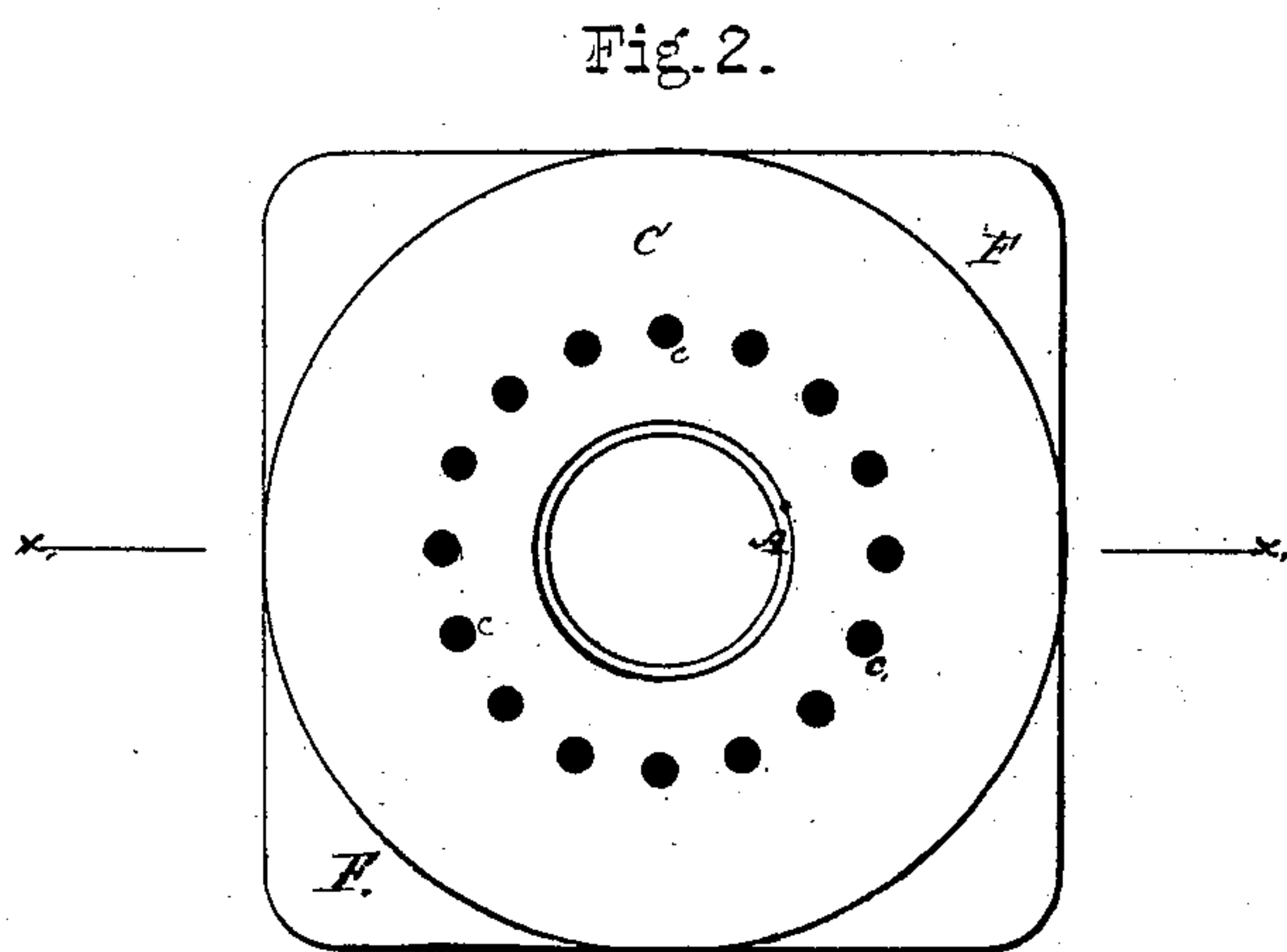
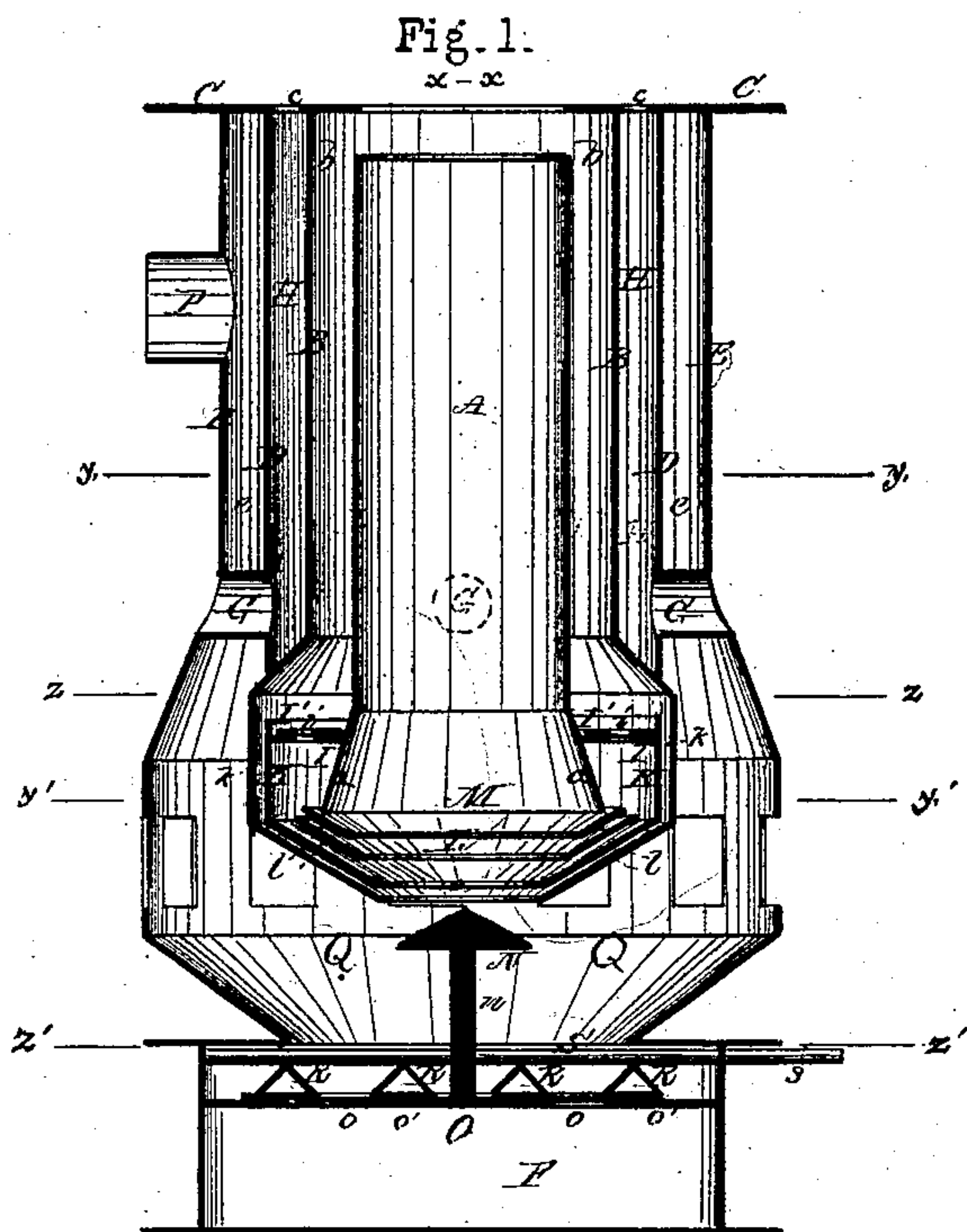


W. J. KEEP.
Base Burning Stove.

3 Sheets—Sheet 1.

No. 102,682.

Patented May 3, 1870.



Witnesses.

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Samuel J. Marr

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by Prindle and Ayer
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W. J. KEEP.
Base Burning Stove.

No. 102,682.

Patented May 3, 1870.

Fig. 3.

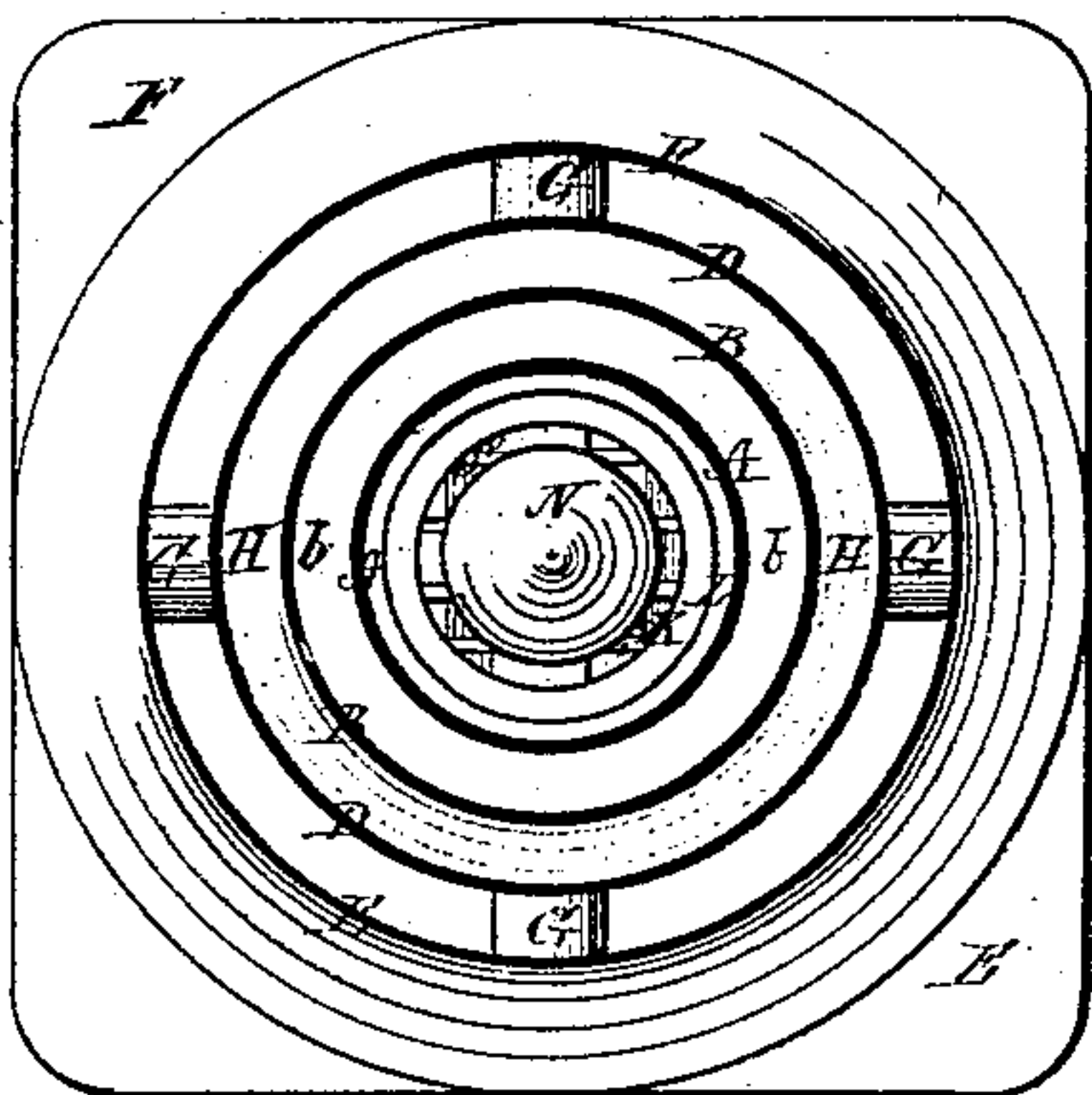


Fig. 4.

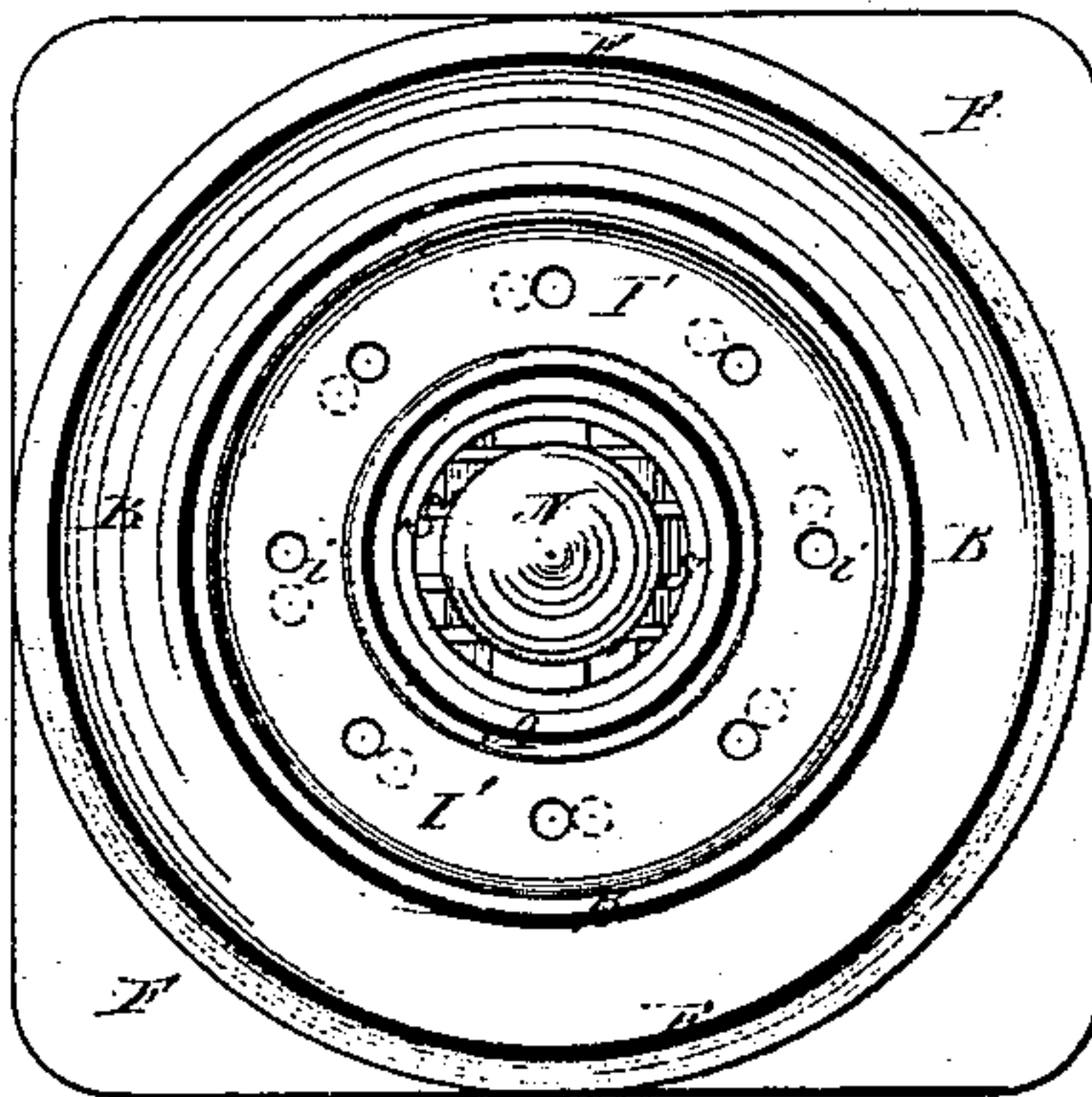


Fig. 5.

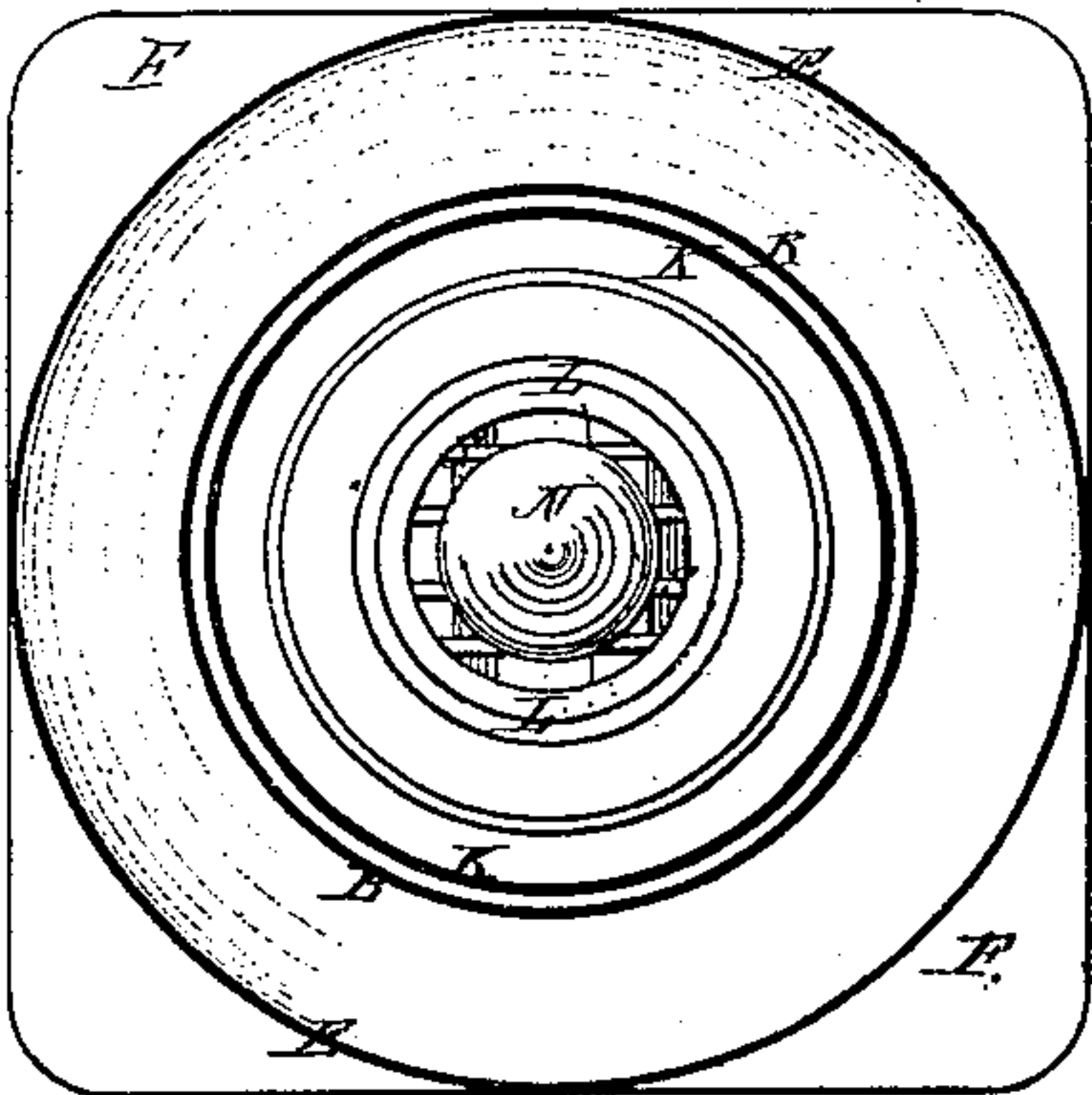
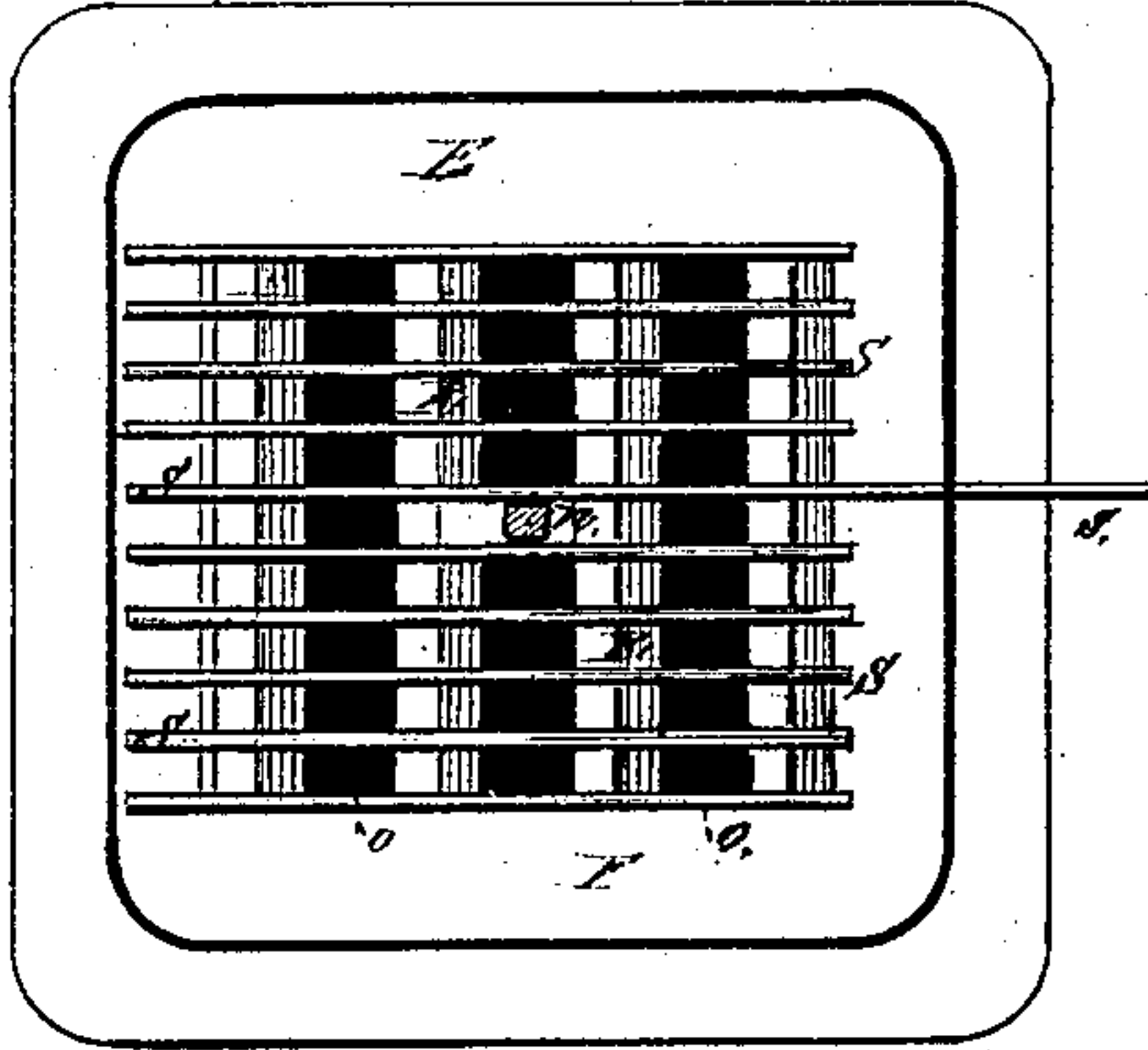


Fig. 6.



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Base Burning Stove.

No. 102,682.

Patented May 3, 1870.

Fig. 7.

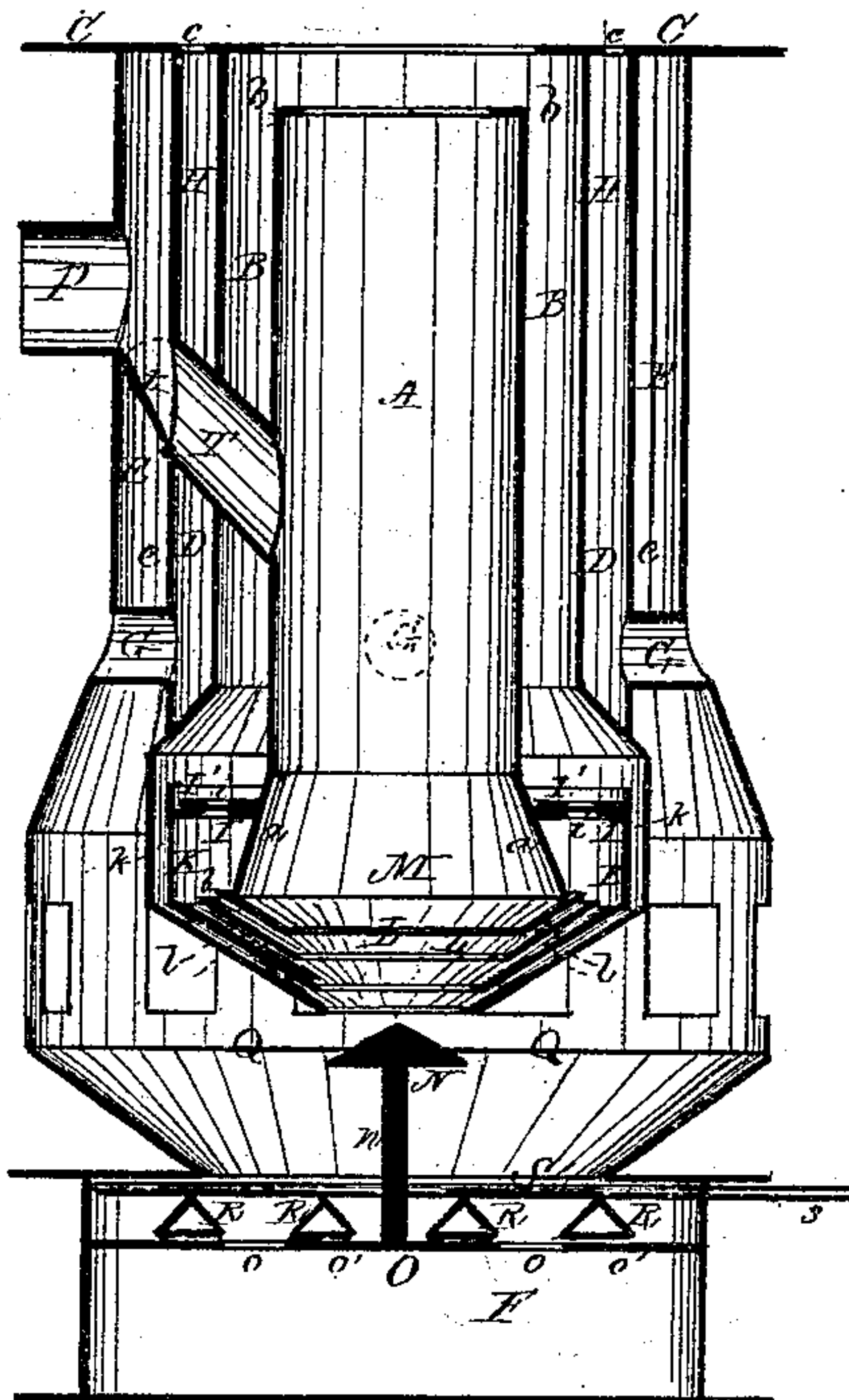


Fig. 8.

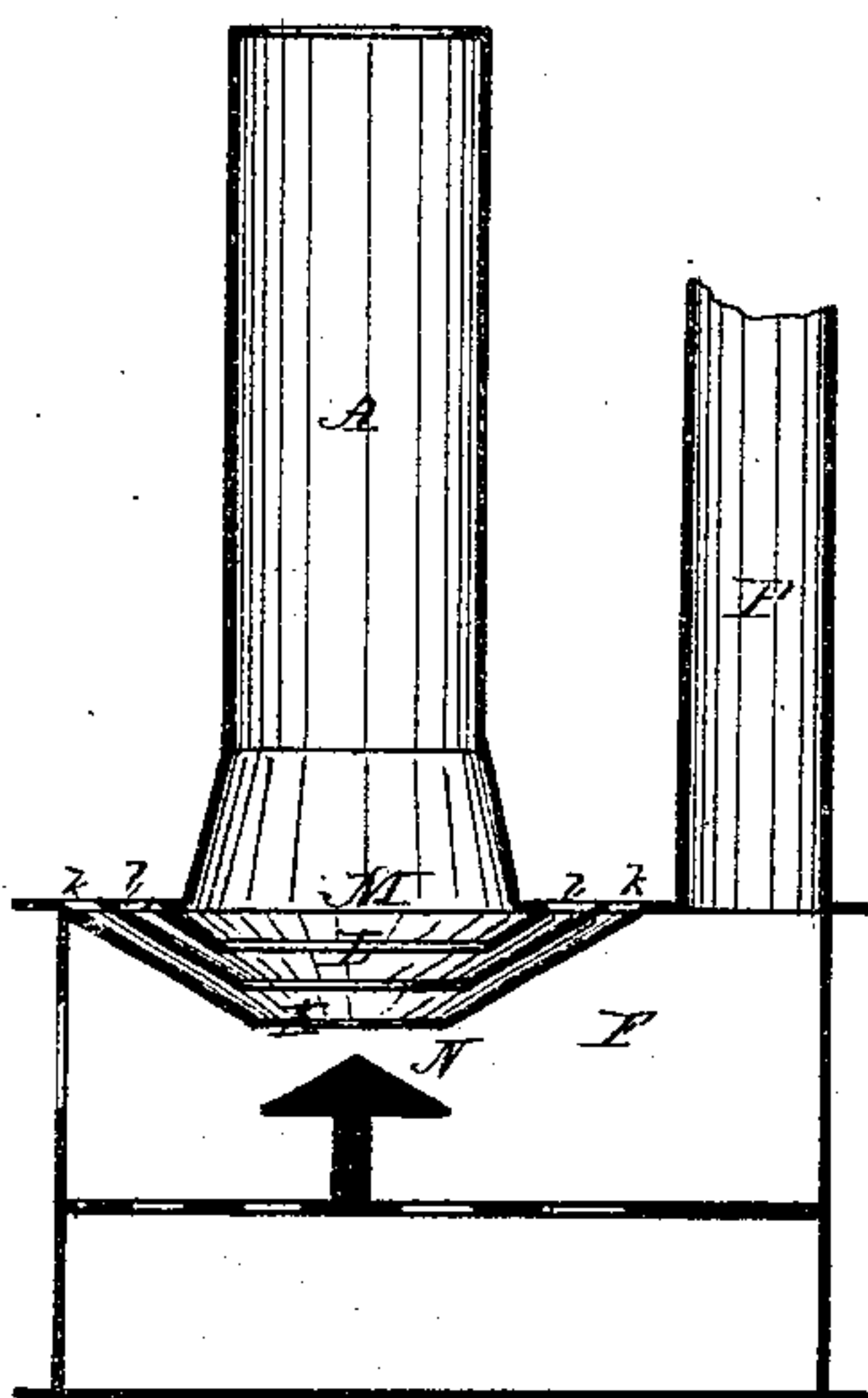
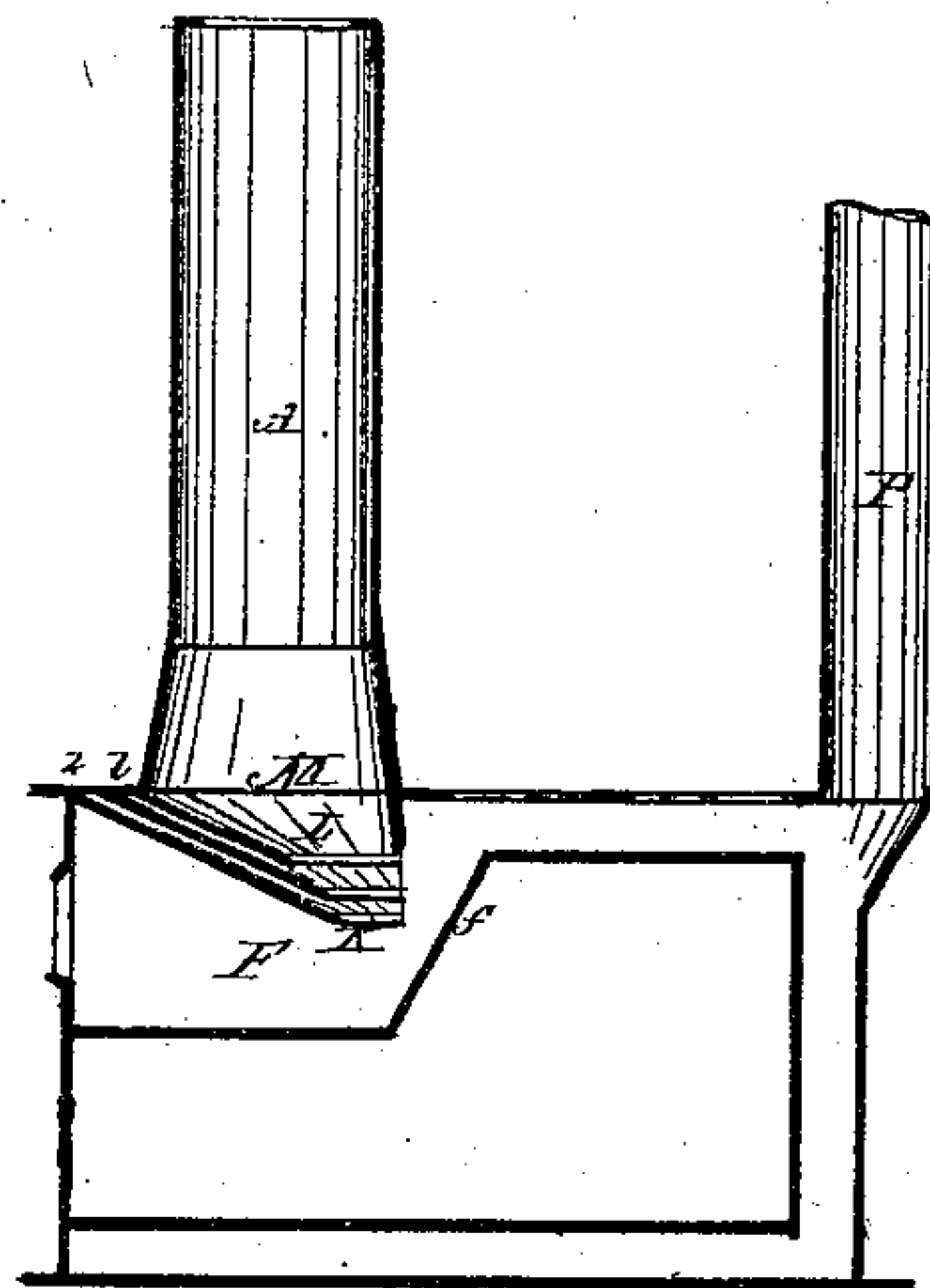


Fig. 9.



Witnesses.

A. B. Mearns
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W. J. Keep
by Prindle & Dyer Attys.

United States Patent Office.

WILLIAM J. KEEP, OF TROY, NEW YORK.

Letters Patent No. 102,682, dated May 3, 1870.

BASE-BURNING STOVE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, WILLIAM J. KEEP, of Troy, in the county of Rensselaer and in the State of New York, have invented certain new and useful Improvements in Base-burning Stoves for Bituminous Coal; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a vertical central section of my improved stove, on the line *x x* of fig. 2;

Figure 2 is a plan view of the upper side of the same;

Figures 3, 4, 5, and 6 are horizontal cross-sections, on the line *y, z, y'* and *z'*, respectively, of fig. 1;

Figure 7 is a like view to that shown in fig. 1, with the addition thereto of a direct flue from the magazine to the exit-pipe;

Figure 8 is a modification of the foregoing, in which the magazine is entirely exposed; and

Figure 9 shows the application of the "base-burning" principle to a cooking-stove.

Letters of like name and kind refer to like parts in each of the figures.

My invention is designed to produce a more perfect combustion of bituminous coal and of the gases given off from the same, when burning, than has hitherto been possible; and to this end

It consists, principally, in a stove using the downward draught, and having a fire-pot supplied with fuel from a magazine, contracting the lower end of said fire-pot for the purpose of concentrating the gases, as is hereinafter shown.

Further, in a stove using the downward draught, the employment of a fire-pot having its lower end contracted, in combination with a suitable device for sustaining the coke placed immediately beneath said fire-pot, substantially as is hereinafter shown and described.

Further, in a stove using the downward draught, the admission of air to the base of a column of fuel, by means of one or more annular openings or flues, substantially as and for the purpose hereinafter specified.

Further, in the employment of an annular flue at the contracted end of the fire-pot, as is hereinafter set forth.

Further, in a stove using the downward draught, compelling the air required for feeding the fire to pass between the magazine and smoke-flue or combustion-chamber, so that the heat radiated from the latter shall not pass into the former, as is hereinafter set forth.

Further, in the employment of a circular damper, in combination with the flue or flues through which

air is admitted to the fire-pot, substantially as is hereinafter shown and described.

Further, in the employment, between the combustion-chamber and ash-box of a stove, of a partition containing suitable openings, which may be closed when desired by means of corresponding slides or valves, substantially as hereinafter shown.

Further, in the construction and arrangement of the hereinafter-described ash-sifting device, substantially as shown and specified.

In the annexed drawing—

A represents the magazine, consisting of a cylinder of sheet or cast metal, the sides whereof extend downward in parallel lines to within a short distance of its lower end, and from thence flare outward at such an angle as to prevent the fuel contained therein from becoming wedged when expanded by the heat, and also to cause such expansion to force said fuel downward. It is intended that the upper end of the magazine should be provided with a suitable opening for the admission of fuel, which opening, when not in use, may be closed by a cover in the usual manner.

The magazine is suitably suspended within a cylindrical casing B, the upper portion of which is straight, while toward its lower end it flares outward for a short distance at an angle of about forty-five degrees; from thence extends vertically downward, and then draws inward beneath the magazine until its lower end, which is open, has about two-thirds the size of the upper portion of said magazine.

The upper end of the casing B is connected to the top plate C, while its lower portion is secured in position, laterally, by means of a second casing, D, which, being also connected at its upper end to said top plate C, extends downward, outside of said casing B, and has its lower end secured to and upon the upper flaring portion thereof.

The outer casing or shell E, having the same general form and relative proportions as the inner casing B, is connected at its upper end to the top plate C, and from thence extends downward, so as to inclose the hereinbefore-mentioned parts, and has its lower contracted end secured to the upper side of a square base, F.

Four or more pipes G, passing through the walls of the shell E and casing D, hold the latter firmly in position, and also admit air to the lower end of the space H between said casing and the inner casing B, from whence, passing upward, it escapes through a series of small openings, *c*, within the top-plate C.

Secured to the outer side of the magazine A, immediately below the upper end of the flaring portion *a*, is the inner edge of an annular ring of metal, I, the outer edge of which, in turn, has secured thereto and supports the upper portion of an inner shell, K,

which from thence extends downward, and then inward, at angles corresponding to those of the casing B, so as to leave between it and said casing a narrow annular space or flue, *k*.

The ring I has resting loosely thereon a second ring, I', and both are provided with a series of openings, *i*, which, by revolving said loose ring I', may be caused to correspond, so as to permit the air to pass freely from above through said rings, or, by a like change of the loose ring, said openings may be closed so as to exclude the air.

Two concave annular plates L, corresponding in inward and downward inclination with the casing B and shell K, are secured in position at points equidistant from each other, said shell, and the lower end *a* of the magazine, so as to form three narrow annular flues *l*, like that hereinbefore described, *k*, opening from without said magazine into the space M, between the lower end of the same and the lower end of the casing B, which space forms the fuel or fire-chamber.

A conical deflector, N, or other equivalent device, held in position immediately below the open end of the fuel-chamber M, by means of a vertical standard, *n*, resting upon and secured to a horizontal partition, O, extending across the base F, and the exit-pipe P extending horizontally outward from the shell E, completes the principal features of the device, the operation of which is as follows:

The cover inclosing the upper end of the magazine being removed, a sufficient quantity of kindlings, charcoal, &c., to fill the fire-chamber is introduced and ignited, a small quantity of coal added, and the magazine closed.

The air passing downward through the space *b*, between the casing B and the magazine, enters the fuel-chamber M through the annular flues *k* and *l*, in a sufficient quantity to supply the requirements of combustion, after which, with the heated escaping gases, it passes through the lower end of said fuel-chamber against the deflector N, by which it is thrown toward the outer sides of the combustion-chamber Q, and from thence, passing upward through the flue *e*, between the shell E and casing D, escapes from the stove through the exit-pipe P.

The coal being sufficiently ignited, the magazine is filled, and thenceforth no attention is required, except to regulate the degree of combustion, replenish the fuel, and remove the ashes.

As thus constructed, air is admitted to the base only of the column of coal contained in the magazine, and, as from the manner of its admission, only the lowest stratum of coal is consumed, the supply and formation of gas is constant.

The air entering through the annular flues *l* is sufficient to cause active combustion of the coal and to cut away the coke as rapidly as formed, while such air as passes through the lower flue *k* meets and unites with the descending current of gas given off from the burning coal, so as to insure the perfect combustion of the same. It will be readily seen, therefore, that while the quantity of air admitted to the fuel-chamber may be varied at will or entirely cut off, a steady current must be caused to pass through the flue *k*, as otherwise the gases given off from the coal after the supply of air thereto ceased, would not be consumed, smoke would be formed, and carbon deposited.

To insure the desired result, the flue *k* is at all times open, while the flues *l* can be closed at will by means of the damper I'.

The situation of the flue *k*, next to the combustion-chamber, gives the air passing through a sufficiently high temperature to render certain the perfect combustion of the gases given off from the burning coal as soon as said air is united therewith.

Another effect produced by the continuous current of air into the combustion-chamber is to prevent the

magazine from becoming heated, and, so effectually is this result accomplished, that the coal contained therein can at any time be removed with the unprotected hand.

The base F, as in ordinary stoves, furnishes a receptacle for ashes; but, in order that they may be removed therefrom without permitting air to enter the combustion-chamber, the following described means are employed:

Three or more openings *o* are provided in the partition plate O, which openings extend nearly across said plate, and correspond in width with the intervening strips of metal *o'* left between. A number of triangular bars, R, having a breadth of base a little more than equal to the width of the openings, and a somewhat greater length than the same, is connected together by means of a series of rods S, secured at a right angle with and at equidistant points upon the upper edges thereof, so that, when suitably adjusted, said bars R shall entirely close the openings *o*, or at other times shall leave them entirely unobstructed.

The elevation of the rods S is such as to bring them immediately beneath the lower end of the outer casing E, in which position they serve to retain any coal that might accidentally fall from the fuel-chamber, while, at the same time, allowing the ashes to pass freely through.

A suitable rod, *s*, passing through the wall of the base furnishes a means for giving to the sifting devices a reciprocating movement in a line at a right angle to that of the opening *o*, and, by alternately opening and closing the latter, causes the ashes to pass through into the lower part of the base.

In starting the fire, it may be desirable to cause an upward draught, in which event a flue, T, shown in fig 7, passing from the central portion of the magazine A through the casings B and D, so as to furnish a direct communication between said magazine and the flue *e*, would accomplish the desired result.

A valve, *t*, placed at the outer end of the flue T, or at any other point deemed best, would enable the latter to be closed, and the draught turned downward, when desired.

In fig. 8 is shown another form of stove, in which is employed the "base-burning" principle involved in that hereinbefore described.

In this stove the cylindrical magazine A is entirely within the open air, its lower end being supported at the top line of the combustion-chamber F, which has here a different shape from that before shown.

One or more flues *l* communicating with the base of the column of fuel contained within the magazine, a flue, *k*, for furnishing a supply of air to the gas, and a deflector, N, are provided, as in the former instance, while the exit-flue P is placed upon the top and at one side of the combustion-chamber.

In fig. 9 is shown a stove for cooking purposes, in which the fuel-chamber M is so constructed as to incline to the rear only, and thereby enable the back plate *f* of the combustion-chamber F to perform the office of deflector.

This stove possesses many new and advantageous features, among which are—

First, the contracted end of the fuel-chamber, by means of which the gases given off from the burning coal are concentrated, and thereby their heat rendered more intense, instead of being spread out in a thin annular sheet, as in other stoves in which the downward draught is used.

Second, the means employed for supplying air to the fuel and to the gases given off from the same not only insures the perfect combustion of both, but also carries the ashes formed downward into the combustion-chamber, so as to keep the fuel-chamber and fire at all times clean, and make the fire self operating while the magazine is supplied with fuel. In addition to

the above, the continuous current of air passing downward around the magazine keeps the latter cool, and thereby renders more easy the confining of the fire to the base of the column of coal.

Third, the construction of the ash-sifting devices enables the removal of ashes from the stove without in the slightest degree interfering with the fire, or, as in other stoves, permitting a rush of cool air into the combustion-chamber, and, by lowering the temperature of the gases contained therein, cause the production of smoke.

Fourth, by means of the flue H the heating capacity of the stove is at least forty per cent. greater than would otherwise be the case.

Having thus fully set forth the nature and merits of my invention,

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

In a stove using the downward draught, and having a fire-pot supplied with fuel from a magazine, contracting the lower end of said fire-pot, substantially as and for the purpose set forth.

Also, in a stove using the downward draught, the employment of a fire-pot having a contracted lower end, in combination with a suitable device for sustaining the coke placed immediately beneath said fire-pot, substantially as shown and for the purpose described.

Also, in a stove using the downward draught, the admission of air to the base of a column of fuel by

means of one or more annular flues *l*, substantially as shown and for the purpose set forth.

Also, the employment of the annular flue *k* at the lower end of the fire-pot M, substantially as and for the purpose specified.

Also, in a stove using the downward draught, compelling the air for feeding the fire to pass between the magazine and smoke-flue or combustion-chamber, so that the heat radiated from the latter shall not pass into the former, substantially as shown and for the purpose described.

Also, in combination with the flue or flues *l*, the circular damper I', constructed and arranged to operate substantially as and for the purpose shown.

Also, the employment, between the combustion-chamber and the ash-box, of a partition containing suitable openings, which may be closed when desired by means of corresponding slides or valves, substantially as shown and for the purpose specified.

Also, the hereinbefore-described ash-sifting device, consisting of the bars R, the rods S, and the partition O, provided with the openings *o*, substantially as set forth.

In testimony that I claim the foregoing, I have hereunto set my hand this 29th day of January, 1870.

Witnesses: WILLIAM J. KEEP.

WILLIAM KELLY,
B. MACGREGOR.