

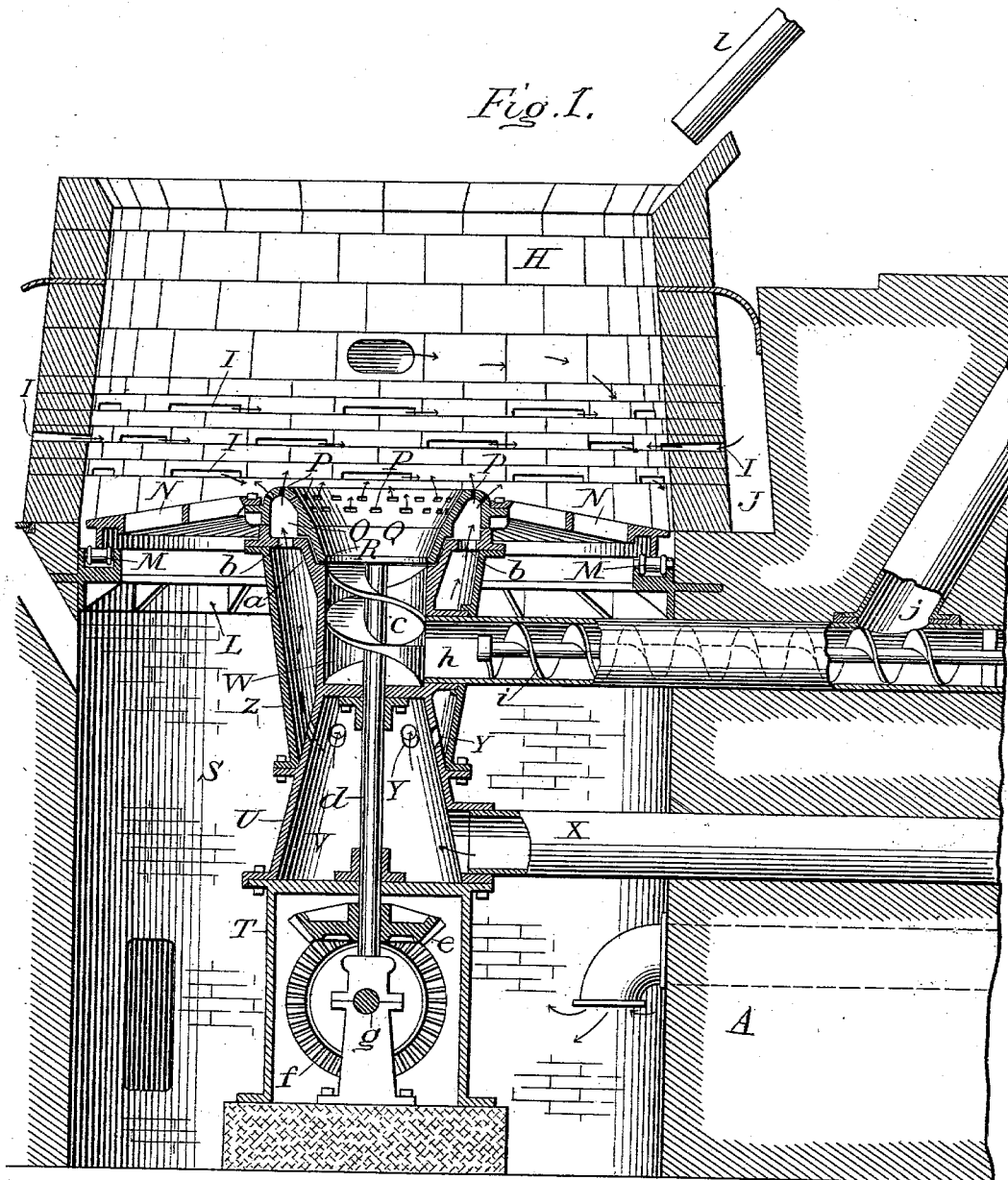
No. 717,634.

PATENTED JAN. 6, 1903.

I. D. SMEAD.
HEATING APPARATUS.
APPLICATION FILED JULY 1, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

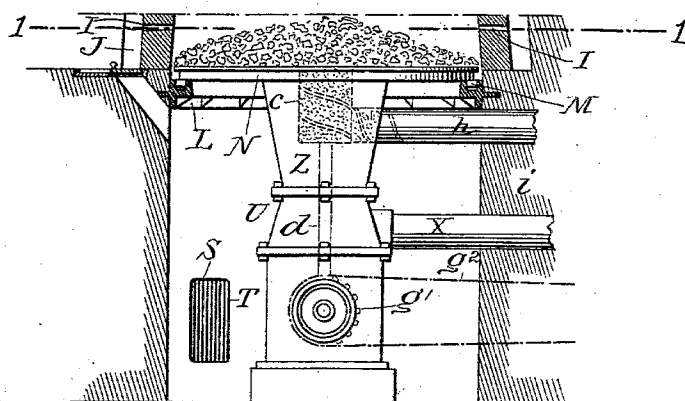
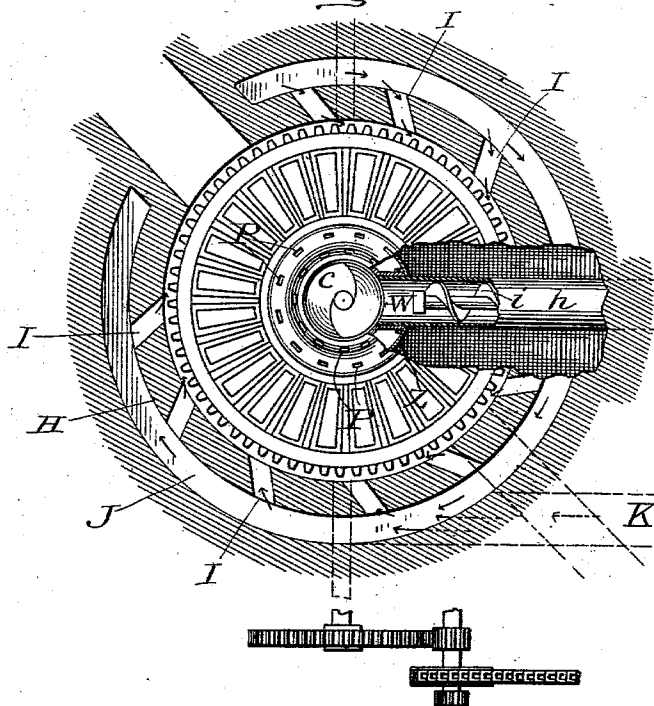


Fig. 3.



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UNITED STATES PATENT OFFICE.

ISAAC D. SMEAD, OF CINCINNATI, OHIO.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 717,634, dated January 6, 1903.

Original application filed July 29, 1901, Serial No. 70,137. Divided and this application filed July 1, 1902. Serial No. 113,937. (No model.)

To all whom it may concern:

Be it known that I, ISAAC D. SMEAD, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification.

My present invention pertains to improvements in heating apparatus, the construction and advantages of which will be hereinafter set forth, reference being had to the annexed drawings, wherein—

Figure 1 is a vertical sectional view of the apparatus; Fig. 2, a similar view of the fire-chamber, the grate, and portions of the fuel-feeding mechanism; and Fig. 3, a horizontal sectional view on the line 1 1 of Fig. 2.

The object of the present invention is to provide a superior grate for a furnace designed more especially for use in connection with hot-water heaters or steam-generators.

Referring to the drawings, A denotes the base or foundation, surmounted by a combustion-chamber H. The wall of said chamber in its lower part is pierced by a series of tangential inlets I, communicating with a passage or channel J, formed in the foundation or wall of the furnace. A pipe K, Fig. 3, leads from a suitable fan or blower to said channel J. Supported by and extending out from the wall of the foundation is a bracket or shelf L, carrying rollers M, which in turn form the support for the outer edge of a circular rotating grate N. The central portion of the grate is formed by a collar or ring-shaped member having a channel or groove O formed in its under surface, said channel communicating with a series of openings P. The central opening Q in the collar converges gradually toward the bottom thereof, the walls of the skirt R being practically vertical.

As will be seen upon reference to Fig. 2, the center of the grate is highest, the grate or grate-bars inclining downwardly therefrom toward the edge or periphery of the grate.

The space S within the foundation below the grate is termed the "ash or cinder chamber," and it is within this chamber that the main operative portions of the fuel-feeding devices are located.

T designates a box or housing surmounted

by a shell or casing U, having two chambers V and W formed therein. A pipe or conduit X, connected to a blower or fan, leads into the chamber V, and any air passing into said chamber finds its way through the opening Y into a sleeve Z, which surrounds the upper portion of the casing U. The upper end *a* of the casing is extended out horizontally beneath the central member of the grate, and in such extension are formed openings *b*, so that the air may pass from the chamber formed intermediate the sleeve or collar Z and the shell or casing U into the channel O and out through the openings P.

The chamber W is made cylindrical, and in it is mounted a screw *c*, its shaft extending down through chamber V into the box or casing T. There it is provided with a bevel-gear *e*, which meshes with a similar gear *f*, carried by a shaft *g*, said shaft *g* passing out to one side of the box or casing T, where it is provided with a sprocket *g'*. A sprocket-chain *g''* passes about said sprocket-wheel and through an opening formed in the base of the furnace to a suitable source of power.

A pipe or conduit *h* opens into the lower part of the chamber W, and in said pipe is located a feed-screw *i*, motion being imparted to said screw by means of suitable gearing.

A supply or delivery pipe *j* extends from a bin or hopper to the conduit *h*, the point of communication being at or near the outer end of the screw. A second pipe or conduit *l* leads from the bin and discharges directly onto the grate. This may be used in case of emergency.

As will be noted upon reference to Fig. 2, the cylindrical chamber W and its feed-screw are somewhat larger in cross-section than the lateral conduit *h* and its feed-screw. By this construction and by proper regulation of the speed at which the screws are rotated the proper amount of coal can be fed up to the grate at all times, and this without clogging the upright screw.

Suitable gearing *p*, Fig. 3, is employed for imparting rotary movement to the grate, which movement serves to distribute the coal evenly over the grate-surface and also keep the grate free from accumulation of ashes, clinker, and the like.

In the operation of the furnace the coal passing down through the conduit *j* into the conduit *h* is fed along by the screw *i* and passing into the chamber *W* is elevated by the screw *c*, the coal passing up through the central collar of the grate and flowing over onto the grate or grate-bars proper. When combustion is once started, it is properly maintained by the introduction of air through the openings in the collar and also by the introduction of air through the openings *I*, as well as up through the grate from the ash-pit, air under pressure being admitted to the ash-pit through a pipe *X'* or in any other suitable manner. The openings *I*, as formerly noted, are arranged tangentially, so that the air has a vertical or whirling movement within the fire-chamber.

By proper regulation of the air which is forced in through the various openings, all of which are under the control of the attendant, the fire may be regulated to a nicety (by dampers or the like, arranged outside of the furnace structure proper) and perfect combustion thereby secured. The rotation of the grate in one direction and the introduction of the air through the tangential openings *I* in a counter direction tend to more thoroughly commingle the heated air and the gases emanating from the coal.

When a fresh charge of fuel is forced up through the central opening in the grate, a sufficient quantity of air may be forced up through the collar to properly consume all the gases arising from the fresh fuel.

It will be noted that the actuating mechanism for the vertical feed-screw is located wholly within the ash-pit and is incased, so as to be protected from the ashes and cinders.

This case is a division of my application

Serial No. 70,137, upon which Letters Patent No. 707,364 were granted to me under date of August 19, 1902.

Having thus described my invention, what I claim is—

1. In a furnace, the combination of a rotary grate having air-passages formed centrally thereof; means for rotating said grate; means for supplying air to said passages; and means for forcing air in above the grate in a direction in opposition to the rotation of the grate.

2. In a furnace, the combination of a rotary grate having a central opening; means for feeding fuel to the grate through said opening; means for forcing air into the combustion-chamber above the fuel resting on the grate in a direction in opposition to the rotation of the grate; means for forcing air through said grate from below; and means for supplying air around the central opening of the grate; substantially as and for the purpose described.

3. In a furnace, the combination of a rotary grate having a central collar with air-passages formed therein; means for feeding fuel through said collar; means for forcing air through the passages in said collar; means for forcing air in above the grate in a direction in opposition to the rotation of the grate; and means for forcing air through the grate from below, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ISAAC D. SMEAD.

Witnesses:

BURTON A. SMEAD,
ANTHONY KUEFER.