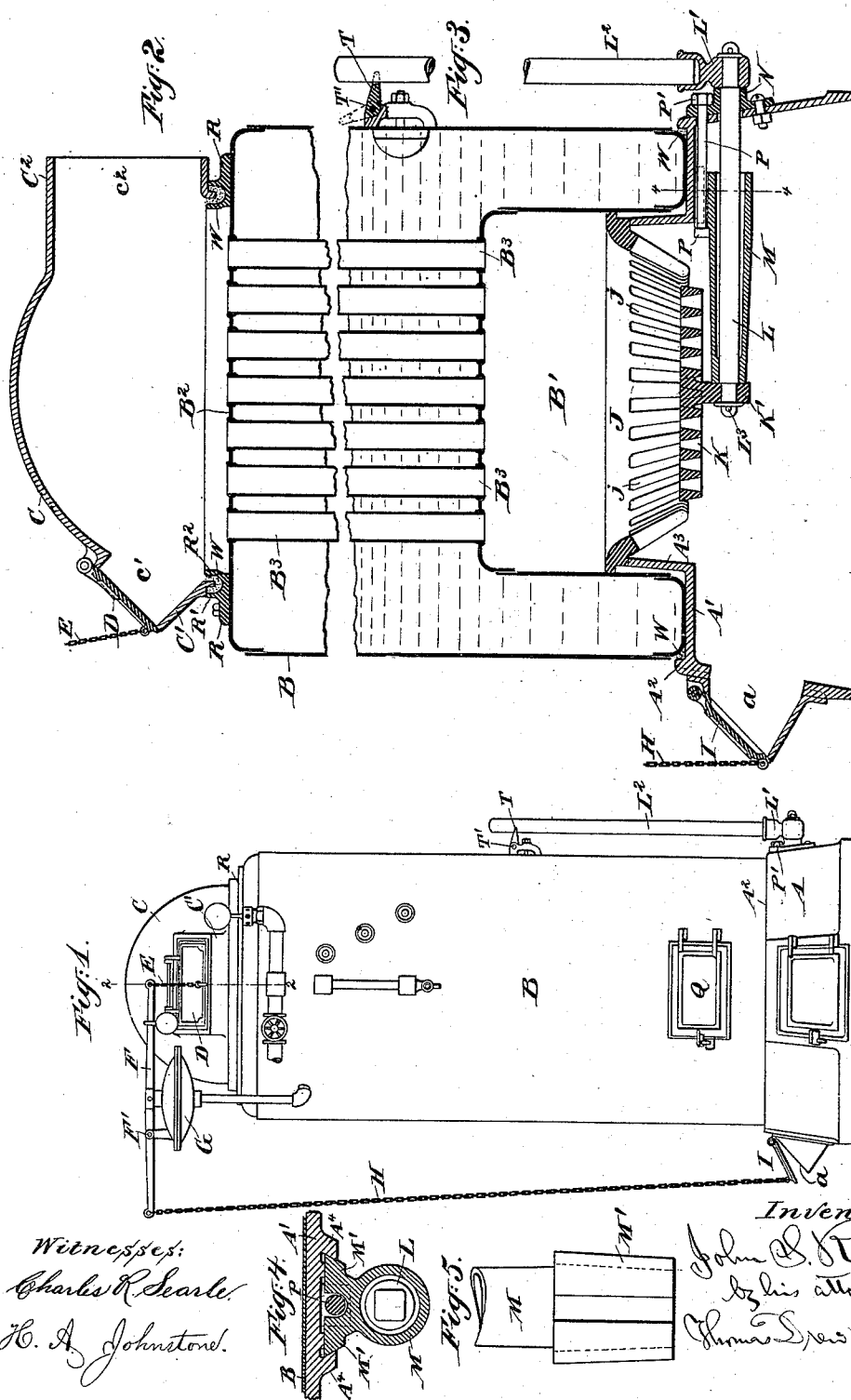


(No Model.)

J. S. ROAKE.
GRATE.

No. 573,164.

Patented Dec. 15, 1896.



THE MORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN S. ROAKE, OF BROOKLYN, NEW YORK.

GRATE.

SPECIFICATION forming part of Letters Patent No. 573,164, dated December 15, 1896.

Application filed January 30, 1894. Serial No. 498,431. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. ROAKE, a citizen of the United States, residing in Brooklyn, Kings county, in the State of New York, have invented a certain new and useful Improvement in Grates, of which the following is a specification.

The improved grate may serve for a great variety of purposes, but is more especially adapted for use in connection with steam-boilers in the basements of dwellings or other buildings to generate steam for warming. It will be described as thus used without requiring skilful attendance and without receiving attention of any kind except at intervals.

The fuel is supported in a grate having a removable flat central portion. I provide special means for supporting the central portion and for allowing its removal for repairs or renewal when required, and also special means for shaking such portion and dumping it. I surround the flat portion by a stationary inverted conical rim, which is preferably grated.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a general front elevation of a steam-generator embodying my invention. Fig. 2 is a central vertical section of the upper portion of the same, the view being taken in the plane indicated by the dotted line 2 2, Fig. 1. Fig. 3 is a corresponding section of the lower portion of the generator. Figs. 4 and 5 show certain portions on a larger scale. Fig. 4 is a detail vertical section taken in the plane indicated by the dotted line 4 4 in Fig. 3; Fig. 5, a plan view of a portion of the tubular casting in which the grate-operating shaft is located.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the base-casting, certain portions being designated, when necessary, by super-numerals.

B is the body or exterior shell of a cylindrical upright boiler having an internal furnace B' and a series of tubes B², connecting

the crown-sheet of such furnace with the upper head B². The top casting has a main dome-shaped body C with a liberal opening c' on one side having a coaming C' around it. Another passage c² serves for the exit of the gases through a discharge C². The aperture c' is provided with a hinged cover D, which is operated automatically by a connection E to a "damper-regulator" composed of the weighted lever F and operated by a diaphragm inclosed in the casing G and exposed to the steam-pressure on the under side in the long-approved manner. The opposite arm of the lever F has a connection H, which leads to a hinged cover I, controlling the draft-aperture a, which supplies air to support the combustion.

The casting A is formed with an annular plate A', which receives the bottom of the body B, and with a lip A² on the exterior and a higher lip or rim A³ on the inner edge. On the top of this inner lip or rim A³ rests a grate J, which is the frustum of a cone and contributes to the support of the fuel and to the supply of air thereto through the apertures j thereof in the familiar form of open slots.

K is a flat dumping-grate of circular form, which when in use usually stands with its upper surface horizontal, being loosely inclosed in the bottom of the conical stationary grate J. This circular grate K has a central lug K' on its under face, which receives the squared end of a short socketed arm L', receiving a hand-lever L², extending upward, by which the grate can be strongly rocked to quicken the fire or when required can be tilted to such a degree as to drop the material entirely into the bottom of the ash pit or space within the casting A. The support of this grate K is formed by a tubular casting M, slightly tapered, inclosing the shaft L and forming a bearing therefor near the center of the structure. A dovetail attachment M' at its outer end, cast integral therewith or otherwise firmly fixed to the tubular portion M, is received between correspondingly-inclined cleats A⁴, set a proper distance apart, cast on the under face of the annular portion A'. The inner faces of these cleats are beveled so that they contract in a downward direction, as shown in Fig. 4, to efficiently support the

casting M M'. They also converge in a horizontal direction, their outer ends being nearest together, and the part M' is correspondingly shaped. The outer bearing of the shaft L is formed in a separate piece N, which is bolted on the exterior of the base-piece A in the position shown. P is a bolt traversing a groove in the part M', extending outward through the casting A and the bearing-piece N, and receiving a nut P'. In putting the parts together the casting M M' is introduced through the passage *a* and engaged in the dovetail recess between the cleats A⁴. Then the bolt P is inserted and the nut P' applied and tightened. The shaft L and its arm L' may be introduced from the outer end, and the grate K being held in position receives the inner end of the shaft L, and it is secured by a transverse pin L³. The gravity of the heavy arm L' is liable to dump the grate when such is not desired.

T is a small forked yoke turning on a center-pin T'. It may be turned down into the position shown in strong lines in Fig. 3 and caused to engage with the lever L² and hold it and the connected grate K stationary. When it is turned up into the position shown in dotted lines, it leaves the hand-lever at liberty, and it may be turned at will.

The fire needs little attention except to supply the fuel, which may be done in liberal quantities at long intervals through a door Q. Each change in position of the lever F due to variations in the pressure of the steam will change the position of both the covers D and I, a rise in the pressure causing the cover D to be further opened. The parts may be so adjusted that under all ordinary conditions of working the cover D at the top will be allowed to rest tightly on its seat, and the cover I at the bottom will be held variably open.

In summer, when the apparatus is out of use, the connections E and H to the lever F are unshipped, and the covers D and I are thrown wide open and so held, allowing the air to circulate freely and avoiding the condensation of moisture and consequent rusting in the apparatus.

The aperture *c'* is sufficiently large to serve as a handhold for examination and cleaning of the upper tube-sheet. The moderate draft used in devices of this kind allows ashes and soot to lodge on the horizontal surface, and the material thus accumulated gradually overhangs the tube ends and obstructs the action. On raising the door D to its fullest capacity it is easy to reach in with a brush and remove the whole of the loose material at short intervals.

The junction of the body B with the casting A may be tightened by sand W, which lies on the annular plate A'. The joint between the top C and the upper portion of the body is tightened by sand, similarly marked, applied in the space between two annular rims H' H², formed in the casting R, fitted on the top of the body.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention.

I attach importance to a stout arm constituted by a part of the casting M extending inward to the center from one side. As shown, the central portion K of the grate is supported through the medium of the shaft L, this shaft being capable of turning in the casting M; but in cases where it is not required to shake or dump the grate through such means the support may be more direct. Other means than the cleats A⁴ and dovetail M' may be employed for supporting the casting M. It is only essential that the arm shall be efficiently supported and shall reliably hold up the grate unobstructed at all points save those occupied by this simple arm.

It is not necessary to the success of the rocking portion of the grate K that there shall be a stationary grate J around it. It is sufficient that there shall be an inclosing part to restrain the escape of the fuel laterally when the dumping-grate K is in the horizontal position.

The aperture *a* should be opposite to the casting M and afford facilities for the introduction and removal of this important part of the apparatus. The movable portion K K' of the grate may be introduced and removed through this same aperture, or, preferably, through the ash-pit door, which must be made large enough for that purpose.

I do not in this patent claim the dome C, with its aperture *c'*, coaming C' around such aperture, and cover D, arranged to perform the two functions of aiding to regulate the draft and providing convenient access for cleaning the upper tube-sheet. I propose to make such the subject of a separate application for patent.

I claim as my invention—

1. The shaking and dumping grate K, and a suitable stationary rim to enable it to retain fuel and allow its moderate combustion in combination with a suitable ash-pit and an arm rigidly secured at its outer end to the furnace-base and extending beneath the dumping-grate, together with an operating-shaft parallel with and also supported by said arm and having its inner end connected to the central portion of the grate at its under side, substantially as herein specified.

2. The grate K adapted for rocking bodily as shown, a suitable stationary rim, and the tubular grate-support M and means as the dovetail M', cleats A⁴, embracing the latter, bolt P and nut P', connecting to the support M for holding and releasing it, in combination with each other and with the rocking shaft L, socket L' on such shaft, and handle L² for rocking it, all arranged for joint operation substantially as herein specified.

3. The shaking and dumping grate K and suitable stationary rim, the grate-support M, having an outer dovetailed portion engaging cleats fixed in relation to the base portion, in

combination with each other and with the rocking shaft L, and its operating means, substantially as specified.

4. The shaking and dumping grate K and
5 relatively stationary rim, of a grate-support M, having the outer dovetailed portion, a bolt P, locking dovetailed portion in engagement with cleats, and securing an outer bearing-piece N, in combination with each other and
10 with a rocking shaft and its operating means, the shaft bearing both in said support and piece N, substantially as herein specified.

5. The base-casting A having the horizontal portion forming a bearing for the boiler-
15 body, and provided with the inner lip or rim A³, supporting the stationary grate J, the

shaking and dumping grate K, the grate-support M beneath, and having its outer part secured on the under side of the horizontal portion of the base portion in combination 20 with each other and with an operating-shaft supported by said support and having its inner end connected to the central portion of the grate, substantially as herein specified.

In testimony that I claim the invention 25 above set forth I affix my signature in presence of two witnesses.

JOHN S. ROAKE.

Witnesses:

CHARLES R. SEARLE,
CHAS. D. EVANS.