(No Model.) 2 Sheets—Sheet 1.

C. HYDE.

BOILER.

No. 528,103. Patented Oct. 23, 1894.

Fig. 1.

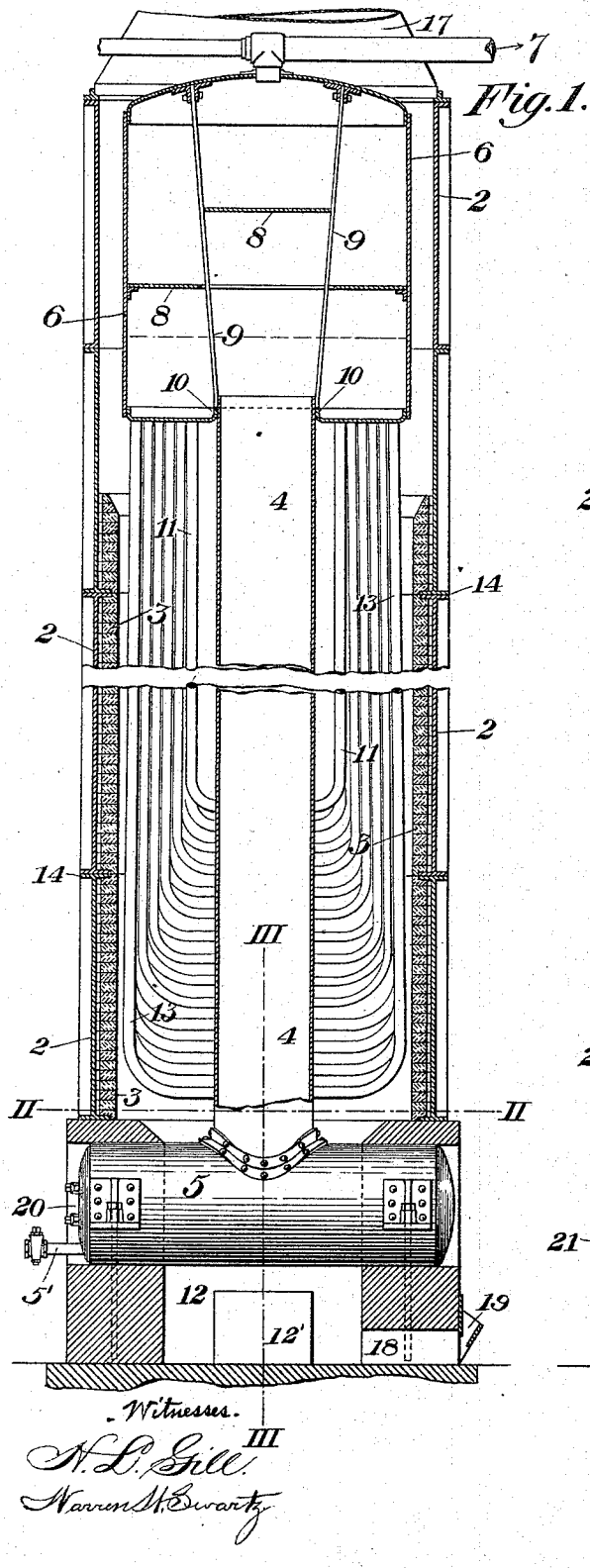


Fig. 2.

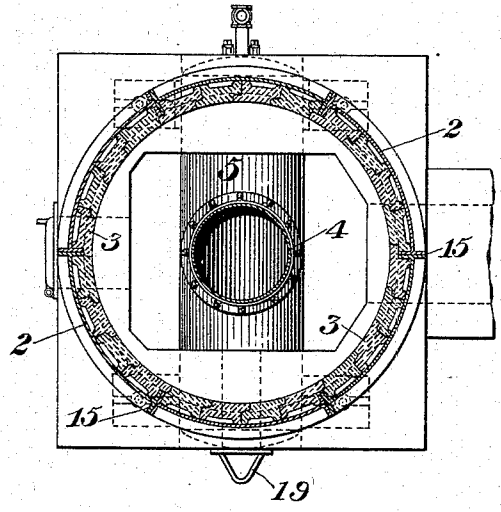


Fig. 4.

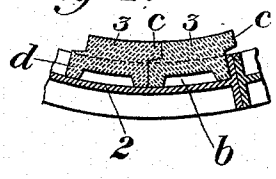
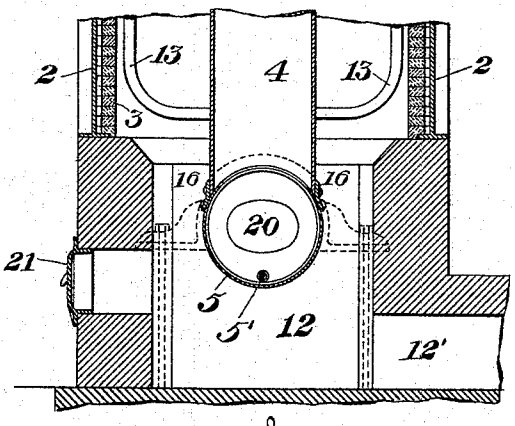


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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FIG. 5.

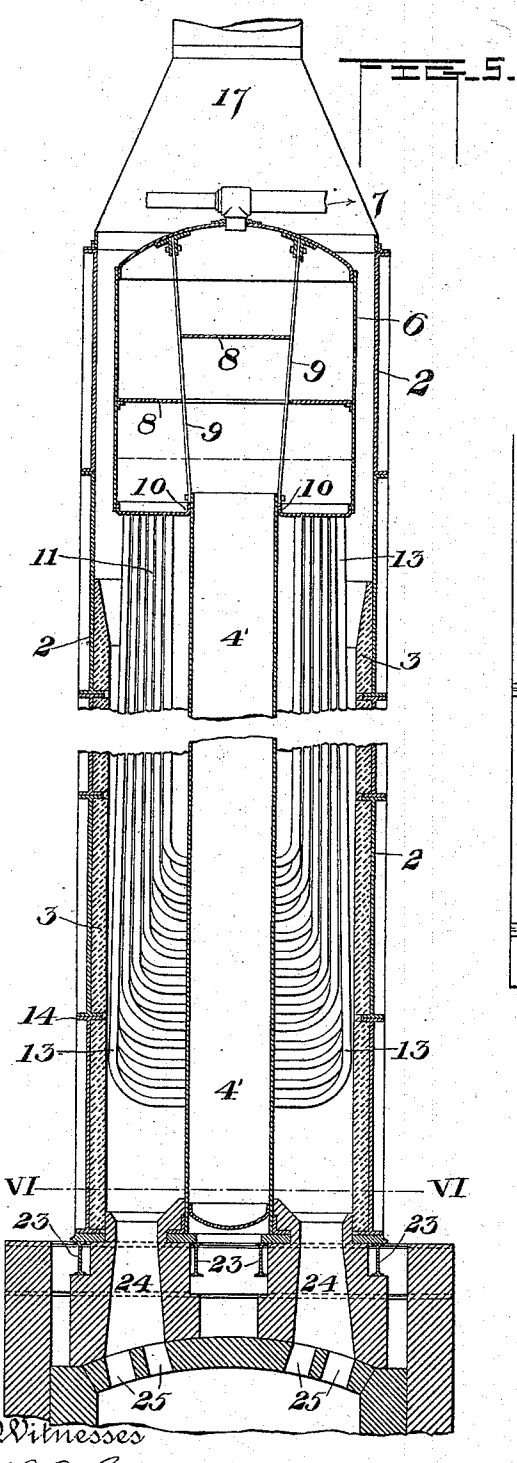
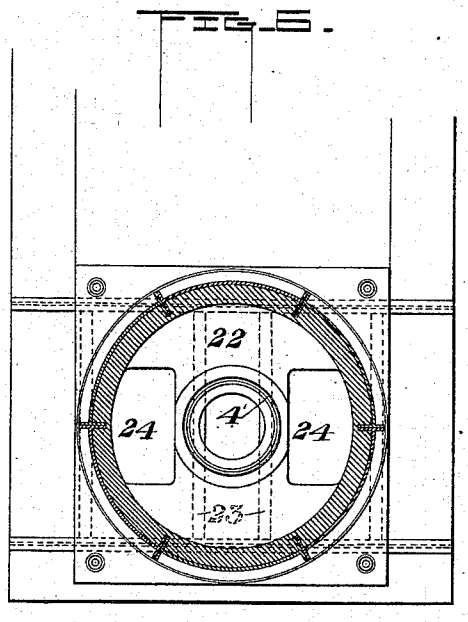


FIG. 6.



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UNITED STATES PATENT OFFICE.

CHARLES HYDE, OF PITTSBURG, PENNSYLVANIA.

BOILER.

SPECIFICATION forming part of Letters Patent No. 528,103, dated October 23, 1894.

Application filed June 27, 1894. Serial No. 515,818. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HYDE, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Boilers, of which the following is a full, clear, and exact description.

The object of my invention is to provide a boiler which shall be especially adapted to be economically heated by the waste gases and hot products of combustion from furnaces, such as heating-furnaces, puddling-furnaces, blast-furnaces, &c., and shall be durable and strong in construction.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 shows in vertical section the vertical column and upper parts of my improved boiler, and in side elevation the lower drum by which the boiler is supported. Fig. 2 is a horizontal section on the line II—II of Fig. 1. Fig. 3 is a vertical cross-section on the line III—III of Fig. 1. Fig. 4 is a detail view of the lining bricks. Figs. 5 and 6 show a boiler of modified construction, in which the lower drum is not used, and the boiler is supported by a plate set directly over the furnace whose waste gases are utilized. Fig. 5 shows the boiler in side elevation, and Fig. 6 is a horizontal section on the line VI—VI of Fig. 5.

Like symbols of reference indicate like parts in each of the figures.

In the drawings, 2 represents the outer shell or casing of the boiler furnace, made of curved cast metal plates, and having an interior brick lining 3 of peculiar construction hereinafter described. The boiler proper comprises a vertical cylindrical column 4, having at its lower end a horizontal drum 5, whose ends rest in and project to the exterior of the masonry, so that the drum is supported thereby and in turn supports the boiler.

5′ is a blow-off pipe extending from the drum. At its upper end, the column 4 opens into a vertical cylindrical steam and water chamber 6, from the top of which leads a steam-outlet pipe 7. This chamber 6 is of larger diameter than the column 4, and is preferably provided with baffle-plates 8, and with vertical interior stays 9 extending from end to end of the chamber. The base of the chamber where it surrounds the end of the column, is inwardly flanged as at 10, so that the rivets which secure together the chamber, the stays, and the column may be easily accessible and may be replaced when necessary. The end of the column is inserted and riveted within the flange, and the stays are also riveted thereto.

11, 13, are water circulating pipes which extend downwardly from the tube sheet at the base of the chamber 6 and enter the side of the column at its middle and lower portions.

It will be noticed that in the drawings, I show the outer tubes 13 inclining inwardly somewhat from the vertical, in order to afford between the tubes and the brick lining an upwardly widening space, which, by reason of its shape causes the gases to pass more freely and directly to the stack, and enables the furnace from which the gases are derived to be operated at full capacity by natural draft.

12 is a chamber at the base of the boiler, into which the heated products of combustion enter from an adjacent furnace, *e. g.*, a heating or puddling furnace, through a flue 12′. From the chamber 12, the heated gases and products of combustion ascend through ports 16 at the side of the drum 5, and thence pass up around the boiler, and out through a stack-flue 17.

18 is a cinder-notch to allow of the outward flow of cinder which may be carried over by the gases from the furnace, and 19 is a fire-basket at the mouth of said notch, in which a fire should be maintained in order to keep the cinder liquid.

21 is the ordinary charging door for affording access to the chamber.

By elevating the drum 5 above the bottom of the chamber 12, it is removed from contact with the deposit of cinder, and also from the impinging flame.

The cylindrical brick-lining in the interior of the boiler-setting is composed of bricks 3, made of the form shown in Figs. 2 and 4, each having a recess *b* on its outer face, and having at its sides offset portions *c*, *d*, situate at diagonally opposite corners, so that when the bricks are placed together, they shall match and fit one another, the offset portions

closing the joints between the bricks as shown, and affording spaces within which the vertical flanges of the metal casing fit, and are thereby shielded from the heat (Fig. 4).

The plates which constitute the outer shell 2 of the boiler setting are made in sections formed with horizontal and vertical flanges 14, 15, by which they may be bolted together, these flanges projecting inwardly as well as outwardly, and the horizontal flanges affording supports for the overlying courses of bricks. When the bricks are laid within the metal casing, the recesses *b* on the outer face of each brick, registering with the recesses of the bricks above and below, afford air-spaces, which, by their heat-insulating action, prevent loss by radiation, and because of the manner of fitting the bricks together and the construction of the metal casing, the boiler setting is rendered strong and durable.

If desired, the hollow spaces afforded by the recesses in the brick lining may be utilized as a means of heating air for combustion, and for this purpose the spaces may be connected from top to bottom, and a current of air caused to pass through them.

In operating the boiler, a vigorous and effective circulation of water takes place through the pipes 11, 13, between the chamber 6 and the middle or lower part of the vertical column. The lower drum 5 receives the sediment precipitated by the water, and because of the fact that its ends project into the boiler setting, the boiler is supported steadily, and easy access through an end man-hole to its interior is afforded.

In the modification of Figs. 5 and 6, the vertical shell 4′ rests directly upon a plate 22 supported upon transverse I-beams 23 carried over the furnace. This plate is square and is provided on opposite sides with ports 24 connecting with ports 25 in the roof of the furnace. The casing and brick-work of the boiler also rest upon the plate, which gives a uniform distribution of the gases. In this form I do not show the recessed bricks to form air-spaces, but these may be used or not as desired in either form. In other respects the two types are similar.

The advantages of the invention will be apparent to those skilled in the art.

The parts are simple and easily accessible.

The recessed bricks form a heat-insulating layer to prevent radiation, while the offsetting of the bricks forms a firm and substantial structure and clamps the shell in place and protects the vertical flanges. The inclination of the tubes gives a freer exit and better draft for the gases.

Access may be had to any part of the boiler by removing a section of the casing and the bricks contained therein.

I claim—

1. A steam-boiler having a vertical water column, water tubes communicating therewith, and a horizontal drum having its axis transverse to the vertical axis of said water-column, said horizontal drum projecting laterally from the base of the vertical column, extending across the setting of the furnace, and supported by the side walls thereof so as to support said column; substantially as described.

2. A steam-boiler having a vertical water-column, a steam and water chamber at the top, of larger diameter than the column, having an inwardly flanged opening into which the column fits and to which it is secured, and stays attached to said flange and extending to the top of the chamber; substantially as described.

3. A steam-boiler having a vertical cylindrical metal casing, and an interior lining constituted of bricks recessed on their exterior so as to afford air spaces said casing having series of horizontal flanges on which the brick lining is built and by which it is supported; substantially as described.

4. A steam-boiler having a vertical cylindrical metal casing having a series of interior horizontal flanges, and a brick lining contained within the casing and built on the flanges; substantially as described.

5. A vertical steam boiler having a cylindrical metal casing, and a brick-lining constituted of bricks having at the lateral margins overlapping flanges affording vertical recesses adapted to receive and to protect vertical flanges upon the casing; substantially as described.

6. A vertical boiler having a furnace-chamber, a horizontal drum supported by the walls of the chamber, and a flue leading from a furnace to the furnace chamber, and arranged to prevent impinging of flame and scoriæ on the boiler; substantially as described.

7. A boiler comprising a vertical shell having a steam and water drum at its upper end of larger diameter than the shell, and pipes connecting the base of the drum and the shell, said pipes being inwardly inclined to give a freer passage to the gases; substantially as described.

In testimony whereof I have hereunto set my hand.

CHAS. HYDE.

Witnesses:
W. B. CORWIN,
C. BYRNES.