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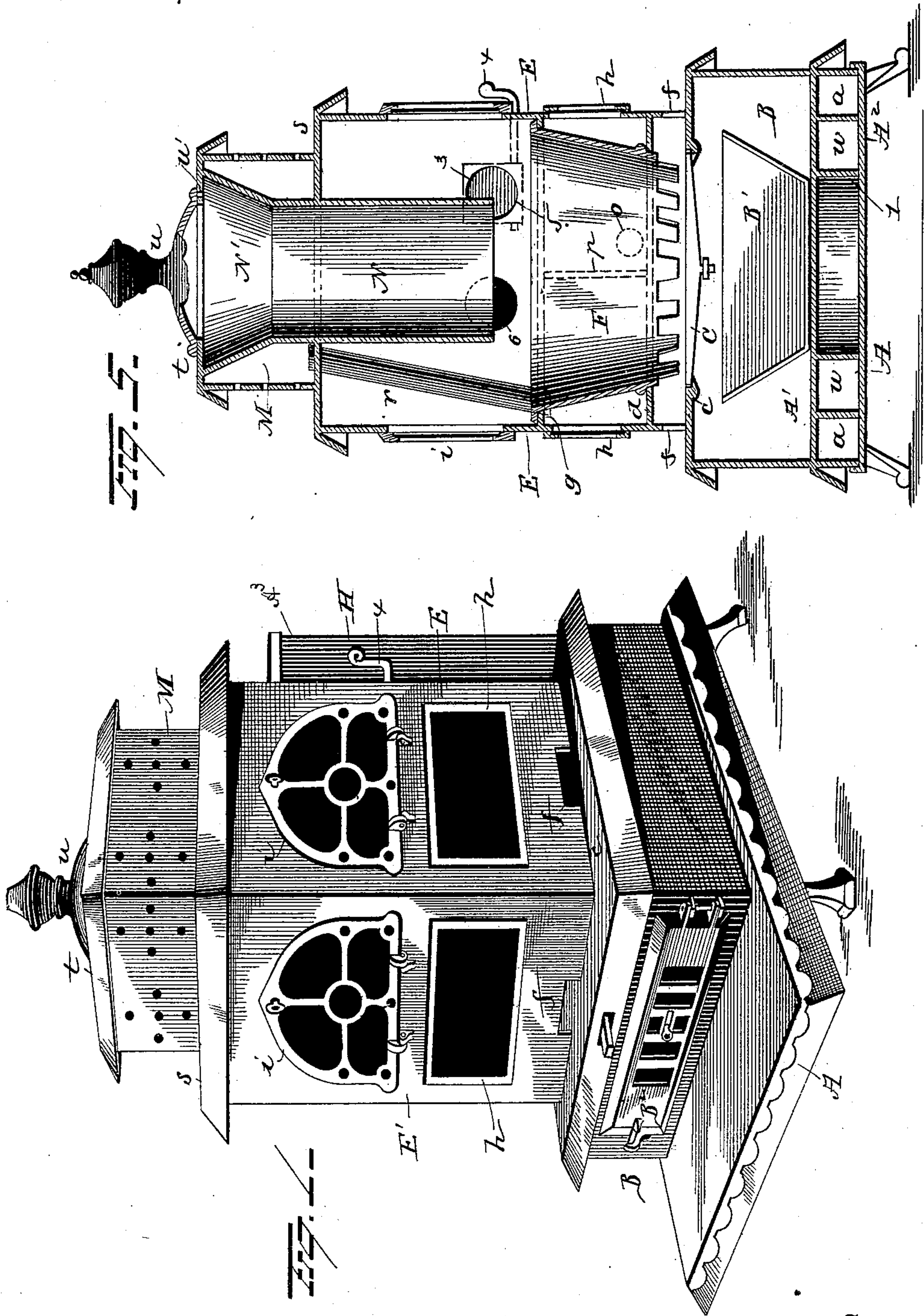
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M. HAYDEN.

HEATING AND VENTILATING STOVE.

No. 390,670.

Patented Oct. 9, 1888.



Witnesses
G. F. Downing
S. G. Nottingham

Inventor
Marshall Hayden
By his Attorney
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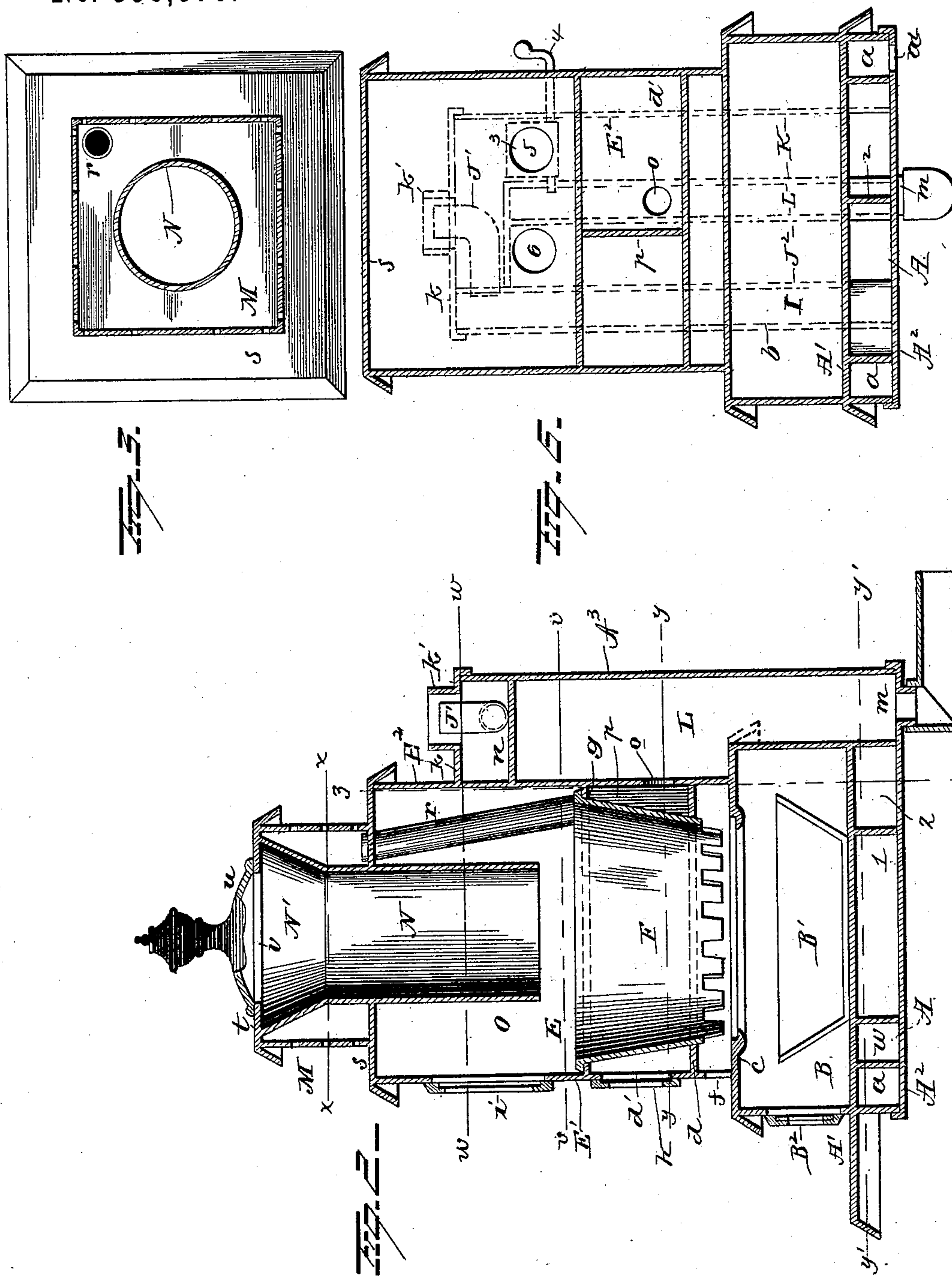
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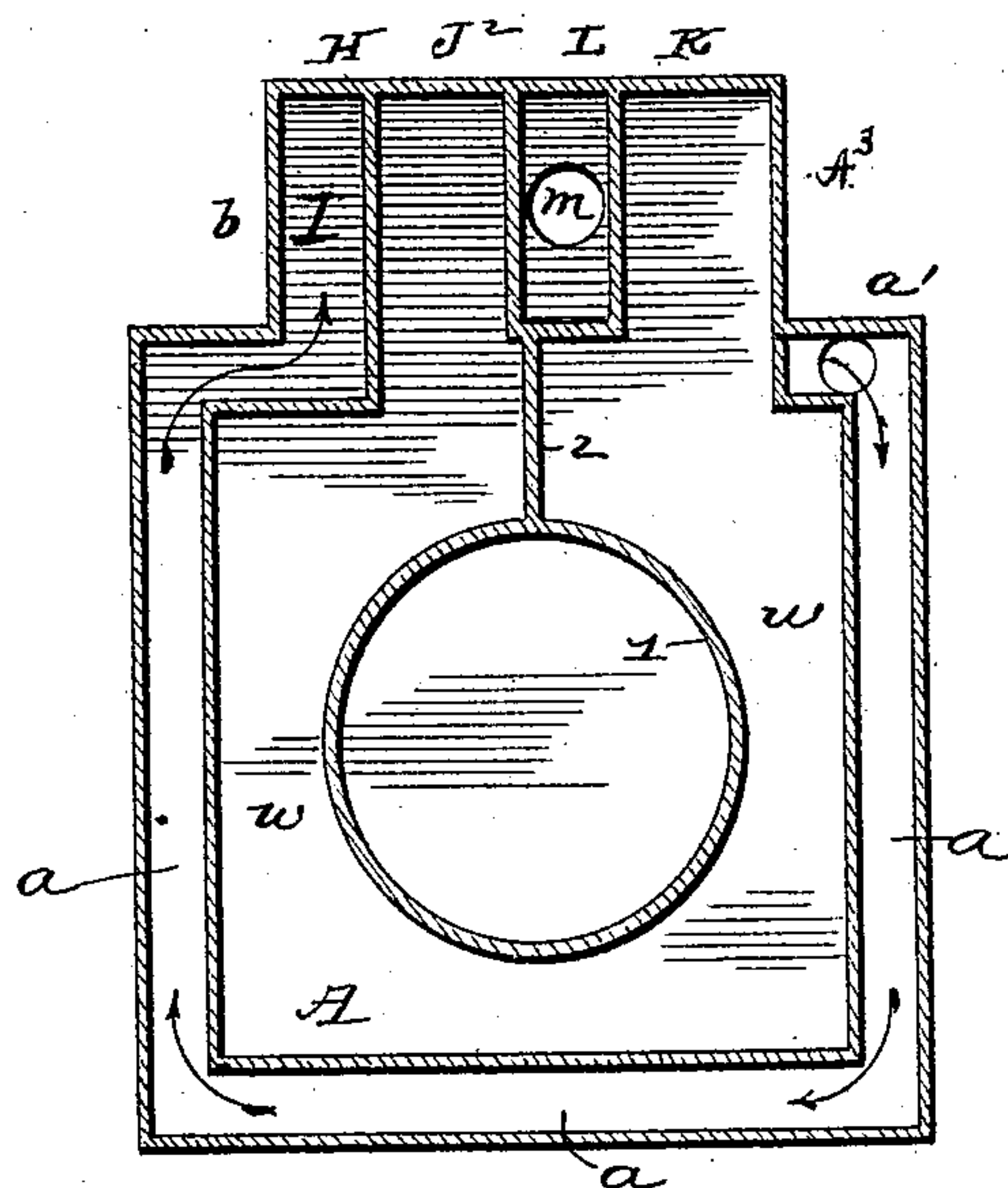
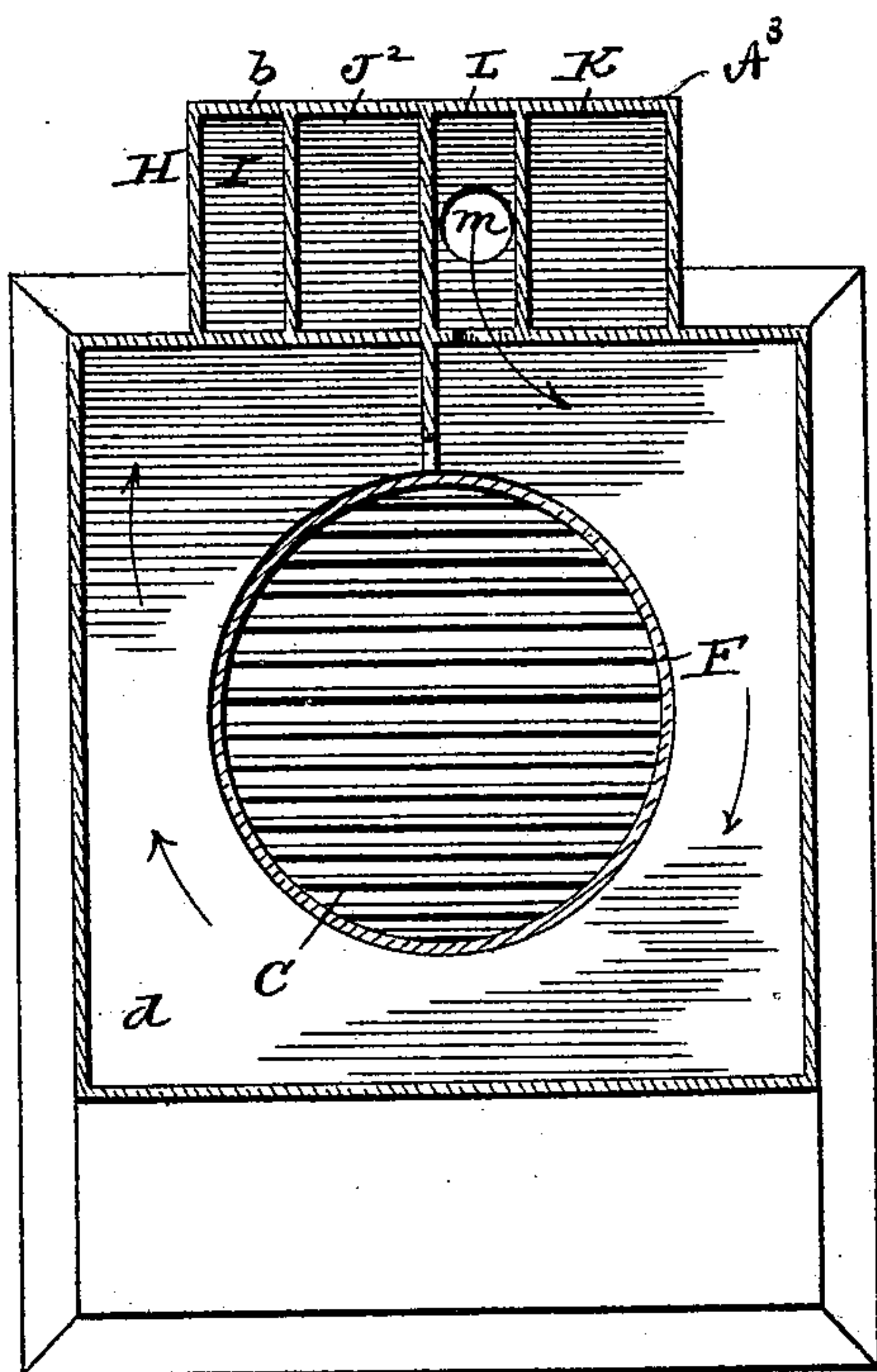
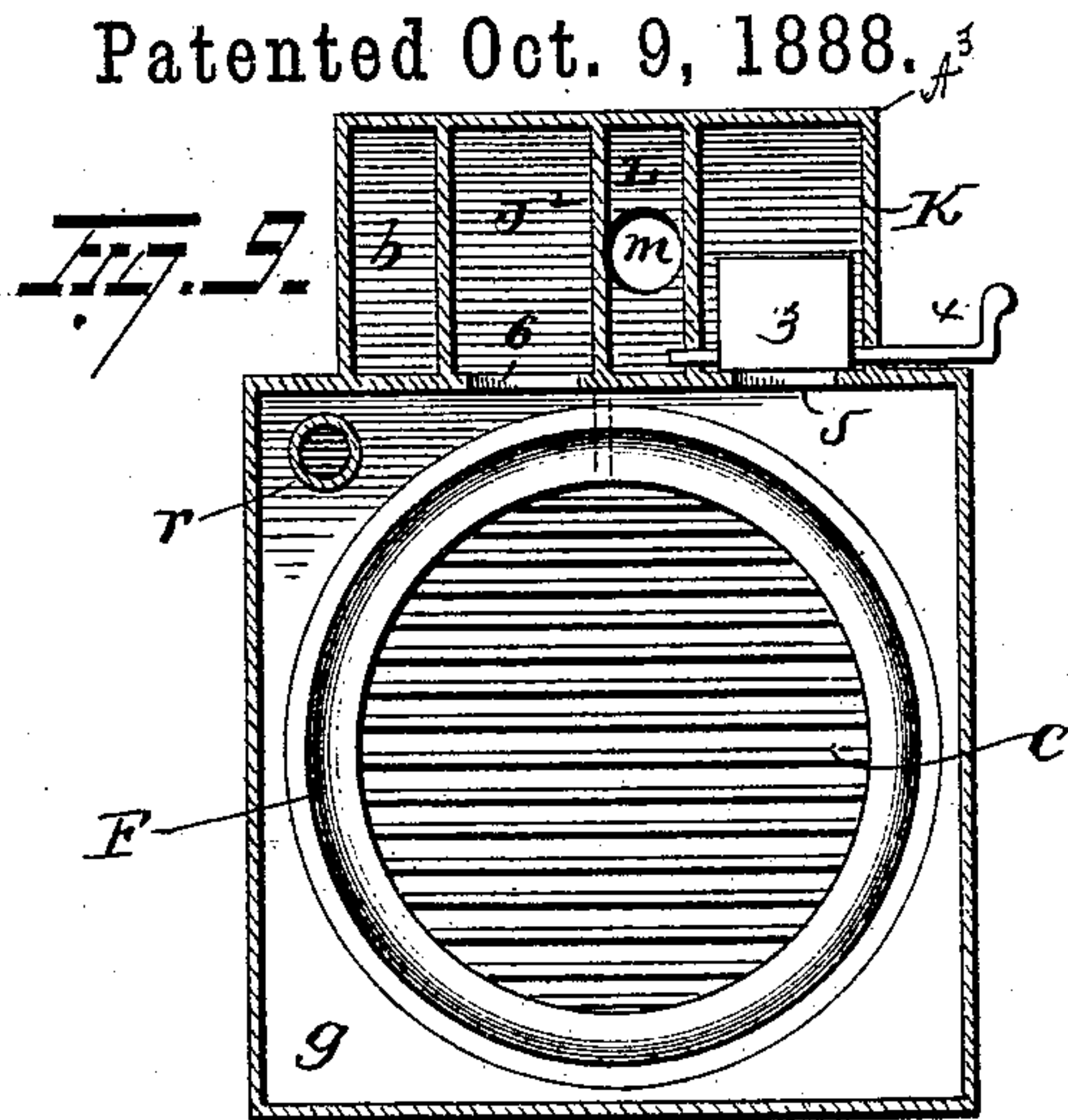
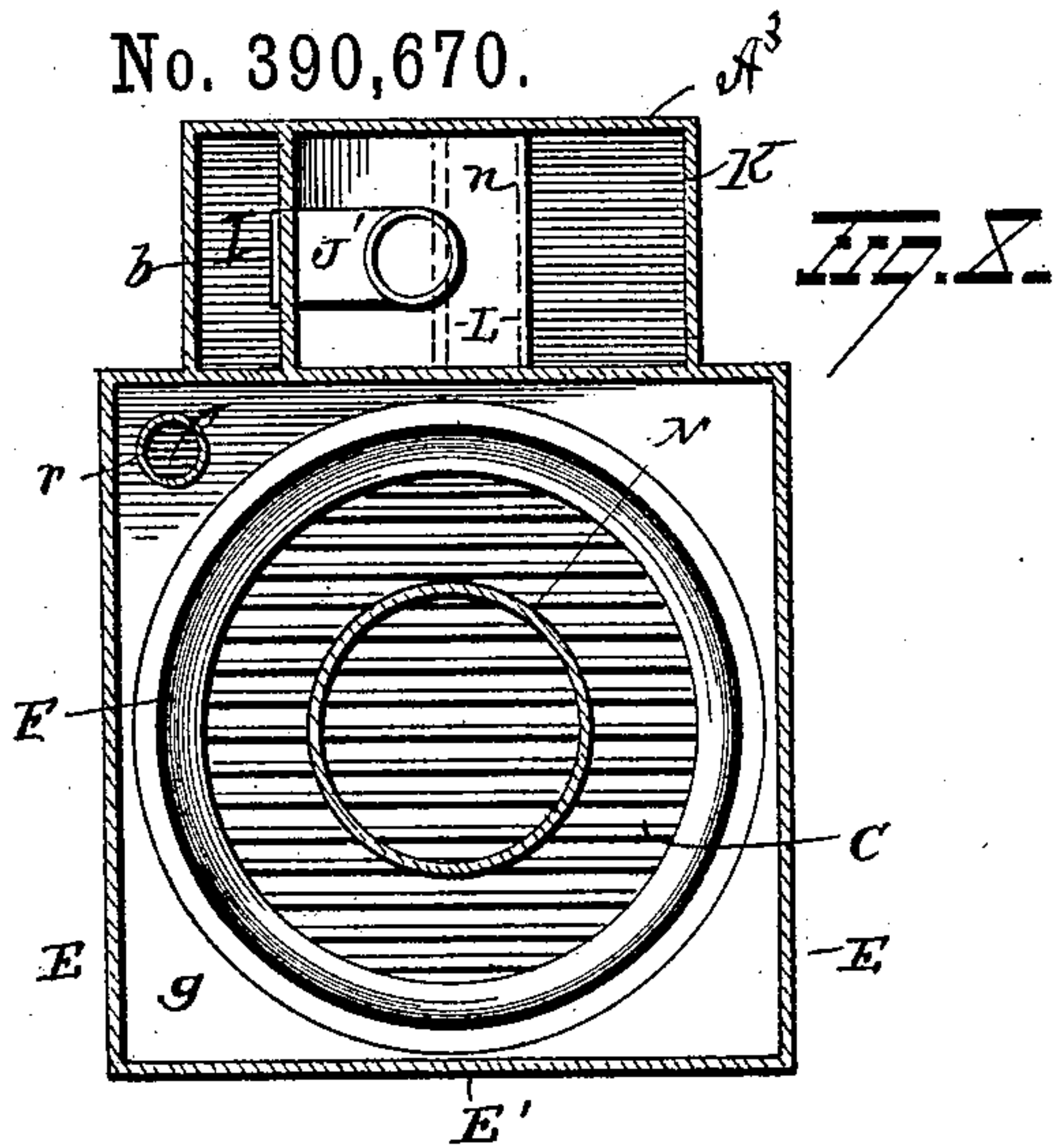


Fig. 4

Fig. 7

Witnesses

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UNITED STATES PATENT OFFICE.

MARSHALL HAYDEN, OF NEW MILFORD, PENNSYLVANIA.

HEATING AND VENTILATING STOVE.

SPECIFICATION forming part of Letters Patent No. 390,670, dated October 9, 1888.

Application filed February 29, 1888. Serial No. 265,652. (No model.)

To all whom it may concern:

Be it known that I, MARSHALL HAYDEN, of New Milford, in the county of Susquehanna and State of Pennsylvania, have invented certain new and useful Improvements in Heating and Ventilating Stoves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in heating-stoves and ventilating attachment combined therewith.

One object of this invention is to produce a heating-stove which will afford a means of ventilating the room in which it is placed by removing the foul air from the lower portion of the room, heating it so as to rarefy it, and then discharge it in this condition into the draft-flues of the stove to be conducted out of the apartment.

A further object is to provide a means for the introduction and circulation of a current of pure air into a chamber that surrounds the fire pot or cylinder, to heat the air and then discharge the hot air from the top of this chamber into a heat-distributing chamber at the top of the stove, and thence into the apartment in which the stove is located, the cool air affording protection to the cylinder to prevent it from burning out.

A further object is to construct a heating-stove that will be self-feeding, be of handsome design, and afford ample surface for heat radiation, with a view of the fire, to light as well as heat a room.

With these objects in view my invention consists in certain features of construction and combinations of parts of the device, that will be hereinafter described, and pointed out in the claims.

Referring to the drawings making a part of this specification, Figure 1 is a perspective view of my improved stove. Fig. 2 is a side elevation in section of the stove, taken on a vertical line through the center of the same. Fig. 3 is a cross section of the stove, taken on the line $x x$ or through the top of the cylinder. Fig. 4 is a plan view in section of the stove, taken on the line $y y$. Fig. 5 is a section taken on a line through the center of the magazine and fire pot or cylinder. Fig. 6 is an elevation in section of the rear side of the stove on line $z z$ of Fig. 2. Fig. 7 represents a cross-

section of the stove, taken on the line $y' y'$, or at the base of the heat-distributing chamber. Fig. 8 is a sectional view of the stove on line $w w$. Fig. 9 is a sectional view on line $v v$.

The outer casing of the stove is preferably made rectangular and in the style shown in Fig. 1. I do not, however, desire to limit myself to such a design, as my improvements may be combined with stoves of other shapes, as will be apparent when a description of the same is given.

The base of the stove consists of a square sub-chamber, A, over which the hearth-plate A' is placed as a cover. The sub-chamber A has a vertical wall that is parallel to the outer wall erected from the base-plate A', so as to produce a continuous passage, a , that extends around the chamber A. This passage is designed to heat up and convey foul air that enters it through the orifice a' to be discharged into a vertical flue, b , as will be further explained in connection with other parts to be described.

Above the sub-chamber A the ash-pit B is formed. This is of ordinary form and may be provided with a drawer, B', to receive the ashes when the grate above it is agitated. The hearth-plate A' is extended toward the front to afford a finish to this part of the stove, as shown, and a door, B², is hinged to open and allow the ash-drawer to be withdrawn.

The ash-pit is covered by a plate, c , which extends beyond the walls of the pit and has a depending ledge formed on it, as shown. This plate c is cut away at its center, so as to receive the grate C, which is mounted on it in a manner to allow a proper agitation that will remove ashes from the fire-pot F. Upon the plate c the side walls of the stove proper are mounted. The two side walls, E E, and front wall, E', are made substantially alike.

At a proper point above the grate C a transverse horizontal flange, d , is located. This is attached to joint closely with the four vertical walls of the stove and has a central orifice of proper diameter made in it to receive the lower end of the cylinder F. The latter consists of a flaring chamber of metal of proper height, having a series of depending spaced lips formed on the lower edge, to afford a means for the insertion of a poker between the slots in the cylinder to remove clinker from the lower part of the same, access being afforded through the apertures f , which may be closed

by small doors or slides to give a finished appearance to the exterior of the stove.

The fire-pot F is supported in position by a plate or cross-wall, *g*, which projects inwardly from the four walls of the stove, this plate having a circular aperture centrally formed of a size to receive the outwardly-projecting top edge of the fire-pot, which closely fits therein.

The two parallel cross-walls *d g*, from their position in relation to the cylinder and vertical casing-walls of the stove, produce a close compartment, *d'*, that surrounds the fire-pot F.

The sides *E E* and front wall, *E'*, of the stove-casing are preferably constructed with doors *h*, that are located opposite the fire-pot. These doors may be glazed with mica, or the doors may be dispensed with and mica be inserted to cover apertures of preferred form and size made opposite the fire-pot F.

Above the doors *h* other doors, *i*, are furnished to cover orifices cut in the sides *E E* and front *E'* of the stove. These may be of any preferred shape to afford ornamentation to the stove-casing, and they are glazed with mica to expose the fire, and thus permit it to diffuse light as well as heat therefrom when in use.

At the rear of the stove a rectangular extension, *H*, is made to project. This extends from the base-wall of the sub-chamber A to nearly the height of the side casing-walls, *E E*, the outer walls of the extension *H* joining the rear wall, *E²*, of the stove-casing and inclosing several flues, which will be explained.

In the flue-chamber A³ the first flue, *I*, on the left side of the stove, considered from the front, is located. This flue is from its position adapted to intersect at its lower end the foul-air conduit *a*. The heavy vitiated air, that is charged with carbonic-acid gas, and from its weight lies near the floor of the apartment, enters the conduit *a* through the orifice *a'*, as has been previously mentioned.

The upper end of the foul-air flue *I* is closed by the top plate, *k*, but has a lateral tubular extension, *J'*, that is located in the side wall nearest the thimble, which engages a draft-pipe that conducts the foul air, as well as the waste products of combustion, to a chimney, whence it escapes to the open air.

The vertical flue *J²*, which is placed adjacent to the foul-air flue *I*, constitutes one of the draft-passages for the stove, which will be further noticed. Another draft-flue, *K*, is situated toward the right side of the stove parallel to the flues *I* and *J²*, but separated from the draft-flue *J* by a passage for pure cold air, which latter-named passage, *L*, extends from the lower wall of the sub-chamber A, but separated from it, to a point just below where the bent foul-air pipe *J'* is extended from the side wall of the flue *I* to enter the draft-pipe *K'*.

The passage *L* is supplied by a tubular conduit, which is connected by its outer end to the orifice *m*, that is formed in the lower end

plate which covers this vertical passage. The conduit mentioned may be projected through the floor of the apartment in which the stove is placed, and thence continued to the open air, so as to permit a free flow of pure air to enter it and be conducted to the stove.

The upper end of the pure-air passage *L* is stopped off by a cap-plate, *n*, which prevents the air from escaping at that point; but at *o* (see Fig. 6) an orifice is cut in the rear wall, *E²*, of the stove to admit pure air into the compartment *d'*, that surrounds the cylinder F, this orifice entering the pure-air passage *L*, as shown.

The orifice *o*, just mentioned, is located on one side of the vertical partition-wall *p*, which is introduced between the inclined wall of the fire-pot F, at the rear side of the same, and the rear casing-wall, *E²*, of the stove. As it is of equal height with the fire-pot, it engages the cross-walls *d g*, and thus divides the compartment at this point.

It is apparent that pure air, which enters through the orifice *o* into the compartment *d'*, will circulate around the fire-pot F and completely envelop it until it reaches the other side of the partition-wall *p*. In a corner of the wall *g* a vertical hot-air pipe, *r*, is connected, to lead the pure air which is introduced through the orifice *o*, and heated by contact with the fire-pot F to an upper heat-distributing chamber, *M*, which latter is mounted upon the top plate, *s*, of the casing of the stove.

The heat-distributing chamber *M* is preferably made rectangular, as shown, and of such a relative size that the pipe *r* may be introduced into it through the top plate, *s*.

A central aperture is made in the top plate, *s*, to receive a fuel-magazine, *N*, which is made cylindrical and of a length proportionate to the height of the stove-casing, so that it will hang with its lower end a short distance above the cylinder F in the combustion-chamber O of the stove.

The upper portion of the magazine *N* is flared to produce a wider top end, *N'*, this flared portion extending between the top plate, *s*, and the cap-plate *t* of the heat-distributing chamber *M*, to which the top edge of the magazine is attached.

The cap-plate *t* of the chamber *M* is centrally perforated, the orifice, *v*, thus produced being intended to afford access to the fuel-magazine *N*, and this hole is closed by a lid, *u*, which is pivoted by an ear, *u'*, to the cap-plate *t*; or it may be made loose and adapted to be seated gas-tight in the orifice or coal-stoking hole *v*, as may be preferred.

The two draft flues *J² K*, that have been mentioned before, are in free connection with the sub-chamber A at its rear side, and, as will be seen in Fig. 7, there is a circular wall, *1*, centrally affixed upon the base-plate of the sub-chamber A, which is of the same height as the chamber, so that an annular passage, *w*, is thus formed.

Between the circular wall *1* and the wall of

the vertical pure-air passage L the partition-wall 2 is erected, which will thus divide the annular passage *w* and cause the draft-flues J² K to be in communication with each other by means of a circuit of the passage *w*—that is to say, the products of combustion which enter one draft-flue, J², and are forced to descend in it cannot reach the other flue, K, to rise in it and escape through the draft-pipe without they circulate through the annular passage *w* to reach said flue K.

In order to cause a circulation of the hot products of combustion in the annular passage *w* of the sub-chamber A, the damper 3 is secured on a rod or handle, 4, so that it may be elevated and close the orifice 5, there being two similar draft-holes, 5 6, made through the rear wall, E², of the casing opposite the flues J² K, to allow the hot gases from the fire to be drawn into the flues and out of the draft-pipe.

It is evident that when the damper 3 is closed the hot products of combustion will be drawn down the pipe J², and after circulating through the passage *w* will rise through the flue K to escape from the draft-pipe K', and from the position of the pure-air passage L between these flues the air which enters the passage L will be measurably heated before it enters the compartment *d'*, that surrounds the cylinder.

It should be explained that the hot air which rises from the compartment *d'* to enter the heat-distributing chamber M may escape therefrom through the perforations made in the side of this chamber.

From the foregoing description it will be apparent that the induction of the impure air at the bottom of the stove, its rarefaction therein, and discharge into the draft-pipe K, and from thence to the chimney of the house, will automatically and continuously effect a purification of air in the apartment without a direct opening being made in the room. As the air which enters the pure-air passage L from without the building will, when heated, be expelled from the heat-distributing chamber M at the top of the stove in a heated state, and as the foul air is drawn out of the room in the manner stated the heated air will descend to occupy the space vacated. This operation will continue as long as there is fire in the stove.

Many slight changes might be made in the details of construction of this stove without departure from the spirit of my invention. Hence I do not wish to limit myself to the exact forms herein shown; but,

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

1. In a heating and ventilating stove, the combination, with a sub-chamber having a foul-air passage extending around the base of the stove, of a foul-air flue in the rear of the stove, into which said passage leads directly, substantially as set forth.

2. In a heating and ventilating stove, the combination, with a casing, a flue-chamber constituting the rear end of said stove, and flues in this flue-chamber, of a sub-chamber in open communication with the flues, a foul-air passage adjacent to the sub-chamber, and a foul-air flue into which this passage leads, said flue opening into the main flue, substantially as set forth.

3. In a heating and ventilating stove, the combination, with a casing, a flue-chamber, draft-flues, and a fresh-air and foul air flue in said flue-chamber, a fire-pot, and a hot-air chamber around the latter, into which the fresh-air flue opens, of a sub-chamber in the bottom of the stove, a foul-air passage extending around the sub-chamber and opening into the foul-air flue, and a pipe leading out of the foul-air flue into the main draft-flue, substantially as set forth.

4. The combination, with a casing, a flue-chamber, a fresh-air flue therein, a fire-pot suspended within the casing to form an inclosed chamber between it and the casing, and a partition in said chamber, of an inlet from the fresh-air flue to the chamber around the fire-pot, said opening being at one side of the partition, and hot-air-discharge pipe extending out of the chamber from the opposite side of the partition, substantially as set forth.

5. In a heating stove, the combination, with a casing, a fire-pot, a magazine, and a hot-air-distributing chamber, of two draft-flues, a damper, an annular passage at the base of the stove that connects the flues, two parallel cross walls or flanges, on which the fire-pot is suspended to form an air-compartment, a partition which divides the compartment and causes air to circulate around the fire-pot, a pure-air-inlet orifice on one side of this partition, a hot air vertical pipe that discharges air from the compartment, and a vertical pure-air passage that conducts air to the compartment which surrounds the cylinder of the stove, substantially as set forth.

6. The combination, with an inlet through the base-plate of the stove that inducts foul air from the room into a sub-chamber, a passage formed in the sub-chamber around its exterior walls that is heated by hot products of combustion which enter the sub-chamber and are conducted in an annular passage adjacent to the foul-air passage, and an annular hot-air passage, of a vertical foul-air flue, into which the foul-air passage leads, a pipe leading from the foul upper end of the foul-air flue into the main flue or draft-pipe, two draft-flues, a damper, and a draft-pipe that leads the foul air out of the apartment in which the stove is placed, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

MARSHALL HAYDEN.

Witnesses:

SAMUEL FALKENBURY,
C. F. WRIGHT.