(No Model.) 2 Sheets—Sheet 1.

A. RAHNER.

BOILER FURNACE.

No. 595,339. Patented Dec. 14, 1897.

Fig. 1.

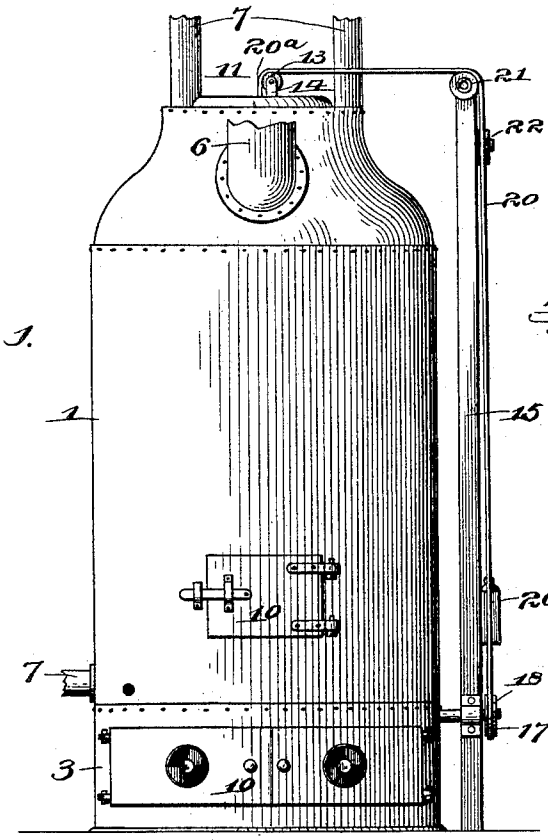


Fig. 3.

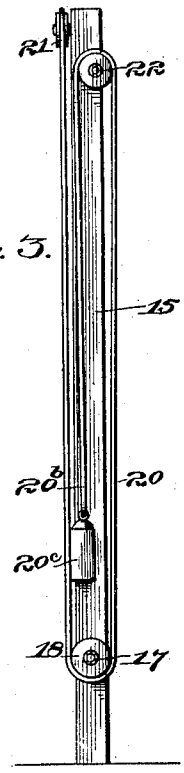
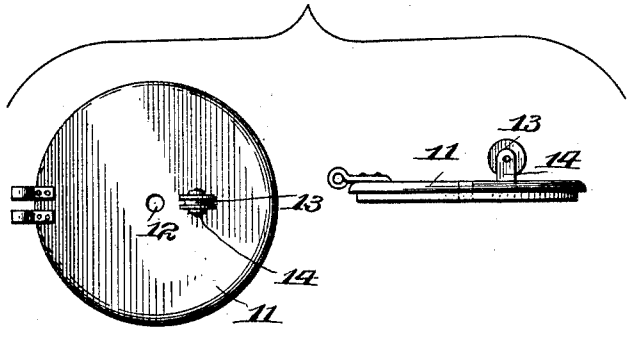


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

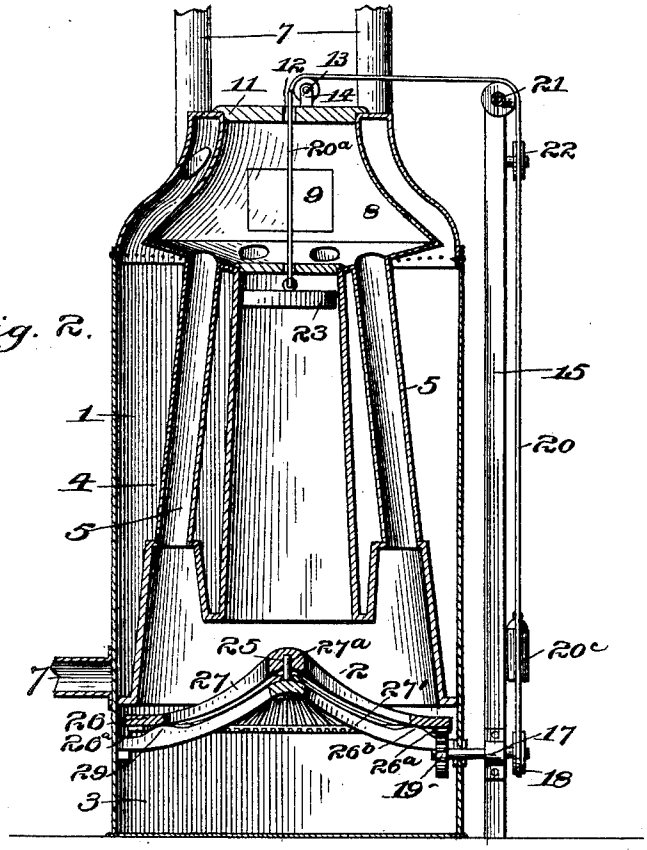


Fig. 5.

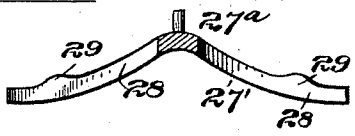
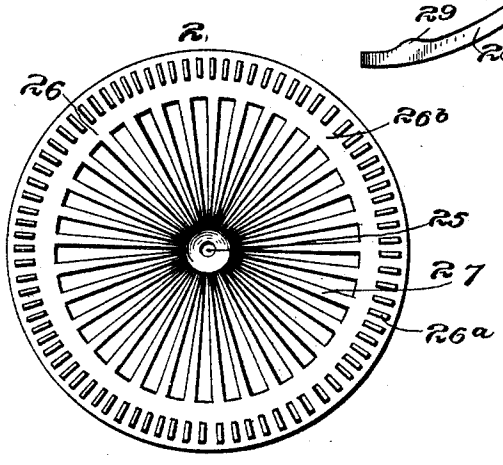


Fig. 6.



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UNITED STATES PATENT OFFICE.

AUGUST RAHNER, OF VILLISCA, IOWA.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 595,339, dated December 14, 1897.

Application filed July 3, 1897. Serial No. 643,415. (No model.)

To all whom it may concern:

Be it known that I, AUGUST RAHNER, a citizen of the United States, residing at Villisca, in the county of Montgomery and State of Iowa, have invented certain new and useful Improvements in Boiler-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to steam-boiler furnaces, and has for its object the production of improved mechanism for automatically feeding the coal to the grate thereof and to provide improved mechanism for rotating the grate in order that the ashes and cinders thereon will be deposited in the ash-pit and the coals on the grate kept in a live state.

To this end my invention consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter more fully described, and specifically set forth in the appended claims.

In the accompanying drawings, Figure 1 is a front elevational view of a boiler-furnace constructed in accordance with my invention. Fig. 2 is a central vertical sectional view thereof. Fig. 3 is an elevational view showing the construction of the feed mechanism for forcing the coal to the furnace-grate. Fig. 4 shows a plan and a side or edge view, respectively, of the boiler coffer-plate. Fig. 5 is a cross-sectional view of the grate-support, and Fig. 6 a bottom plan view of the grate.

Similar numerals of reference designate corresponding parts in the several views.

Referring to the drawings, the numeral 1 designates the boiler-furnace; 2, the grate; 3, the ash-pit; 4, the water-tubes; 5, the flues, and 6 the smoke-stack thereof.

7 designates the flow-pipes, and 8 a coal-magazine formed by the surrounding walls at the center of the furnace. Above said magazine the interior walls of the furnace flare outwardly and form a coffer or space for the circulation of the heated gases and products of combustion before the same pass out of the smoke-stack. The furnace is provided at the rear adjoining the said coffer-space with the door 9 for supply of coal into the magazine and at the furnace with a door 10 for removal of the debris from the ash-pit.

The top of the furnace is closed by a flanged coffer-plate 11, provided with an opening 12 and a pulley 13, journaled between two ears 14 thereon. A standard 15 extends alongside the boiler on the exterior and has a cross-shaft 17 journaled therein near its lower end, said shaft being provided at one end with a pulley and pinion 18 and 18^a, respectively, and at the other end thereof with a gear-wheel 19. This latter end of the said shaft projects through the ash-pit wall of the furnace, and the gear-wheel carried thereby is adapted to rotate the grate, as hereinafter described. A chain or cord 20 passes around the said pulley 18 on the cross-shaft and also around pulleys 21 22, adjoining the upper end of the said standard, and one end 20^a of said chain or rope passes over the said pulley 13 on the coffer-plate 11 and through the opening 12 therein into the coal-magazine of the furnace and has attached thereto a weight 23, adapted to press down upon the bed of coal therein and press the same down upon the grate 2. The opposite end 20^b of the cord or chain carries a counterbalancing-weight 20^c, which holds said cord or rope in proper position and prevents the weight 23 from contacting or crowding the coal down upon the grate.

The grate 2 is cone-shaped and provided at its apex with an opening 25 and with a broad base or rim 26. A series of parallel-faced grate-bars 27 connect the said apex and rim, and the rim is provided on the under side thereof with gear-teeth 26^a and a smooth space 26^b, adjoining said teeth. This grate rests upon a support consisting of a standard 27′, formed with a pivot projection 27^a and a series of downwardly-inclined arms 28, projecting therefrom and resting upon the side walls of the ash-box, said arms being provided with bearing lugs or projections 29. The grate 2 is pivotally mounted upon said support by means of its opening 25, which fits upon the pivot projection 27^a of said support, and the smooth face 26^b of the grate-rim 26 rests upon the bearing lugs or projections 29 of the support. The gear-wheel 19 on the cross-shaft of the standard meshes with the teeth 26^a on the rim of the grate and is adapted to revolve the same on its axis or pivot 27^a.

In operation as the coal on the grate is gradually consumed the weight 23 descends

and forces a fresh supply of coal from the magazine onto the grate, thereby causing the cord or chain connected therewith to move correspondingly and revolve the cross-shaft to which the gear-wheel 19 is connected, and thus the revolution of the grate is effected by the descent of the weight, and the grate-surface is always kept clear of clinkers and ashes and at the same time supplied with fresh coal.

By this construction and arrangements of parts the fresh coal is supplied to the grate as fast as the coal on the latter is consumed. When the coal in the magazine is entirely used, the follower or weight 23 may be lifted out and the magazine readily replenished.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In boiler-furnaces, the combination of a furnace having a grate and a coal-magazine above said grate, a follower to press the said coal down upon the grate, and means actuated by the said follower for moving the grate and clearing the same of clinkers and ashes, substantially as described.

2. In boiler-furnaces, the combination of a furnace having a grate, a coal-magazine above the same, and a door for supply of coal to said magazine, a follower in the magazine to press the coal down upon the grate, and mechanism actuated by the said follower to cause the rotation of the grate, substantially as described.

3. In boiler-furnaces, the combination of a furnace having a grate and a coal-magazine above the same, a standard alongside the exterior wall of the furnace, a follower within the coal-magazine and adapted to press the coal down upon the grate, means for effecting the rotation of the grate, and a chain or rope passing around pulleys on the said standard and having one end connected with the said follower and the other end thereof adapted to operate the said grate-rotating mechanism, substantially as described.

4. In boiler-furnaces, the combination of a furnace provided with a coal-magazine and a grate below the same, a coffer closing the top of the furnace and provided with an opening, a standard on the exterior side of the furnace, a follower within the coal-magazine to press the coal down upon the grate, a connection between the said standard and the grate for effecting the rotation of the latter, and a chain or cord having one end passed through the said opening in the coffer and connected with the said follower, and the other end thereof passing around pulleys on the said standard and provided with a counterbalancing-weight adapted to effect the operation of the said grate-rotating mechanism, substantially as described.

5. In boiler-furnaces, the combination of the furnace provided with a coal-magazine and a door for replenishing the same, a coffer-plate closing the opening to the furnace above said magazine and provided with an opening, a grate-support in the ash-box provided with a pivot, a cone-shaped grate formed with an opening at the apex thereof by which it is mounted on said pivot and having a base or rim formed with gear-teeth, a standard extending alongside of the furnace and provided with a cross-shaft projecting through the furnace-wall and having a gear meshing with the teeth on the grate-rim, a weighted follower within the coal-magazine and adapted to press the coal down upon the grate, and a cord or chain passed through the said opening in the coffer-plate and having one end connected with said follower and the other end thereof passed over pulleys on the said standard and connected with the said cross-shaft, whereby a given coal-forcing movement on the part of the follower will effect a corresponding rotating movement of the grate, substantially as described.

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

AUGUST RAHNER.

Witnesses:
J. A. PULVER,
W. J. OVIATT.