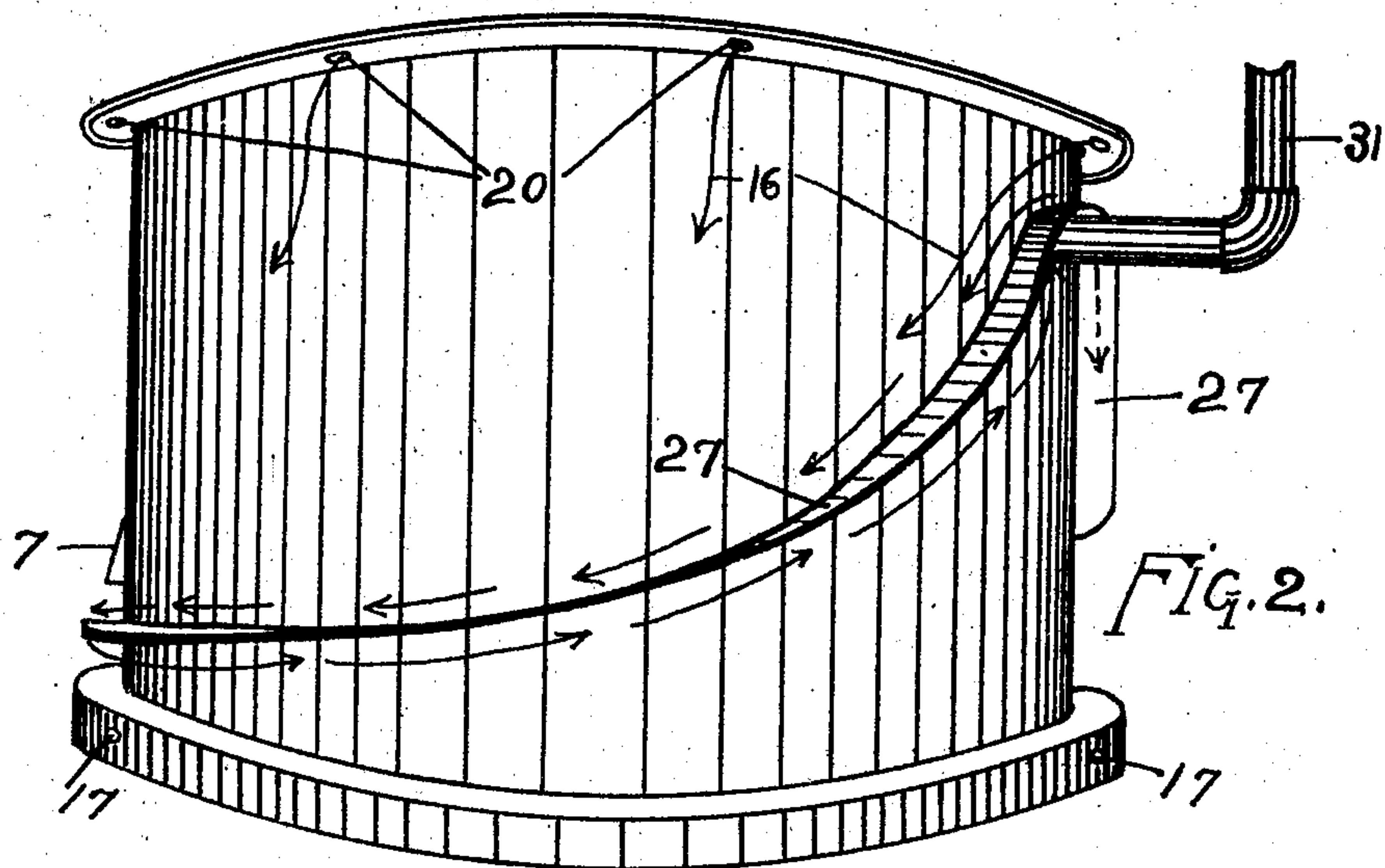
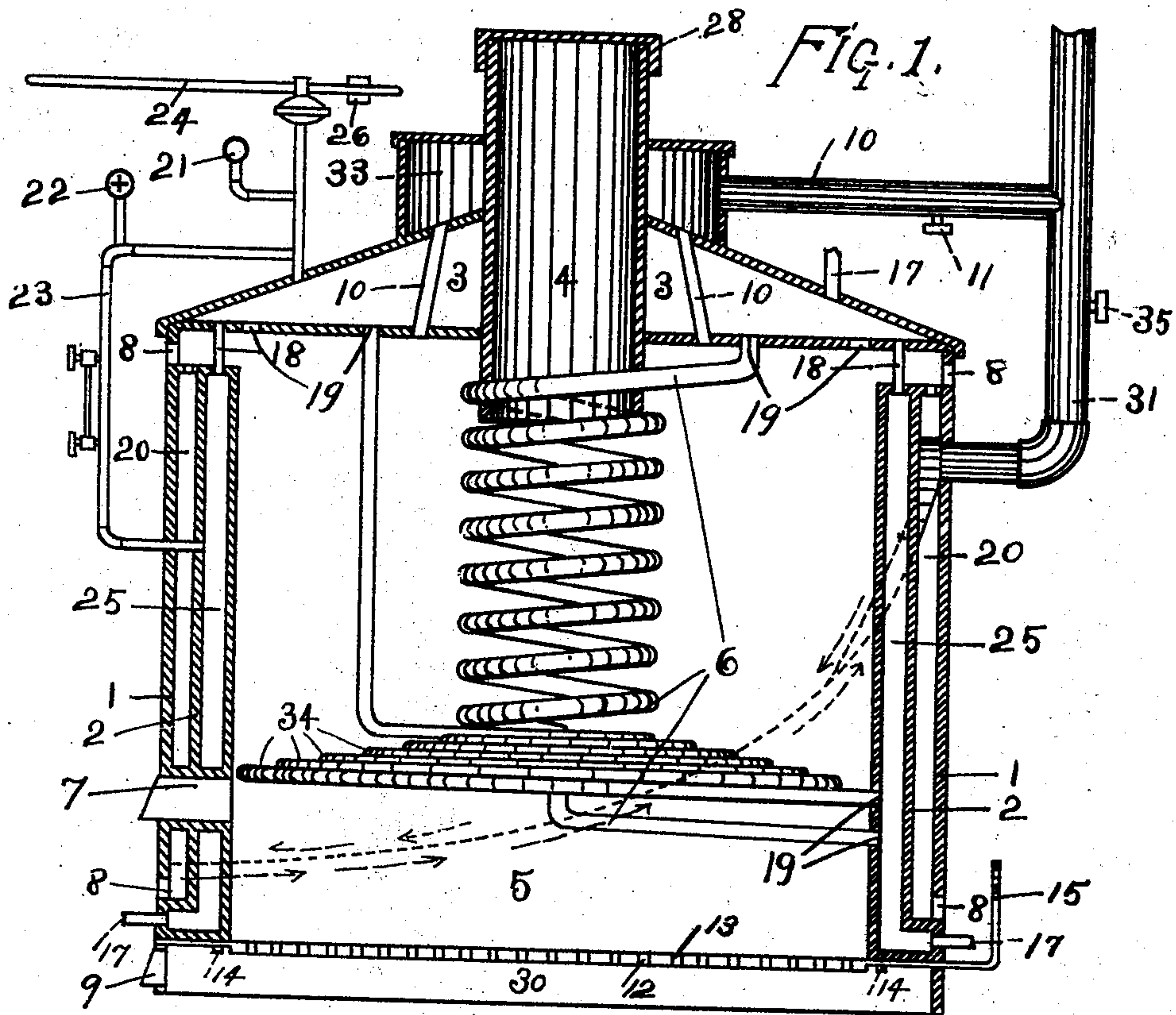


No. 816,012.

PATENTED MAR. 27, 1906.

S. H. HALE.
STEAM BOILER.
APPLICATION FILED JAN. 30, 1905.



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STEPHEN HUMPHREY HALE, OF ST. JOSEPH, MISSOURI.

STEAM-BOILER.

No. 816,012.

Specification of Letters Patent.

Patented March 27, 1906.

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To all whom it may concern:

Be it known that I, STEPHEN HUMPHREY HALE, a citizen of the United States, residing at St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in a Combined Base-Burner Magazine Self-Feeder Steam-Boiler; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

The object of my invention is to provide a steam-boiler that by reason of its peculiar construction presents an unusual heating-surface, obviates clogging by mud or other debris, economizes fuel and labor, and that may be heated by either coal, wood, oil, or gas.

I accomplish my object by the mechanism shown in the accompanying drawings, in which—

Figure 1 is a vertical cross-section showing the interior construction of the device including the double cylinders and dome of the boiler and its fire-box, magazine, and coils; and Fig. 2 is a perspective of the water-cylinder, showing the fire-passages and the partition dividing the same.

Similar numerals refer to similar parts throughout the several views.

1 is a circular metal jacket.

2 is a double cylinder adapted to hold water between its outer and inner parts, the outer cylinder spaced from the jacket to permit the passage of flame and smoke, the inner cylinder forming a fire-box and also serving as a jacket for coils.

3 is a steam-dome; 4, a magazine of tubular form which sets centrally in the dome, its base slightly below said dome to enable it to hold the coil in place, which is a part of the magazine and the upper end of which forms connection with said dome and extends around the tubular part of the magazine.

5 is a fire-box.

6 6 represent a plurality of tubular coils.

7 is a feed-door.

8 8 represent soot-doors, preferably eight.

9 represents a combined clinker and draft door.

10 10 represent the flues.

11 is a damper in the direct draft.

12 and 13 are grates one on top the other operated by the top one sliding back and forth over the one beneath, the bottom one being stationary only when it is turned edgewise for dumping cinders.

14 14 are lugs to hold grates in position, and 15 15 are shaker-bars to shake grates and dump the same by a quarter-turn sidewise of shaker-bar.

16 16 represent arrows showing the fire-passage between the jacket and the water-cylinder.

17 17 represent feed and return and steam outlets for the boiler, 18 18 the various right and left nipple connections between the steam-dome and the water-cylinder, and 19 19 the coil connections between said water-cylinder and steam-dome.

20 20 indicate the fire-passages from the top of the water-cylinder to the bottom thereof.

21 is a safety-valve, and 22 a steam-gage, 23 a water-column, and 24 a bar for a damper-regulator.

25 indicates water in the water-cylinder, and 26 a weight on said damper-regulator.

27 is a partition between the water-cylinder and the jacket, beginning below the top of the water-cylinder and above the main flue and circling thence to right and left downward and around the cylinder to the front of the furnace underneath the main fire-door, as shown in Fig. 2. This partition is adapted to carry the fire from the top of the cylinder down and around the cylinder to the front of the furnace and thence down to right and left around back and up to the main flue 31, thereby forming base-burner features of the boiler. 28 is a flap-door over the top of the magazine. 30 is the ash-pit.

31 is the main flue, 33 a cap around the magazine forming a part of the flue to direct draft, and 35 is a damper in main flue.

Coil 6 makes connection at its upper end with the steam-dome, extending thence around and below the tubular part of the magazine downward through the other coils to the fire-box, at which point it connects with the water-cylinder chamber. This coil is adapted to create circulation and prevent mud accumulating at the base of the magazine, rendering the magazine useless for heating purposes. Moreover, this combination tubular and coil magazine, having a heating-surface far greater than that of other magazines of similar size, secures proportionately better results. The

other coils, excepting only that at the bottom, are the same as the magazine-coil shown in Fig. 1 except that they are reversed, being larger at the bottom than at the top for the purpose of retaining the direct heat inside the water-cylinder as long as possible. These coils fit on the outside of one another far enough apart to allow for combustion. The tubes of coils 6 6 are larger where they enter the steam-dome than where they connect with the water-cylinder. It is the tubes not the coils that lessen the circumference. The interior of these tubular coils correspond with their exterior, being small at one end and large at the other. The small end of each of these tubular coils is connected with the water-cylinder in the fire-box, while the large end of each is connected with the steam-dome. My object in using a tubular coil the interior of which is smaller at one end than the other is to allow for the expansion of water and let steam pass the water up into the steam-dome, thereby creating dry steam and holding a steady water-line in the boiler. 34, as shown in Fig. 1, represents the bottom coil, which is connected at the steam-dome and extends downward between the magazine-coil and the one next to it and around and around the magazine in a circle constantly widening from the magazine to the water-cylinder and connected therewith, thereby creating a spread on the flame to

make the flame spread the heat equally between the coils above it. This coil bears upward and inward from the water-cylinder for the purpose of creating a free circulation of water. This boiler is adapted for either high or low pressure steam.

What I claim, and desire to secure by Letters Patent, is—

In a steam-boiler the combination with a fire-box and magazine, of double cylinders spaced apart said space forming a water-chamber, a jacket spaced from the outer cylinder said space forming a chamber for passage of flame and smoke from the fire-box, a steam-dome said magazine being in the center thereof, the coils with tubes of decreasing circumference from top to bottom and extending from said dome downward around said magazine and below through said fire-box into the water-cylinder, the bottom coil also connected with said dome and spread at its base above the fire-box to connection with said water-cylinder and fire-draft partition encircling the water-cylinder, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

STEPHEN HUMPHREY HALE.

Witnesses:

P. K. ENRIGHT,
WM. A. HALE.