

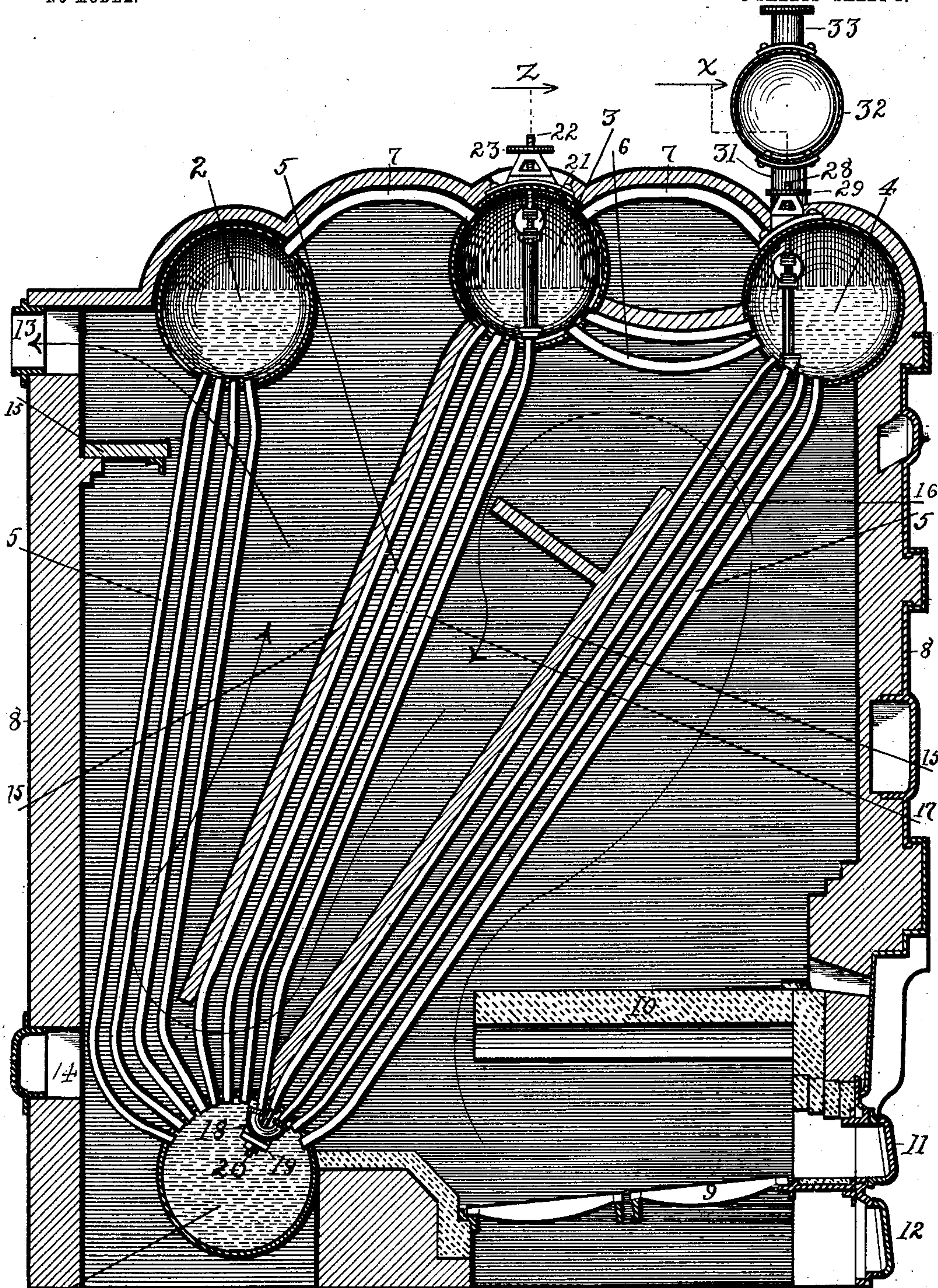
No. 735,871.

PATENTED AUG. 11, 1903.

C. GOTTWALD.
SUPERHEATER FOR BOILERS.
APPLICATION FILED APR. 24, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses: Fig. 1.

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Maude Quisler.

Inventor:

Christian Gottwald,
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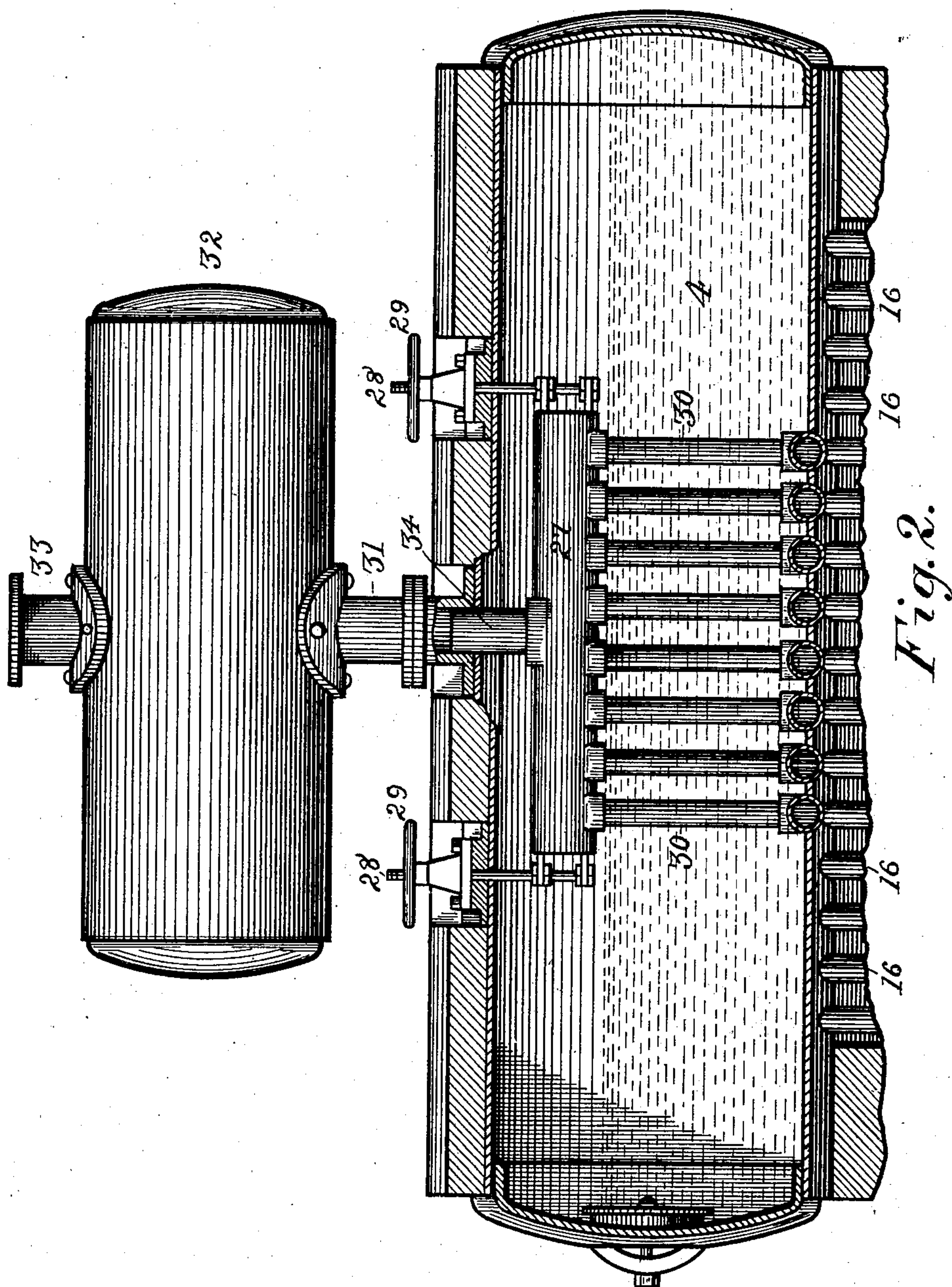
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NO MODEL.

3 SHEETS—SHEET 2.



Witnesses:

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No. 735,871.

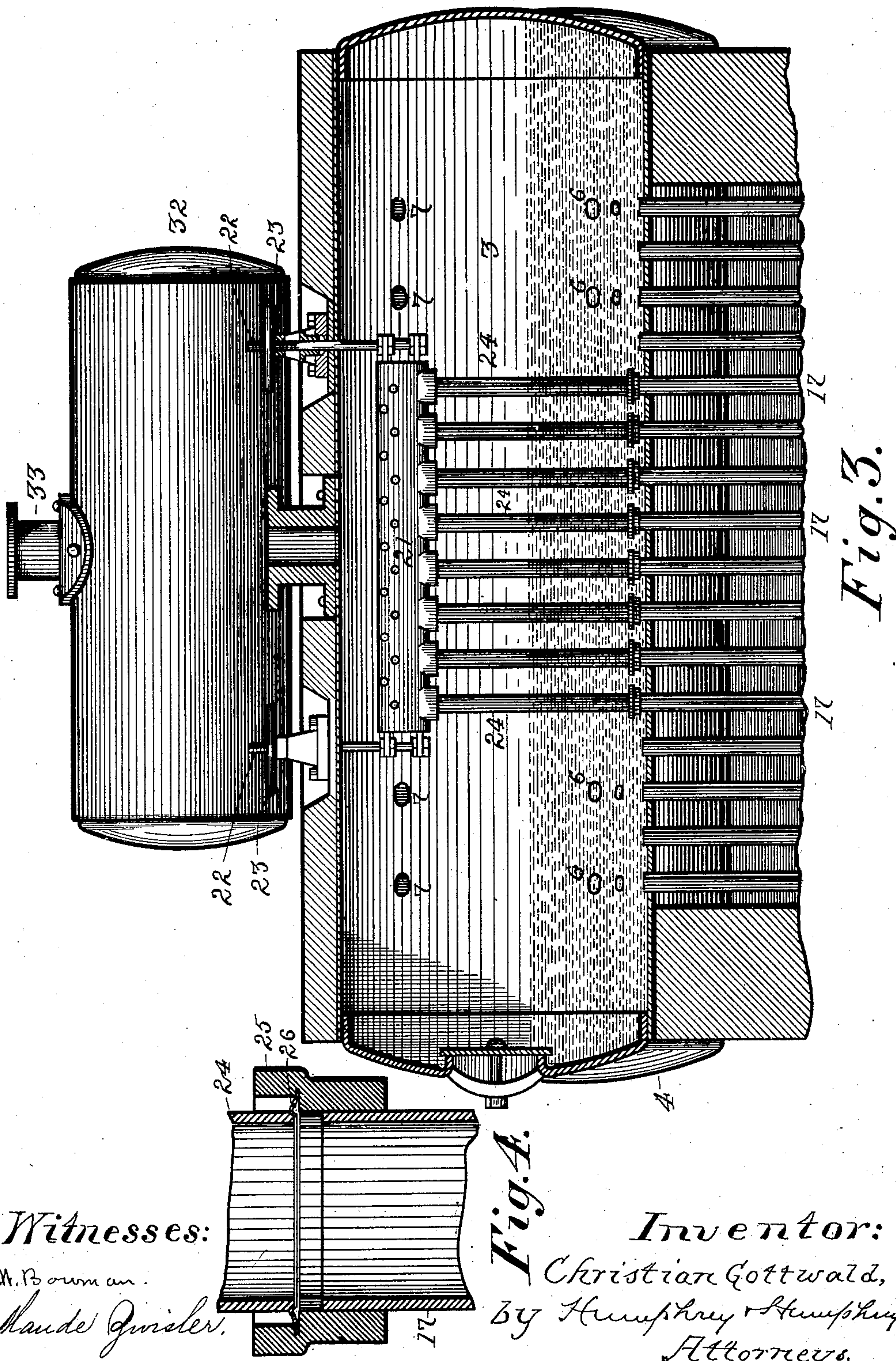
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NO MODEL.

3 SHEETS—SHEET 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHRISTIAN GOTTWALD, OF BARBERTON, OHIO.

SUPERHEATER FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 735,871, dated August 11, 1903.

Application filed April 24, 1902. Serial No. 104,478. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN GOTTWALD, a citizen of the United States, residing at Barberton, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Superheaters for Boilers, of which the following is a specification.

My invention has relation to superheaters for steam-boilers, and has special relation to boilers of the Stirling class.

The object of my invention is to produce a superheater for this class of boilers that will be effective in operation and easily controlled.

To the accomplishment of this object my invention consists in the peculiar and novel construction, arrangement, and combination of parts hereinafter described, and then specifically pointed out in the claims, reference being had to the accompanying drawings, which form a part of this specification.

In the accompanying drawings, in which similar reference-numerals indicate like parts in the different figures, Figure 1 is a section of a boiler of the class named with the inclosing furnace in vertical section transverse to the upper and lower drums and provided with my improved superheater; Fig. 2, a section, enlarged, of the upper portion on the line *x* of Fig. 1; Fig. 3, a similar section at the line *z*; and Fig. 4, a further enlarged section of the upper end of one of the superheating-tubes and tube connection.

Referring to the figures, 1 is the lower drum of the boiler and 2, 3, and 4 the upper drums, severally connected with the lower drums by banks of tubes 5 and with each other by tubes 6 below the water-line and by tubes 7 above the water-line, the whole inclosed in furnace-walls 8, provided with grate-bars 9 and grate-cover 10 and having a firing-door 11, ash-pit door 12, exit 13 to chimney, and clearing-hole 14.

Baffle-plates 15 deflect the heat and products of combustion about the tubes and against the drums, as indicated by arrows.

Thus far the boiler is of the ordinary construction of the class named.

My invention consists of the devices now to be explained.

Two ranks of tubes 16 and 17 in the right and central bank, respectively, are selected, and pairs of each rank are united at their

lower ends by elbows 18 in the drum 1, and these elbows are for convenience connected either integrally or mechanically with a plate 19 and drawn against the ends of the pipe by a bolt and nut 20, by which means the elbows are detachable when desired. The upper ends of the rank of tubes 17 are cut off squarely at the top in the same plane as shown in Fig. 4. Directly above a determined number of the ends of these tubes in the drum 3, is a perforated horizontal hollow cylinder, 21, sustained at each end and adapted to be raised and lowered by screws, 22, that pass through stuffing-boxes in the top of the drum, by hand-wheel nuts 23. Secured in the lower face of the cylinder are a number of depending tubes 24, that register vertically with a determined number of the tubes 17. The upper ends of this determined number of tubes have severally secured to them enlarged sockets 25, (see Fig. 4,) that the lower ends of the tubes 24 enter, and in the lower ends of these sockets is an annular detachable spring-ring 26, of resilient metal, that the lower ends of the tubes 24 bear on when they are lowered, and thus make tight joints. The upper ends of the rank of tubes 16 are in a like manner cut off on a plane parallel with the inner face of the drum 4, where they enter. Above the ends of a determined number of these tubes in the drum 4 is a closed hollow cylinder 27, sustained, like the cylinder 21, by screws 28, that pass through stuffing-boxes in the drum 4 and are raised and lowered by hand-wheel nuts 29. The upper ends of this determined number of tubes 16 are in like manner as the tubes 17 (but necessarily at a slight angle on account of the angle at which they enter the drum 4) provided with like sockets with spring-rings. Tubes 30, depending from the cylinder 27 in like manner as just described of the tubes 24, enter these sockets when the cylinder 27 is lowered, and by pressure on the rings therein seated form a tight joint therewith.

Above the drum 4 and supported by a pipe 31 is the superheated steam drum or dome 32, from which a pipe 33 conveys the superheated steam to the engine. The lower part of the pipe 31 is accurately bored internally, and in this fits and slides a pipe 34, internally connected with the cylinder 27, by which construction a compensating sliding joint is pro-

duced which constantly maintains a secure connection between the cylinder 27 and dome 32 as the former is raised and lowered.

In operation if the cylinders 21 and 27 are raised so as to open the upper ends of the determined number of ranks of tubes 16 and 17 the boiler operates in the usual manner without superheating effect, the steam being taken for use from the drum 3 in the usual manner; but when these cylinders are lowered steam enters the perforated cylinder 21 and passes thence through the selected tubes from the rank 17 around the elbows 18, selected tubes of the ranks 16 into the cylinder 27, by which course it is superheated and passes in that condition into the steam drum or dome 32.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An improved superheater for boilers consisting of a plurality of upper drums and a lower drum, tubes to connect said upper drums with said lower drum, means for connecting selected ranks of tubes within said lower drum, means to deliver steam from said selected ranks of tubes through one of said drums.

2. An improved superheater for boilers consisting of upper drums and a lower drum, tubes to connect said drums, means in one of said drums to connect a selected number of tubes leading to the other drums, a steam-drum on one of said drums and means to deliver steam from said selected tubes through one of said drums to said steam-drum.

3. In a superheater for boilers the combination of a plurality of upper drums and a lower drum, tubes to connect said upper drums with said lower drum, means for connecting selected tubes with each other situated in said lower drum, a steam-drum on one of said upper drums, means to convey steam from one drum above the water-line through the water in another drum and into said steam-drum.

4. In a superheater for boilers the combination of a plurality of upper drums and a lower drum, tubes to connect said upper drums with said lower drum, means in said lower drum for connecting selected tubes leading to said upper drums, means to permit the steam in

one upper drum to pass through said lower drum and another upper drum.

5. In a superheater the combination of upper drums and a lower drum, tubes to connect said drums, means in said lower drum to connect selected tubes with each other, means to extend said selected tubes above the water-line of their respective drums.

6. In a superheater for boilers the combination of a plurality of upper drums and a lower drum, tubes to connect said drums, means to connect selected tubes with one another, a steam-drum mounted on one of said drums and means to connect the steam-space in another drum with said steam-drum.

7. In a superheater for boilers the combination of an upper and lower drum, tubes connecting said drums, a steam-drum on one of said drums, means for connecting selected tubes with each other, and means to convey steam from the steam-space of one drum through said selected tubes to said steam-drum.

8. In a superheater for boilers the combination of a plurality of upper drums and a lower drum, tubes to connect said drums, means to connect selected tubes with each other, sockets on the ends of said tubes, spring-rings in said sockets and a vertically-adjustable rank of short tubes in one of said drums arranged when lowered to fit said sockets.

9. In a superheater the combination of a plurality of upper drums and a lower drum, tubes to connect said drums, means to connect selected tubes with one another, a steam-drum on one of said drums, a pipe depending from said steam-drum into its drum, a series of short vertical tubes in said drum connected with said pipe and capable when lowered to connect with the tubes from said lower drum and means to vertically adjust said series of short tubes.

In testimony that I claim the above I hereunto set my hand in the presence of two subscribing witnesses.

CHRISTIAN GOTTWALD.

In presence of—

C. P. HUMPHREY,

C. E. HUMPHREY.