

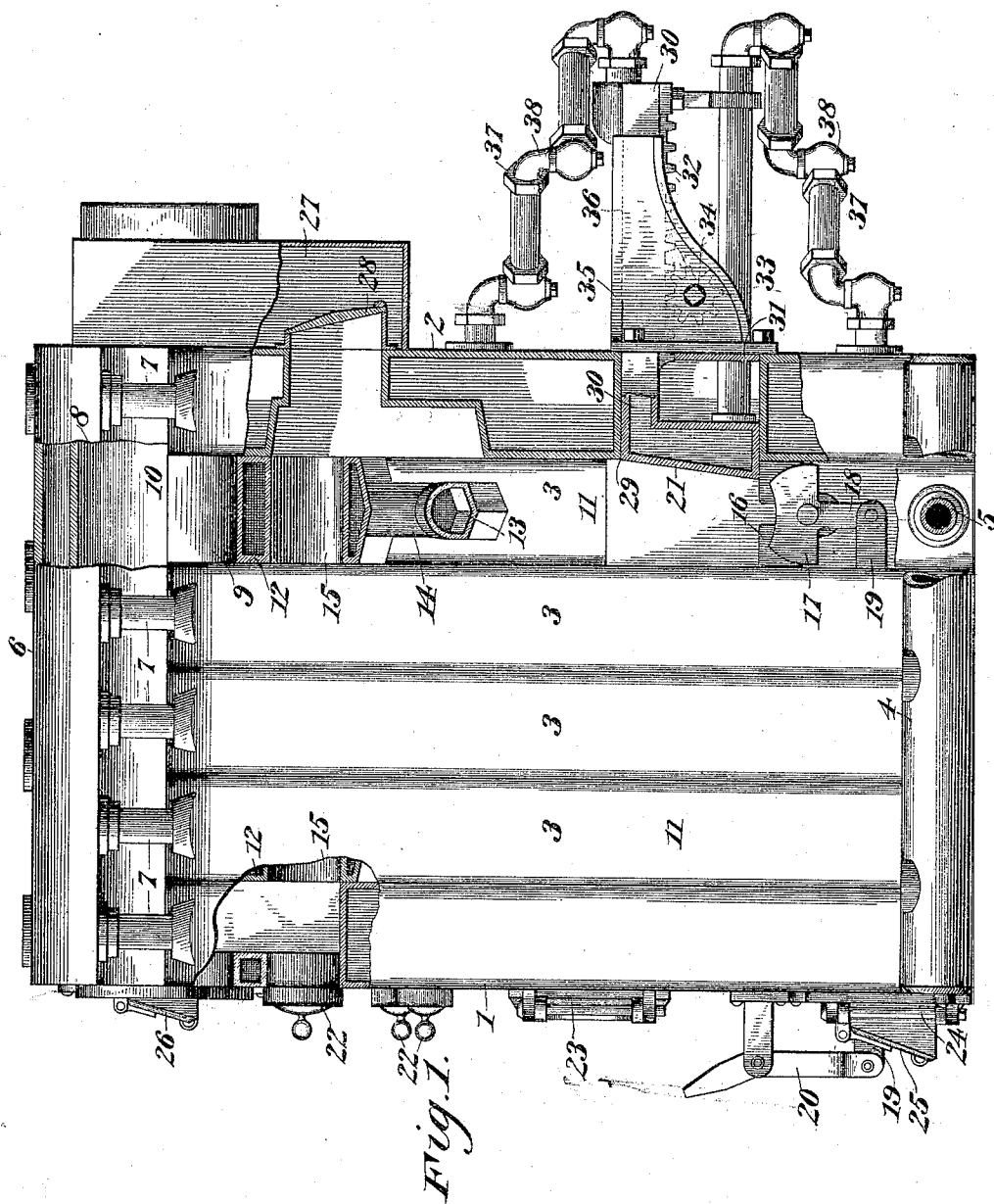
(No Model.)

3 Sheets—Sheet 1.

G. H. BURLEY
STEAM BOILER.

No. 544,841.

Patented Aug. 20, 1895.



Inventor.

George H. Burley.

Witnesses;

M. Withwood
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By *his* Attorneys.

C. Snow & Co.

(No Model.)

3 Sheets—Sheet 2.

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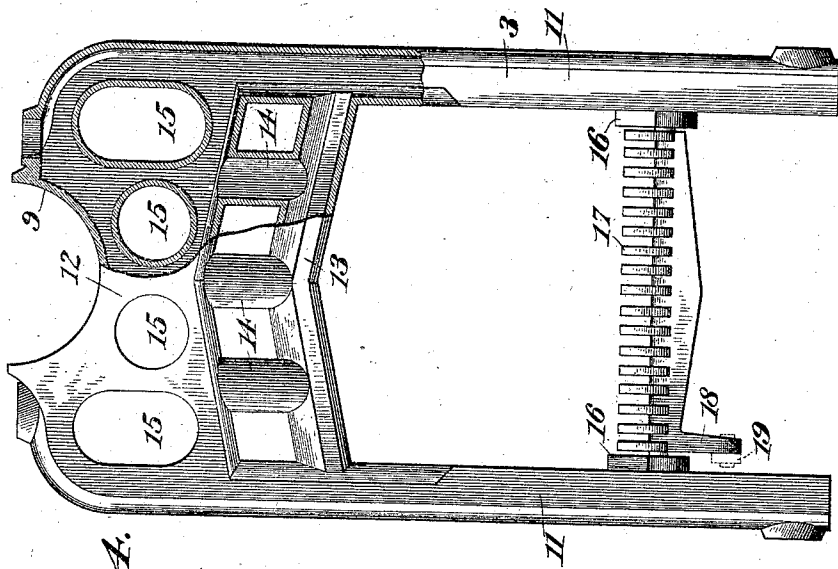


Fig. 4.

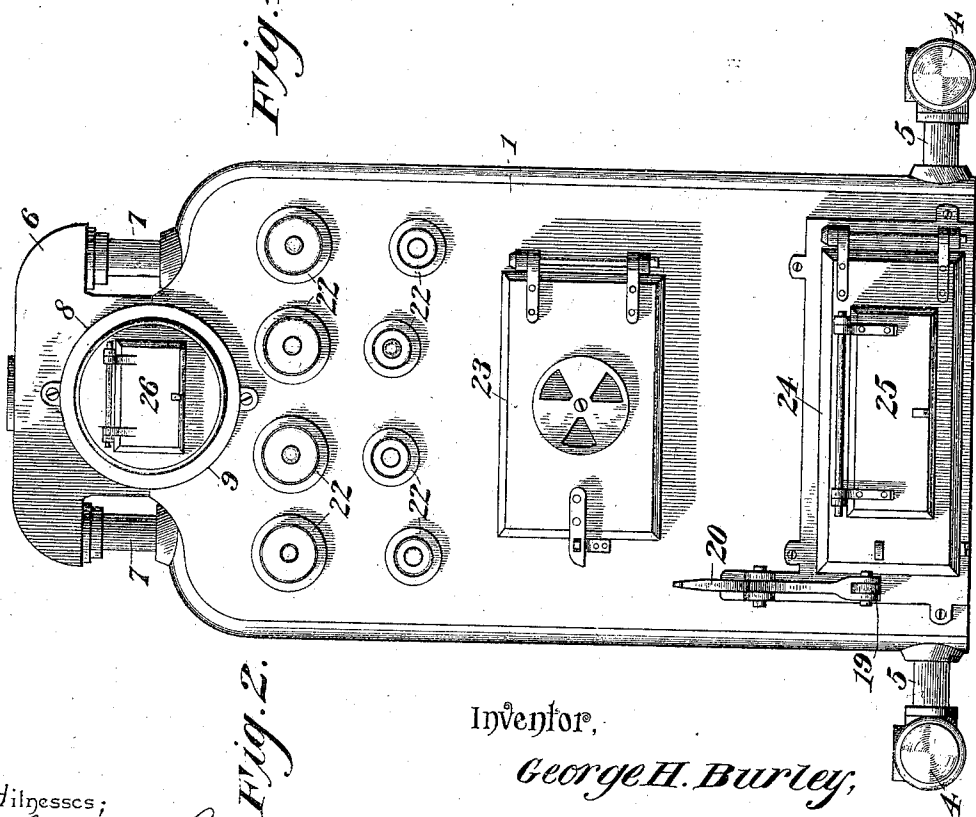


Fig. 2.

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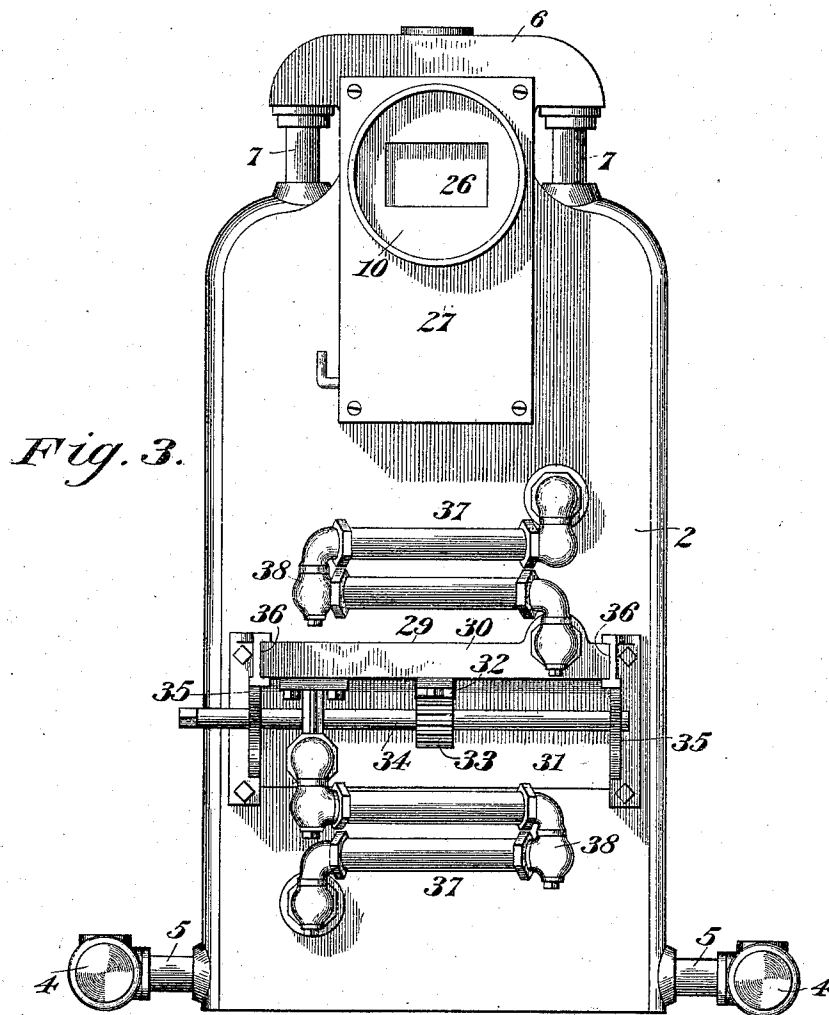
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UNITED STATES PATENT OFFICE

GEORGE H. BURLEY, OF TYRONE, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 544,841, dated August 20, 1895.

Application filed March 23, 1895. Serial No. 542,969. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. BURLEY, a citizen of the United States, residing at Tyrone, in the county of Blair and State of Pennsylvania, have invented a new and useful Steam-Boiler, of which the following is a specification.

This invention relates to boilers for generating steam or heating water, and aims to improve that type of boilers which embody in their organization a vertical series of separate and independent sections which unitedly form the boiler proper and the fire-box and combustion-chamber, and the principal object of the improvement is to provide a simple means for reducing the capacity of the fire-box to suit the changes in the weather. Thus in extreme cold weather it is desirable to have the full capacity of the fire-box, and in warmer weather the size and capacity of the fire-box can be diminished, thereby resulting in an economy of fuel in operating a boiler-furnace constructed in accordance with the principles of the present invention.

Other objects will be apparent and are contemplated by the present invention, which consists of the novel features and the peculiar construction and combination of the parts hereinafter more particularly set forth and claimed, and which are illustrated in the annexed drawings, in which—

Figure 1 is a side elevation, parts being broken away, of a boiler embodying the essence of the invention. Fig. 2 is a front view, and Fig. 3 a rear view, of the improved boiler. Fig. 4 is a front elevation of one of the intermediate sections which are used in the formation of the boiler, parts being broken away to show the hollow structure.

The boiler comprises a front section 1, a rear section 2, and intermediate sections 3, the latter being provided in sufficient number corresponding to the required size of boiler. The intermediate sections are similarly constructed and a description of one will be sufficient. The front and rear sections differ materially and will be described in detail later on. Water-drums 4 are disposed one on each side of the boiler, near the lower end thereof, and have connection with the several sections by means of nipples 5. A steam-dome 6 is located over the sections and has connection

with each by means of nipples 7. This dome 6 is concaved in its lower side, as shown at 8, and corresponds with a corresponding and oppositely-formed concavity 9 in the upper end of the several sections, so that when the parts are assembled the concavities 8 and 9 will unitedly form a smoke-flue 10 for the escape of the products of combustion to the stack. (Not shown.) The intermediate sections have their opposite faces disposed in parallel relation, so that a close joint will be provided between the sections when the latter are placed together so as to form the boiler. These sections 3 are hollow castings, and comprise upright portions 11, a head portion 12, having its lower edge oppositely-inclined from a point midway between the uprights 11, a tubular cross-bar 13 extending parallel with the oppositely-inclined lower edge of the head 12, and vertically-disposed tubes 14 connecting the cross-bar 13 and the head 12. Openings 15 are provided in the head 12 to form smoke-flues, and lugs 16 are formed on the inner side of the uprights 11 to support the grate-bar 17, which latter has a depending arm 18 at one end to form connection with a shaker-bar 19, which has attachment at its outer end to a lever 20, provided on the front side of the section 1, and by means of which all the grate-bars of the different sections are simultaneously operated. The upper edges of the lugs 16 form a support for the movable water-back 21, which is supported thereon during its movements to vary the capacity of the fire-box.

The front section 1 is provided with openings which are closed by plugs 22, by means of which access is had to the smoke-flues for purposes of cleaning.

23 represents the door by means of which fuel is supplied to the fire-box, and 24 is the door to the ash-pit, having the draft damper 25 for controlling the air to the fire-box to support combustion of the fuel.

26 is a door at the front end of the smoke-flue 10, which can be opened more or less, so as to control the draft, as will be readily understood.

The back section 2, like the front section, is a hollow casting, and has smoke-box 27 attached to the upper end thereof and supplied with a damper 28, by means of which direct

draft is established between the fire-box and the rear portion of the smoke-flue 10. An opening 29 of substantially rectangular shape is provided above the plane of the grate-bars 17, and through this opening the water-back 21 is adapted to operate. The water-back 21 has a rear extension 30, which prevents the fuel from falling behind the water-back when the latter is advanced into the fire-box. This rear extension 30 will be of a length corresponding with the distance of travel of the water-back into the fire-box. A plate 31 is arranged to close that portion of the opening 29 immediately below the rear extension 30, so as to prevent the loss of heat and any draft from the rear when the water-back is moved forward past the section adjacent to the said rear section. A rack-bar 32 is attached to the under side of the rear extension 30 of the water-back and meshes with a pinion 33 upon a transverse shaft 34, which latter is journaled near its end in brackets 35, projecting rearwardly from and secured to the rear side of the section 2. When it is required to move the water-back, a suitable instrument is fitted upon the projecting end of the transverse shaft 34 and the latter is rotated, and by means of the pinion 33 and the rack-bar 32 the water-back is moved in the required direction. In order to give stability to the water-back and prevent toppling over of the same in its movements, the edge portions of the rear extension 30 are adapted to operate or slide in grooved ways 36, provided in the inner sides of the brackets 35. This water-back has connection with the rear section by means of swinging pipe-sections 37, which are connected by knuckle joints or couplings 38 of ordinary construction common in gas fittings. These swinging pipe-sections and their knuckle-joints will be so disposed as to adapt themselves to the various positions of the water-back when moving the latter to regulate the capacity of the fire-box to suit the conditions of the weather.

In providing and fitting water-backs to steam-boiler furnaces already in use it is clear that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. The combination with the fire box of a furnace, of a movable water-back to vary the capacity of the said fire box, and provisions for supplying water to the back to be heated, substantially as set forth.
2. The combination with a steam boiler furnace, of a movable water-back to reduce the capacity of the fire box, and connections between the said water-back and the boiler to

admit of the free movement of the water-back and establish communication between it and the boiler, substantially as set forth.

3. The combination with a boiler furnace, of a water-back adapted to move over the grate bars and through an opening in the side of the boiler, and provided with a hollow rear extension to prevent the fire from getting in the rear of the water-back when the latter is advanced into the fire box, and connections between the boiler and the said hollow rear extension, substantially as described.

4. The combination with a boiler furnace, of a movable water-back to vary the capacity of the fire box, and swinging pipe connections connected by knuckle couplings, establishing communication between the water-back and the boiler, substantially as set forth.

5. In a boiler furnace, the combination of a water-back adapted to operate through an opening in the side of the boiler and travel over the grate bars to vary the capacity of the fire box, and having a rearwardly-projecting hollow extension, brackets having guide ways in their sides for the said rear extension to travel in, connections between the boiler and the water-back, and means for moving the water-back within the fire box, substantially as described for the purpose set forth.

6. In combination, a boiler furnace, a water-back having a rear hollow extension, brackets having guides in their inner sides for the said rear extension to work in, connections between the boiler and the water-back, a rack bar secured to the said rear extension, a transverse shaft journaled in the brackets, and provided with a pinion to mesh with the said rack bar, and a plate to close that portion of the opening through which the water-back operates immediately below the said rear extension, substantially as set forth.

7. The herein specified boiler, formed from a series of vertical sections placed side by side, a dome located above and water drums on each side of the sections, nipple connections between the water drums, the said dome and the individual sections, grate bars supported in lugs on the inner side of the upright portions of the sections, a water-back adapted to travel upon the said lugs and over the grate bars to reduce the capacity of the fire box, and having a rear hollow extension, connections between the water-back and the rear boiler section, and means for operating the water-back, as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEORGE H. BURLEY.

Witnesses:

C. G. NISSLEY,
HERBERT GIBSON.