

(No Model.)

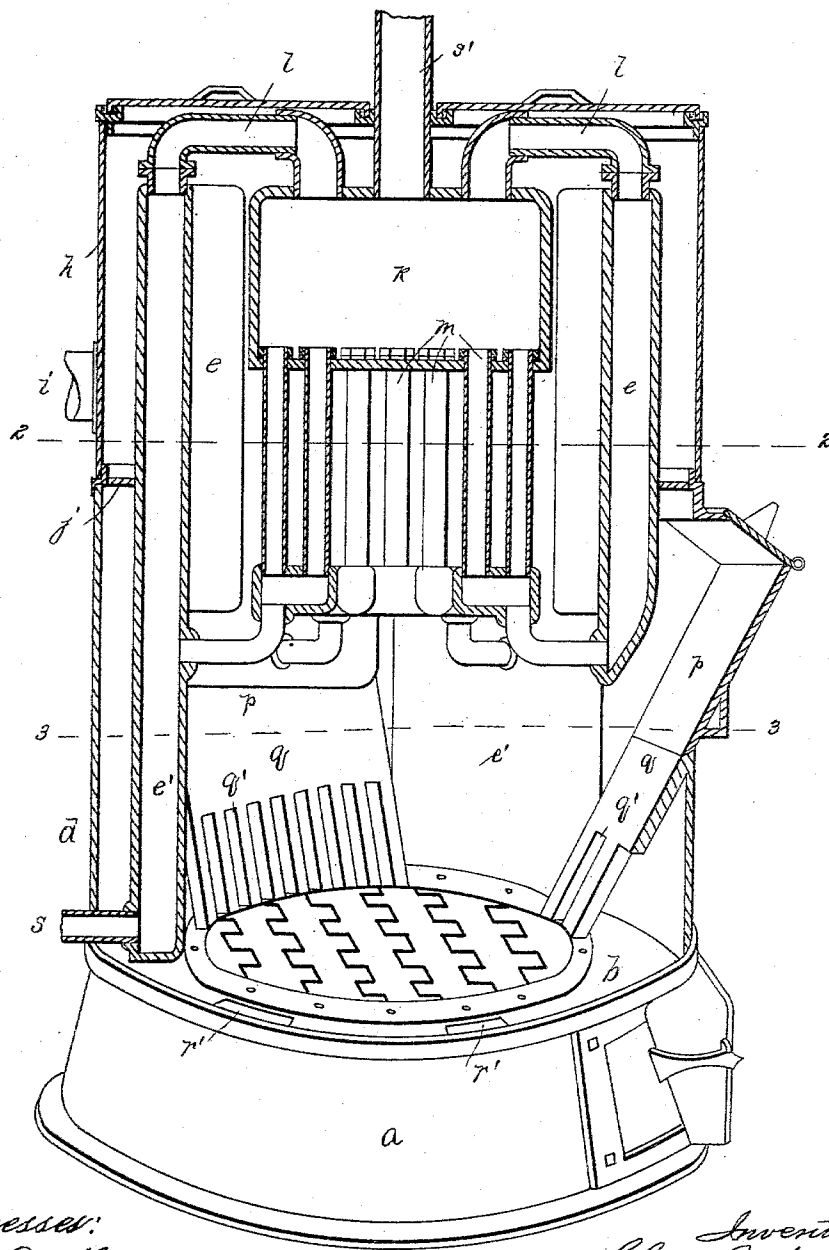
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C. GORTON.
SECTIONAL STEAM BOILER.

No. 571,657.

Patented Nov. 17, 1896.

Fig. 1.



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Fig. 2.

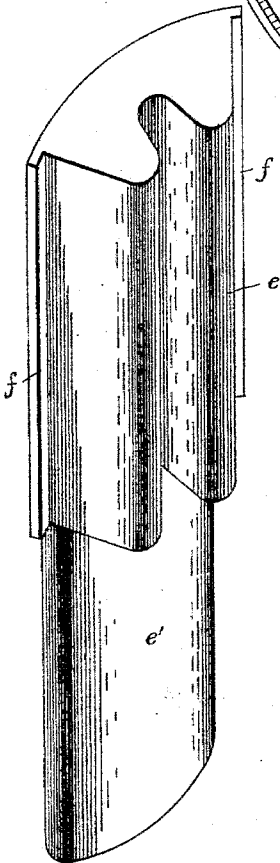
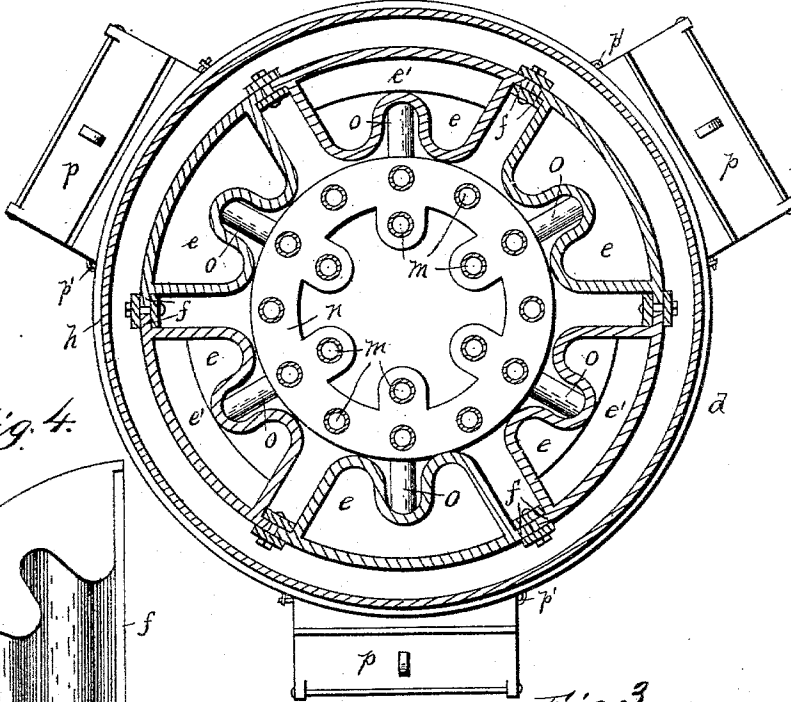
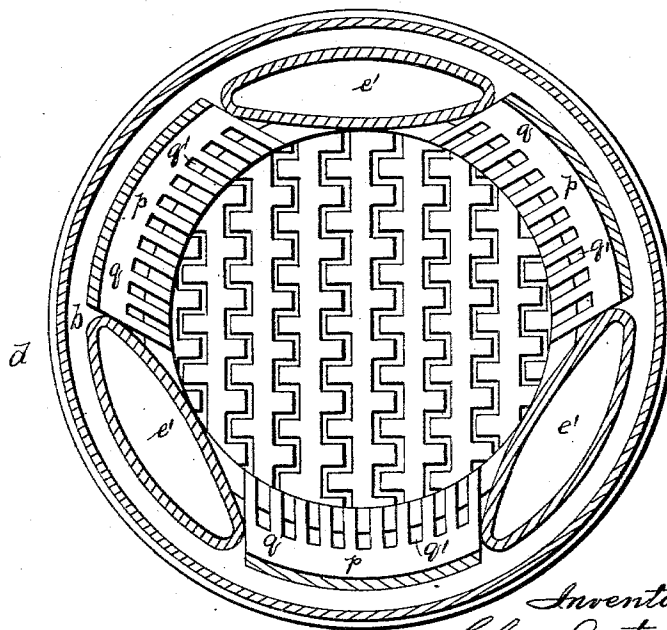


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES GORTON, OF NEW YORK, N. Y.

SECTIONAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 571,657, dated November 17, 1896.

Application filed May 17, 1895. Serial No. 549,674. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GORTON, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Sectional Steam-Boilers; and I do hereby 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in sectional boilers and furnaces.

The object of the invention is to provide an improved upright boiler exceedingly simple and durable in construction and constructed and arranged to feed automatically from the side and to produce approximately perfect combustion, reducing the discharge of smoke to a minimum.

A further object of the invention is to provide an improved construction of boiler provided with side pockets for the fuel, separated by water-legs, so that coking-chambers are thus formed around and opening into the fire-pot, and the fuel slides down into the fire-pot as needed without clogging and without the formation of a crust or arch of coked fuel around the fire-pot, preventing feeding down of the fuel.

A further object of the invention is to provide an improved house-heating boiler wherein a draft is carried or supplied through the coking-chambers, so that perfect combustion ensues.

A further object of the invention is to provide an improved house-heating boiler having side feeding-pockets around the fire-pot opening down into separate coking-chambers sloping into the fire-pot and each having separate air supply.

A further object of the invention is to provide a house-heating boiler with coking-chambers around and extending into the fire-pot and each having a fuel-supply opening at the top and an air supply at or near the bottom.

A further object of the invention is to provide an improved boiler having side fuel-pockets with inclined planes extending down

from the pockets to the fire-pot grates and provided with air-openings and water-legs arranged between the planes forming separate coking-chambers.

A further object of the invention is to provide an improved boiler having a series of separate vertical sections united to form an open cylinder and communicating at the top with a water-drum.

A further object of the invention is to provide an improved boiler built up of vertical water-sections segmental in cross-section and united at their longitudinal vertical edges and vertically corrugated at their inner faces and means connecting said sections to cause the water to circulate therethrough.

A further object of the invention is to provide a house-heating boiler with side fuel-pockets hinged so that they can be swung to permit ready access to the interior of the fire-pot when the fire is out.

A further object of the invention is to improve details of construction and arrangements of parts whereby a highly efficient and greatly improved house-heating boiler is provided.

The invention consists in certain novel features of construction and in combinations and arrangements of parts more fully and particularly pointed out hereinafter.

Referring to the accompanying drawings, Figure 1 is a perspective of the improved boiler. Fig. 2 is a cross-section on the line 2 2, Fig. 1. Fig. 3 is a cross-section on the line 3 3, Fig. 1. Fig. 4 is a detail view of one of the water-sections.

In the drawings, *a* is the base of the boiler and furnace, inclosing the ash-pit.

b is a horizontal ring or annulus at the top of the base and ash-pit surrounding the grate *c*.

d is the outer casing resting on the base.

The base is provided with the usual doors, draft-openings, &c.

The boiler here shown is built up of a series of vertical sections joined at their vertical edges to form the inclosed cylinder. Each water-section *e* is formed, preferably, integral with the transversely-convexed outer surface, preferably forming a segment of the circle formed by the sections. The inner surface of each section is vertically fluted or corru-

gated, as shown, to increase heating-surface and strength thereof, and the vertical longitudinal edges thereof are formed with flanges *f*, whereby the sections can be suitably united.

5 They are here shown united by tight joints formed of metal plates or strips on opposite sides of the flanges and bolts between the flanges *f*, clamping said plates rigidly to the flanges and the sections together. A space
10 is formed between the outer surfaces of the water-sections by the upper casing *h* for the passage of the products of combustion to the outlet *i*. The bottom of this space is closed from the fire-pot by the ring or flange *j* around
15 the lower portions of the water-sections.

k is a water-drum within the top of the cylinder formed by the water-sections. Each section has an elbow-pipe *l* from its upper end into the top of the drum. Series of drop-
20 water tubes *m* depend from the bottom of the drum and at their lower ends open into a water-ring *n* directly over the fire. The lower portion of each water-section is connected with the bottom of this ring by the pipes *o*.
25 A complete circulation is thus maintained through all the sections and the drum-ring and tubes in connection with the connections hereinafter mentioned. Every alternate water-section is extended down (see *e'*) to and
30 rests on the said top ring of the base around the grate, thereby forming depending water-legs. These said legs *e* are reduced in thickness so as not to extend into the fire-pot from a point about opposite the water-ring. The
35 alternating short sections are also reduced at their lower ends below this ring and are beveled off at the outer sides of their lower ends opposite the fuel-pockets *p*, which are arranged opposite each short section and on the
40 outer side of the casing.

A side fuel-pocket is formed between each pair of long water-sections. Each pocket has a top opening and cover and a downwardly and inwardly inclined bottom, and these
45 pockets are herein shown hinged at *p'* at one vertical edge, so that each can be swung laterally from the large opening in the casing covered thereby, hence permitting easy access through a large opening to the interior of the
50 fire-pot. Each pocket is provided with a suitable latch to normally hold it in its proper closed position. Each pocket has an inclined plate *q* extending down from its lower edge between the water-legs to the outer edge of the
55 top base-ring, forming the bottom of a coking-chamber between the water-legs. The ring can be suitably formed to receive the lower ends of these bottom plates *q*. At its lower portion each plate is formed with air-openings
60 *q'* from the air-space above said base top ring, which has air-supply openings *r'* from the ash-pit.

It should be observed that the lower ends of the fingered grates do not extend inwardly
65 beyond the inner circle of the lower ends of the water-legs *e'*, so that said plates are between the water-legs which form the sides of

the coking-chambers. The said plates are inclined downwardly and inwardly from the coal-pockets and the circle of the outer faces
70 of the water-legs to the circle of the inner faces of the legs and to said ring or flange around the grate-opening. However, should small quantities of coal-dust, ashes, &c., fall behind the plates it would not be injurious. 75

s is an inlet-pipe into one of the water-legs, and *s'* an outlet-pipe from the top steam or water drum, according as to whether the device is used for steam or hot-water heating.

It will be observed that the products of
80 combustion and heat, &c., from the fire pass directly up around the ring, tubes, and drum and along the inner faces of the sections and then beneath the top of the outer casing into the space around the water-sections. The
85 water-containing parts, which are thin or narrow, are thus surrounded by the heat, and the lower parts thereof are directly over the fire, so that the heat directly impinges against the same. All heat is thus utilized. 90

The boiler can be easily taken apart for ease of transportation, ready repair, and handling, particularly through small doors of private dwellings.

It will be observed that the fuel placed in
95 the side pockets slides down the inclined grates to the fire as fast as needed and no faster.

Coal is coked between the water-legs on the inclined grates, and air passes transversely
100 through the inclined grates and coking-chambers thus formed in a plentiful supply to cause perfect combustion of all the gases evolved, and as the fuel reaches the main grate and fire-pot it is thoroughly incandescent and
105 entirely consumed without waste. The fuel gradually spreads out around the inner faces of the water-legs as it moves down, and as it moves down slowly it is consumed without the formation of a crust or ring which will pre-
110 vent proper feeding.

It should be observed that the heat of the fire in the fire-pot causes the coal to evolve gas and coke in the coking-chambers, and the air passes in through said chambers and min-
115 gles with the gases, and the mixture passes across the fire and burns with great heat, consuming all smoke.

It is evident that various slight changes might be made in the forms, constructions,
120 and arrangements of the parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the exact construction herein set forth, but consider myself entitled to all such
125 changes as fall within the spirit and scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is— 130

1. The combination of a base having the top ring with air-openings, a casing supported on said base, the grate in the base within the ring, the boiler comprising the vertical

sections secured together and forming an inclosed cylinder, alternate sections extended down and resting on said ring, side fuel-openings between the long sections, inclined grates
5 from said openings between the long sections and resting on said ring and having openings above the air-openings of the ring.

2. An upright boiler comprising the vertical series of water-sections having the narrow
10 vertical edges whereby the sections are secured together to form a vertical inclosing wall, the inner and outer surfaces of which are subjected to the heat and products of combustion, each section formed integral with
15 the transversely-rounded outer surface and vertically-corrugated inner surface, and con-

nections to cause a circulation vertically through each section, substantially as set forth.

3. A boiler having a side fuel-pocket at the 20 exterior of the casing, and an opening thereinto, and pivoted to swing laterally and permit access to the fire-pot, substantially as described.

In testimony that I claim the foregoing as 25 my own I affix my signature in presence of two witnesses.

CHARLES GORTON.

Witnesses:

WILLIAM R. SYME,
TIM J. CROWLY.