2 Sheets—Sheet 1.

W. B. TREADWELL.

HEATING-STOVE.

No. 169,601. Patented Nov. 2, 1875.

Fig. 7.

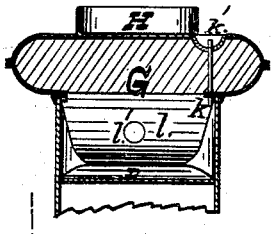


Fig. 6.

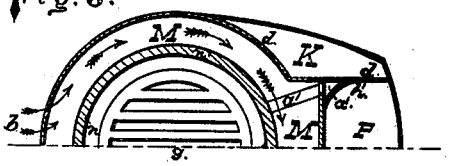


Fig. 1.

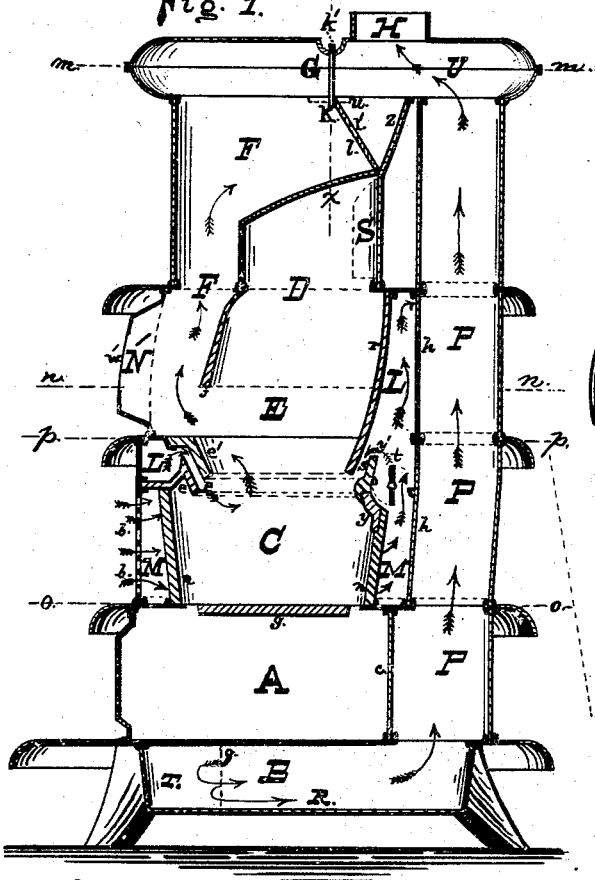


Fig. 3.

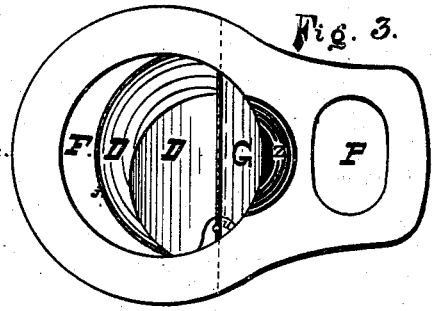


Fig. 4.

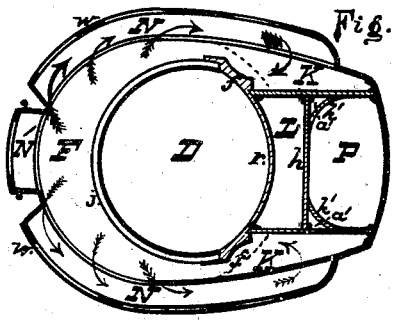
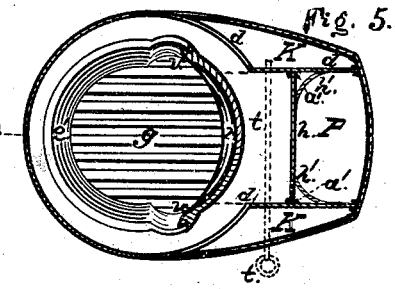


Fig. 5.



Witnesses:

Herbert J. Houghton

Joseph L. Enderle

Inventor:

William B. Treadwell

By his attorney

Thos. Houghton.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

W. B. TREADWELL.

HEATING-STOVE.

No. 169,601. Patented Nov. 2, 1875.

Fig. 9

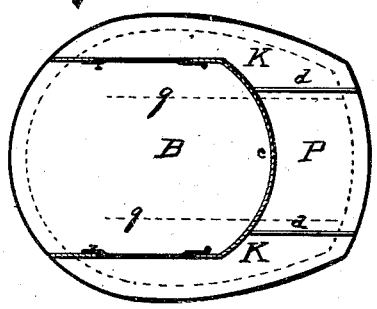


Fig. 2.

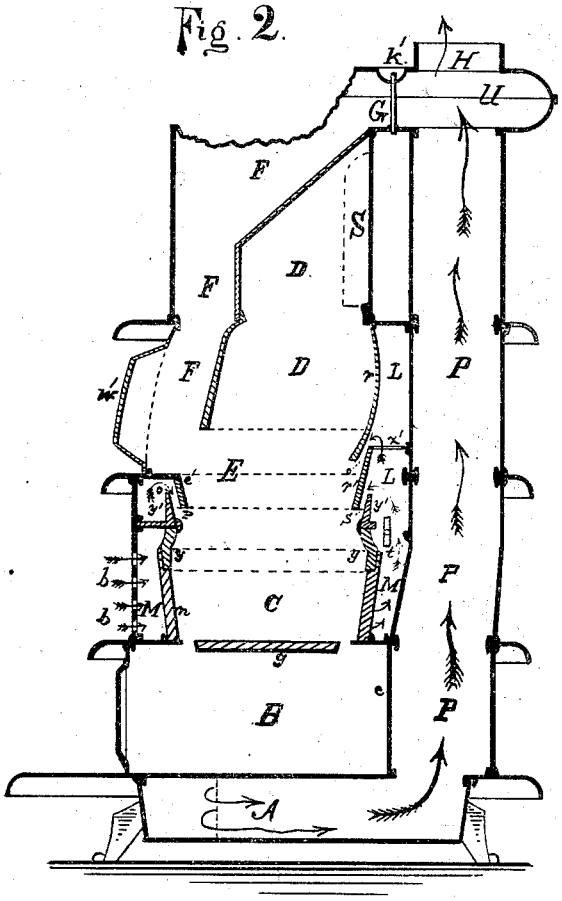
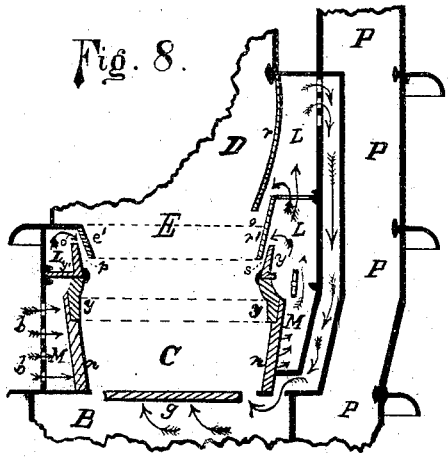


Fig. 8.



Witnesses:
Joseph L. Enderle
Herbert T. Houghton

Inventor:
William B. Treadwell
By his attorney
Thos. Houghton.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM B. TREADWELL, OF ALBANY, NEW YORK.

IMPROVEMENT IN HEATING-STOVES.

Specification forming part of Letters Patent No. **169,601**, dated November 2, 1875; application filed October 15, 1875.

To all whom it may concern:

Be it known that I, WILLIAM B. TREADWELL, of the city and county of Albany, and State of New York, have invented certain new and useful Improvements in Heating-Stoves, particularly adapted to the burning of bituminous coals; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming a part of this specification, in which—

Figures 1 and 2 are vertical central sections of stoves embodying my invention. Fig. 3 is a horizontal view on the plane of line *m m*, Fig. 1. Fig. 4 is a horizontal section on line *n n*, Fig. 1. Fig. 5 is a horizontal section on the plane of line *p p*, Fig. 1. Fig. 6 is a semi-horizontal section on line *o o*, Fig. 1. Fig. 7 is a vertical section through the center of the upper portion of valve G on line *x x*, Fig. 1. Fig. 8 is a vertical section through one of the descending hot-air flues *a'* and chambers L and M. Fig. 9 is a horizontal section through the ash-pit.

Similar letters of reference indicate corresponding parts in the several figures.

In this invention the fire-chamber C, combustion-chamber E, magazine D, the mouth or lower portion *j* of the magazine, the feed-door S, direct flue F at the front of the stove and over the fuel-reservoir, air-chamber L, and the outlet-pipe H, I place relatively to each other the same as shown in Patent No. 155,685, granted to me October 6, 1874; but with a desire to produce a more perfect combustion I omit the inner plate, forming the mouth of the fuel-magazine in said patent, and, in place thereof, adopt the arrangement of plates hereinafter fully described, to form air passages or conduits *o*, *p*, and *s* below the mouth of the reservoir. Said air passages or conduits enable me to carry warm atmospheric air deeply down into the midst of the burning fuel, from five to six inches deeper than was carried in the said patent above mentioned.

This mode of construction I find gives greatly superior results to any other hitherto known by me, and is due, I think, to the atmospheric air being supplied deeper into the mass of burning fuel, and not suffered to be driven off from the surface of the ignited fuel, as in the old methods of construction.

My invention consists, first, in constructing around the upper edge of the fire-pot, and at the back of the reservoir, a receiving and distributing hot-air chamber, governed by a single valve; secondly, in combination with the above, the construction of deeply-penetrating air passages or conduits, by which a full supply of atmospheric oxygen shall be carried into the midst of the burning fuel; thirdly, in providing an expansion-chamber in the mica section of the stove, to facilitate the free distribution of caloric to the front of the stove, in order to heat the room better, and also to permit the products of combustion to pass easily, without crowding, into the descending flues K K; fourthly, in providing air-flues leading from the distributing air-chamber at the back of the magazine down to the ash-pit, to supply the fuel upon the grate with oxygen—the supply being governed by a valve, *t*, at the back of the fire-pot; fifthly, in providing a gate, valve, or damper, so arranged in the top of the stove as to govern the direct and the revertible drafts of the stove; sixthly, in the general arrangement in a base-burning stove of an open-work jacket at the lower front part of the fire-pot, so as to form an air-heating chamber, and connecting the same by a valve, *t*, to a distributing-chamber, from whence the air is conveyed to the midst of the fire by deeply-penetrating conduits, and simultaneously under the grate, and regulating the passage of the products of combustion by a valve in the top of the stove, thereby producing a better heater, and a more economical user of coal.

In the accompanying drawings, A is the ash-pit, formed in the usual manner, and provided with hinged doors on each side, by which to clean out side flues K K. B is the base-section of the stove, divided by flue-strips *q q* into three flues—two side flues, T T, and one central return-flue, R—in the usual well-known manner. C is the fire-chamber section, the jacket or outer casing of which is perforated or made of latticed work on the

front, permitting atmospheric air to enter freely through said perforations or open-work *b b* into chamber M, surrounding the lower portion of the fire-pot, as shown in Figs. 1 and 6. Distributing-chamber L is constructed at the rear of the combustion-chamber and the illuminating-sections of the stove, and at its lower part fills the entire circumference of the stove. It is inclosed between plates *e* and *e'* at the front, and *r*, *y'*, and *h* at the back, as shown in Figs. 1, 2, 4, 5, and 8. Said chamber L is constructed to hold in reserve warm atmospheric air in sufficient quantity for equal distribution at points most remote from the point of entrance. Air-passage *p* in front will be as well supplied as air-passage *s* at the rear of the stove. Plate *e* is so formed that the air must rise to point *o* before it can enter passage *p*. (See Fig. 1.) Valve *t*, at the bottom of chamber L, is to regulate the supply of air passing into said chamber. Valve *t* may be a sliding valve instead of a revolving valve, as shown, and serve the same purpose. At each side of the stove, within the outer casing, are descending flues K K, (shown in Figs. 4, 5, and 6,) extending from the illuminated section to the base, and connecting there with bottom flues T T.

To provide for the free expansion of the heat generated by the burning fuel, and to give the products of combustion easy access to flues K K at the rear, I enlarge the illuminated section of the stove, as shown in Figs. 1 and 4, by constructing two illuminated flue-passages, N N, which may be covered with the ordinary casing, which would prevent illumination. Plates *d d* form ascending flue P and descending flues K K at the rear of the stove, as shown in Figs. 4, 5, and 6. Plates *h' h'*, combined with plates *d* and *h*, form air-flues *a' a'*. Flues *a' a'* are continued across chamber M to the ash-pit by flue-strips *c' c'*, as shown in Figs. 4, 5, 6, and 8. Openings *x' x'* lead from the top of air-chamber L into said air-flues *a' a'*, as shown in Fig. 8. By means of flues *a' a'* the surplus of heated air is taken from the upper part of chamber L, down through descending flue P, to the ash-pit, which it enters just forward of the back plate *c*, as shown in Fig. 8. A projection, *z*, Figs. 1 and 3, is formed by expanding the top of the rear portion of the feed-cylinder section, to give more room for the natural deposit of soot and ashes, and to facilitate the falling of the same into the fire-pot below. In the top section, near outlet H, I construct a cut-off valve or gate, G, which I hang, as gates are often hung, by two pivots or pins, *k* and *k'*. Said gate G is at the top of flue F, and in chamber U of the top of the stove. It is made with its upper perpendicular portion fitted to close chamber U, and its lower inclined portion to close entirely the passage up the projection *z* into the same chamber. There is, however, a perforation in the lower, oblique portion of said valve G, of about one inch diameter, or sufficiently large to permit the constant escape of the surplus gases directly toward outlet H.

The upper pin *k'* of gate G is shielded from injury during transportation by being placed in a hollow or recess cast on the under side of the top plate of the stove, as shown in Fig. 1. Valve G is held shut by being driven upon a slightly and gradually inclined way in closing. Plate *y* is bolted to the fire-pot *n*, and plate *y'* rests upon it, as shown in Fig. 1.

If desired, plates *y* and *y'* may, in casting, be joined into one by the use of a divided pattern.

The upper part *y* of the fire-pot may be made in one piece, and fitted within the top of the lower or body part, as shown in Fig. 2.

A second air-passage, *o'*, at the back of the stove, may be formed by making plate *r* in two parts, *r* and *r'*, and separating them, so as to form air-passage *o'* above air-passage *s*, both of said passages *o'* and *s* being below the mouth of the fuel-reservoir D, as shown in Figs. 1 and 2.

Plate *h* forms the rear wall of the air-chambers L and M, and also divides or separates said chambers from back flue P.

When gate-valve G is open the products of combustion from the fire-chamber will pass directly upward through flue F over the top of reservoir D, and off into direct outlet-pipe H. With valve G closed they will pass from the fire-chamber into the expansion-chamber, through flue-passages N N, and thence to the rear of the stove; thence descending through side flues K K into the bottom or base B; thence passing forward through the two side flues T T, they enter central flue R, and, passing through to the rear of the stove, ascend flue P into chamber U, and off through outlet-pipe H, as shown by arrows in Fig. 1.

The air to support combustion is admitted through the lattice or open work of the outer casing, as at *b b*, in front of the fire-pot, into chamber M, surrounding the fire-pot *n* at its lower part. By opening valve *t* the warm air will pass into chamber L, and from thence be distributed through air passages or conduits *p*, *s*, and *a'*, thus introducing a full supply of oxygen deeply into the mass of ignited fuel, inducing a more perfect combustion thereof, and thereby causing a greater and more uniform supply of heat.

Having thus described my invention and its mode of operation, what I claim, and desire to secure by Letters Patent, is—

1. Plates *h*, *r*, and *e'*, in combination with plates *e* and *y'*, and with fire-pot *n*, forming an air-distributing chamber, L, and extended air-passages *p* and *s*, and with valve *t*, substantially as described, and for the purpose set forth.

2. Fire-pot *n*, rings *y* and *y'*, in combination with plates *e*, *r'*, and *r*, arranged and constructed in the manner and for the purpose herein set forth.

3. Illuminated or expansion chamber or

flues N N, in combination with flues F, K, T, R, and P, substantially as herein described and shown.

4. Air-flues *a' a'*, in combination with air-chamber L, valve *t*, and ash-pit B, all arranged and operating in the manner herein described.

5. Gate G, pivoted and constructed as herein shown, in combination with chamber U, flues F and K, and outlet H, as herein set forth.

6. Open-work jacket *b b*, fire-pot *n*, air-valve *t*, air-chamber L, air-flues *o*, *s*, *p*, and *a' a'*, and magazine D, arranged, combined, and operating as and for the purpose herein described.

WILLIAM B. TREADWELL.

Witnesses:
ROBERT H. BULLOCK,
JOHN HOUNGAN.