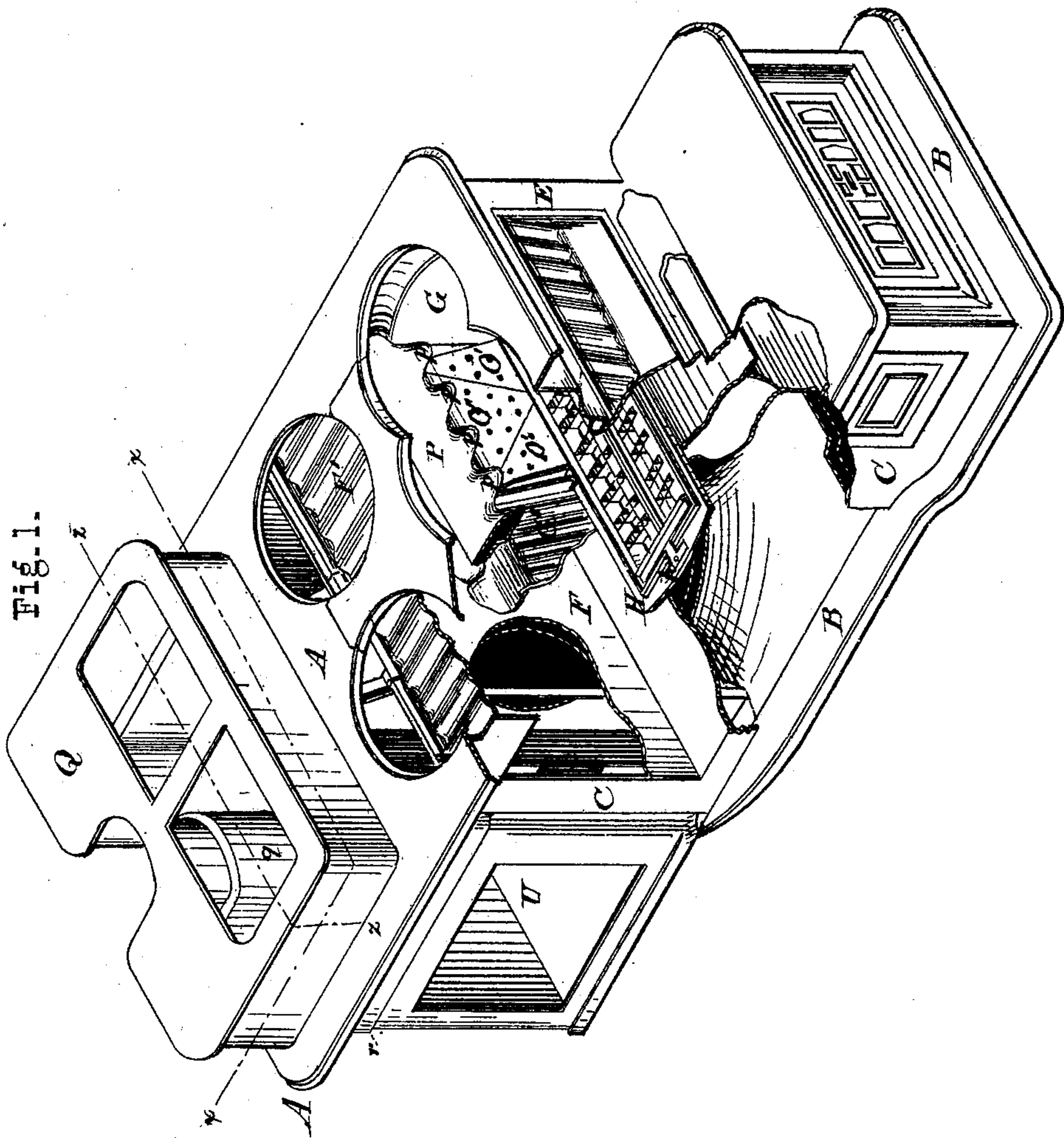


Wm. J. Keep.
Improv't. in Cooking Stoves.

No. 121,876.

Patented Dec. 12, 1871.



Witnesses.

Alb. M. M. M.
C. H. Poole

Inventor.

Wm. J. Keep, by
Prindle and Byer, his
Attys.

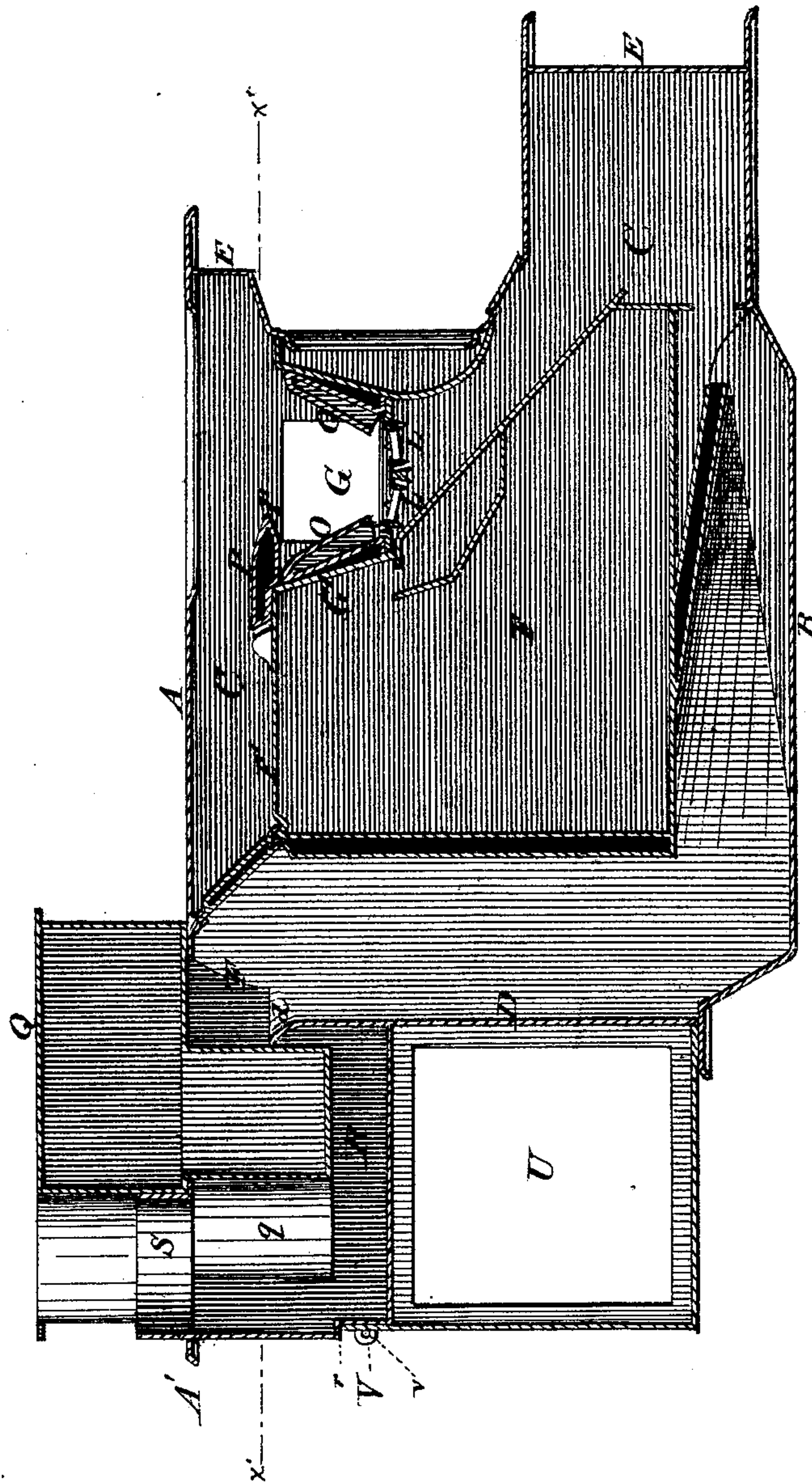
Wm. J. Keep.

Improv't. in Cooking Stoves.

No. 121,876.

Patented Dec. 12, 1871.

Fig. 2.



Witnesses.

Wm. J. Keep
C. H. Poole

Inventor.

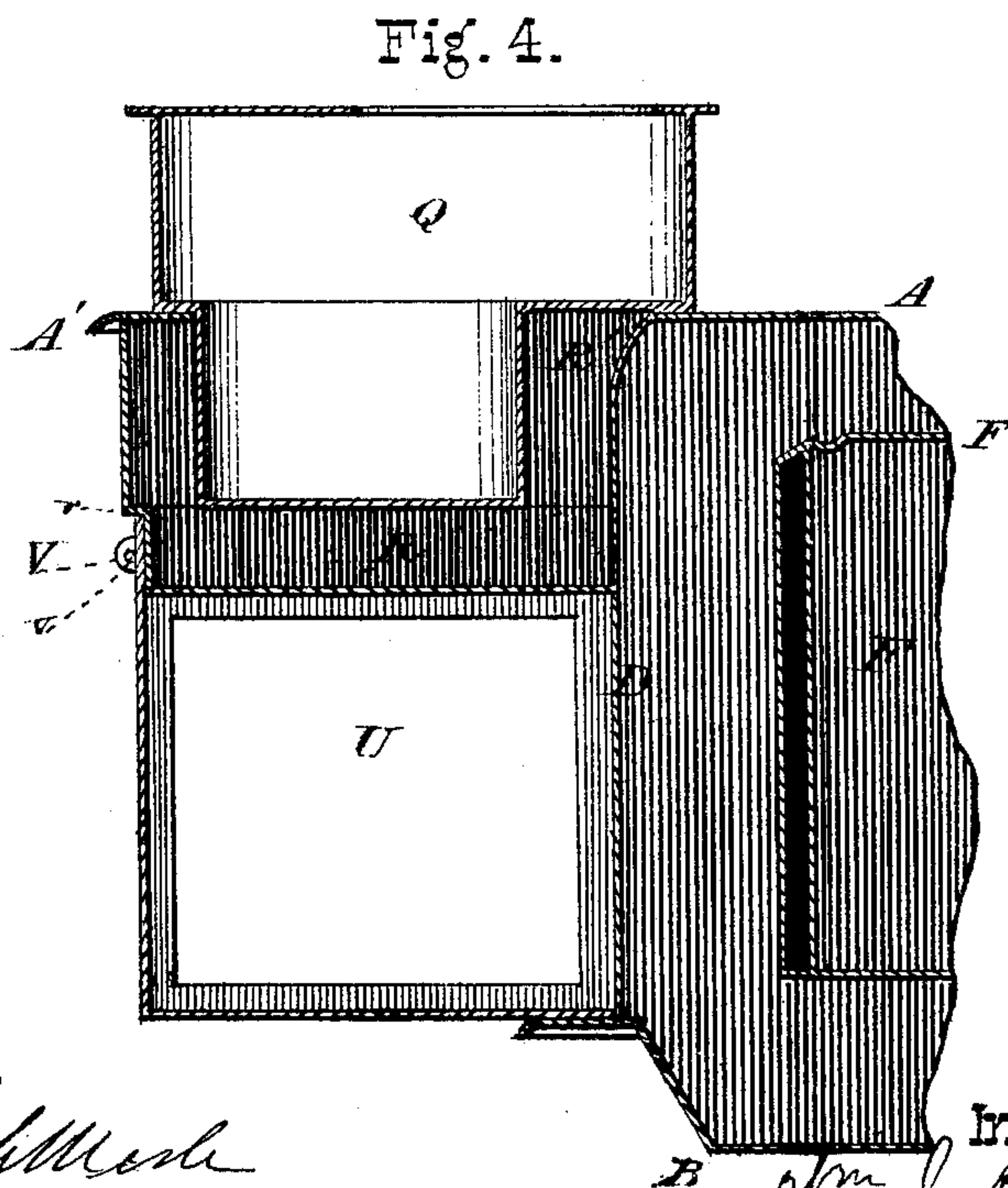
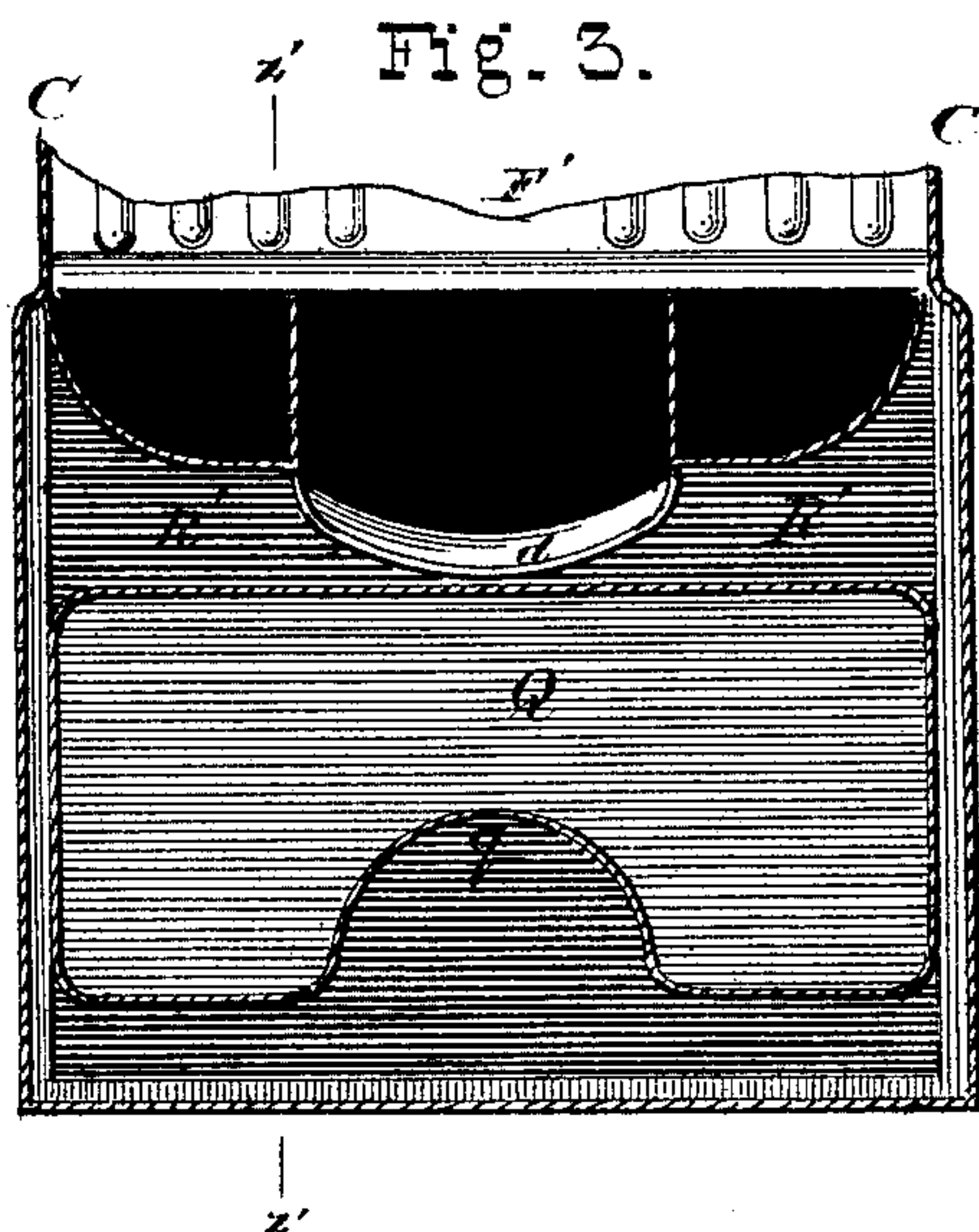
Wm. J. Keep, by
Prindle and Dyer, his
Attys.

Wm. J. Keep.

Improv't in Cooking Stoves.

No. 121,876.

Patented Dec. 12, 1871.



Witnesses.

A. S. Marsh
C. H. Poole

Inventor.

Wm. J. Keep, by
Orinelle and Dyer, his
Attys.

Wm. J. Keep.

Improv't in Cooking Stoves.

No. 121,876.

Fig. 5.

Patented Dec. 12, 1871.

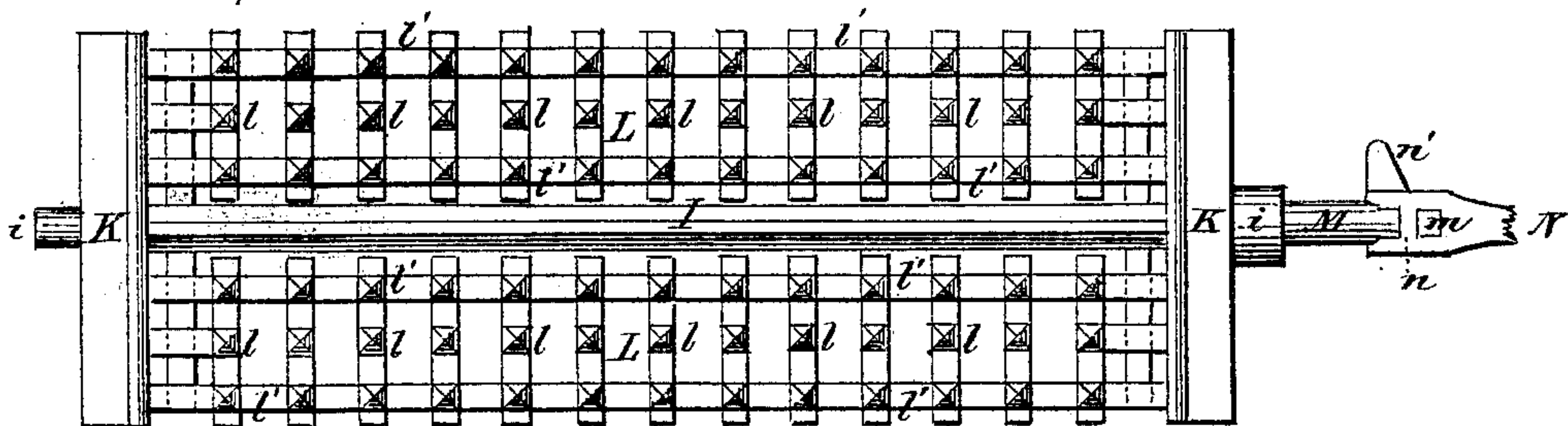


Fig. 6.

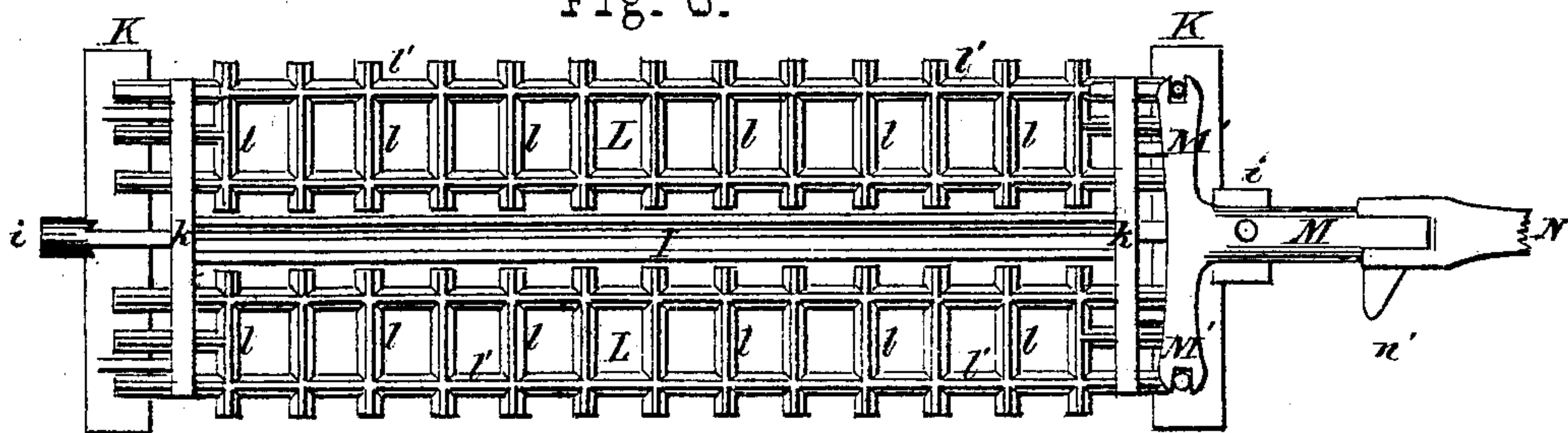


Fig. 7.

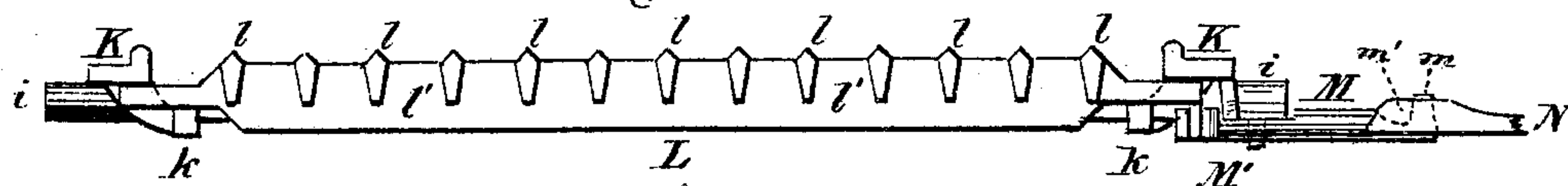


Fig. 8.

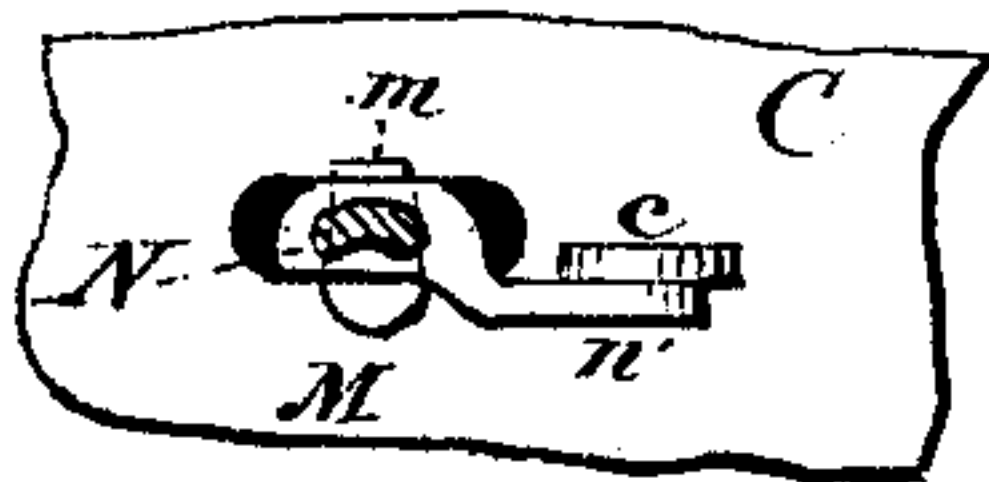


Fig. 9.

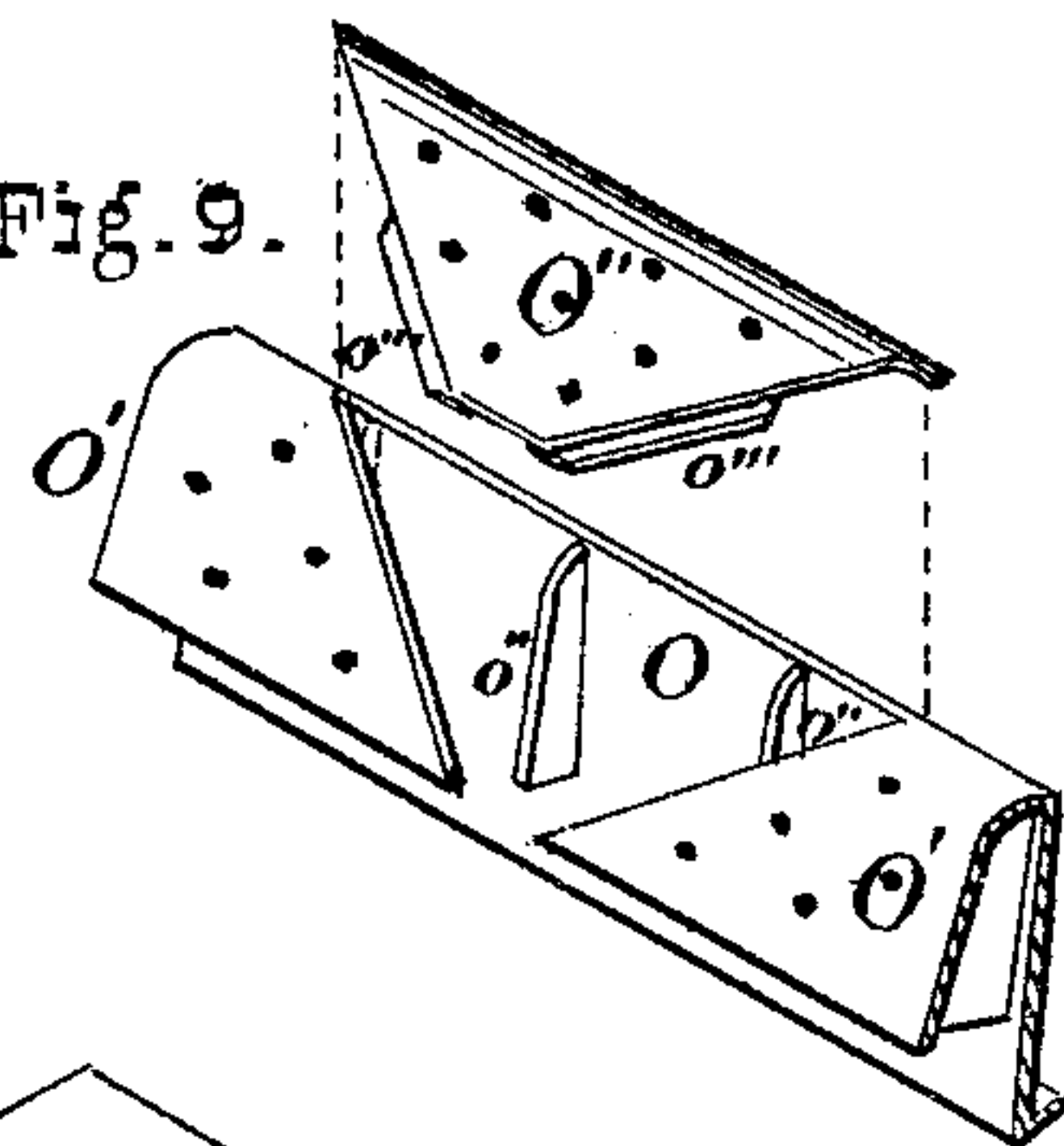
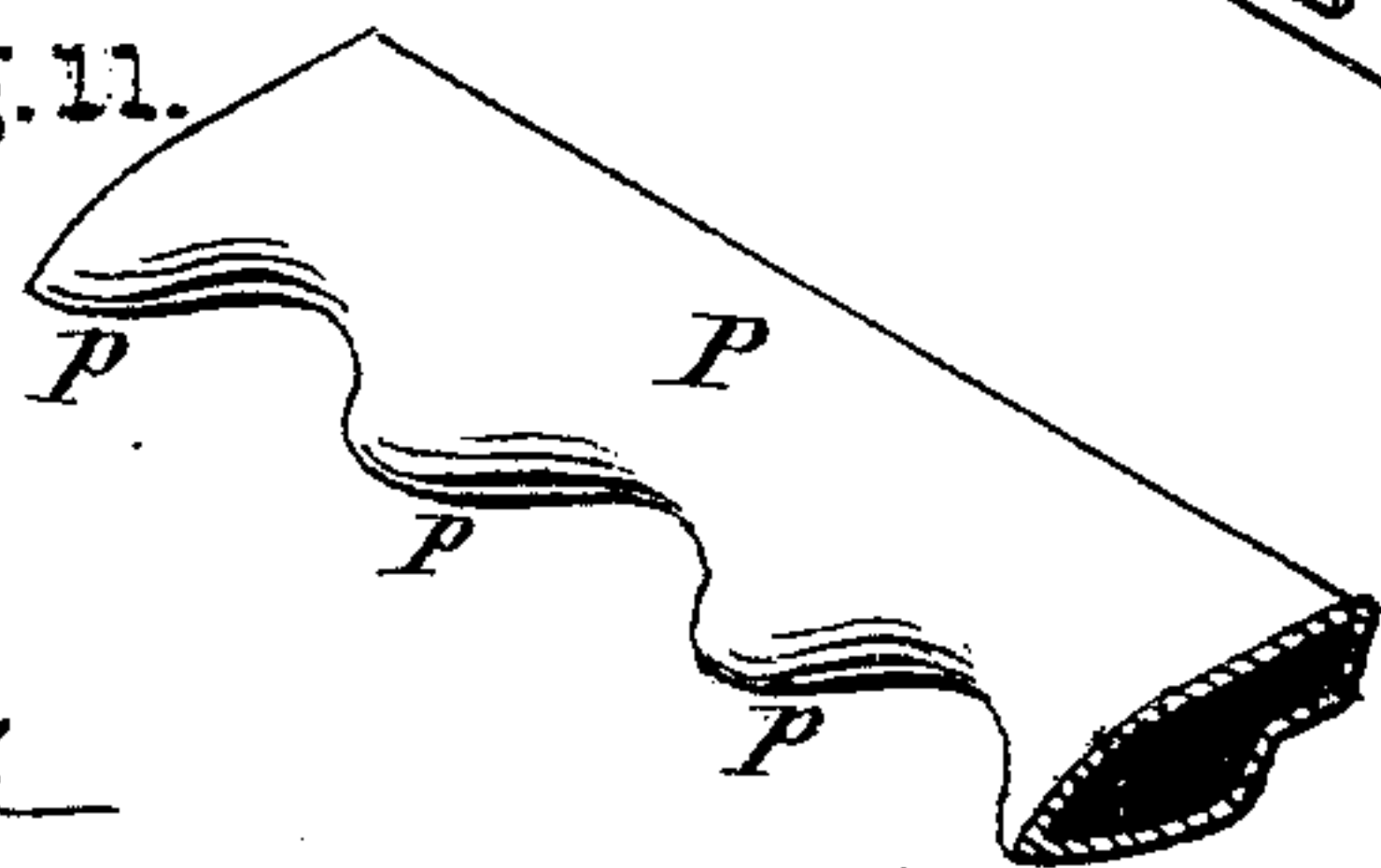


Fig. 10.



Fig. 11.



Witnesses.

Alb. Marsh
Ch. Poole

Inventor.

Wm. J. Keep, by
Prindle and Byer his
Attys.

Wm. J. Keep.

Improv't in Cooking Stoves.

No. 121,876.

Patented Dec. 12, 1871.

Fig. 13.

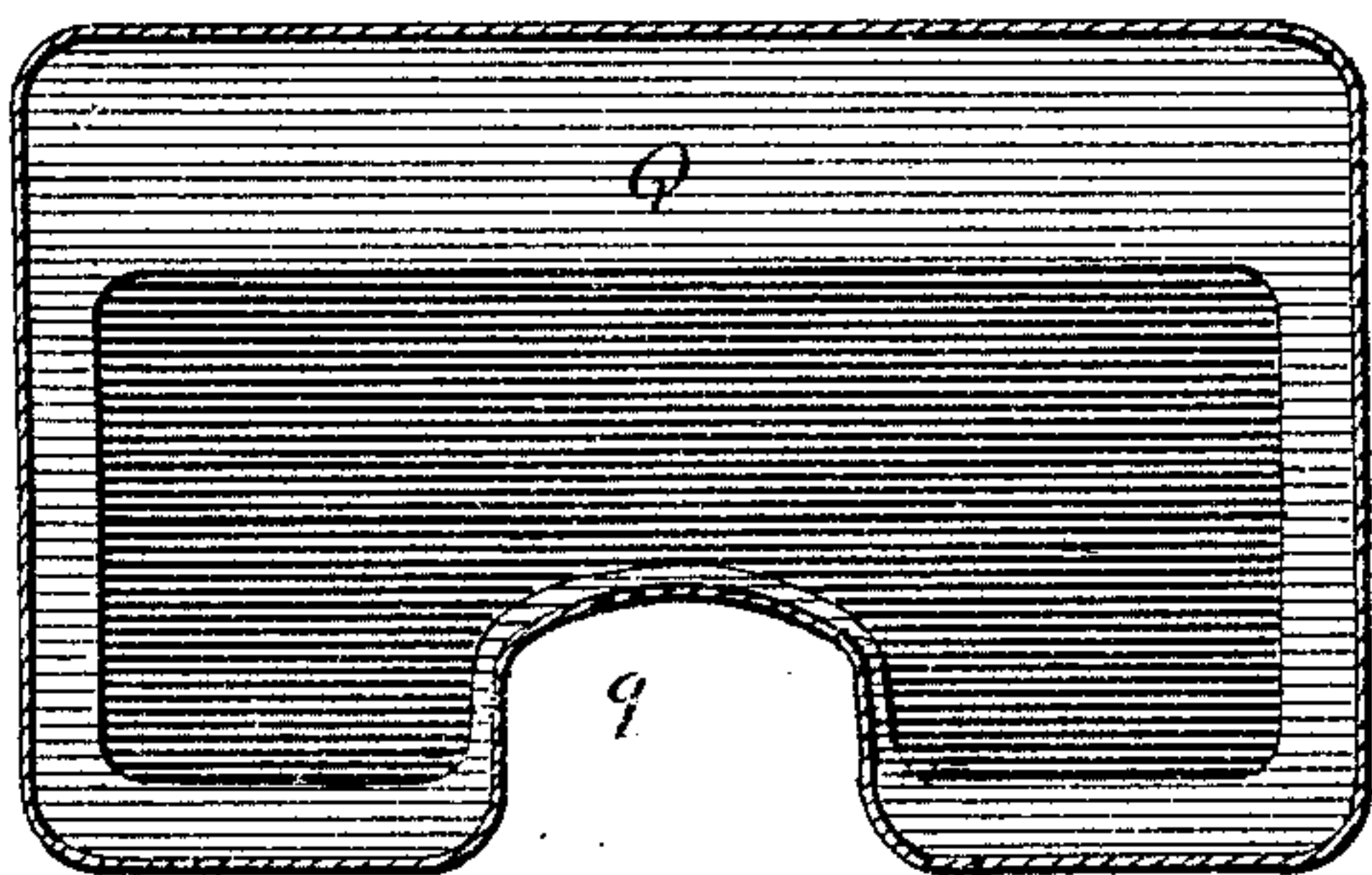


Fig. 14.

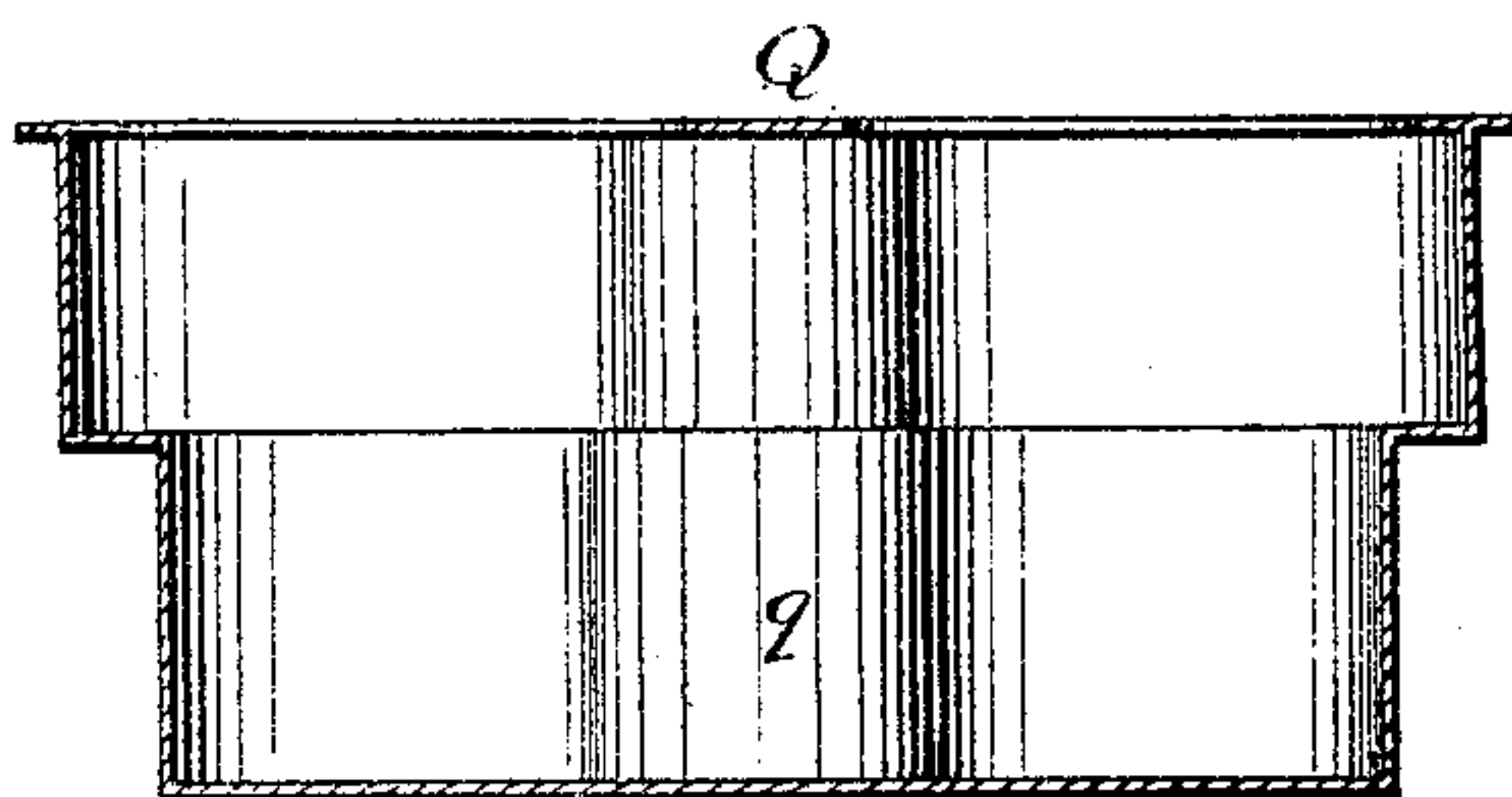
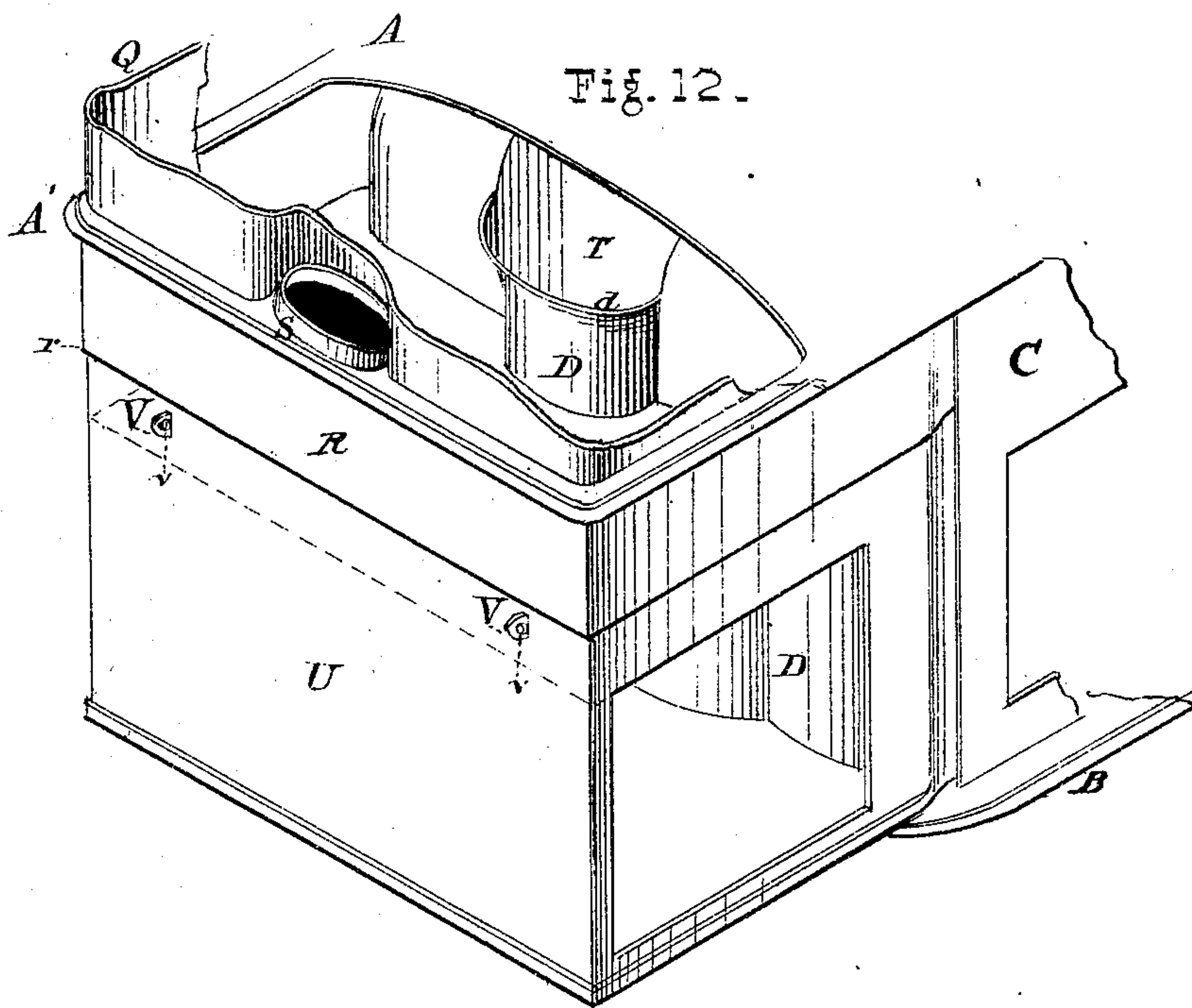


Fig. 12.



Witnesses.

Ed. M. M. M.
A. H. Poole

Inventor.

Wm. J. Keep, by
Orinville and Dyer, his
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM J. KEEP, OF TROY, NEW YORK.

IMPROVEMENT IN COOKING-STOVES.

Specification forming part of Letters Patent No. 121,876, dated December 12, 1871.

To all whom it may concern:

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

Figure 1 is a perspective view of a stove containing my improvements. Fig. 2 is a vertical central section of the same on a line passing from front to rear. Fig. 3 is a horizontal section of said stove on the line $x' x'$ of Fig. 2. Fig. 4 is a vertical longitudinal section of the same on the line $z' z'$ of Fig. 3. Fig. 5 is a plan view of the upper side of the grate. Fig. 6 is a like view of its lower side. Fig. 7 is a side elevation of the same. Fig. 8 is an end elevation of one of the pivotal bearings for said grate, showing the "shaker" bar or lever in place. Fig. 9 is a perspective view of a section of the metal lining of the fuel-chamber. Fig. 10 is a vertical cross-section of the same. Fig. 11 is a perspective view of a section of the "water-back." Fig. 12 is a perspective view of the rear end of the stove, with the reservoir broken away so as to show the chamber beneath the same and the means of communication between said chamber and the flues of the stove. Fig. 13 is a horizontal section of said reservoir on the line $x x$ of Fig. 1, and Fig. 14 is a vertical section of the same on the line $z z$ of said figure.

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

My invention is an improvement in the construction and operation of various parts of a cooking-stove for which Letters Patent were granted to Philo P. Stewart January 18, 1859, and to me, for certain improvements thereon, June 1, 1869; and it consists principally in a grate, provided upon its upper side with a series of transverse ribs, which is raised above the surface of its longitudinal bars for the purpose of protecting the latter from the intense heat of the burning fuel, substantially as is hereinafter set forth. It consists further in the means employed for preventing the grate from dumping while being shaken, substantially as is hereinafter set forth. It consists further in the peculiar construction of the metal lining of the fuel-

chamber, by reason of which its length is not affected by changes of temperature, substantially as is hereinafter shown. It consists further in the construction of said lining, which permits such ashes as may sift through its openings to fall upon the grate, substantially as is hereinafter shown and described. It consists further in the peculiar construction of the water-back, substantially as and for the purpose hereinafter specified. It consists further in the rearward-extended casing of the center rear flue, in combination with the contiguous portion of the reservoir and with the heating-chamber surrounding the lower part of said reservoir, and extending below the upper end of said casing, substantially as and for the purpose hereinafter shown. It consists further in the diving-flue, situated in front of the reservoir, and between the same and the rear casing of the vertical flues, when its upper open end and the lower side of its only opening into said vertical flues are upon such a line as to cause the heated escaping products of combustion to enter said flue at the same point and at the same angle, whether the direct or reversed draught is employed, substantially as and for the purpose hereinafter shown and described. It consists further in a heating-chamber for inclosing the lower portion of the reservoir, situated beneath the extended top plate and in rear of the vertical flues, and with its bottom below the oven-top, when the only passage to the same for the heated escaping products of combustion is upon a line with said oven-top, substantially as and for the purpose hereinafter specified. It consists further in constructing the side and rear walls of the heating-chamber beneath the reservoir with an offset immediately above the upper edge of the warming-closet for the purpose of inclosing said upper edge and bringing the vertical exterior surfaces of said combustion-chamber and warming-closet flush with each other, substantially as is hereinafter shown. It consists finally in the employment of one or more lugs, secured to and projecting horizontally outward from the casing of the heating-chamber beneath the reservoir, and passing through corresponding openings within the contiguous portion or portions of the warming-closet for the purpose of securing the latter to or upon the stove, substantially as is hereinafter shown and described.

In the annexed drawing, A represents the top

plate; B, the bottom plate; C, the side plates; and D and E the rear and front end plates, respectively, of the stove, inclosing an oven, F, a fuel-chamber, G, suspended within the front and upper corner of the latter, and the usual system of flues, all of which are substantially the same as in the Stewart stove, improved and patented by me June 1, 1869. Resting within suitable bearings *h*, formed at the ends and upon the lower side of the frame or bed-plate H, is a grate, consisting of a central bar, I, the ends of which form the axial pivots *i*, upon which said grate revolves, two cross-bars, K, secured to or upon said bar I immediately inside of said frame, and two open or grated sections, L, placed upon opposite sides of said bar I, with their ends resting upon and supported by two cross-bars, *k*, which are placed at a short distance below and connected with said cross-bars K. Pivoted to or upon the lower side of the outer pivot *i* of the bar I is a short bar, M, having attached to its inner end and forming a part of the same a cross-bar, M', which extends laterally and horizontally outward in opposite directions, and has its ends loosely connected with the corresponding ends of the grated sections L, the whole being so arranged as to permit said bar M to have a reciprocating horizontal movement upon its pivot, which movement is communicated to said grated sections and causes them to move longitudinally in opposite directions and at the same time, the object of which is to cleanse the fuel resting upon the grate from ashes, slate, &c. When it is desired to remove the entire contents of the fuel-chamber the grate may be turned toward the front upon its pivotal bearings so as to dump said contents into the ash-pit in the usual manner; but if said grate were constructed with plane or horizontal upper or lower surfaces and had a sufficient depth to insure durability, the space between its upper face, when said grate is turned to a vertical position, and the side of the frame or bed-plate H, would not be sufficient to permit coal or cinders of ordinary size to pass downward. To remove this objection, and also to cause the fuel to settle toward the center of the grate and away from the sides of the fuel-chamber, I construct each grated section L with its upper face inclining downward and inward, as seen in Fig. 2, by which means the distance between the side of the frame and the center of said grate, when tilted, is increased in proportion to the dish of the latter, while the movement of the fuel toward the center of said grate, when placed horizontally, is in a like degree governed by the transverse shape of the same. The sections L are each composed of a series of short bars, *l*, arranged transversely in parallel lines, and at equidistant points upon and connected with two longitudinal bars, *l'*, the latter of which, from their length, are liable to injury from the heat of the burning fuel. To prevent such action of the heat the transverse bars are constructed considerably higher than the longitudinal bars, and receive and sustain the fuel so as to prevent in a great measure the same from coming into contact with the latter. A like effect is produced

with reference to the sides of the bed-plate or grate-frame by making the adjoining sides of the grate sufficiently above said frame to prevent the fuel from resting upon the latter. In order to prevent the transverse bars from warping their upper sides are notched, and the remaining portion of said sides allowed to expand freely without affecting the balance of the bars. In order that the grate may be shaken or dumped the outer end of the pivoted bar M (which projects through a suitable opening within the side plate C, immediately beneath the end door of the fuel-chamber) is flattened upon its vertical sides, and provided upon its upper side with an upward-projecting spur, *m*, immediately inside of which is a semicircular depression, *m'*. The handle or shaker N is provided at its end with a longitudinal vertical recess, which corresponds with and receives the end of the bar M, while upon the upper side of said shaker is provided a cross-bar, *n*, which extends transversely across its recess and, when the device is in place, rests within the depression *m'* so as to lock said parts in longitudinal position. A lug, *n'*, projecting horizontally outward from the side of the shaker and toward the rear of the stove, passes under a similar lug, *c*, which projects outward from the side plate C and prevents the grate from dumping while said shaker is in a horizontal position without in the least interfering with the free horizontal movements of the latter. When it is desired to dump the grate the shaker is turned to a vertical position, and thereby the lug *n'* withdrawn from beneath the lug *c* so as to offer no obstacle to the turning of said grate.

It is well known that for use in constructing the sides of a fuel-chamber iron is in most respects superior to fire-brick or any similar article, as its durability, if properly proportioned, is much greater, while cinders, which form upon and adhere to fire-brick to such a degree as to soon obstruct the fuel-chamber, do not in the slightest degree interfere with the metal lining. While possessing such advantages the expansion and contraction of metal linings, and the consequent breakage or displacement of the same or other portions of the fuel-chamber, has proved so great an objection as to prevent their use from becoming general. To obviate this objection, and to secure certain advantages, I construct my lining in the form shown in Fig. 9, the back wall O being straight and solid, with a horizontal flange, *o*, secured to and extending rearward from its lower edge, while the front wall O' of said lining is perforated, and from its point of union with the upper edge of said rear wall extends outward and downward to within a short distance of the lower edge of the latter, and forms between the same a space, *o'*, open at its lower side. A series of vertical ribs or braces, *o''*, extending between the front and rear walls, attaches said parts more firmly together and insures their relative positions. At the longitudinal center of the lining, where the heat from the burning fuel is greatest, the front wall O' is divided from its lower edge upward and outward in diverging lines, so as to form a central portion, O'', separated from the

back, wall and capable of an independent vertical movement. Two flanges, o''' , extending laterally outward from the edges and back of said part O'' , and fitting behind the contiguous portions of the front wall O' , insure the horizontal positions of said parts without impeding the free vertical movement of the former. As thus constructed, the expansion or contraction of the central portion of the front wall of the lining, and its consequent elongation, can have no other effect than to cause said part to rise upward, its combined lower edges giving to it the form of a wedge, upon which the corresponding edges of the balance of said wall operate as double inclined planes. When placed within the fuel-chamber the front side of the rear wall O of the lining is nearly on a line with the inner edge of the bed-plate, so as to cause the front wall O' to project over the contiguous edge of the grate and bring the space o' between said walls immediately over the space left between said bed-plate and grate, by which means a portion of the air that passes upward through or around said grate enters said space within said lining and escapes therefrom into the combustion-chamber through a large number of small openings, while ashes passing outward through said perforations fall directly upon the grate instead, as in ordinary perforated linings, of lodging upon the base-plate and obstructing communication between said perforations and the air beneath the grate. Resting upon the top oven-plate F' , at its intersection with the back plate G' of the fuel-chamber, is a pipe or water-back, P , which extends forward over said fuel-chamber, and has its lower wall dropped downward, as seen in Fig. 2, from said back plate to its front edge. The front wall of said water-back has a notched or serrated form, so that while extending outward to a considerable distance over the fuel-chamber, but slight obstruction is offered to the upward and rearward passage of the heated escaping products of combustion, the same passing readily between the projections p . The forward portion of the water-back having a considerable greater depth than its rear portion, the cold water upon entering its interior will at once, from its greater density, pass downward and forward into the projections p , where, from the large surface exposed to the action of the heated gases of or from the fuel-chamber, said water becomes quickly heated, and, rising, passes rearward into the straight water-channel formed at that point, and through the same escapes from the stove. As in the original and improved "Stewart cook," the top plate A is extended beyond the rear end plate for the purpose of receiving and sustaining a water-reservoir, Q , but, unlike said stoves, the chamber R , formed beneath said extended top plate A' , extends downward below the top oven-plate F' to a distance equal to if not greater than that from said top oven-plate to the top plate A , while the exit-flue, instead of being formed within and passing upward through the reservoir, commences at the rear central portion of said extended top plate, where a suitable collar, S , extending horizontally inward so as to be entirely within the line of said plate, is provided for the

reception of the exit-pipe. The passage T from the flues of the stove to the chamber R is at the upper end of the center vertical flue, and is formed by removing the rear plate D across the entire width of said flue and from the top plate A to a point upon a line with the top oven-plate F' . Immediately beneath the opening thus formed the upper edge d of the rear end plate D is curved rearward, as shown, the purpose of which will be hereinafter explained. The reservoir Q has, preferably, a slightly greater depth below than above the top plate, and at the latter point has a general rectangular form, except at its rear side and transverse center, where it extends inward in a curve corresponding in size and shape to the collar S , and furnishes space for the same and for the exit-pipe. The portion of the reservoir below the top plate corresponds in shape to that placed above said plate, but is considerably less in capacity and horizontal size, the front wall of said lower portion being upon a line with and resting against the curved portion d of the rear end plate D , while the bottom, ends, and rear side of said reservoir are placed at a sufficient distance from the contiguous portions of the chamber R to insure a free circulation between the same of the heated escaping products of combustion as they pass from the flues of the stove to the exit-pipe. As thus arranged it will be seen that the escaping gases entering the chamber R are compelled, by the rearward-curved end plate d and adjoining front wall of the reservoir, to divide and pass around the ends of and beneath said reservoir until they reach the rear side of the latter, when they again unite in and pass upward through the recess q formed within its rear side, from whence they escape into the exit-pipe, said gases having in their passage communicated to said reservoir and its contents a larger percentage of their heat than would have been possible had the bottom of the reservoir been upon a line with or above the opening T , or had the current of said gases not been compelled to divide and pass around its ends. The opening T between the chamber R and the flues of the stove being placed upon a line horizontally with the top oven-flue, the direction of the heated escaping products of combustion as they pass from the stove into said chamber R is the same whether the direct or reversed draught is employed. The warming-closet U conforms to and fills the space vertically between the bottom plate B and the lower side of the chamber R , and horizontally between the rear end plate D and the rear edges of said chamber, with its front lower corner resting upon and supported by the rear end of said bottom plate, all in the usual manner; but, unlike other closets, its upper edge is received by and contained within a corresponding rabbet, r , formed within the side walls of said chamber R , so as to cause the exterior faces of the same and of said closet to coincide or be flush with each other. The closet is secured in place by means of one or more lugs, V , which project horizontally outward from the rear wall of the chamber R , and pass through corresponding openings formed in and through the contiguous wall of said closet, a lateral opening

being provided in and through each lug immediately outside of the wall of said closet for the reception of a pin, *c*, which pin while in place securely locks the parts together.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. A stove-grate provided upon its upper side with a series of transverse ribs, which is raised above the surface of its longitudinal bars, substantially as and for the purpose shown and described.
2. The means employed for preventing the grate from dumping while being shaken, consisting of the shaker *N* provided with the lug *n'* and connected to or with the outer end of the spindle or pivoted bearing *M*, in combination with the lug *c* secured to and projecting horizontally outward from the side plate *C*, or their equivalents, substantially as shown and described.
3. A metal lining for a fuel-chamber, so constructed as that the expansion caused by a high degree of temperature shall increase its vertical dimensions without changing its length, substantially as and for the purpose specified.
4. A metal lining for a fuel-chamber, consisting of an imperforate rear wall, *O*, and a perforated front wall, *O'*, meeting at their upper edges, and from thence extending downward and apart so as to form an air-space, *o'*, having its lower side within the fuel-chamber, substantially as and for the purpose specified.
5. A water-back, constructed with a lower front channel for receiving and containing the water to be heated, and a rear upper channel for the reception and passage of said water when heated, substantially as and for the purpose shown.
6. The water-back *P*, having its front edge serrated so as to form the projections *p*, substantially as and for the purpose shown and described.
7. The rearward extended portion *d* of the rear end plate or casing *D* of the center vertical flue,

in combination with the contiguous portion of the reservoir *Q*, and with the heating-chamber *R* surrounding the lower part of said reservoir and extending below the top oven-flue, substantially as and for the purpose specified.

8. The diving-flue *R'*, situated in front of the lower portion of the reservoir *Q* and between the same and the rear casing *D* of the vertical flues, when its upper end and the lower side of its only opening into such flues are upon such a line as to cause the heated escaping products of combustion to enter said flue at the same point and angle, whether the direct or reversed draught is employed, substantially as and for the purpose shown.

9. A heating-chamber for inclosing the lower portion of a water reservoir situated in rear of the vertical flues, and with its bottom below the oven-top when the passage thereto for the entrance of the heated escaping products of combustion is upon a line with said oven-top, substantially as and for the purpose set forth.

10. The chamber *R*, provided with the rabbet *r* formed within its exterior vertical side walls for containing the upper edge of the warming-closet *U*, in combination with said closet, substantially as and for the purpose specified.

11. The means employed for securing the warming-closet to or upon the heating-chamber, consisting of one or more lugs, *V*, projecting horizontally outward from said chamber and passing through corresponding openings within the contiguous portion or portions of said closet, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 12th day of June, 1871.

WILLIAM J. KEEP.

Witnesses:

C. H. ADAMS,
JNO. H. O'BRIEN.

(154)