A. NICOL.

Grate for Stoves.

No. 204,911. Patented June 18, 1878.

Fig. 1.

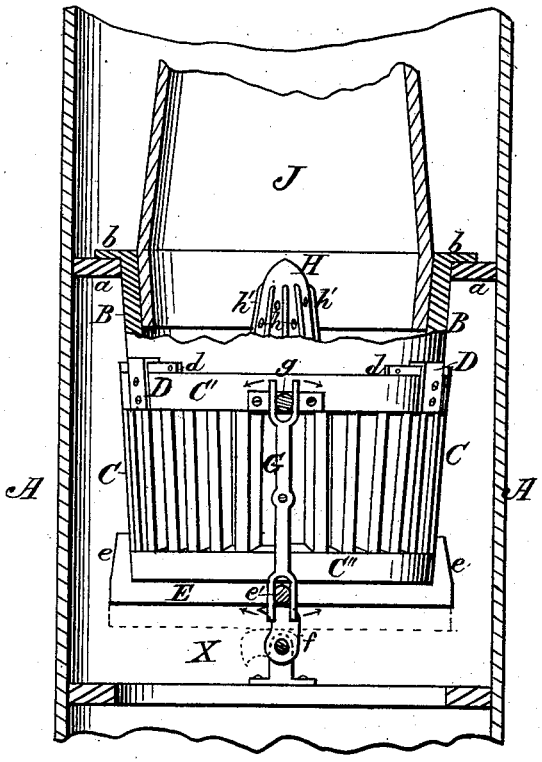


Fig. 2.

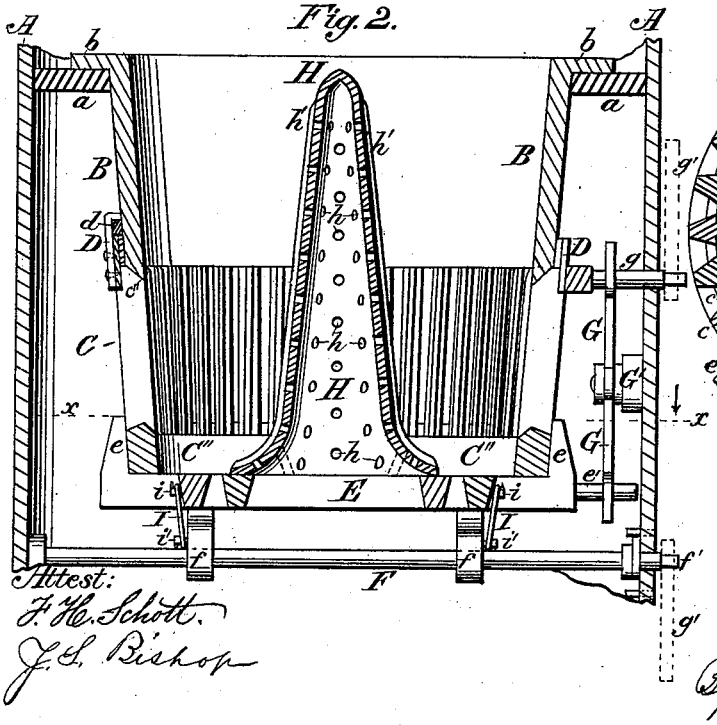
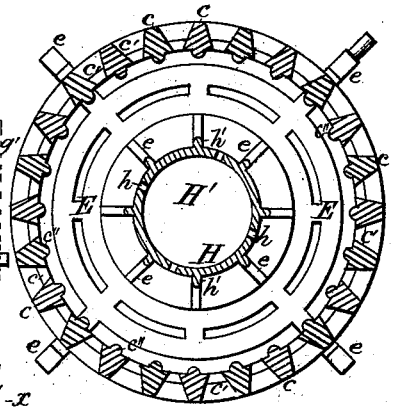


Fig. 3.



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ANDREW NICOL, OF SCRANTON, PENNSYLVANIA.

IMPROVEMENT IN GRATES FOR STOVES.

Specification forming part of Letters Patent No. **204,911**, dated June 18, 1878; application filed April 25, 1878.

To all whom it may concern:

Be it known that I, ANDREW NICOL, of Scranton, in the county of Luzerne and State of Pennsylvania, have made certain Improvements in Stoves for Burning Culm or the Waste of Anthracite Coal, of which the following is a specification:

Heretofore efforts to burn and make available for heating purposes the comminuted particles of anthracite coal have failed to produce success; and the object of this invention is to produce a stove so constructed that such culm will be completely burned, and, by being consumed, will give out heat that can be utilized in the various ways that heat is now used; and it consists in the construction of the stove and its parts, whereby the object is attained, as will be fully hereinafter described.

In the drawing, Figure 1 represents a partial upright section of a stove with my improvements inserted therein. Fig. 2 is a transverse section of my improvement; and Fig. 3 is a top view of grate and appendages on line *x x*, Fig. 2.

A represents the outer jacket of a heating-stove, which may be of any desired shape to receive my improvement. *a* is an inward-projecting flange from the jacket to support the fire-pot. B is the fire-pot, or upper solid or imperforate section of the same, and is secured to the flange *a* by the outwardly-projecting flange *b* on its top edge, and is fixed in position. C is the lower or basket-grate part of the fire-pot, and is formed by having an upper and bottom rim, C′ C″, with upright grate-bars *c* and intermediate open spaces *c′* between them, and tapering to be smaller toward the bottom, when desired. This part of the fire-pot is caused to be partially rotated to shake out the ashes. The spaces between the bars *c* of part C are narrow, should not be more than about one-eighth of an inch wide, and greater in width on the outside, as seen in Fig. 3. D D are three or more hooks or bent plates, secured to the upper rim of basket C, which is a trifle larger in diameter than the fire pot B at its lower end. *d d* are horizontal plates, secured to the lower part of fire-pot B, and in the position to receive the hook part of plates D, which bear upon the plates *d*, as seen in Figs. 1 and 2, and thereby support section C upon section B.

The upper part of rim C′ is rabbeted to receive the lower part of the fixed fire-pot B, so that the lower part of B will be lower than the top of rim C, and within the rabbet.

E is the shaking and rising and falling grate, of which Fig. 3 shows the top view. This grate has radiating arms *e e*, projecting outside of the outer diameter of the grate proper, upon which are upwardly-projecting lugs *e′ e′*, that act as guides to the grate in its perpendicular movements, and insure a sure centering of the grate with relation to basket C.

F is a transverse rock-shaft, working in bearings in the outer jacket A, having two eccentrics, *f f*, projecting upward from the shaft F, and adapted to bear upon the under side of grate E, to hold it up to or near the bottom of the shaking basket-grate C.

At one end of one of the arms *e* of the grate E is a projection, *e′*, that extends to, or nearly to, the inside of jacket A, to receive the slotted and pivoted vibrating lever G, which is pivoted to stud G′, that is secured to the inside of jacket A vertically over the projection *e′*. The upper end of lever G is also slotted, to receive in the slot-stud *g*, that is secured to and projects outwardly from the upper part or rim C′ of the grated part of the fire-pot C. Stud *g* projects outward and through a horizontal slot in the jacket A far enough for a wrench or shaker handle, *g′*, to engage it; and by a horizontal reciprocation of the projecting arm *g*, the grated part C of the fire-pot will be correspondingly rotated back and forth; and, lever G being pivoted and fixed to the outer jacket of the stove, midway between projecting arms *e′* and *g*, the grate E will be made to rotate in the opposite direction the same distance that the grated part of the fire-pot rotates in the other, which gives to the contents on the grate double the agitation by the same movement that is given to the grate only.

H is a central hollow upwardly-rising cone from the grate E, to which it is permanently attached, and moves with the grate, and rises to, or nearly to, the top of the fire-pot B. It is perforated with numerous holes, *h*, to admit air to pass from the open center H′ of the cone

to supply oxygen to the fine culm being burned around the cone.

h' h' are outwardly-projecting ribs, that commence near the top of the cone, and extend to, or near to, the base on either side of the rows of holes *h*. These outwardly-projecting ribs will take hold of the fine impacted culm when the grate is shaken, and cause a general agitation of all the comminuted culm next the cone, and allow a greater freedom of air to penetrate the mass than has heretofore been practiced.

c'' c'' are projecting ribs, that project inwardly from each bar that forms the grated part of the fire-basket, and are for the same purpose as the ribs on the cone, and will agitate and break up the impacted culm that is next to the outside of the mass, and thereby cause the ash and cinders, if any adhere, to drop down through the openings *c'* into the ash-pit X beneath, and at the same time allow a greater amount of air to be circulated within the burning mass. If more air is necessary to insure combustion than is supplied by the ordinary pressure of the atmosphere, it can be forced into the hollow cone at the base by any convenient means.

The cone H may be constructed with an outwardly-flaring base; or it may be simply a cone; or a part of its height may have parallel sides; or the base may be formed as shown by dotted lines in Fig. 2.

If at any time clinkers form on the grate and cannot be discharged by the ordinary shaking of the grate and basket, the wrench *g'* is placed upon the end *f'* of rock-shaft F, that projects through the jacket A, and by turning the shaft and therewith the eccentrics *f* over, as seen in Fig. 1 in dotted lines, the grate will fall, and by so doing will leave a space between it and the bottom of the grated fire-pot large enough to insert a poker and break up any clinkers too large to go through the open spaces between the grate-bars, and cause their discharge into the ash-pit. Sometimes it may be necessary to force the grate E down, by reason of its being cemented by clinkers to the lower part of fire-pot C. To overcome such difficulty, a link or chain, I, or other equivalent device, is attached at its upper end to a hook, *i*, in the grate E, and at its lower end to a hook, *i'*, in the eccentrics *f*, so that when the eccentrics are turned over it will force the grate to be drawn down, thus breaking up any cementation by which the grate is prevented from falling down by its own weight when the eccentrics are turned over.

Any exterior construction of stove that my improvement can be inserted in will answer, as the culm is placed or fed into the common magazine J by any convenient or well-known method.

I am aware of Patent No. 151,212, dated May 26, 1874, and do not claim what is described and shown therein, as my grated section to the fire-pot is differently constructed and for a different purpose.

Having thus described my invention, what I claim is—

1. In a stove adapted to burn culm, the combination of the fixed and imperforate part B and the vertically and closely-grated and partially-rotating part C, the bars of which are separated from each other to admit air to the burning mass within, the two parts forming the fire-pot of the stove, as described.

2. The combination of the partially-rotating and grated section C of the fire-pot with the partially-rotating grate E, adapted to be simultaneously moved in opposite directions by the means substantially as described, and for the purpose set forth.

3. In combination with the partially-rotating section C of the fire-pot of a stove, the upwardly-projecting centering lugs *e* on grate E, as and for the purposes described.

4. The combination of the partially-rotating grate E with the hollow perforated central cone H, having the ribs *h'*, substantially as and for the purposes described.

5. The combination of the inwardly-projecting ribs *c''* on bars *c* of a partially-rotating grated-section, C, of the fire-pot with the partially-rotating hollow perforated and ribbed cone H, as and for the purposes described.

6. The combination of the partially-rotating grate E, having the perforated and ribbed cone H thereon, with the eccentrics *f f* on rock-shaft F, substantially as and for the purposes described.

7. The combination of the partially-rotating grate E, having the perforated and ribbed cone H thereon, eccentrics *f f*, rock-shaft F, and links I, as and for the purposes described.

ANDREW NICOL.

Witnesses:
NEWTON CRAWFORD,
F. H. SCHOTT.