No. 676,632. Patented June 18, 1901.

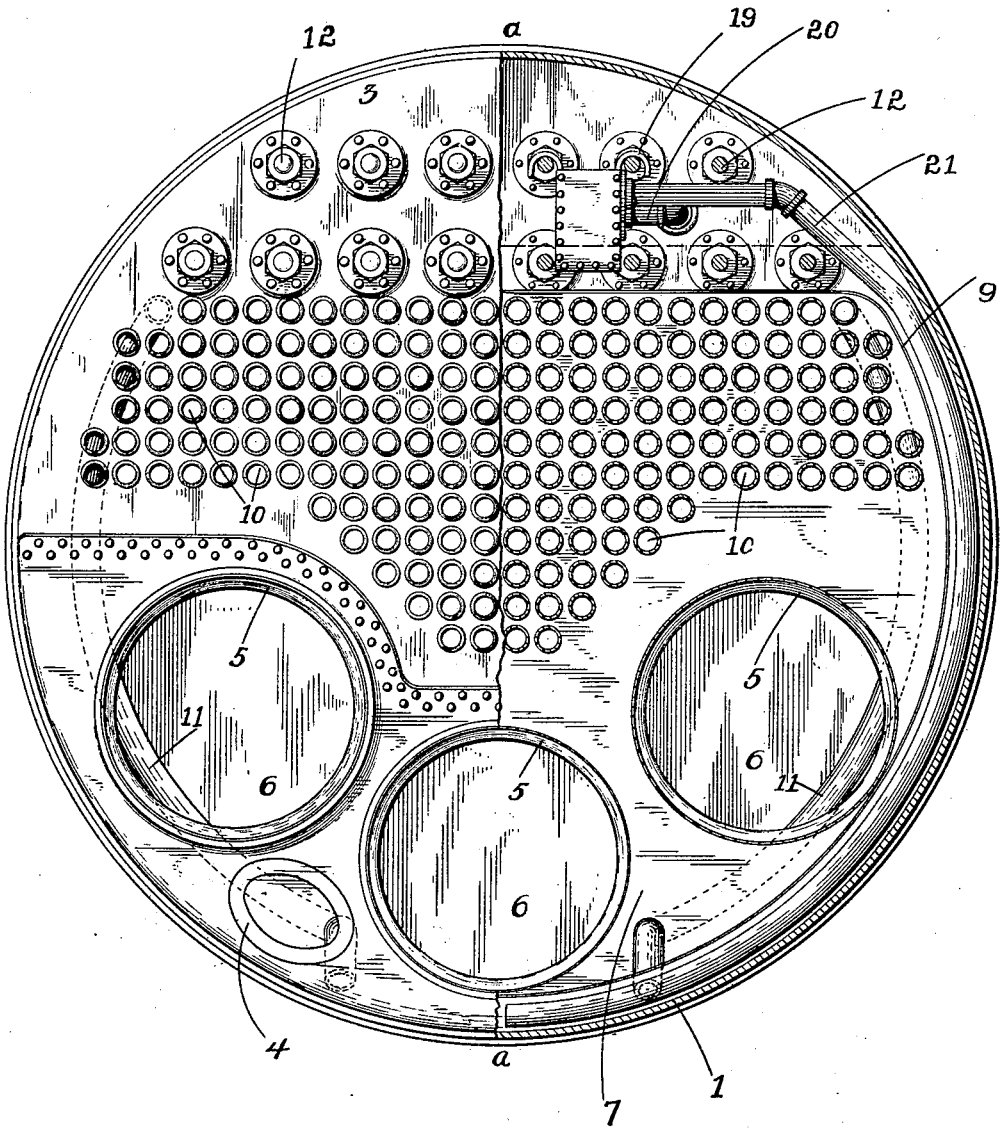
F. G. ROGERS.

BOILER.

(Application filed Jan. 30, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses.

L. M. Billings.

Geo. A. Neubauer.

Inventor.

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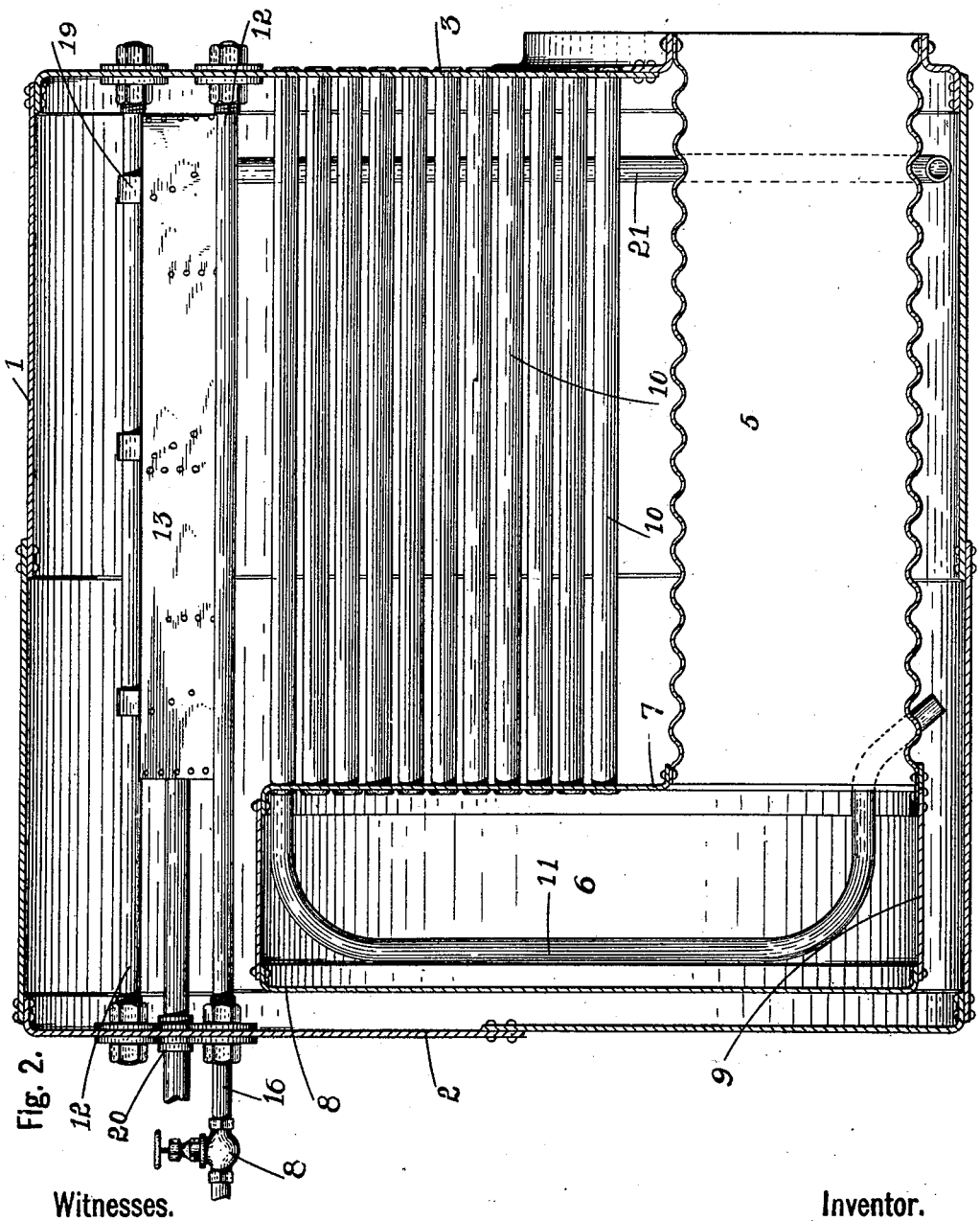

Fig. 2.

Witnesses.

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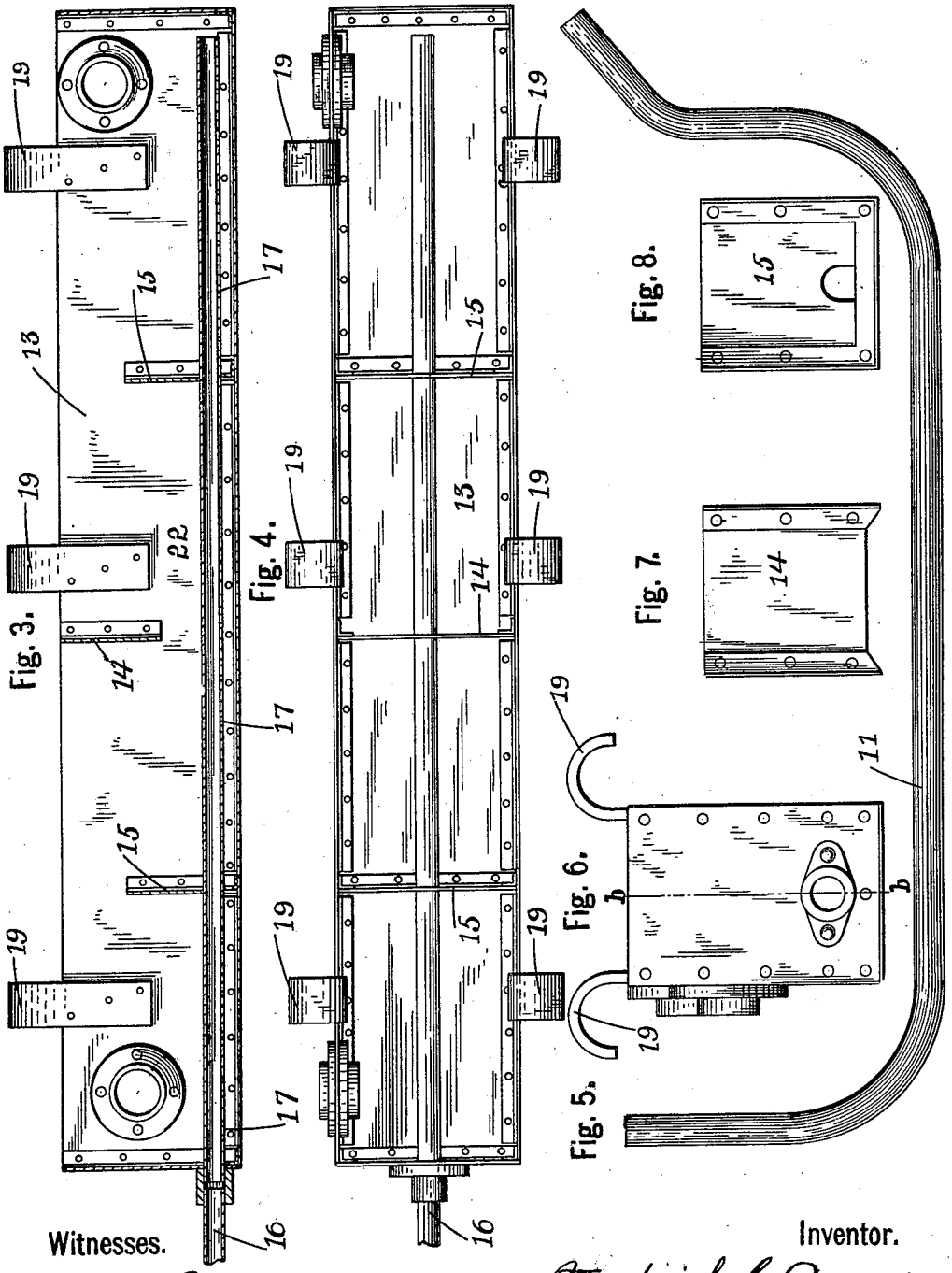

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UNITED STATES PATENT OFFICE.

FREDERICK G. ROGERS, OF BUFFALO, NEW YORK.

BOILER.

SPECIFICATION forming part of Letters Patent No. 676,632, dated June 18, 1901.

Application filed January 30, 1901. Serial No. 45,326. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK G. ROGERS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a certain new and useful Improved Boiler, of which the following is a specification.

My invention relates to an improved steam-boiler; and the object of the invention is to materially prevent the formation of scale by arranging a purifying device in the upper portion of the interior of the boiler, through which the water passes before entering the boiler proper, said purifying device having a blow-out valve and an outlet-pipe extending to near the bottom of the boiler and serving to increase the rapidity of the water-heating, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is an end elevation, partially in section, of my improved steam-boiler. Fig. 2 is a vertical longitudinal section on line *a a*, Fig. 1, through my improved steam-boiler. Fig. 3 is an enlarged detached vertical longitudinal section through the purifying device on or about line *b b*, Fig. 6. Fig. 4 is an enlarged detached top plan view of the purifying device. Fig. 5 is an enlarged detached view of one of the circulating-pipes. Fig. 6 is an enlarged detached end view of the purifying device. Fig. 7 is an enlarged detached view of one of the upper partitions. Fig. 8 is an enlarged detached view of one of the lower partitions.

In referring to the drawings in detail like numerals designate like parts.

The boiler-body consists of the usual shell or cylinder 1 and front and rear end plates 2 and 3.

The boiler-body is provided with the usual manhole 4, one or more horizontal heat-conducting corrugated pipes 5 of large diameter, a vertical heating-compartment 6, located in the rear portion of the boiler and formed by the separated vertical plates 7 and 8 and the side walls 9, and a plurality of flues or tubes 10, arranged above the corrugated pipes 5 and of lesser diameter than said pipes. Said flues or tubes 10 extend between the front end plate 2 and the vertical plate 8 and serve to conduct the heat from the upper portion of the compartment 6 and through and out of the boiler.

One or more circulating-pipes 11 extend in a curved direction from the boiler-bottom to the upper portion thereof, through which the partially-heated water in the lower portion of the boiler passes during the operation of the boiler into the upper portion. A preferred form of the circulating-pipes is shown in Fig. 5. Two of these tubes are preferably employed, each of which curves or extends in substantially the way shown in Figs. 1 and 2, extending rearwardly from the boiler-space between the flues 10 into the compartment 6, in which it bends in a downward direction and also curves to extend concentric to the shell 1 (see Fig. 1) and finally bending forward near its lower ends and extending through the plate 8 and one of the corrugated pipes 5 to within a short distance of the bottom of the boiler. (See Fig. 2.) The main advantages of these pipes are that they materially increase the circulation in the boiler, render the heating more rapid, and thus greatly economize in the production of steam. Stay-bolts or tie-rods 12 connect the upper portions and rear end plates 2 and 3, and a purifying device located in the upper portion of the boiler is hung from said stay-bolts or tie-rods.

The preferred construction of the purifying device is shown in Figs. 3, 4, 6, 7, and 8 and consists of a long trough 13, having upper and lower vertical transverse partitions 14 and 15, arranged at intervals, and a blow-out pipe 16, extending throughout the trough and slightly above the bottom, with one end passing through the boiler-body. The blow-out pipe 16 is provided with a series of transverse bottom openings 17 and a valve 18. Hangers or hooks 19 extend upward and curve outward from the sides of the trough and are adapted to catch over the bolts 12 to sustain the purifying device in position. An inlet-pipe 20 is provided at one end of the trough for the entrance of the water, and a pipe 21 at the opposite end forms the outlet and conducts the water from the trough into the bottom of the boiler. This outer pipe bends or curves downward from the trough around one side of the flues to within a short distance of the bottom and materially increases the rapid-

ity of the water-heating. Another advantage of this arrangement is that water nearly heated to steam temperature is introduced into the space immediately above the boiler-bottom, which is the space having the lowest temperature in the boiler.

The operation of the boiler is as follows: The water is first conducted into the trough by means of the inlet-pipe 20, where it is purified, and then passes through the trough into the outlet-pipe 21, through which it is conducted into the bottom of the boiler. The partially-heated water in the bottom of the boiler passes upward through the circulating-pipes into the upper portion of the boiler. The impurities in the water are precipitated to the bottom of the trough and collect in the compartment 22, formed by the lower transverse partitions 15, from which they are removed by opening the valve 18, so that the boiler-pressure can blow them out through the blow-out pipe 16. The precipitation is extremely rapid, as the elevation of the purifying device exposes it to the highest temperature in the boiler. The function of the upper partitions is to catch or collect the oil or other materials or substances floating upon the surface of the water, which is then blown out through the blow-out pipe.

In this invention the larger portion of the impurities and scale-forming ingredients are precipitated to the bottom of the trough and removed and the remaining portion is materially prevented from coating the boiler-surface by the constant circulation of the water produced by means of the circulating-tubes.

The purifying device also serves as a heating device to heat the water before it passes into the body of the boiler proper, owing to its location in the upper portion or point of highest temperature of the boiler and the fact that the water first passes through it before mixing with the water in the boiler.

I claim as my invention—

1. In combination, a boiler having stay-bolts and a purifying device comprising a trough provided with hangers hooking over the stay-bolts and separated into collecting-compartments by upper and lower transverse partitions, and a blow-out pipe arranged in said trough, slightly above the bottom of the trough and extending through the lower partitions, substantially as set forth.

2. In combination, a boiler having stay-bolts and a purifying device comprising a trough provided with hangers hooking over the stay-bolts and separated into collecting-compartments by transverse partitions, and a blow-out pipe longitudinally arranged in said trough slightly above the bottom and provided with a series of transverse bottom openings, substantially as set forth.

3. In combination, a boiler having stay-bolts and a purifying device comprising a trough provided with hangers hooking over the stay-bolts and separated into collecting-compartments by transverse partitions and a blow-out pipe longitudinally arranged in said partition slightly above the bottom thereof and extending from near one end to and through the opposite end and through openings in the partitions and having a series of transverse bottom openings, substantially as set forth.

4. In combination, a boiler and a water-purifying device located in the upper portion of said boiler and having an inlet-pipe through which the water passes into the water-purifying device before reaching the boiler, a blow-out pipe and an outlet-pipe extending to near the boiler-bottom.

5. In combination, a boiler having a plurality of heating-flues, and a water-purifying device located in the upper portion of said boiler above the heating-flues and having an inlet-pipe, a blow-out pipe, and an outlet-pipe extending by the heating-flues to near the boiler-bottom.

6. A boiler having a purifying device consisting of a trough having lower transverse partitions shorter in height than the side walls of the trough and extending from the bottom upward, and upper transverse partitions extending from the top downward to a point slightly below the top edge of the lower partition.

FREDERICK G. ROGERS.

Witnesses:
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