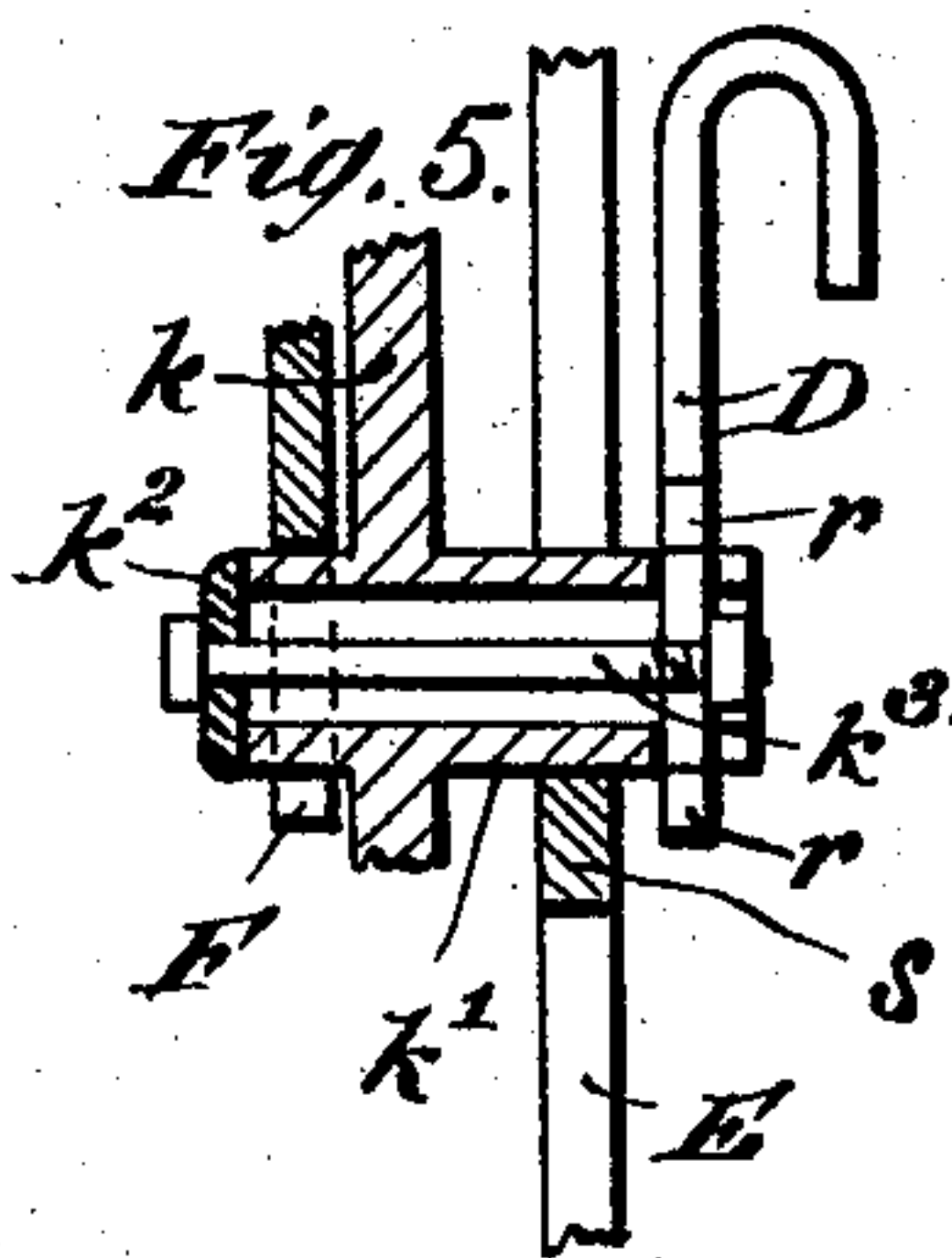
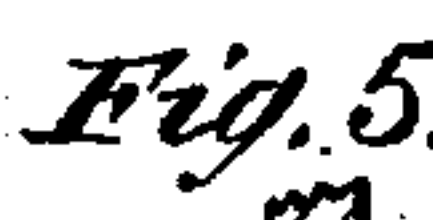
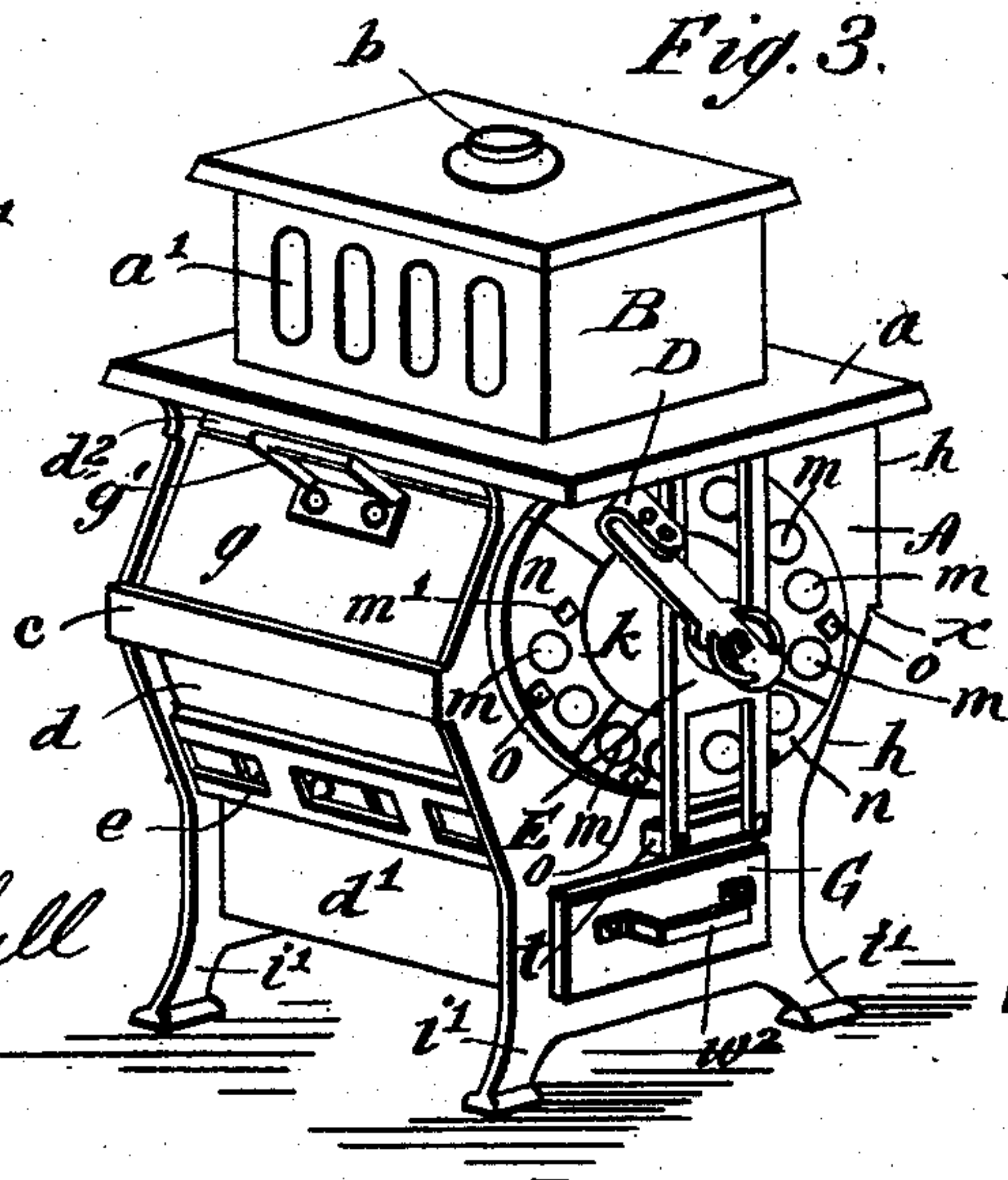
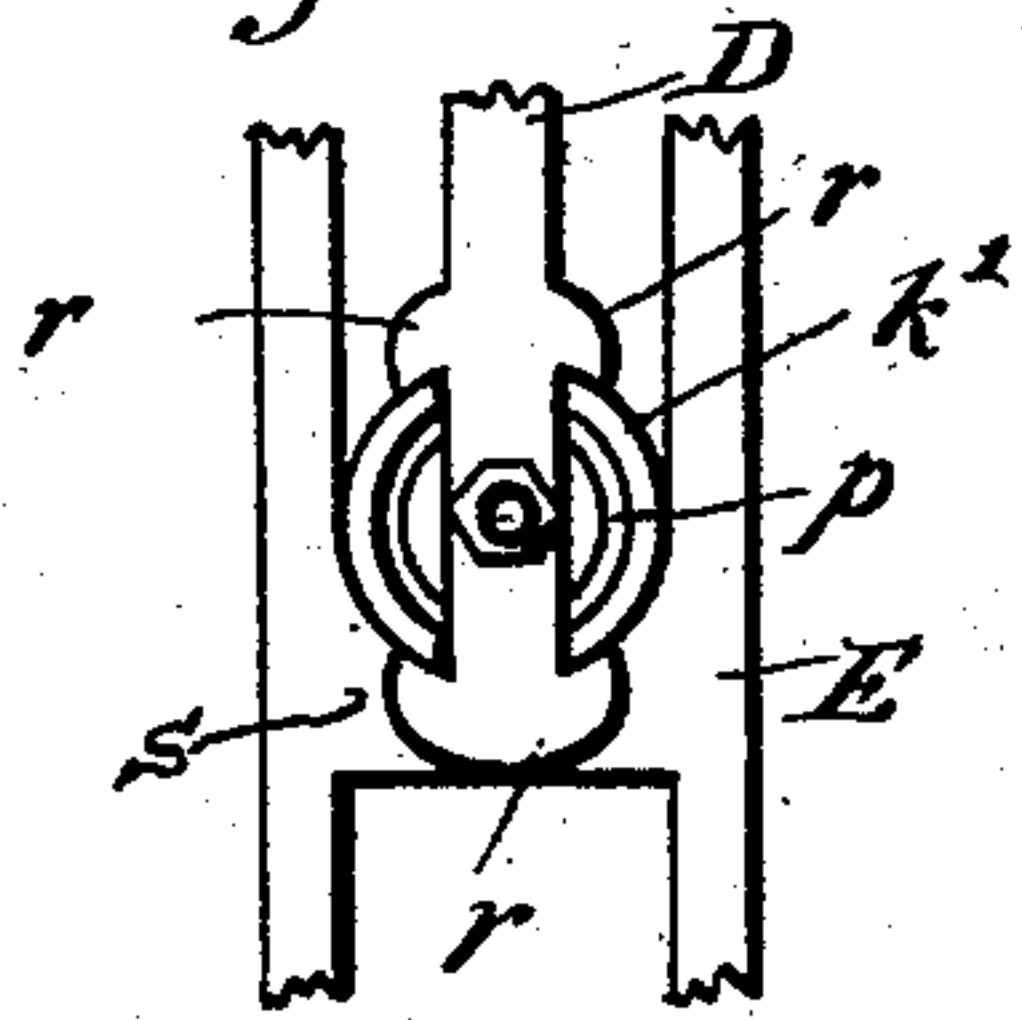
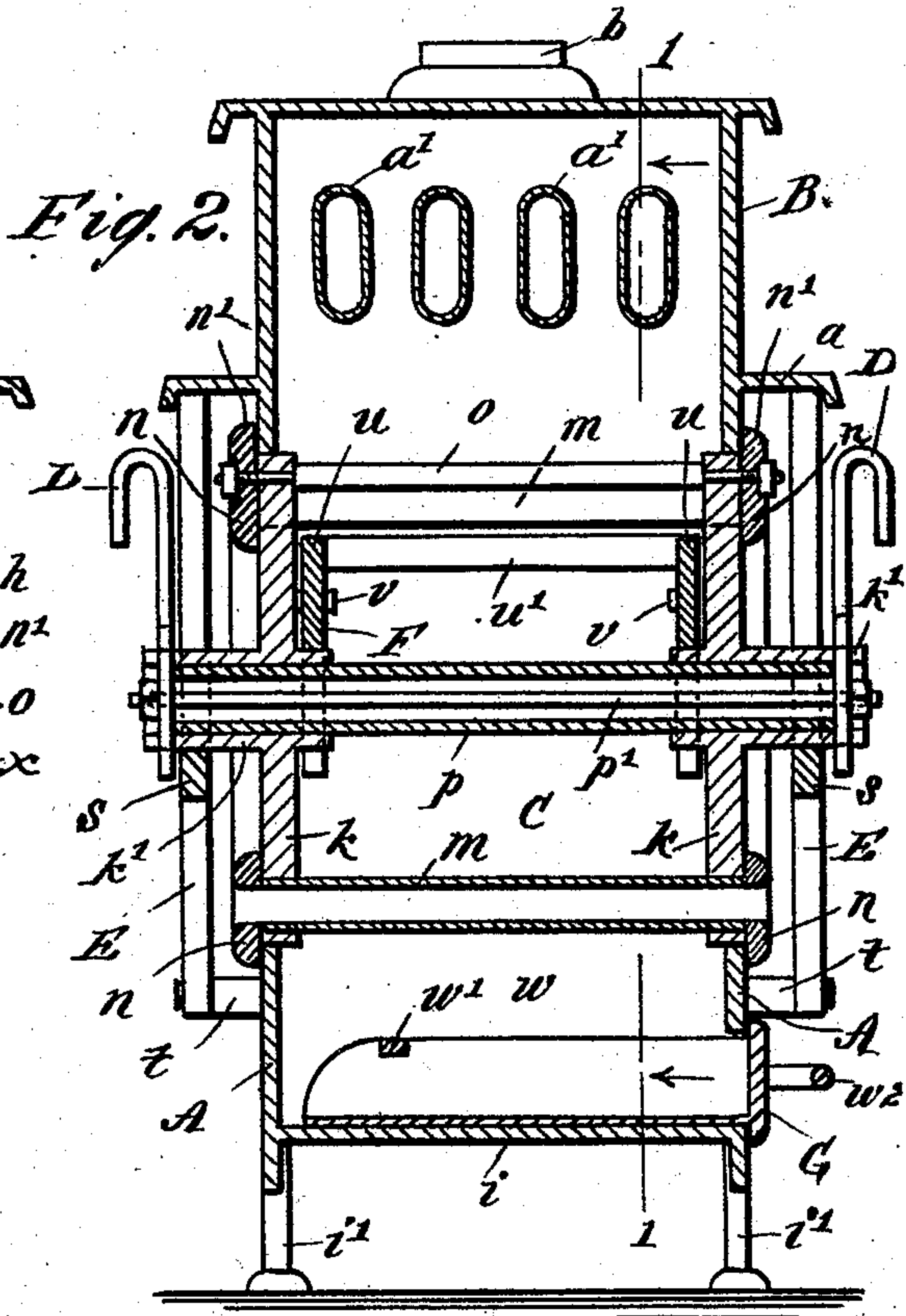
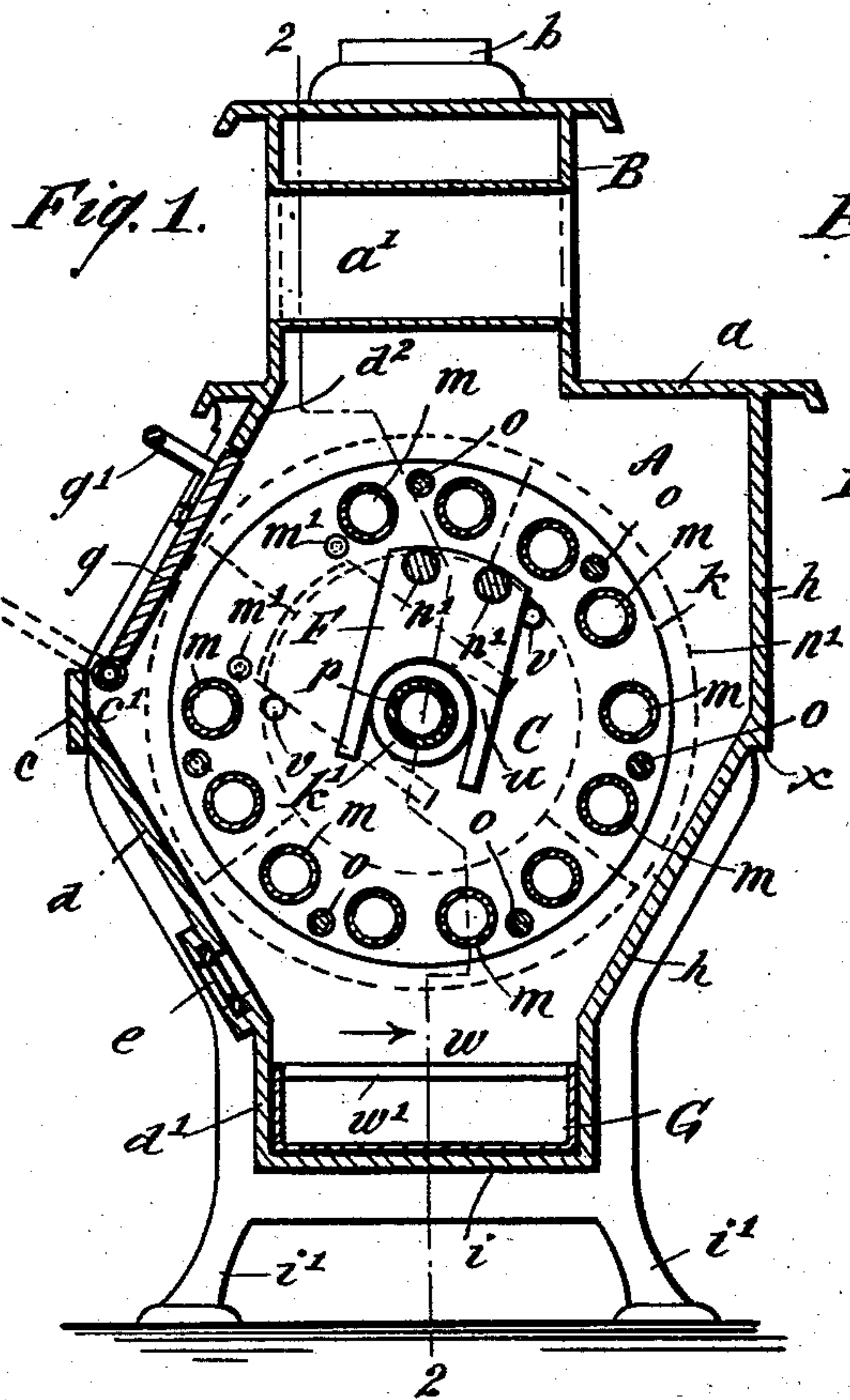


(No Model.)

W. FORBES.
STOVE.

No. 455,613.

Patented July 7, 1891.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM FORBES, OF PLAINWELL, MICHIGAN.

STOVE.

SPECIFICATION forming part of Letters Patent No. 455,613, dated July 7, 1891.

Application filed October 24, 1890. Serial No. 369,237. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM FORBES, of Plainwell, in the county of Allegan and State of Michigan, have invented a new and useful Stove, of which the following is a full, clear, and exact description.

This invention relates to an improvement in heating-stoves which use either coal, coke, or wood as a fuel, and has for its objects to provide a simple and convenient stove which will afford a large area of heating-surface that has direct contact with the incandescent mass of fuel and the air surrounding the stove, whereby the air will be quickly and uniformly heated.

A further object is to furnish a heating-stove the grate of which forms the fire-pot, which is adapted to receive a rocking movement or be completely rotated within the stove.

A further object is to provide a heating-stove with a revoluble fire-pot which is comprised of hollow bars or tubes that have communication with air outside of the stove, and also to adapt said fire-pot to be readily removed from the walls of the stove for repairs.

To these ends my invention consists in certain features of construction and combination of parts, as hereinafter described, and pointed out in the claims.

Reference is to be made to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation in section of the stove, taken on the line 1 1 in Fig. 2, viewed in the direction of the arrows in said figure. Fig. 2 is a front elevation in section, taken on the line 2 2 in Fig. 1, other parts being also shown which are represented in Fig. 3. Fig. 3 is a perspective view of the device, showing its front side and one end. Fig. 4 is an enlarged detached view of an essential detail broken, and Fig. 5 is a broken sectional view of one end of the stove-cylinder adapted to burn wood as a fuel.

The casing of the stove is composed of metal plates or walls, there being two parallel side walls A, that are perpendicular, which wall-plates are surmounted by a hot-air chamber B, of smaller dimensions than the compart-

ment below it wherein the cylinder is located, said hot-air chamber having a laterally-extended base-plate *a*, that is furnished with a depending edge and rests upon the side plates A, to which the base-plate is joined in any suitable manner.

A series of flues *a'* are introduced within the chamber B, and are connected at their ends with the front and rear vertical walls of said chamber, which they perforate, thus affording conduits for the transmission of heat, which their walls receive from the fire below, and on top of the chamber B is a thimble *b'*, that opens into the chamber and affords a connection for a draft-pipe. (Not shown.)

The front edges of the side plates A are inclined outwardly to a point *c'*, where a cross-bar *c* joins the two side plates at the front of the stove, the front plate *d* being held in place transversely below the cross-bar *c*, joins the side plates near their edges, and is inclined outwardly in a plane parallel to said edges, as shown in Fig. 1. At a proper distance from the lower edge of the plate *d* said front plate is bent to throw it into a vertical plane, and above the vertical portion *d'* of the front plate a transverse sliding gate or damper *e* is secured upon the lower portion of the inclined walls of the front plate, that is slotted at this point for the introduction of air, which the damper will control. Above the cross-bar *c* a door *g* is jointed to the side plates A at its lower edge and inclines inwardly to allow its upper edge to fit closely against a portion *d²* of the front plate, which is located above the door and joins the sides A, and base-plate *a* of the hot-air chamber B, a handle *g'*, that is secured to the front face of the door, affording means to manipulate it, which door, when lowered, as shown by dotted lines (broken) in Fig. 1, will admit the entrance of material through the opening thus afforded.

The rear plate *h* of the stove is formed below the point *x* similar to the shape of the front plate *d* below the cross-bar *c*, being inclined inwardly to a point opposite the lower edge of the damper *e*, and thence vertically downward to be joined by a bottom plate *i*, that is also secured to the lower edge of the portion *d'* on the front plate, the side plates A having feet *i'* formed or secured to their

lower edges. Above the point x the rear plate or wall of the stove is extended vertically to engage the lower surface of the base-plate a near its margin, thereby completing a walled compartment wherein the cylindrical fire-pot C is placed, which will be described.

Each side wall A has a circular aperture of the same diameter formed in it oppositely. Said apertures have their centers nearly in the same horizontal plane with the cross-bar c , and are of proper dimensions to receive the cylinder-heads k , that loosely fit within the marginal edge of the apertures. Upon the cylinder-heads k the centrally-located tubular hubs k' are formed or affixed, which project laterally on each side of the heads and have their bores of the same diameter. At equal radial distances from the centers of the cylinder-heads k equally-spaced perforations are formed in the heads at a point near the periphery of each head, which perforations are designed to receive a series of hollow grate-bars m , that are of equal length and cylindrical form, the end portions of said tubular grate-bars fitting closely into the perforations of the heads k when inserted therein. Upon the outer faces of the cylinder-heads k the segmental clamping-plates n are retained in place by a series of spacing-bolts o , the reduced ends of which bolts pass through aligning perforations in the heads and plates formed at proper intervals therein, the bolts being adapted to hold the plates and heads in pairs together and the cylinder-heads properly spaced apart, as shown in Fig. 2, the plates being perforated at points opposite the hollow bars m , the diameter of said holes being equal to the caliber of the bars. Each set of segmental clamping-plates n together form an annular disk of such a relative diameter to the cylinder-head it is secured upon that an overlapping flange n' is afforded on the outer edge of each clamping-plate, which flanges engage loosely the outer surfaces of the side plates A of the stove, and thus prevent a longitudinal displacement of the cylindrical fire-pot C, revoluble movement of the same being permitted.

As the stove is intended for the use of coal or wood as a fuel, when the first-named material is to be utilized as a source of heat by its combustion there is an elongated center tube p inserted in the hollow hubs k' , which tube or pipe when in place corresponds in length with the distance between the outer ends of the projecting hubs and in diameter closely fits the bores of the hubs. The ends of the center tube p and the outer ends of the hollow hubs k' are transversely channeled for the reception of the end portions of the handle-bars D, which when seated in the channels mentioned are embraced on opposite edges by the shoulders of the channels, the lugs r on the handle-bars having a close contact with the outer surface of the cylindrical hubs k' to coact with the channel-shoulders and form an interlocking engagement

between the end portions of the handle-bars and the other parts named.

As shown in Fig. 2, the handle-bars D, hubs k' , and center tube p are secured together by a long bolt p' , which latter passes through aligning perforations made laterally in the handle-bars at points which will correspond with the center of the tube p , the bolt being held by a nut at each end, whereby the handle-bars are attached to the cylindrical fire-pot C and adapted to rock the latter when the bars are vibrated.

The frictional contact of the cylinder-heads k with the side plates A would be objectionable if the entire weight of the fire-pot C and its contents was allowed to rest on the side plates. To obviate this and reduce friction, so that the fire-pot may be readily agitated by a vibration of the handle-bars D, two similar bracket-frames E are provided, which frames each consist of a pair of parallel bars centrally joined by a transverse web s , the latter having their upper edges cut away in circular form to receive the exterior surfaces of each of the outwardly-projecting portions of the hubs k' , the ends of the bars being secured to the base-plate a of the heating-chamber above and the sides of the stove below the webs s , spacing-blocks t being inserted between the ends of the bars and the sides A to hold the lower ends of the bracket-frames at a proper distance from said sides, as shown in Fig. 2.

The hollow grate-bars m do not form a complete chamber or fire-pot, there being an opening afforded by omitting two bars, as shown in Fig. 1, thus providing an inlet for the introduction of coal or other fuel, and in order to close this opening when the fire-pot is replenished with fuel a rocking grate-frame F is introduced within the fire-pot. The grate-frame F is composed of two end plates u , that are held spaced apart and parallel by the grate-bars u' , the length of the frame being proportioned to allow it to enter freely between the cylinder-heads k and rest upon the inner projecting portions of the hollow hubs k' , the end plates u having their lower edges deeply scalloped to allow them to engage the hub ends peripherally and retain the grate-frame thereon free to rock laterally. The fire-pot C should for convenience normally rest on its supports with the grate-frame F opposite the door g , and the adjustment of the handle-bars D should be such relatively that they will lie in a vertical plane when the grate-frame is in the position mentioned.

Such a proportionate length is given to the end plates u at their shortest points that the grate-frame bars u' and said end plates will travel closely to the inner surface of the hollow grate-bars m and bolts m' , that are located near the grate-bars which form the side boundaries of the fuel-stoking aperture, and to limit the rocking movement of the grate-frame F in either direction the studs v are inserted in the cylinder-heads k on their in-

ner faces at such points as will allow the grate-frame to be moved to completely open or close the aperture in the fire-pot, the latter-named position of the grate-frame being indicated by dotted lines in Fig. 1.

Below the cylindrical fire-pot C the rectangular chamber *w*, which is formed by the junction of the side walls A with the front and rear walls, as before explained, is utilized as an ash-pit, and through a proper-sized opening formed in one side wall the ash-receiving drawer G is introduced. Said drawer, having its inner end open and the side walls cut rounding on the upper corners at this end, is adapted to scoop up any droppings that fall into the ash-pit.

A cross-bar *w'* is secured on the upper edges of the side walls of the ash-drawer G to stiffen them, and a handle *w²* is attached to the front wall of the drawer to permit it to be handled.

If wood is to be used as a fuel in the stove, the tube *p* is preferably withdrawn, so as to afford more room within the fire-pot C, and the ends of the hollow hubs *k'* closed by cap-plates *k²*, short bolts *k³* taking the place of the long bolt used with the tube *p*, this modified form of construction being shown as applied to one hollow hub in Fig. 5.

In operation the hollow grate-bars *m* form a series of open passages through the stove, through which air in the room circulates, and as the exterior surface of the bars has direct contact with the burning fuel in the fire-pot C it is evident that the air will be rapidly heated thereby. The hot-air currents produced near to the floor of the room in which the stove is located by the parallel tubular bars render the room comfortable in short time and will maintain a regular heat with the consumption of a comparatively small quantity of fuel.

The peculiar construction of the fire-pot and its manner of support enable an operator to change the position of the contents of the fire-pot, so as to bring clinkers that are in the bottom of the fire to the upper surface for easy removal through the door *g* and also to agitate the mass of coal and thereby remove ashes from the entire fire-bed in an expeditious manner. It is also of advantage to be enabled to carry a fresh increment of coal below the major portion of fuel in the fire-

pot which has been partly burned, as the upward passage of the carbon gas evolved from the fresh coal will cause it to be consumed as it filters through the incandescent mass of coal above it, and thus save the valuable heat-producing gaseous product that is wasted in ordinary stoves to a large degree.

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

1. In a stove, the combination, with stove-plates forming a compartment and a door therein, of a revolubly-supported fire-pot within that has tubular open-end grate-bars which extend toward and through opposite walls of the stove-compartment, and a device whereby the fire-pot may be revolved, substantially as set forth.

2. In a heating-stove, the combination, with a walled compartment composed of plates, a door therein at the front, and an air-damper below the door, of a revolubly-supported transversely-located cylindrical fire-pot having tubular grate-bars that extend through the sides of the walled compartment, and a device by which the cylindrical fire-pot may be rotated, substantially as set forth.

3. In a heating-stove, the combination, with a compartment composed of plates, a door thereon, an air-damper below the door, a hot-air chamber above on the compartment, an ash-pit below therein, and a removable ash-drawer, of a revolubly-supported transversely-located cylindrical fire-pot having hollow grate-bars which are open at the ends and extending through the sides of the stove-compartment, and handle-bars that are connected to the fire-pot, substantially as set forth.

4. In a heating-stove, a revoluble fire-pot comprised of cylinder-heads that have hollow hubs that are seated on bracket-frames attached to the sides of the stoves, cylindrically-arranged spaced tubular grate-bars that extend between the cylinder-heads, and a grate-frame which is adapted to rock on the hollow hubs within the fire-pot and close or open a fuel-stoking hole formed between the grate-bars, substantially as set forth.

WILLIAM FORBES.

Witnesses:

JOHN C. EMERY,
J. R. CRUNDULL.