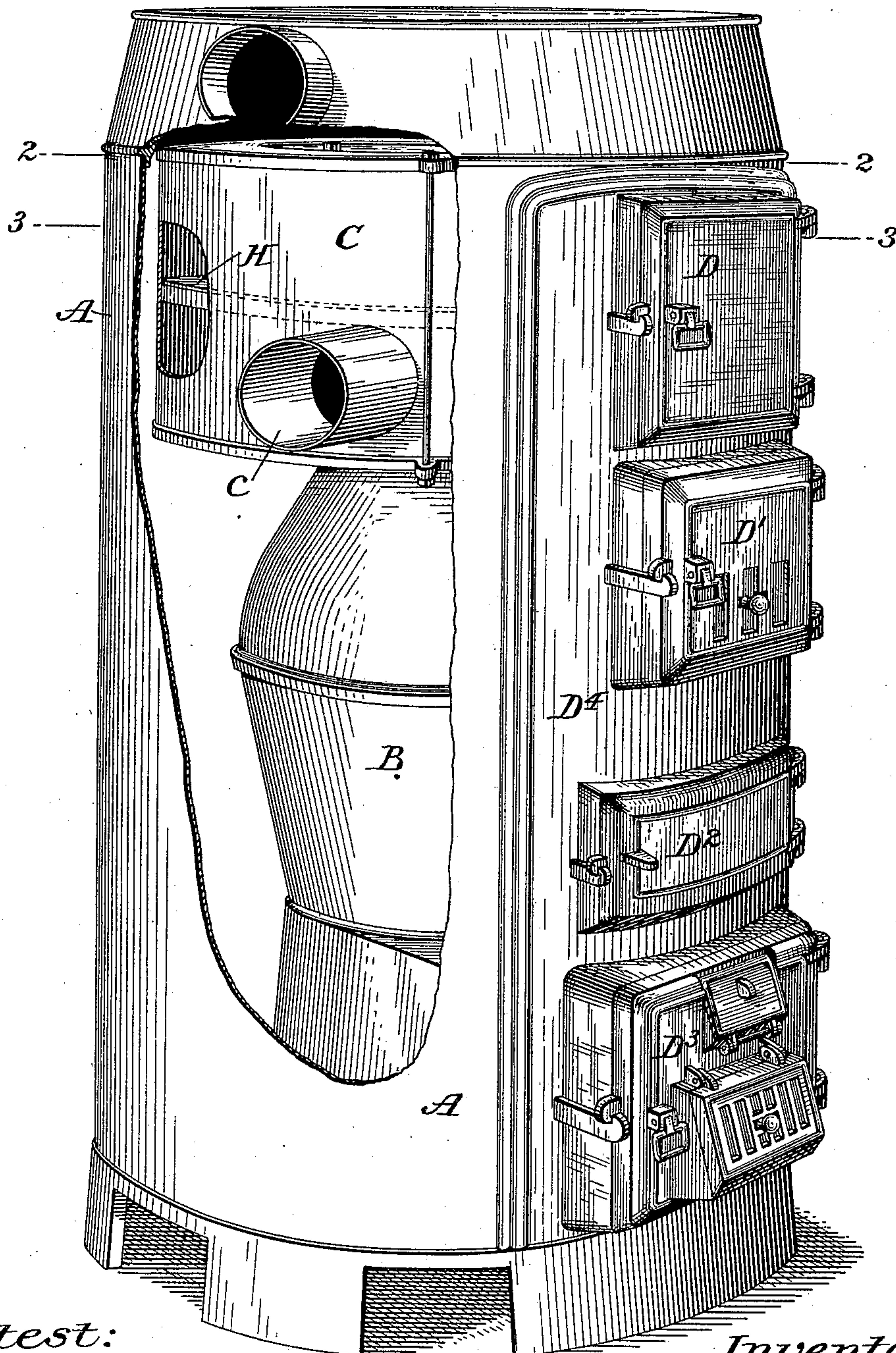
H. E. JAMES.  
FURNACE.

(Application filed Dec. 9, 1897.)

No Model.)

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*Fig. 1.*



*Attest:*

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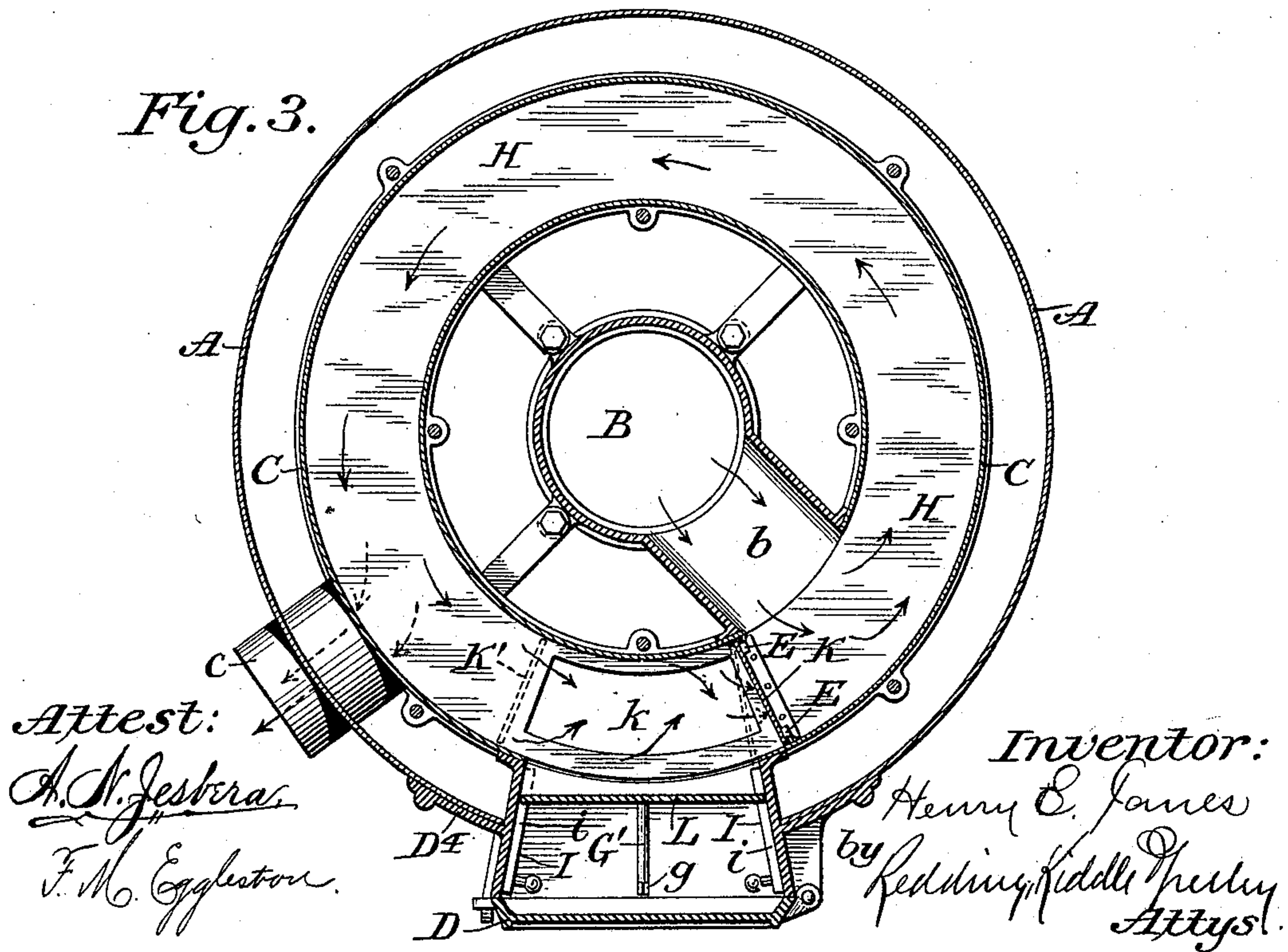
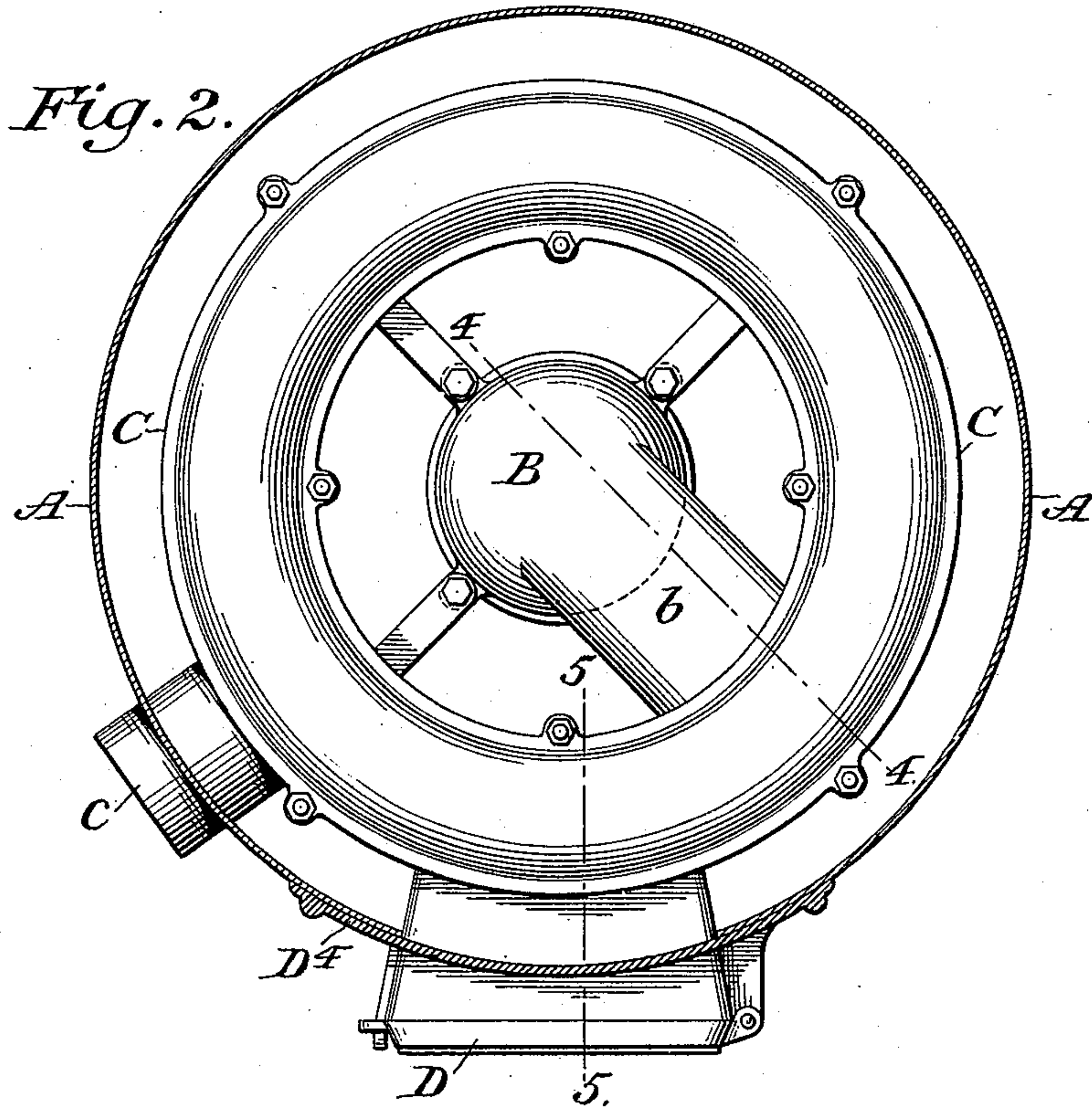
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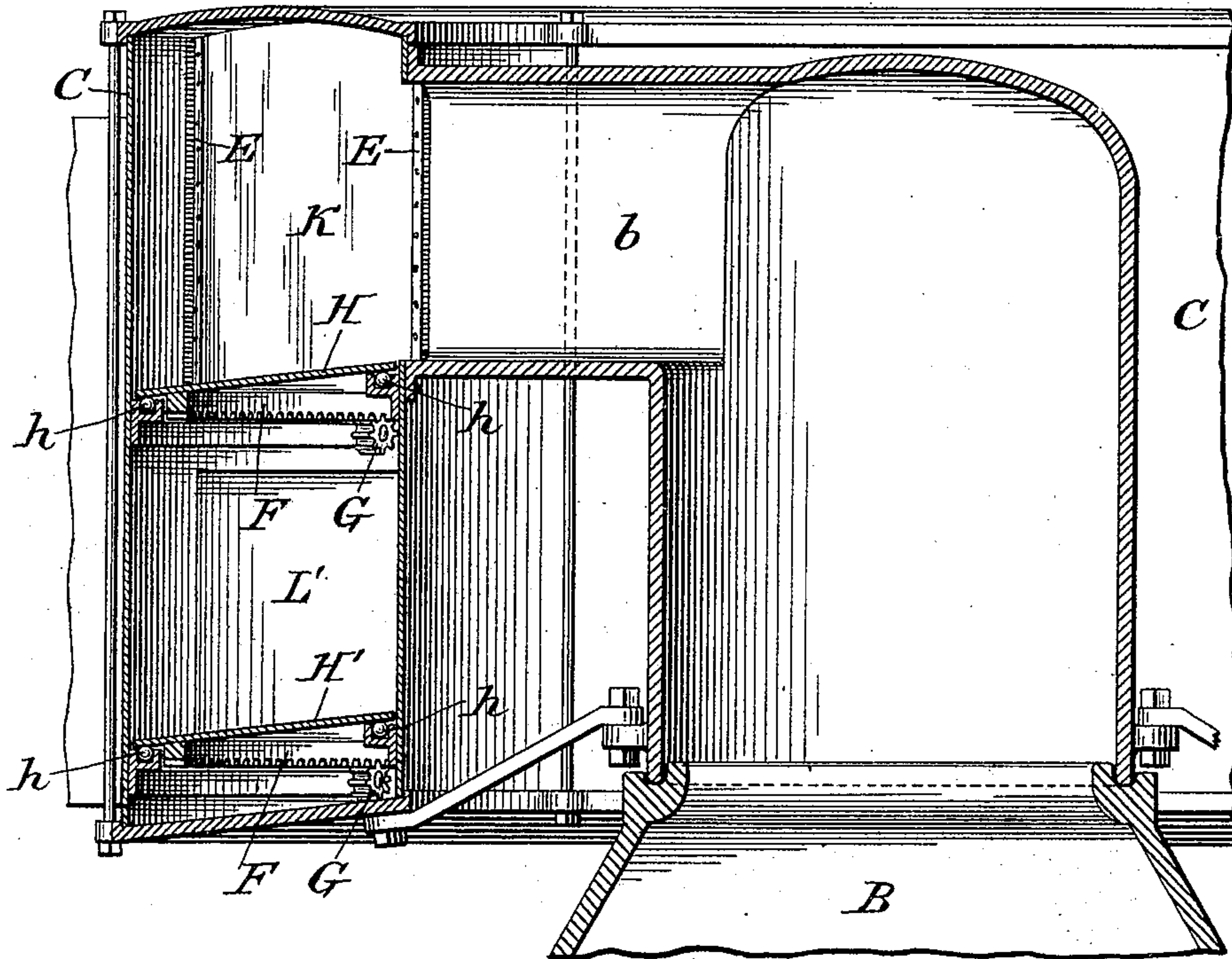
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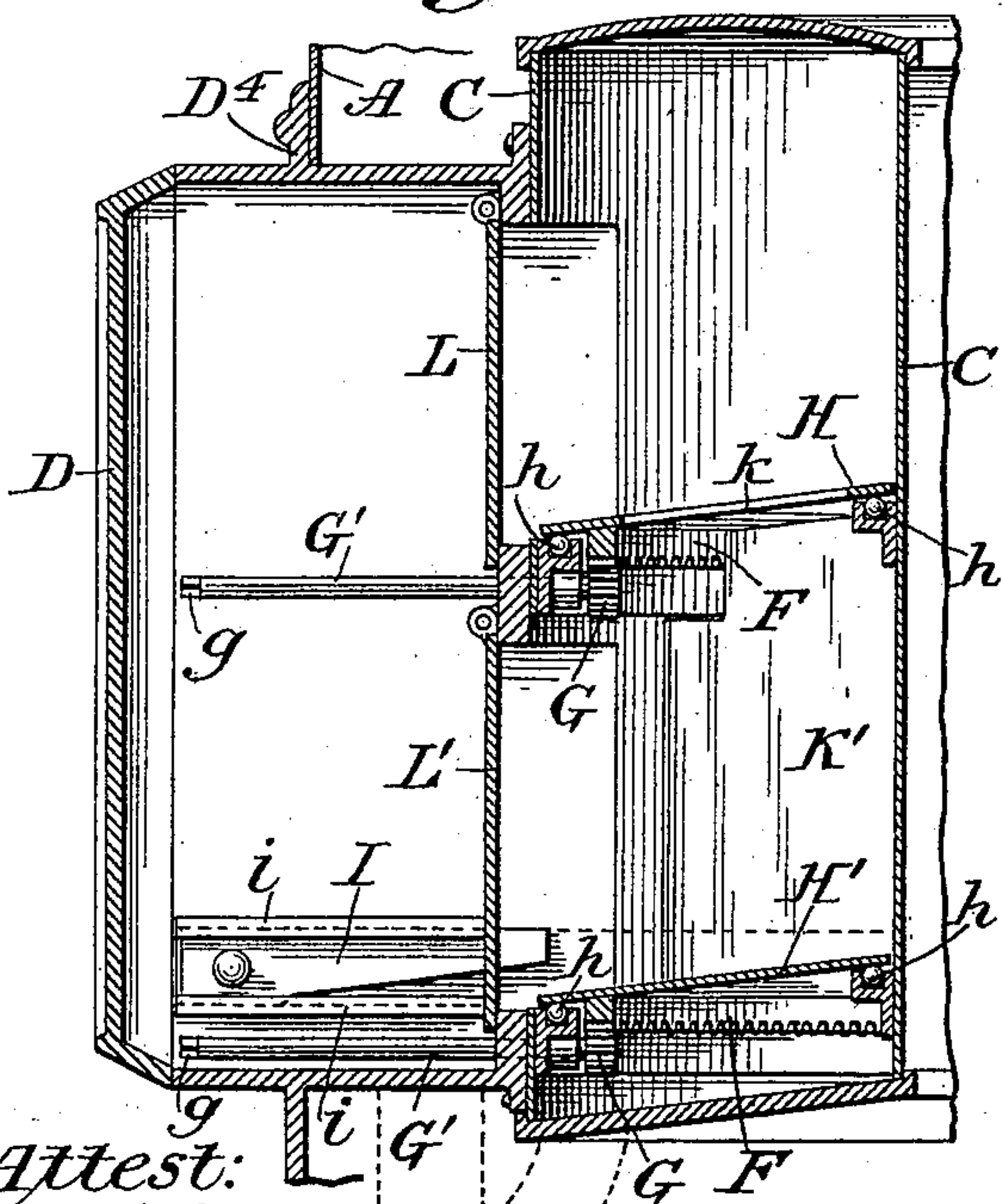
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*Fig. 4.*

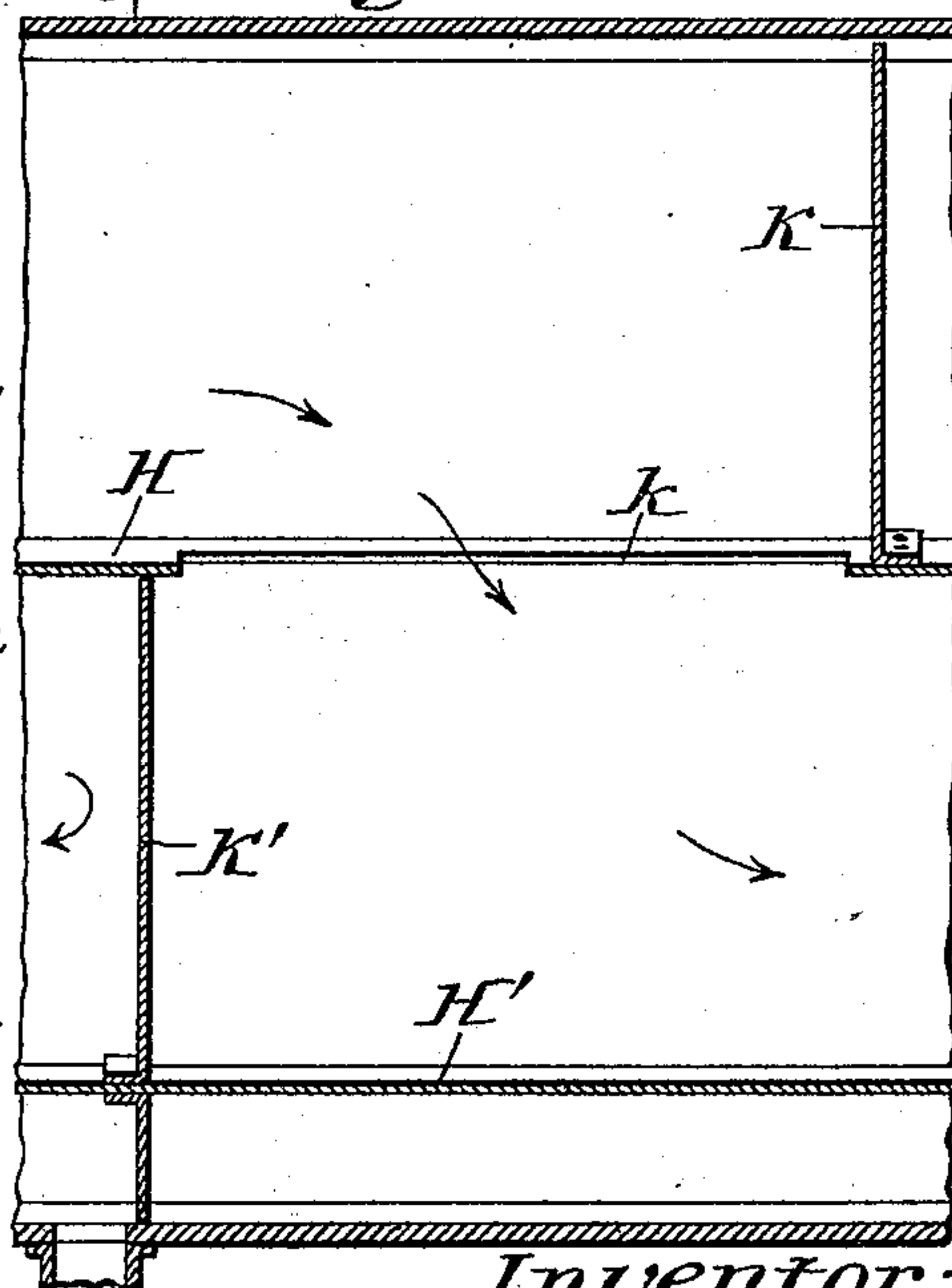


*Fig. 5.*



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*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

HENRY E. JANES, OF NEW ROCHELLE, NEW YORK.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 615,710, dated December 13, 1898.

Application filed December 9, 1897. Serial No. 661,230. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY E. JANES, a citizen of the United States, residing in New Rochelle, in the county of Westchester, in the State of New York, have invented certain new and useful Improvements in Furnaces, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

10 This invention relates to that class of furnaces commonly known as "hot-air heaters," in which the products of combustion pass from the combustion-chamber into what is termed a "radiator," through which they travel before passing to the chimney in order that they may give up as much as possible of their heat to the air which is in contact with the outer walls of the radiator. It is well understood that in order to obtain the greatest amount of heat from a given quantity of fuel the products of combustion should be made to travel a long distance within the radiator, and to that end it has been common heretofore to fix diaphragms or partitions within the radiator to make the path of the heated gases as long as possible without too much reduction of the draft. It is inevitable, however, that dust and soot will accumulate in the radiator and that unless they are removed from time to time they will prevent radiation of heat through the walls of the radiator and diminish very largely the heating capacity of the furnace. It is obvious that the multiplication of fixed diaphragms or partitions within the radiator will render the removal of the accumulated dust and soot extremely difficult and, indeed, practically impossible without taking the radiator apart. For this reason it has now become common to leave out all diaphragms or partitions, thereby sacrificing the advantages gained by keeping the heated gases within the radiator for a considerable time.

45 It is the object of the present invention to overcome the difficulties above alluded to and to make it possible to clean the inside of the radiator readily as often as may be required, and also to make it possible to employ division-plates within the radiator without making it difficult to clean same, thereby compelling the heated gases to remain within the radiator for a considerable time and increas-

ing the heating capacity of the furnace. To this end I mount a cleaner movably within the radiator and provide means for operating it conveniently to remove the dust or soot, and I have also provided the radiator with a movable floor-plate, which not only makes it possible to keep the radiator clean and clear of dust and soot without difficulty, but to divide the radiator interiorly in such a manner as to compel the products of combustion and heated gases to travel over a somewhat longer path than usual within the radiator. It will be apparent that the means for accomplishing the desired results may be variously constructed and arranged in various ways; but in order that the nature of the invention may be more clearly explained I have chosen for illustration of the invention in the accompanying drawings one embodiment of the invention which is both convenient and practical in operation.

In the drawings, Figure 1 is a perspective view of a furnace to which a convenient and practical form of my improvement is applied, the outer casing and the wall of the radiator being partly broken away. Fig. 2 is a section on the plane indicated by the line 2 2 of Fig. 1. Fig. 3 is a section on the plane indicated by the line 3 3 of Fig. 1. Fig. 4 is a vertical section, on a larger scale, on the plane indicated by the line 4 4 of Fig. 2. Fig. 5 is a vertical section, also on a larger scale, on the plane indicated by the line 5 5 of Fig. 2; and Fig. 6 is a vertical section on a plane at right angles to the plane of Fig. 5.

The precise form and construction of the furnace to which my improvements are applied are immaterial so far as this invention is concerned; but I have represented in the drawings a furnace of portable type in which a sheet-metal casing A incloses the fire-pot and combustion-chamber B and the radiator C, access to the various parts being afforded by doors D D' D<sup>2</sup> D<sup>3</sup>, supported by a plate or casting D<sup>4</sup> in the usual manner. The radiator C is represented as an annular chamber which surrounds the upper part of the combustion-chamber B and communicates therewith through an opening or passage b. The radiator is also provided with an exit, as at c, for the escape of the products of combustion to the chimney-flue. It is especially difficult



to clean radiators of the form here shown when fixed partitions are placed in them to lengthen the course of the heated gases, and for this reason it is common to omit such partitions altogether. Even without parti-  
 5 tions it is often a matter of much difficulty to remove the accumulations from the interior of the radiator, and I therefore provide a cleaner within the radiator and means  
 10 whereby it can be operated conveniently without regard to the partitions. The cleaner represented in the drawings consists of a stiff brush or scraper E, which is arranged to travel in close contact with the wall of the  
 15 radiator, being held closely against such wall throughout its movement, thereby scraping or brushing off the dust, soot, and scale.

As a means for operating the cleaner I have provided a rack F, which is adapted to the  
 20 shape of the radiator, being curved and preferably annular when applied to an annular radiator. This is supported in any convenient manner and at a suitable point is engaged by a pinion G, which is fixed to a shaft  
 25 G'. The latter is mounted in suitable bearings and is arranged at a convenient point, preferably in the walled space covered by the door D, and may be formed at its outer end, as at g, for engagement by a suitable crank or  
 30 handle. Rotation of the shaft and pinion will cause the cleaner, which is supported by the rack, to travel in contact with the wall of the radiator. A cleaner is preferably arranged for contact with each side wall of the  
 35 radiator, and a cleaner may also be arranged for contact with the bottom of the radiator to clean the same and also to bring all of the accumulated dust, soot, and scale to the cleaning-out door D, through which it may  
 40 be finally removed.

For the more expeditious cleaning of the radiator I prefer to provide movable floor-plates H H', especially for the upper chamber of the radiator, which is formed by the up-  
 45 per floor-plate H, which itself constitutes a partition for the radiator to lengthen the path of the heated gases therein. It will be obvious that these movable floor-plates, and especially the upper floor-plate H, might be arranged and operated in various ways; but I  
 50 prefer the construction and arrangement shown in the drawings, in which each plate H and H' is formed as an annular plate, preferably inclined outwardly, as shown, which  
 55 rests upon suitable bearings, preferably ball-bearings h, formed therefor on the walls of the radiator. Each floor-plate is secured to the rack F and moves therewith, every part of the floor-plate being brought thereby in  
 60 front of the cleaning-out door D, so that the accumulations of dust, soot, and scale may be removed therefrom. The upper plate H is arranged just below the level of the passage or opening b from the combustion-chamber to the upper part of the radiator, while  
 65 the plate H' is arranged near the bottom of the radiator. A scraper I may be arranged,

as represented in Figs. 3 and 5, to rest upon a floor-plate to scrape the dust, soot, and scale therefrom as the floor-plate travels, so  
 70 that the accumulations may be conveniently removed through the cleaning-out door. The scraper may be held to slide in ways i i, secured to the casting.

For the purpose of forming a long path for  
 75 the heated gases in the radiator the upper floor-plate is provided with a partition-plate K, which extends to the top of the radiator and may be made to bear the scrapers or  
 80 cleaners E for the upper part of the radiator, while an opening k is formed in the floor-plate H near such partition-plate K. A similar partition-plate K' is secured to the lower floor-plate H'. Doors L and L' close the open-  
 85 ings into the radiator above and below the floor-plate H, respectively. When the floor-plates H and H' with the partitions K and K' are properly adjusted, as represented in Fig. 3, the heated gases from the combustion-  
 90 chamber pass into the upper portion of the radiator just to the right of the partition-plate K, make a circuit of the upper portion of the radiator, pass into the lower portion through the opening k in the floor-plate H to  
 95 the left of the partition-plate K and to the right of the partition-plate K' of the lower plate H', and make a circuit of the lower portion of the radiator, passing out through the exit c, the heated gases thus making two complete  
 100 circuits of the radiator and giving up a large portion of their heat. The inner doors L and L' prevent the escape of the heated gases from the upper and lower portions, respectively, of the radiator into the space in-  
 105 closed by the main cleaning-out door D.

It will be evident that in the use of the construction shown and for the purpose of starting up the fire the two floor-plates with the  
 110 respective partition-plates may be revolved back from the positions shown to the other side of the door-neck and the smoke-collar, respectively, and the doors L L' be removed, so as to give a direct draft.

It will be obvious that although the arrangement of the movable floor-plates above  
 115 described is efficient in operation and entirely practicable in construction and therefore desirable nevertheless such movable floor-plates, and particularly the upper floor-plate H, might be arranged and adapted for move-  
 120 ment otherwise than as described for the purpose of enabling them, or either of them, to be freed readily from the accumulations thereon, the upper plate, for example, being arranged to move so as to discharge the accumulations  
 125 thereon upon the lower plate or upon the bottom of the radiator, the main object in view being to arrange the upper plate so that in use it shall separate the upper portion of the radiator from the lower portion thereof and  
 130 so that it and the upper portion of the radiator can be cleaned readily. It is to be understood, therefore, that as to the floor-plates and as to the cleaners as well I do not intend



to limit my invention to the precise construction and arrangements of parts which I have shown and described herein.

I claim as my invention—

5 1. In a hot-air furnace, the combination with a combustion-chamber and a radiator communicating therewith and having a smoke-exit, of a floor-plate between the communication with the combustion-chamber  
10 and said exit and dividing said radiator into upper and lower chambers, said floor-plate having an opening for communication between said chambers and being movable whereby it can be cleaned of dust and soot.

15 2. In a hot-air furnace, the combination with a combustion-chamber and an annular radiator communicating therewith and having a smoke-exit, of an annular floor-plate between the communication with the combustion-chamber and said exit and dividing said  
20 radiator into upper and lower chambers, said floor-plate being mounted to revolve and having an opening for communication between said chambers, and means to revolve said floor-  
25 plate.

3. In a hot-air furnace, the combination with a combustion-chamber and an annular radiator communicating therewith, of an annular floor-plate mounted to revolve in said  
30 radiator and dividing said radiator into upper and lower chambers, said floor-plate having an opening for communication between said chambers, and a partition-plate extending across and from top to bottom of one of  
35 said chambers.

4. In a hot-air furnace, the combination with a combustion-chamber and an annular radiator communicating therewith, of an annular floor-plate mounted to revolve in said  
40 radiator and dividing said radiator into upper and lower chambers, said floor-plate having an opening for communication between said chambers, and a partition-plate secured to said floor-plate and extending to the top  
45 of said upper chamber.

5. In a hot-air furnace, the combination with a combustion-chamber and an annular radiator communicating therewith, of an annular floor-plate mounted to revolve in said  
50 radiator and dividing said radiator into upper and lower chambers, said floor-plate having an opening for communication between said chambers, a second annular floor-plate mounted to revolve in the lower chamber of  
55 said radiator, and a partition-plate secured to the lower floor-plate and extending to the upper floor-plate.

6. In a hot-air furnace, the combination with a combustion-chamber and a radiator communicating therewith, said radiator having a clean-out door or opening, of a movable floor-plate dividing said radiator into upper and lower chambers, means to operate said movable floor-plate, said floor-plate having an opening for communication between said  
60 chambers, a cleaner mounted to travel within said radiator and means to operate said cleaner.

7. In a hot-air furnace, the combination with a combustion-chamber and an annular  
70 radiator communicating therewith, of an annular floor-plate mounted to revolve in said radiator, said floor-plate being inclined outwardly.

8. In a hot-air furnace, the combination  
75 with a combustion-chamber and an annular radiator communicating therewith, of an annular floor-plate mounted to revolve in said radiator, said floor-plate being inclined outwardly, and a scraper mounted for contact  
80 with said floor-plate to clean the same as it is revolved.

9. In a hot-air furnace, the combination with a combustion-chamber and an annular  
85 radiator communicating therewith, of an annular floor-plate mounted to revolve in said radiator and a scraper mounted in ways fixed with relation to said floor-plate to slide in said ways across said floor-plate and to clean the same as the latter is revolved.  
90

10. In a hot-air furnace, the combination with a combustion-chamber and a radiator communicating therewith, of a floor-plate for said radiator and a cleaner secured to the upper side of the floor-plate in contact with  
95 the wall of said radiator, said floor-plate and cleaner being mounted to travel within said radiator, and means to operate said floor-plate and cleaner.

11. In a hot-air furnace, the combination  
100 with a combustion-chamber and an annular radiator communicating therewith, of an annular floor-plate mounted to revolve in said radiator, a cleaner secured to the upper side of said floor-plate in contact with the wall  
105 of said radiator, a rack secured to said floor-plate and cleaner and a pinion and shaft to operate said rack.

This specification signed and witnessed this 7th day of December, A. D. 1897.

HENRY E. JANES.

In presence of—

W. B. GREELEY,  
A. N. JESBERA.