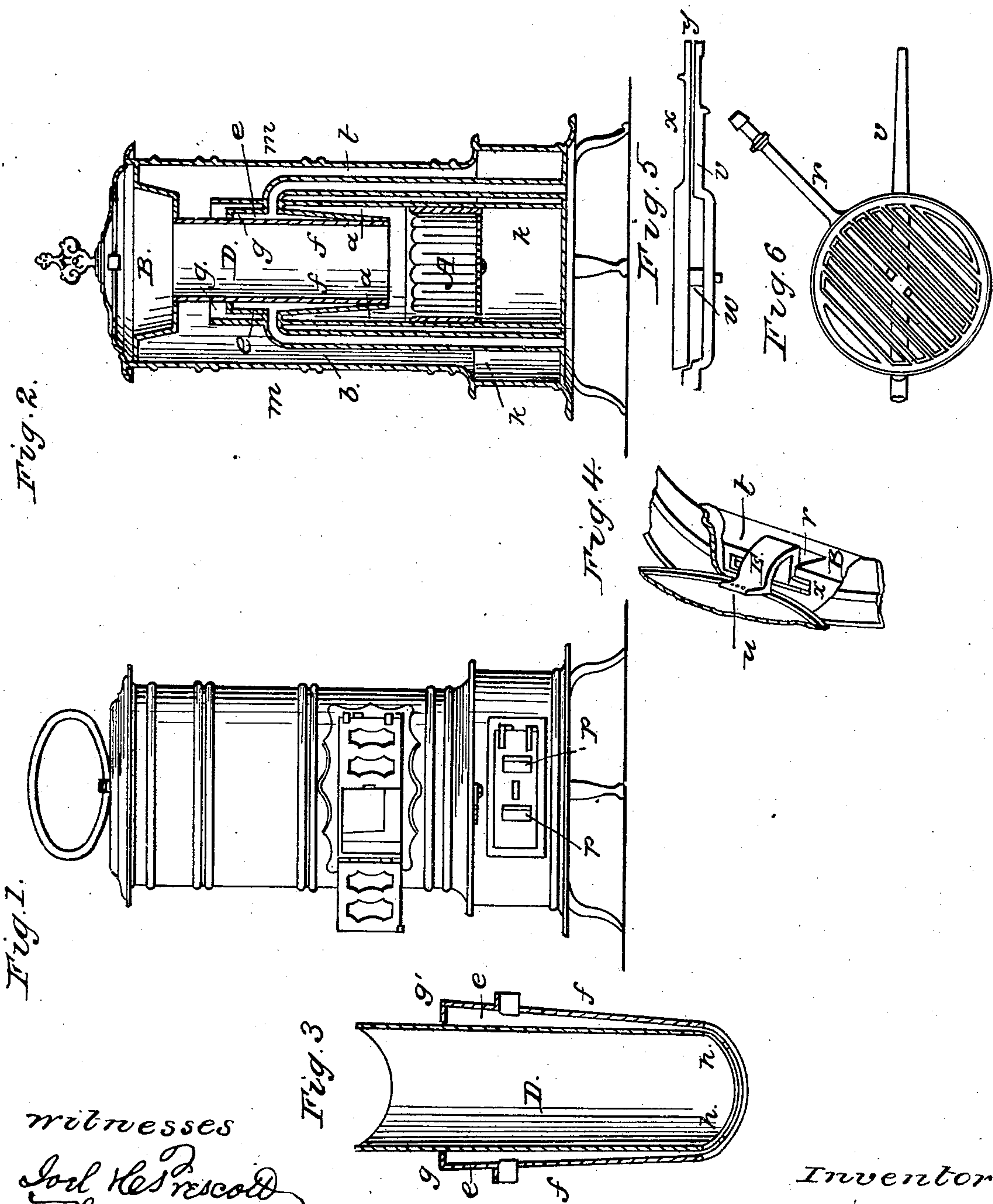


S. CULVER.

Stove.

No. 84,537.

Patented Dec. 1, 1868.



witnesses
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United States Patent Office.

STEPHEN CULVER, OF NEWARK, NEW YORK.

Letters Patent No. 84,537, dated December 1, 1868.

IMPROVEMENT IN BASE-BURNING STOVES.

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, STEPHEN CULVER, of Newark, in the county of Wayne, in the State of New York, have invented a new and useful Improvement in the Mode of Constructing Stoves; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification.

My improvement consists—

First, in conducting to and discharging at the lower extremity of the magazine of a base-burning stove a current of air for the purpose of keeping the magazine cool, and more perfectly and effectually consuming the fuel used.

Second, in operating the cover to the pan or hopper through which the magazine is supplied, by an internal or concealed hinge; and

Third, in giving the fire-grate both a horizontal and rotary movement by means of a divided or double axle.

The particular construction of the stove, apart from my improvement, is not very material, since the same may be applied to stoves differing considerably in style, form, and structure.

Figure 1, of the drawings, is an elevation, exhibiting a view of the front of the stove, with one of the doors above the fire-pot open, to show the relative position of the lower end of the magazine, and with the cover of the hopper turned back, to show the hinge on which it turns.

Figure 2 is a view of a vertical section through the centre.

Figure 3 is a view of a longitudinal section of the magazine, and shell surrounding it, presented horizontally, to exhibit the air-channel at the lower extremity of the magazine.

Figure 4 is a view of a section of the cover, with a portion of the top plate broken out to show the hinge of the cover.

Figure 5 is a side view of the fire-grate, with the divisions or parts of the axle in juxtaposition.

Figure 6 is an elevation, presenting a view of the upper surface of the grate, with the divisions of the axle asunder.

A, fig. 2, is the fire-pot, made of the usual materials, and in any of the common ways.

a a, fig. 2, is the cylinder, within which is the fire-pot, and up through which the flame rises to the direct-exit pipe near the top, in the rear, or to the extreme upper end, and thence down the reverted flue b, fig. 2, to the base, and thence to the smoke-funnel.

B, fig. 2, is the pan or hopper, through which the magazine is fed, and which may also be conveniently used as an oven for baking different kinds of food, and for heating sad-irons.

D, figs. 2 and 3, is the magazine, in which the fuel is deposited, made of cast-iron or other suitable material, and extending from a few inches above the fire-pot to the hopper at the top.

e, figs. 2 and 3, is a shell, of cast-iron or other proper material, which surrounds the magazine, and forms, between it and the magazine, an air-channel or chamber, f, figs. 2 and 3. This shell is closed at the top by a head or diaphragm, g, figs. 2 and 3, and, at the bottom, is left a little apart from the magazine, thereby forming an annular orifice for the exit of the air-current.

As shown at h h, fig. 3, stays are interposed to keep the shell e, figs. 2 and 3, in the proper position relative to the magazine.

The length of the shell may be greater or less, according to convenience or the description of fuel used. If bituminous coal, which more readily ignites than anthracite, be used, then, the greater the length, the better, since the current between it and the magazine tends to keep the same at a lower temperature, and thus prevents the ignition of its contents. If anthracite coal be used, it may be much shorter.

For the purpose of providing sufficient room for the facile reception and movement of an ample supply of air, the upper portion of the shell is of greater diameter than the lower. The lower portion and end should be of such dimensions as to leave between it and the magazine sufficient space for the discharge of the quantity of air requisite to effect the most perfect combustion, which quantity will depend mainly upon the kind and quality of coal used.

The particular form of the shell, and the shape of the chamber formed by it, are not material. Nor is it essential, though it is better, that the magazine and shell should be of even length at the lower end. The end of one may be a little above that of the other, and the action be quite satisfactory. Nor is it necessary that an annular slot or orifice, and that at the very extremity of the magazine, should be provided for the discharge of the air-current, as herein shown, since it may be delivered in jets, and at or from the side of the magazine, though with diminished effect. Nor is it important that the current of air should be conducted to the points of delivery at or near the extremity of the magazine by means of the channel formed by the surrounding shell, since it may be conveyed there, though much less conveniently, by a series of ducts or their equivalents.

For supplying air to the chamber surrounding the magazine, tubes or conduits, k k, fig. 2, of sheet-iron or other fit material, are provided, which start beneath the bottom plate of the stove and rise between the cylinder a a, fig. 2, holding the fire-pot and the outer jacket of the stove, m m, fig. 2, and pass through the cylinder a, and open through the shell e into the chamber f, as shown in fig. 2. The capacity of these tubes should be such as to keep the chamber mentioned constantly charged. Two and a half inches internal diameter answers well for a stove with fire-pot from twelve to fourteen inches across. It is not strictly essential that the tubes should start at the points mentioned, nor that they should pass through the space described. Any other convenient mode of supplying

the chamber would answer, though the further below the bottom of the magazine the conduits be started, the stronger will be the current conveyed.

The fire-pot and magazine being charged with fuel, and the contents of the former being ignited, and the slide *p*, fig. 1, in the ash-pit door adjusted, the blaze or flame carrying the gases evolved by the process of combustion, as it ascends, is intercepted by the magazine, and deflected by it into the passage between the cylinder *a a*, fig. 2, and the shell *e*, fig. 2, surrounding the magazine, and when the valve in the direct exit to the smoke-funnel is closed, rises and turns over the top of the cylinder, and moves down the flue *b* to the base, and thence to the funnel.

As the flame in its ascent passes the lower end of the magazine, it is impinged by a thin sheet or current of air there discharged from between the magazine and surrounding shell, the air for the production of this current having previously risen through the tubes *k k* to the chamber *f*, and thence descended to the aperture of discharge.

By the employment of this air-current, in the manner described, the magazine is kept at a reduced temperature, and the contents rendered less liable to ignition, and a quantity of oxygen is supplied to the flame, and evolved gases, sufficient to effect a complete combustion of the different varieties of coal, and thereby utilize the large proportion of carbonaceous elements ordinarily carried off unconsumed through the smoke-funnel.

At B, fig. 4, is shown a section of the further side of the pan or hopper, in which is a recess, *r*, for the reception of a portion of the hinge when the cover is closed.

The hinge E, fig. 4, is a curved piece of cast-iron or other metal, one end of which is furnished with journals that rest and turn in boxes formed by sinks in the upper surface of the rim of the hopper, as shown at *t*, fig. 4, and the other end of which is riveted to the cover, as shown at *u*, fig. 4. When the cover is closed, the recess *r* receives the leg to which the journals are attached, and when thrown back or opened, this leg lies beneath the top plate of the stove, and the one to which the cover is fastened rises and turns above the plate. The relative length and distance asunder of the respective legs of the hinge should be such as that, when the cover is being opened, the hinge shall not interfere with the edge of the opening in the top plate.

The advantages of the hinge, constructed as described, are, that it holds the cover in position when

open, and is always out of sight except when the cover is raised.

The grate, figs. 5 and 6, is supported and operated by a compound or divided axle, of which *v*, fig. 5, is the lower division. This division has a bearing at both ends, and supports the whole weight of the grate; and, for the purpose of preventing the grate being obstructed when operated horizontally by pieces of coal protruding between the bars, the part of it immediately beneath the grate is depressed, as shown in fig. 5. In the middle of the depressed part is a boss, *w*, fig. 5, of height equal to the depth of the depression mentioned, to which the grate is pivoted, and on which it moves when operated horizontally.

The upper division of the axle *x*, figs. 5 and 6, is attached fixedly to the grate, as shown in figs. 5 and 6. When the two divisions are brought together, and are in line, as in fig. 5, a square section is formed by the junction at the extremity *y*, to which the wrench or lever may be applied, and a rotary movement communicated to the grate, and the same be turned partly over, or bottom side up; and when the two divisions of the axle are in the position last mentioned, or in a different one relative to each other, as in fig. 6, the lever may be applied to the upper division, and a horizontal movement be communicated to the grate. In this manner, by means of the axle constructed as described, the two movements mentioned are imparted to the grate—the rotary, for occasionally discharging the contents of the fire-pot into the ash-pit, and the horizontal, for liberating the ashes from the burning fuel.

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

1. The air-chamber *f*, in shape of a frustum of a cone, surrounding the magazine, and provided with air-inlet passages from the base of the stove, and a narrow throat between its lower end and the mouth of the magazine, substantially as and for the purposes set forth.

2. Operating the cover of the hopper, through which the magazine is supplied, by means of the concealed hinge, herein described, constructed and arranged substantially as specified.

3. Communicating to the fire-grate both a rotary and horizontal movement, by means of the divided axle, herein described, constructed and operated as specified.

Witnesses:

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