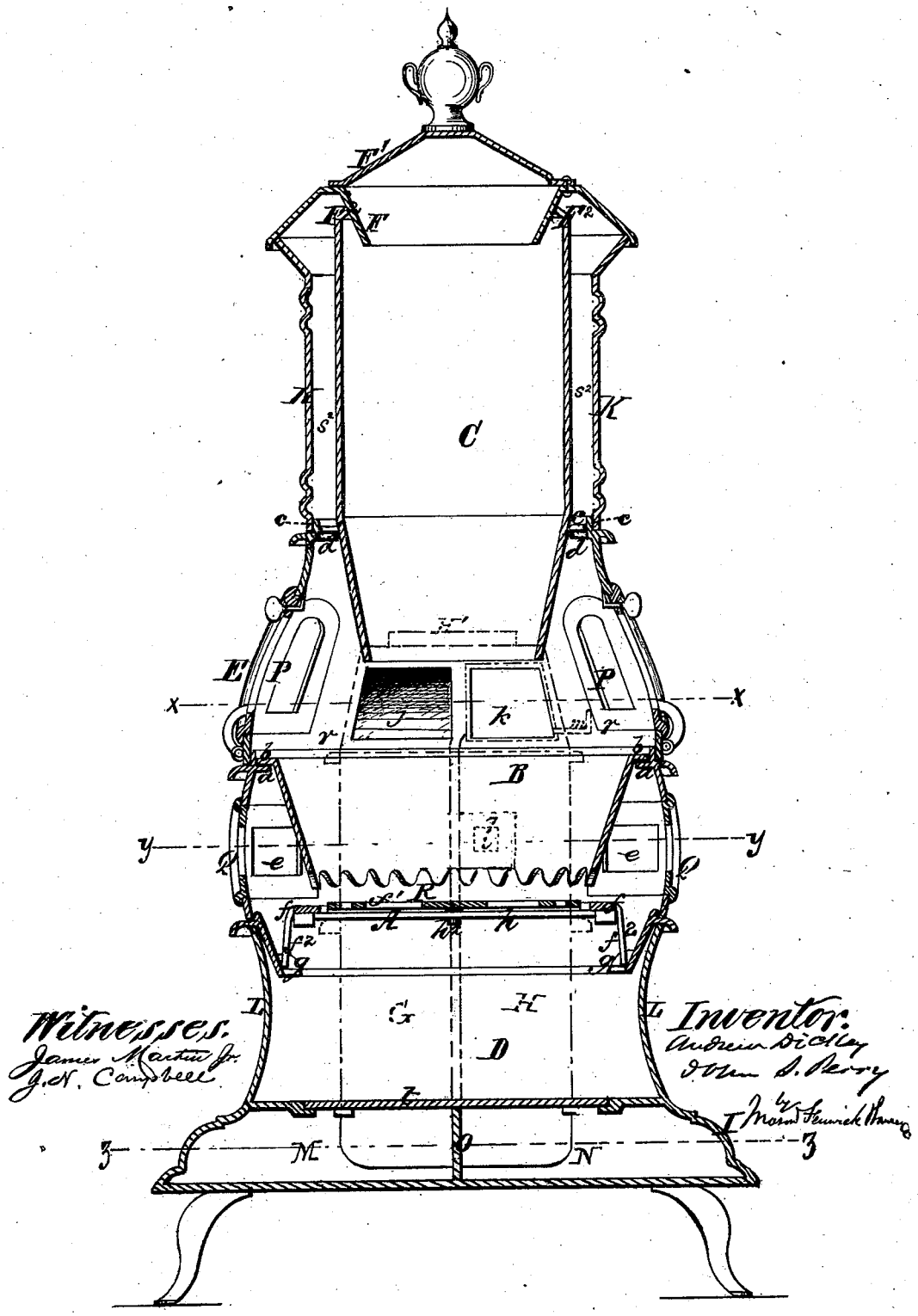
2 Sheets—Sheet 1.

A. DICKEY & J. S. PERRY.

HEATING-STOVE.

No. 183,545. Patented Oct. 24, 1876.

Fig. 1



2 Sheets—Sheet 2.

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Fig. 2

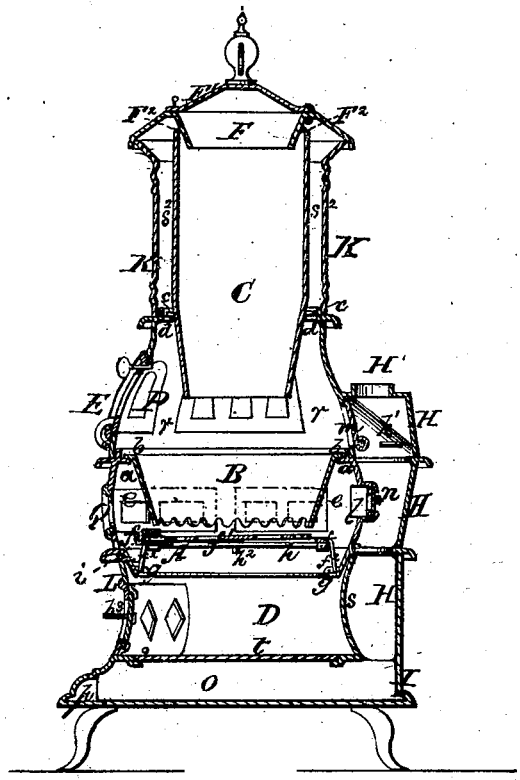


Fig. 4

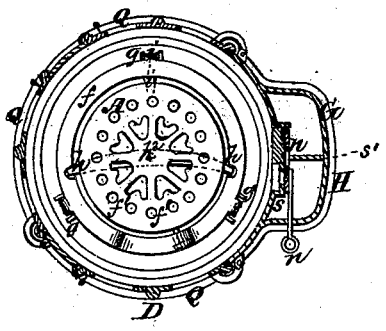


Fig. 5

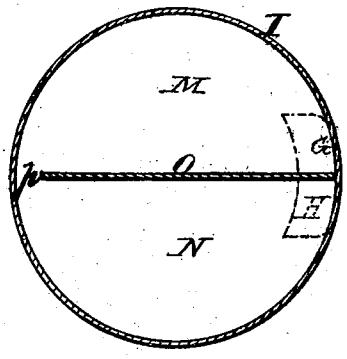
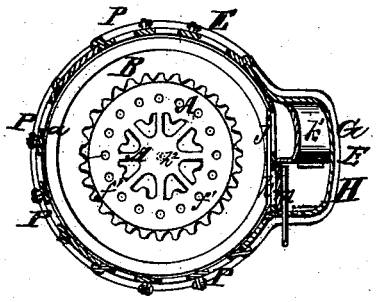


Fig. 3



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UNITED STATES PATENT OFFICE.

ANDREW DICKEY AND JOHN S. PERRY, OF ALBANY, NEW YORK.

IMPROVEMENT IN HEATING-STOVES.

Specification forming part of Letters Patent No. **183,545**, dated October 24, 1876; application filed April 24, 1874.

To all whom it may concern:

Be it known that we, ANDREW DICKEY and JOHN S. PERRY, of the city and county of Albany, and State of New York, have invented certain new and useful Improvements in Heating-Stoves; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical transverse section of the stove, looking toward the rear thereof. Fig. 2 is vertical central section, at right angles to the line of section of Fig. 1. Fig. 3 is a horizontal section in the line *x x* of Fig. 2. Fig. 4 is a similar section in the line *y y* of Fig. 1. Fig. 5 is a similar section in the line *z z* of Fig. 1.

Our invention relates to certain constructions in stoves, either surface or base burners, as hereinafter specified, whereby the necessary direct and indirect draft-flues which lead directly from the fire-pot may be on one side only of the stove, and in communication with the combustion-chamber above the fire-pot, and also with the flues in the hollow base, so that the advantage of the reverse draft and the circulation of the products of combustion downward through the said hollow base may be secured and at the same time a large portion of the surface of the outer wall of the draft-chamber base-section opposite or directly above the space R, between the base of the fire-pot or combustion-chamber proper and the top of the grate or fire-bed, may be left, for placing in the same illuminating doors or windows, as hereinafter described.

The invention further consists in placing a check-draft or passage, having a regulating-slide over it on the inner side of the ascending flue H, thus directly connecting the draft-chamber base-section with said flue, whereby the progress of combustion can be effectually controlled, and the escape of ashes outside of the structure, when the grate is shaken, prevented. By this means the air, which otherwise would pass through or over the grate or fire-bed to support combustion, is diverted through the said passage into the direct flue at a point below the top of the fire-pot, thus checking the combustion, and at the same time carrying with it the ashes and dust that would otherwise fly into the room when the grate is shaken.

It further consists in the adaptation of the legs f^2 to the ring or grate frame *f*, within which the central portion of the grate or fire-bed f^1 is placed, the whole being supported upon the depressed flange *g g*. This is a simple and cheap mode of supporting the grate or fire-bed, and is a valuable improvement, on account of the facility with which these rings or frames can be changed for those with legs of a greater or less length, thus adapting the altitude of the said grate or fire-bed, and thereby varying the width of the opening R to the size of coal to be used. It also consists in the construction of two vertical flues, one of which is descending and the other ascending, formed in one chamber on the rear or side of the stove by the outer walls of the same and divided by the vertical plate S set at right angles to the face of the stove. By this arrangement the projection necessary for these flues is not as great as when they are placed one outside of the other. A portion of the heat in passing through the descending flue is conducted through the division-plate S, thus rarefying the air in the ascending flue, and as a necessary result increasing the strength of the draft, which is liable to be more or less imperfect in stoves with revertible or diving flues.

In the accompanying drawings, I is the hollow base; O, the division flue-plate in the same; M, the base-flue, through which the products of combustion pass forward; N, the base-flue through which they pass backward; *p*, the passage between these flues; D, the draft-chamber base-section; L L, the outer wall of same; *s*, the inner wall of the same on the rear; b^3, the draft-register in walls of same; *t*, a cover forming a portion of the top of hollow base, which can be removed for cleansing the same; Q Q, the windows or doors in same; B, the fire-pot or combustion-chamber proper; *b*, the flange at top of same; *a a*, the projections from the inside of the outer wall upon which this flange rests; *e e*, the combustion-chamber for the gases above the enlarged grate or fire-bed; *f*, the grate-frame or external portion of the grate or fire-

bed A; f^2 f^2, the standards for supporting the same; g g, the flange or groove in which the standards rest; f^1, the central portion of the grate or fire-bed A; h, the grate-bar; h^2, the pivot connecting the grate and bar; i, the shaking-lug of grate; A, the complete grate or fire-bed; R, the open free space, between the base of fire-pot or combustion-chamber proper, and the top surface of grate or fire bed; l, an opening into the upward flue to check the draft and carry off the dust; n, a damper to close the same; E, the middle section of the outer wall, forming also the upper mica section; P P, the windows or doors in same; r r, the combustion-chamber above the grate or fire bed; j, the opening from the combustion-chamber into the descending flue; k, the opening from the combustion-chamber into the ascending or direct flue; m, the damper to close the same; G, the descending flue; H, the ascending flue; s^1, the vertical division-plate between G and H; H′, the exit-pipe; K, the upper section of the outer case; C, the magazine; s^2 s^2, the flue around the same; c c, lugs to support the same; d d, projections from the inside of the outer case on which the lugs rest; F, the funnel-shaped feed-hopper; F^1, the top cover to same; F^2 F^2, passages for gas from the top of magazine into the flue s^2.

It will be observed that the grate or fire-bed is placed in a plane below the base of the fire-pot or combustion-chamber proper, thus forming the free open space R, for the increase of the draft for the protection of the grate or fire-bed, for facilitating the removal of clinkers and other refuse, for illuminating the draft-chamber base-section, and for other purposes.

The standards upon which the grate-frame rest can be made at any desired length, and thereby the depth of the free open space R regulated to the size of coal used in the stove. This grate or fire-bed is placed about the center of the draft-chamber base-section, and made with a diameter or area greater than the diameter or area of the inside of the said fire-pot or combustion-chamber proper at its base. It is isolated from the walls of the said draft-chamber base-section to allow a free circulation of air between the two, around and over the periphery of the said grate upward to the burning fuel, and also to allow the passage of ashes and other refuse from the surface of the said grate or fire-bed downward into the ash-pit.

The said space R extends into the gas-combustion chamber e, and with the latter forms a part of the said draft-chamber base-section. The central portion f' of the said grate or fire-bed is supported upon a tilting or dumping bar, h, and is kept in horizontal position by the stop and shaking lug i. It is pivoted to this bar h, as shown at h^2, and can be vibrated horizontally and dumped vertically in the usual manner.

The fire-pot B is suspended by the flange b at the top upon the annular flange a, projecting from the inner side of the wall or case E. It is in the form of a inverted truncated cone, scalloped at its lower end, and extends down toward the center of the draft-chamber base-section, terminating a little distance above the top surface of the grate or fire-bed.

The outer wall L L of the draft-chamber base section is ogee in form, and extends from the hollow base I to the top of the fire-pot or combustion-chamber proper. A considerable space, e e, is formed between the said wall and the fire-pot or combustion-chamber proper and the grate or fire-bed, for the purposes before described. Windows or doors Q Q, for illumination, are placed in the said wall opposite or a little above the incandescent fuel which is exposed in the open free space R.

The opening l is in the inner rear wall s, at a point between the top of the fire-pot or combustion-chamber proper and the grate or fire-bed, and is provided with a register-slide, n. This opening leads into the ascending flue H, through which the air will be drawn away from the fire, thus checking the combustion, and when the grate is shaken the light ashes or dust will be borne upon this current into the said flue instead of flying out into the apartment. When the slide n is closed, and the draft-register b^3 opened, the fire will burn as usual.

Between the lower part of the magazine C and the top b of the fire-pot the two flue-passages j k are formed in the inside rear wall s, the latter of which is provided with a damper, m. Behind these passages vertical flues G H are constructed, so as to inclose these passages. The flue G is formed with an arching hood, and it extends down to the hollow base I, and connects with the flues M and N formed in said base. The flue H also extends down to and connects with the same, and also extends up above the said arching hood of the flue G to the exit-pipe H′.

Fig. 5 of the drawings illustrates the division of the chamber in the hollow base by the plate O, forming two horizontal flues, M N, which are connected together at p. By this arrangement of the flues G H and M N a very small portion of the outer wall L L is covered, and thus, while a direct and indirect circulation of the products of combustion is secured throughout the hollow base, illuminating windows or doors can be applied to the whole remaining wall L L.

This very desirable combination cannot be realized in revertible-flue stoves of the ordinary description, in which the products of combustion are carried over the edges of the fire-pot or combustion-chamber proper, downward along its sides, and thence into the hollow base.

In thus constructing the said flues G H side by side, a less projection is required than if they were placed one in front of the other, and the beauty of the structure is further secured by embodying them within the external wall or main body. A further advantage is obtained in the material increase of the draft

of the stove by this arrangement. A portion of the heat in passing down the flue G is, by conduction, passed through the vertical plate s^1 into the upward flue H, and the air in the same becomes thereby rarefied, and thus a good draft is insured, the absence of which is a serious objection in most of the revertible-flue stoves constructed upon the old principle.

The magazine C is suspended by means of lugs *c c* on projections *d d*, within the chamber formed by the outer case K, which may be cylindrical, or of any other desired form. This magazine is tapering at its lower end, and extends downward into the intermediate sections E, which also forms the upper mica section. The top of the magazine adjoins a funnel-shaped feed-hopper, F, above and within the same, which is closed by a top cover, F^1. Gas-escape passages F^2 are provided from the top of the magazine into the flue s^2 s^2. This flue extends all around the magazine, and is enlarged downward from the flange *d*, where the magazine begins to taper.

By this construction a large horizontal and lateral flame-expansion chamber for the burning of the gases is formed above the top of the fire-pot or combustion-chamber proper.

Operation: When the fire is to be started, the direct draft-passage *k* is to be opened, also register b^3 under the grate. When the fuel has become ignited, close the former by the damper *m*, when the products of combustion will descend the flue G into the hollow base I, pass forward in the flue M into the flue N through the passage *p*, and thence upward through the flue H to exit-pipe H′. The entire structure thus becomes thoroughly heated, including the hollow base, and also the chamber *s s*, which forms a drum, radiating the heat powerfully. The inflammable gases are burned in the combustion-chamber *r r*, producing, with the reflection from the incandescent fuel, a brilliant illumination through the windows P P.

When the grate or fire bed has become clogged with ashes, clinkers, and other refuse, this can be removed with a poker, scraping the same from the surface of the grate over its edge, from whence it will fall between the same and the walls of the draft-chamber base section into the ash-pit or ash-drawer. Shaking the grate or fire bed should be avoided as much as possible, as this process packs the coal in a solid mass, and thereby impedes a free combustion. The check-passage *l* should be opened while the grate is being cleaned, as the draft into it will prevent any ashes or dust flying into the room.

A brilliant illumination through the windows Q Q will reward a little attention to keeping the outer rim or enlarged portion of the grate or fire-bed free from refuse matter.

When it is desired to clean the hollow base, remove the cover *t* of same, when every portion can be easily reached, and the work effectually performed.

We do not claim the device shown in patent of W. Keyser, December 27, 1870, of supporting the pan or ring upon which the grate or fire-bed rests, upon legs reaching to the base of the ash-pit section, as our plan is designed to permit of the use of an ash-pan for receiving ashes from the fire above. Another object we have in view is to have the ring and its supports of such a short length that it will be convenient to cast the two together, and when in use may be removed for repairs and replaced without taking the whole structure apart.

We claim—

1. The combination of ascending and descending flues placed on the rear side of a stove, illuminating windows or doors in the draft-chamber base-section, and the free open space R, between the top surface of the grate or fire-bed and the base of the fire-pot or combustion-chamber proper.

2. The combination of ascending and descending flues placed in the rear of a stove, a free open space between the top of the grate and lower end of the fire-pot sufficiently large to permit the removal of clinkers and other obstructions, illuminating windows opposite said space, and a grate or fire-bed having an open space between it and the walls of the stove to admit of clinkers and other obstructions being dropped between the grate and said walls of the stove into the ash-pit, substantially as described.

3. The combination of the check-draft passage *l*, having a damper, *n*, to open and close the same, with the upward flue H and the ash-pit, substantially as described.

4. The grate-frame constructed with legs, supported upon, and in combination with, a flange or projection upon the side wall of the draft-chamber base-section, substantially as described.

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JOHN S. PERRY.

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