No. 833,807. PATENTED OCT. 23, 1906.

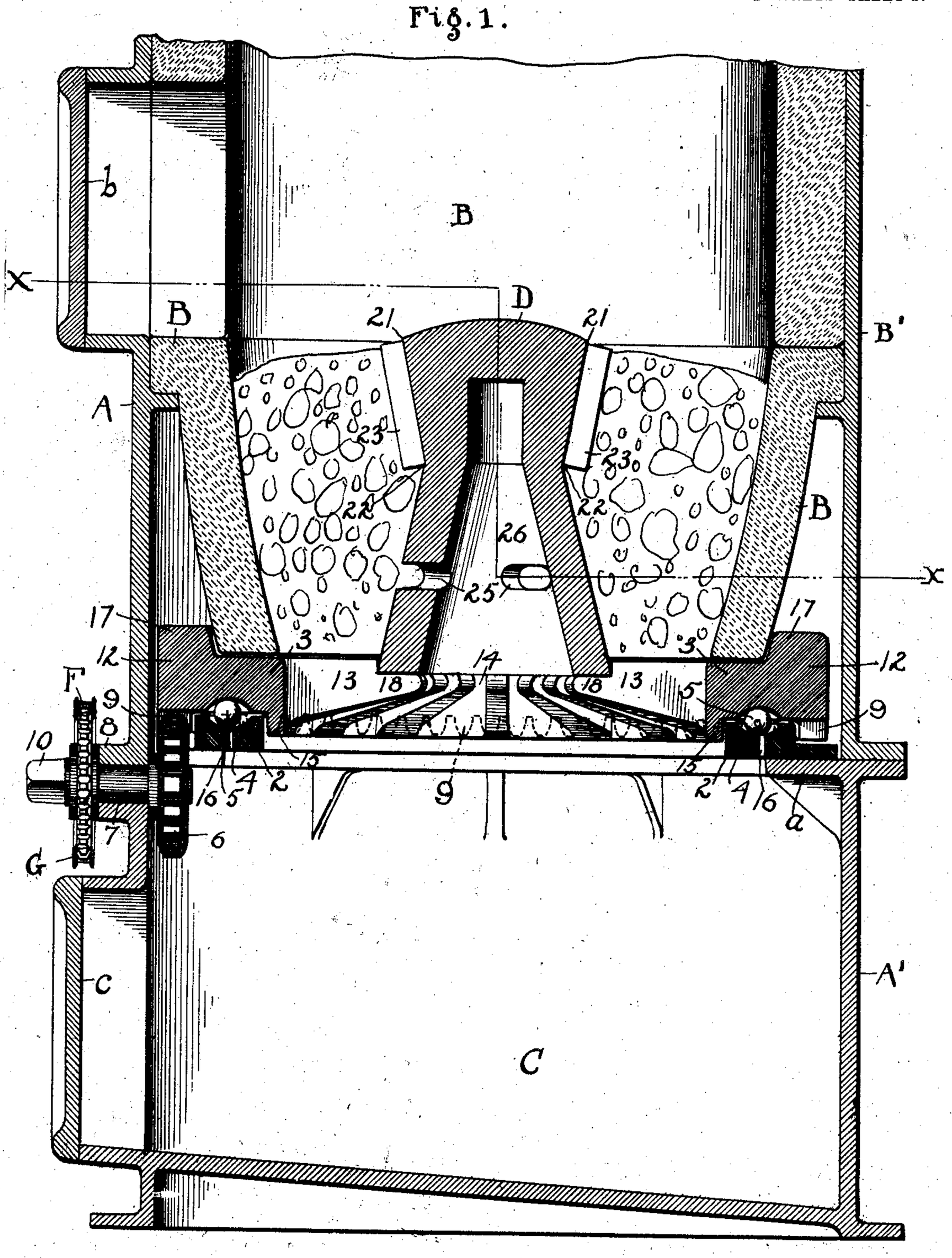
S. G. TIBBS & J. A. & W. E. COREY.

FURNACE GRATE.

APPLICATION FILED OCT. 9, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



ATTEST.

A. M. Moser.

R. B. Moser

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2 SHEETS—SHEET 2.

Fig. 2.

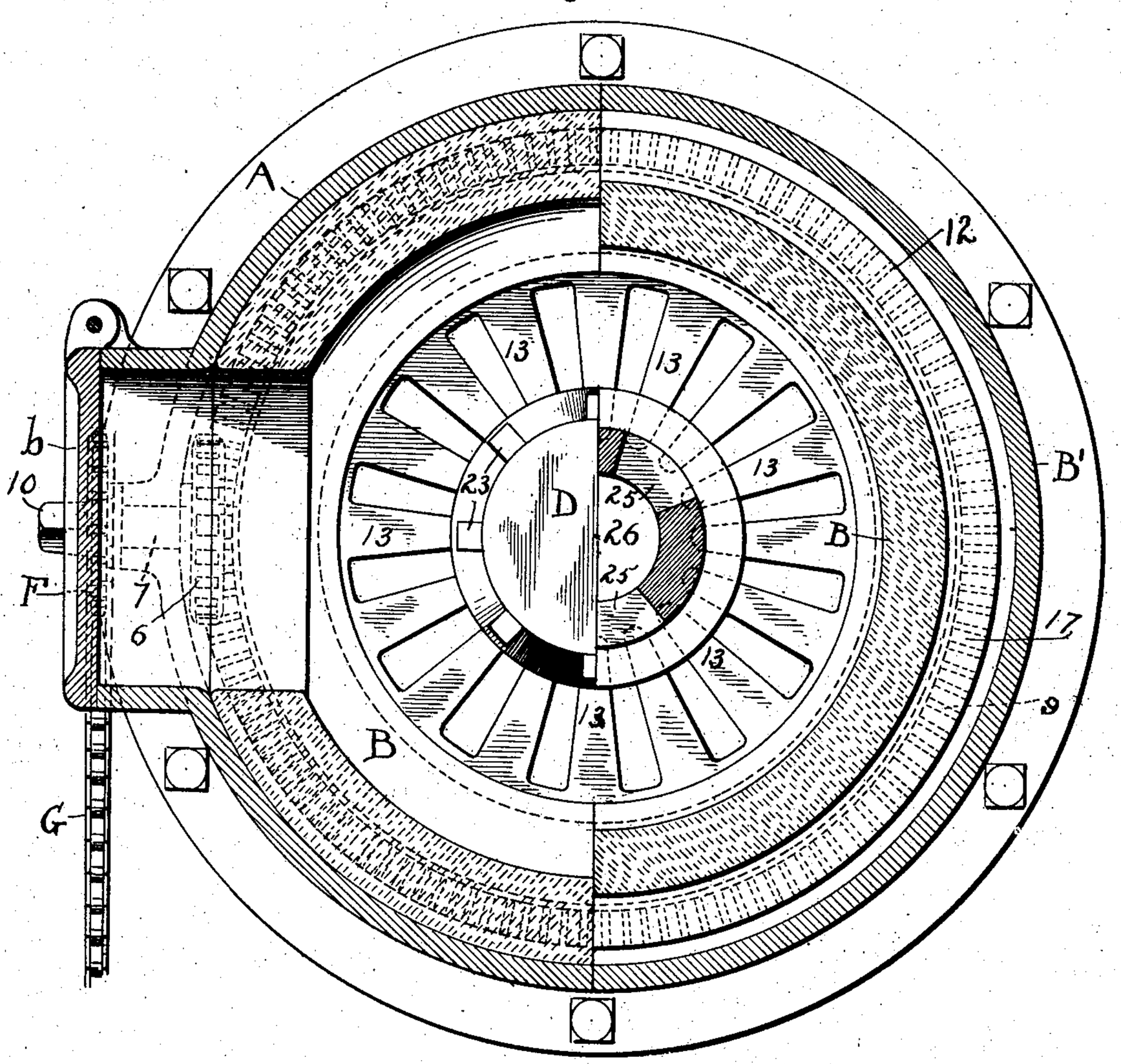
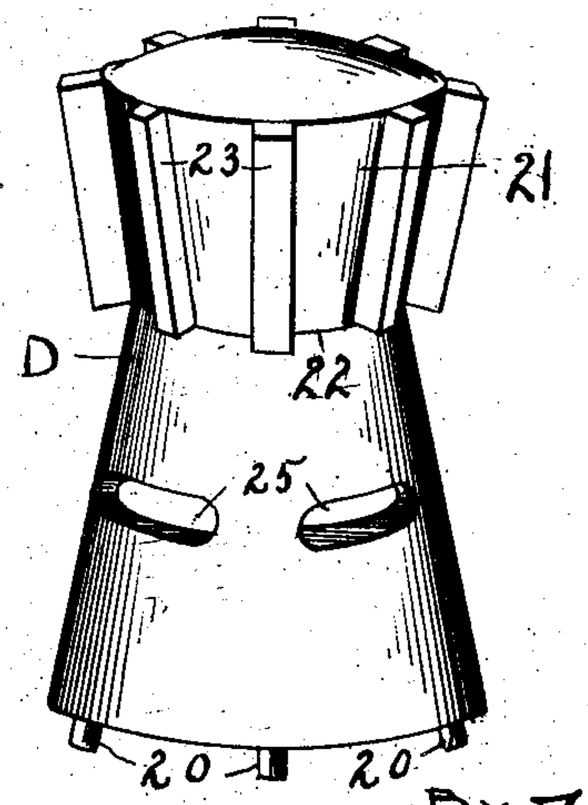


Fig. 3.



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UNITED STATES PATENT OFFICE.

SMITH G. TIBBS, JAMES A. COREY, AND WILLIAM E. COREY, OF AKRON, OHIO.

FURNACE-GRATE.

No. 833,807. Specification of Letters Patent. Patented Oct. 23, 1906.

Application filed October 9, 1905. Serial No. 281,910.

To all whom it may concern:

Be it known that we, SMITH G. TIBBS, JAMES A. COREY, and WILLIAM E. COREY, citizens of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Furnace-Grates; and we do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in grates for furnaces and stoves; and the improvement consists in the construction and arrangement of parts adapted to provide uniform firing and an equal distribution of heat within the fire-pot, all substantially as hereinafter shown, and more particularly pointed out in the claims.

Our object is embodied in a rotary grate and a centrally-located member therein adapted to displace the coal within the center portion of the fire-pot and whereby a uniform fire is obtained about the entire circular wall of the pot.

In the accompanying drawings, Figure 1 is a central sectional elevation of our improved grate and its related parts as seen in one form of stove or furnace. Fig. 2 is a cross-section on line *x x*, Fig. 1; and Fig. 3 is a perspective view of the coal-displacement member alone.

It will be understood that our device is adapted for various forms of furnaces and stoves, only one form of which is shown. Thus the furnace comprises a casing or body A, provided with the usual fire-pot B and ash-pit C and doors *b* and *c*, respectively, therefor. Casing or body A may be made in one or more parts, but as here shown has an ash-pit section A′, adapted to support fire-pot section B′, the upper smoke-flue portion of which is broken away and not shown, as the same may be of any well-known type.

Section A′ is provided with an inturned flange or projection *a*, upon which the lower supporting-ring 2 for grate member 3 is supported. Any other suitable support for ring 2 may be employed or the ring may be bolted directly to the wall of casing A. Ring 2 has a circular or endless race 4 for balls or rollers 5, upon which grate member 3 is adapted to rest and whereby ease and freedom of rotation for the grate member is obtained. Rotation to member 3 is imparted by pinion 6, mounted on a short shaft 7, having bearing in boss 8 of casing A, which pinion meshes with a circular gear or rack 9, the teeth of which are preferably cast integral with member 3 at its bottom and edge. A suitable crank-handle engagement is made with squared end 10 of shaft 7 to either rotate said shaft continuously or to rock the same, and thereby impart like movement to grate member 3.

Grate member 3 comprises as its main portion a ring-like body 12, having integral fingers or grate-bars 13 radiating therefrom toward the center and terminating short thereof to provide a central opening 14. A flange 15 overlaps the joint between ring 2 and body 12 to exclude cinders and ashes from race 4, although said race has through-openings 16 at its bottom which permit any and all accumulations to escape to the ash-pit. An upper flange 17 on member 3 is also provided about the lower edge of fire-pot B to prevent the escape of coal and ashes at this point.

Having described the main parts of the grate, we now come to the essential element which contributes the most to the advantages and benefits derived by our device and which comprises a hollow pillar member D, of cone shape, adapted to rest upon the inner ends or reduced projections 18 of grate-bars 13 and removable therefrom, but seated so closely thereon that it rotates with grate member 3. Short lugs or interlocking extensions 20, such as shown in Fig. 3, may be provided at the bottom of pillar member D to engage between the ends of the grate-bars 13 and cause common rotation of said parts.

Pillar member D is preferably of such height as to bring its top about on a level with the bottom of the fire-door *b* or to the level of the bed of coal usually placed within pot B, and said top portion is rounded and has flaring sides 21, widest at its top and meeting the contracted portion 22 of the pillar just above its center between its ends. A series of spaced ribs 23, running axially of the pillar the full length of flaring sides 21 serve to break up the coal at the top of the bed when grate 3 and pillar D are rotated. These ribs may be made shorter or longer, or equivalent projections or fingers may be placed upon the side of the cone, although

the form shown is deemed best, because the natural dropping of the coal toward the grate during combustion is not impeded, the ribs being vertically inclined with their bottom ends nearer to the center of the pot than the top. A series of openings 25 about the cone-body of the pillar communicates with its hollow interior 26 and provides for a supply of air for the bed of coal above the grate-bars in order to promote better combustion.

Other air-openings may be made higher up if the nature of the coal so requires, or the form and shape of the openings may be different from that shown.

Pillar member D is particularly well adapted for any coal stove or furnace such as are in daily use, and with its use a certain amount of coal within the center of the fire-pot is displaced and saved. The fire being compelled to follow the ring of coal about the center pillar or cone-displacement member and against the wall of the fire-pot, the heat generated is concentrated at the sides of the pot, where it is most desired for quick radiation, and not in the center of the bed of coal, as formerly.

With a stove of a given size using our device a great saving of fuel is effected as compared with one without, and although the quantity of fuel is lessened in use a greater heating effect is obtained than heretofore. Perfect combustion and the disposition of the bed of fuel and the mixing thereof by the means heretofore described all contribute to give the advantages stated.

Shaft 7 has a sprocket or gear wheel F attached thereto at the outside of casing-boss 8, which is adapted to be operated by chain G or equivalent gear connection, which chain may extend to any point for distant manipulation of the grate. For example, said chain may be operated from the upper floor of the dwelling if the furnace is located in the basement.

What we claim is—

1. In stoves and furnaces, a fire-pot tapering inwardly and downwardly, a main grate member rotatable at the bottom thereof, a hollow coal-displacing pillar supported centrally upon said grate and having inclined coal-breaking projections upon its sides near its top substantially parallel to the taper of the fire-pot, said pillar having an air-outlet at about its middle portion.

2. In stoves and furnaces, a rotatable grate, in combination with a hollow upright member mounted thereon, said member having a plain upwardly-tapered body circular in cross-section with air-outlets at about its middle portion and an outwardly-flaring head with inwardly-inclined ribs from the top to the bottom of said head, and a fire-pot having its wall converging toward the bottom and substantially parallel to the edges of said ribs.

3. As an article of manufacture and sale, a supplemental grate member for stoves and furnaces adapted to displace the center portion of the bed of coal within the stove or furnace, said member having a cylindrical hollow body with an air-opening at its side and closed above and below said opening, and provided with an integral outer flaring head having vertically-disposed ribs about its outside inclined inward from top to bottom.

In testimony whereof we sign this specification in the presence of two witnesses.

SMITH G. TIBBS.
JAMES A. COREY.
WILLIAM E. COREY.

Witnesses:
WM. WELLS,
J. I. BACHTEL.