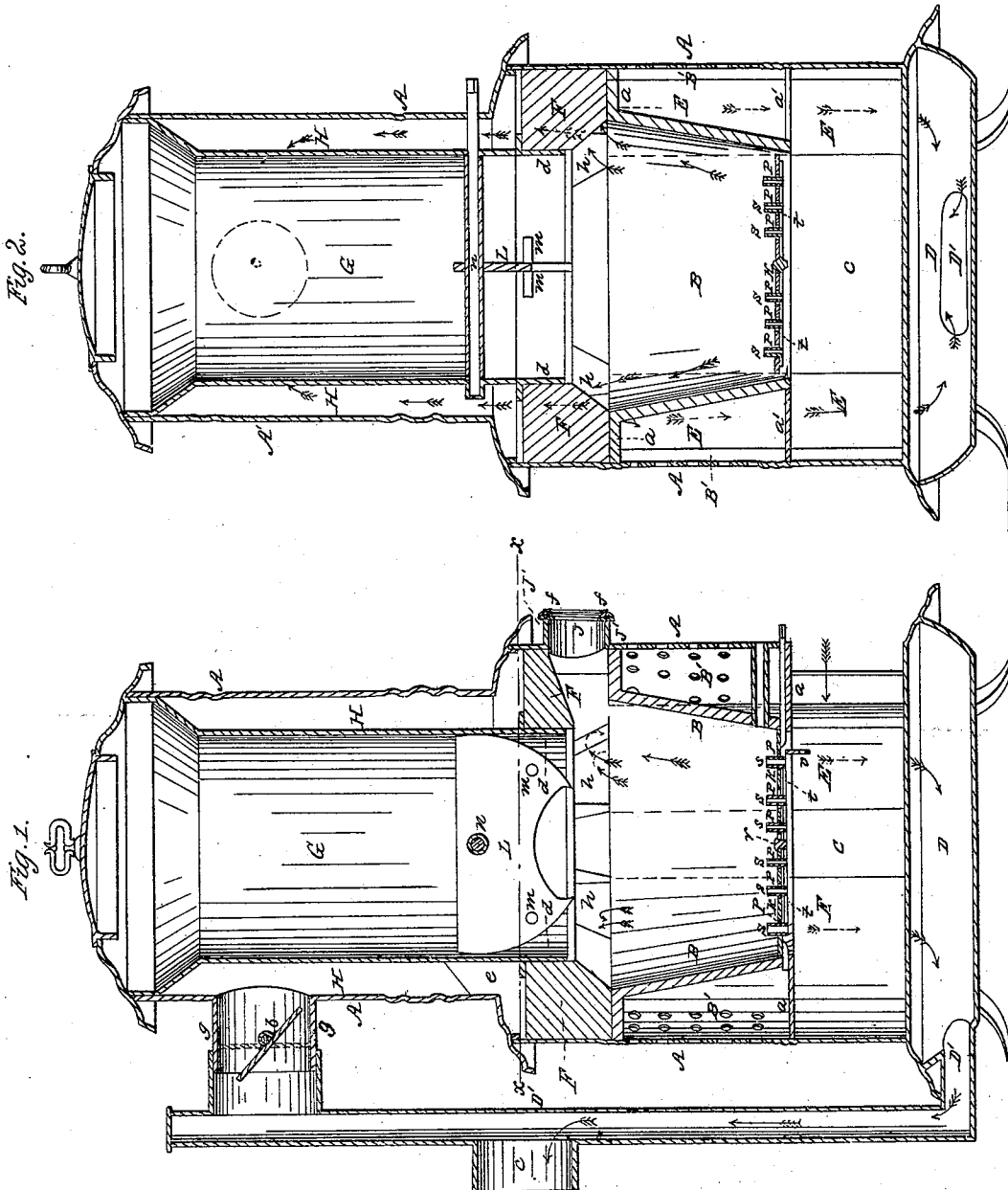


W. B. TREADWELL.

Coal Stove.

No. 40,132.

Patented Sept. 29, 1863.



Witnesses:  
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D. Schaefer

Inventor:  
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by his Atty  
Mason & Co.

W. B. TREADWELL.

2 Sheets—Sheet 2.

Coal Stove.

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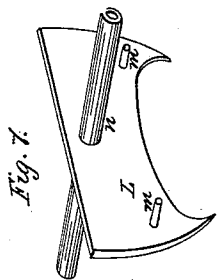


Fig. 7.

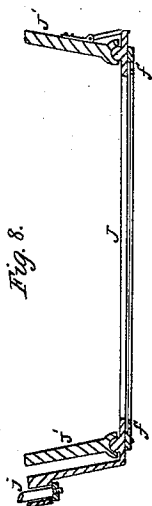


Fig. 8.

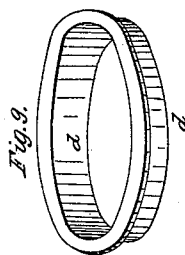


Fig. 9.

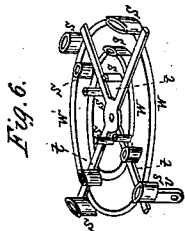


Fig. 6.

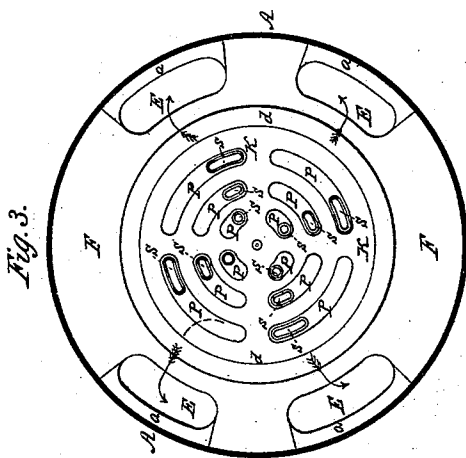


Fig. 3.

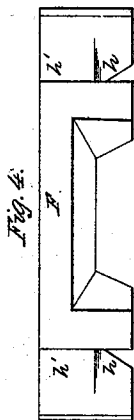


Fig. 4.

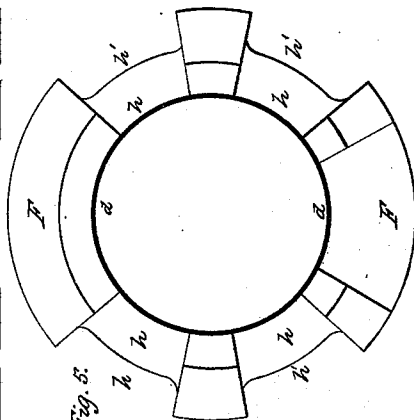


Fig. 5.

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# UNITED STATES PATENT OFFICE.

W. B. TREADWELL, OF ALBANY, NEW YORK.

## IMPROVEMENT IN COAL-STOVES.

Specification forming part of Letters Patent No. 40,132, dated September 29, 1863.

*To all whom it may concern:*

Be it known that I, W. B. TREADWELL, of Albany, in the county of Albany and State of New York, have invented a new and Improved Supply-Cylinder Coal Stove; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figures 1 and 2 represent vertical diametrical sections through the stove, taken in planes at right angles to each other. Fig. 3, Sheet 2, is a horizontal section through the stove at the point indicated by red line *x x* in Fig. 1, showing the parts below the supply-cylinder. Fig. 4, Sheet 2, is a front elevation of the arched fire-brick. Fig. 5 is a bottom view of Fig. 4. Fig. 6 is a perspective view of the vibrating rake detached from its grate, the latter being shown in Fig. 3. Fig. 7 is a perspective view of the agitator detached from the supply-cylinder. Fig. 8 is an enlarged sectional view of the mica-frame. Fig. 9 is a perspective view of the fire-brick protector.

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

This invention relates to certain new and useful improvements in that class of coal-burning stoves which are denominated "base-burners," from the fact that all the combustion takes place at the bottom of a body of coal, which gradually descends as it is burned away, and thus keeps up a constant supply to the fire as long as any coal remains in the stove.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

It will be seen by reference to Figs. 1, 2, and 3 that my stove is constructed of a cylindrical form, the lower half, A, being made somewhat larger than the upper half, A', in order to give a symmetrical shape and neatness to the stove. Within the lower portion, A, I have arranged the fire-pot B, which is of the form of the frustum of a hollow cone inverted, and surrounding the upper edge of this fire-pot is a ring, *a*, which closes the top of the chamber B' around the fire-pot, the bottom of which chamber is formed by means of a similar ring, *a'*, as shown in Figs. 1 and 2. Below the fire-pot and the chamber surrounding it is the ash-pit C, and below this ash-pit is the chamber D, which communicates with the

main draft-pipe D'. Surrounding the fire-pot B are four vertical flues, E E, which form communications between the flaring top of the fire-pot B and the chamber D at the base of the stove; and when the ascending draft is cut off by means of the damper-valve *b* near the top of the stove all the products of combustion which rise from the fire-pot pass over the rim of this pot and descend through the pipes E into chamber D, from whence they are carried upward through pipe D', and finally escape into the chimney through the central pipe, *c*.

On top of the rim, or ring *a* rests the arched fire-brick F, which is shown clearly in Figs. 1, 2, 3, 4, and 5, and which will be explained hereinafter, and within the circular opening through the fire-brick, is placed a short flanged cylinder, *d*, its cylindrical portion entering the fire-brick opening, and its flange portion projecting a short distance over the upper surface of the fire-brick. The object of this flanged cylinder is to protect the edge and inner surface of the fire-brick, and also to afford a smooth surface, over which the coal which is contained in the upper part of the stove may easily slide as their coal descends into the fire-pot. This portion *d*, therefore, serves as a protector to the fire-brick, forming a partial inside lining for the same inside as well as on top.

Within the upper or reduced portion 'A of the stove I have arranged a cylinder, G, having a flaring or funnel-shaped top, which extends up to the top of the stove, as shown in Figs. 1 and 2. The lower end of this cylinder G is centered within cylinder A' and kept in this position by means of the brackets *e*, one of which is shown in Fig. 1. These brackets may be formed upon the outer casing, A', or upon a ring encircling the stove within this casing; or they may be formed on the feed-cylinder G and have their bearings upon stops formed on the inner surface of the plates, constituting the outer casing of the stove. For all ordinary purposes three of these brackets *e*, placed at equal distances apart around the cylinder G, will answer, though more may be used if necessary. The bottom of the feed-cylinder G is equal in diameter to the central opening through the fire-brick F, and this cylinder rests upon the fire-brick, or, rather, upon the flange of the protector *d*, as shown in Figs. 1 and 2.

Surrounding the feed-cylinder G, which is to contain and to supply coal to the fire-pot beneath it, is a chamber, H, and at or near the top of this chamber is a short pipe, *g*, which communicates with the upper end of the vertical flue D', and when the valve *b*, which is in pipe *g*, is opened, the products of combustion ascend from the fire-pot through the arches in the fire-brick F through the chamber H and pass out at the pipe *g*, thus taking in their passage through the stove a directly contrary course to that which they take when this damper-valve is closed.

The fire-brick F consists of arched spaces *h h* and vertical spaces *h' h'*, corresponding in number to the vertical flues E, and so located with reference to these flues that the heated air and products of combustion will be drawn over the rim of the fire-pot, through arches *h h* of the fire-brick, (damper *b* being closed,) and down into the chamber D at the bottom of the stove, and thence carried off through the vertical flue D'. But when the damper *b* is open and the draft is upward, the products of combustion will enter the chamber H through the spaces *h' h'* and *h h* in the fire-brick. In this manner I am enabled to secure both the upward and downward drafts and at the same time employ fire-brick at the point where the most rapid combustion of the coal takes place. I have indicated the direction which the currents will take when the damper *b* is closed by red arrows, Figs. 1 and 2, and the direction which the currents will take when this damper is open by black arrows, the cold air entering at the ash-pit door, as shown in Fig. 1.

The bricks which form the arches *h h* may be made of one or more pieces, and should be set in place before the top casing of the stove is put on. The opening through the center of the fire-brick is equal in diameter to the interior diameter of the supply or feed cylinder G, but at the bottom of this cylindrical opening the solid portions of the brick (on each side of the arches) are beveled downward and outward so as to give a gradually-contracted opening from the top edge of the fire-pot to the bottom edge of the supply-cylinder, as shown in Figs. 1 and 2. Hence the coal will find no obstructions in entering the fire-pot as it is gradually burned away therein.

The illuminating-door J is closed by means of a door which is composed of a strip of mica secured to the frame of the door by a strip, *f*, which overlaps the edges of the mica, and which is riveted or otherwise secured to the frame of the door. The door itself has a tongue projecting from its inside face, which enters a corresponding groove that is formed in the edge of the door-opening J' of the stove when the door is closed. This will make a closely-fitting joint, through which neither air can enter nor ashes escape. The door is hinged on one side and secured when closed by means of a nut, *i*, and screw-stem *j*, as shown in Fig. 8.

Many difficulties are found to exist in burn-

ing bituminous coal successfully in stoves, growing out of the cohesive nature of the coal when under the influence of heat and gases while burning. The coal under these influences will cohere and lodge in the feed-cylinder and sometimes become very hard, and if left in this way the fire will go out. To obviate these difficulties I construct an agitator, L, shown in Figs. 1, 2, and 7, which is best made in the form of a wheel or the segment of a wheel, with points or teats *m m* formed upon its sides. This agitator is hung on a shaft, *n*, which passes through the feed-cylinder, and is allowed to project a short distance from the outer casing of the stove to receive a handle, by which it can be revolved, and, being located near the bottom of the feed-cylinder, in the midst of the coals, and at the point where cohesion is most likely to take place, this agitator, upon being rotated, will break up the cohering mass and keep the lower end of the bed of coals in a proper condition to supply the fire and to burn.

K is the grate, upon which the coals in the fire-pot will lie. This grate is arranged at the bottom of the fire-pot and pivoted to the same, so that it may be tilted over for discharging the contents of the fire-pot. Grate K is flat, with circular concentric openings *pp* through it, as represented in Fig. 3, and to the center of this grate I attach a vibrating rake by means of a bolt, *r*, about which the rake vibrates. This rake consists of a number of solid or hollow prongs *s s*, which are attached to radial arms *t t*, and which project up through the circular openings in the grate an inch or so, and the rake is vibrated by means of a lever which is passed into the hole in the projecting portion *v*. The circular bars *w*, which are shown in Fig. 6 attached to the arms of the rake, are intended as braces for these arms.

Having thus described my invention, what I claim as an improvement in supply-cylinder base-burning stoves is—

1. Constructing the fire-brick F with horizontal arched openings *h h* and vertical openings *h' h'*, communicating therewith, substantially in the manner and for the purposes described.
2. Arranging the fire-brick F with its arched openings in such a relation to the flue H, surrounding the supply-cylinder G, and the descending flues E E, surrounding the fire-pot, that either a descending or ascending draft may be obtained by regulating the single-damper valve *b*, substantially as set forth.
3. The cylindrical flanged metallic lining *d*, in combination with the fire-brick F, constructed substantially as and for the purposes described.
4. The circular plate-grate K, constructed with concentric openings through it, in combination with vertical fingers *s s* of a circularly-vibrating rake, substantially as described.
5. Constructing the illuminating-door frame with a tongue on its inner surface and the door-box J, with a corresponding groove on its

outer edge, in combination with the nut-fastening *ij*, as set forth, whereby a closely-fitting tongue-and-groove joint is obtained when the door is closed, substantially as described.

6. The revolving or rocking agitator *L*, provided with projections *mm* on its sides, said agitator being arranged at the base of the supply-cylinder *G*, substantially as and for the purposes described.

7. In a base-burning stove having a supply-cylinder, *G*, and a flaring fire-pot, *B*, interposing between said cylinder and pot the perforated fire-brick lining when the same is ar-

ranged at the point where the combustion of the fuel takes place most rapidly, and is supported directly or indirectly by the fire-pot *B* and the cylinder *A*, substantially as described.

8. The combination and arrangement of flue-space *H*, supply-cylinder *G*, chamber *B'*, flues *E E*, chamber *D*, fire-pot *B*, and arched fire-brick lining *F*, the whole operating substantially as described.

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