No. 701,895. Patented June 10, 1902.

J. J. KILSHAW.

STEAM GENERATOR.

(Application filed June 26, 1901.)

(No Model.)

3 Sheets—Sheet 1.

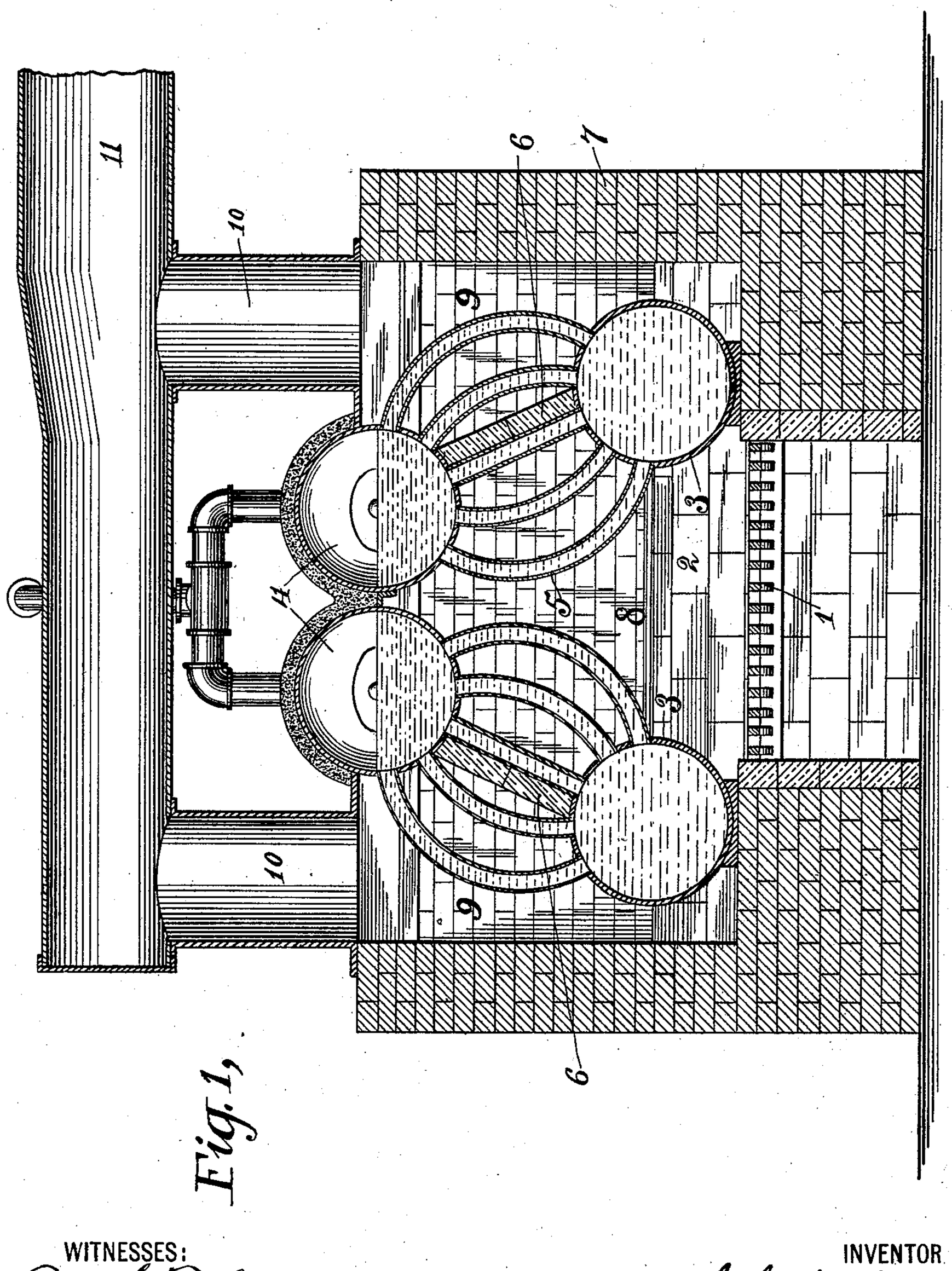

Fig. 1,

WITNESSES:

Benj. C. Teale.

M. M. Conover.

INVENTOR

John J. Kilshaw

BY

Chapin & Hayward

his ATTORNEYS

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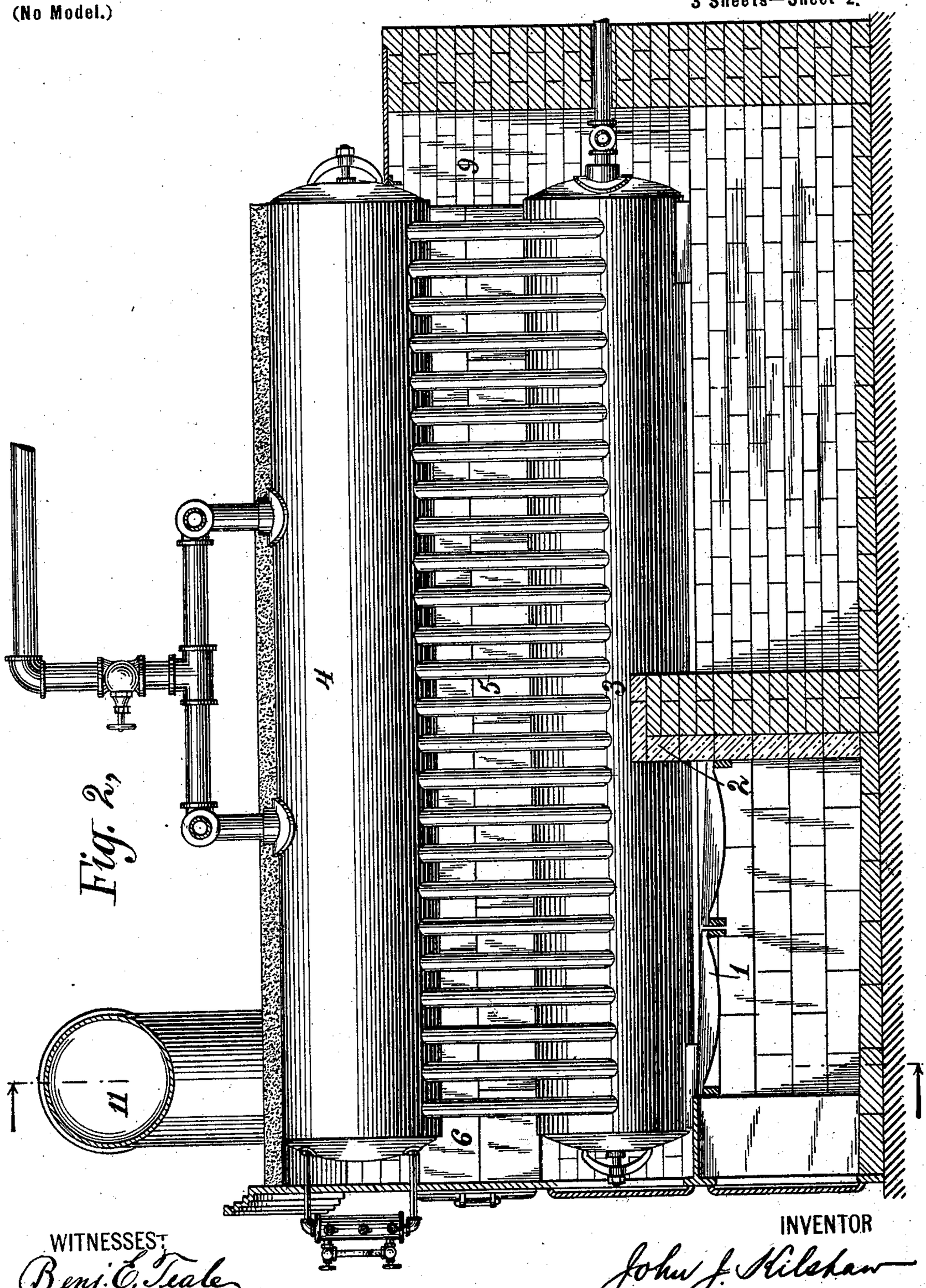

Fig. 2.

WITNESSES:

Benj. C. Teale

M. M. Conover.

INVENTOR

John J. Kilshaw

BY

Chapin & Hayward

his ATTORNEYS

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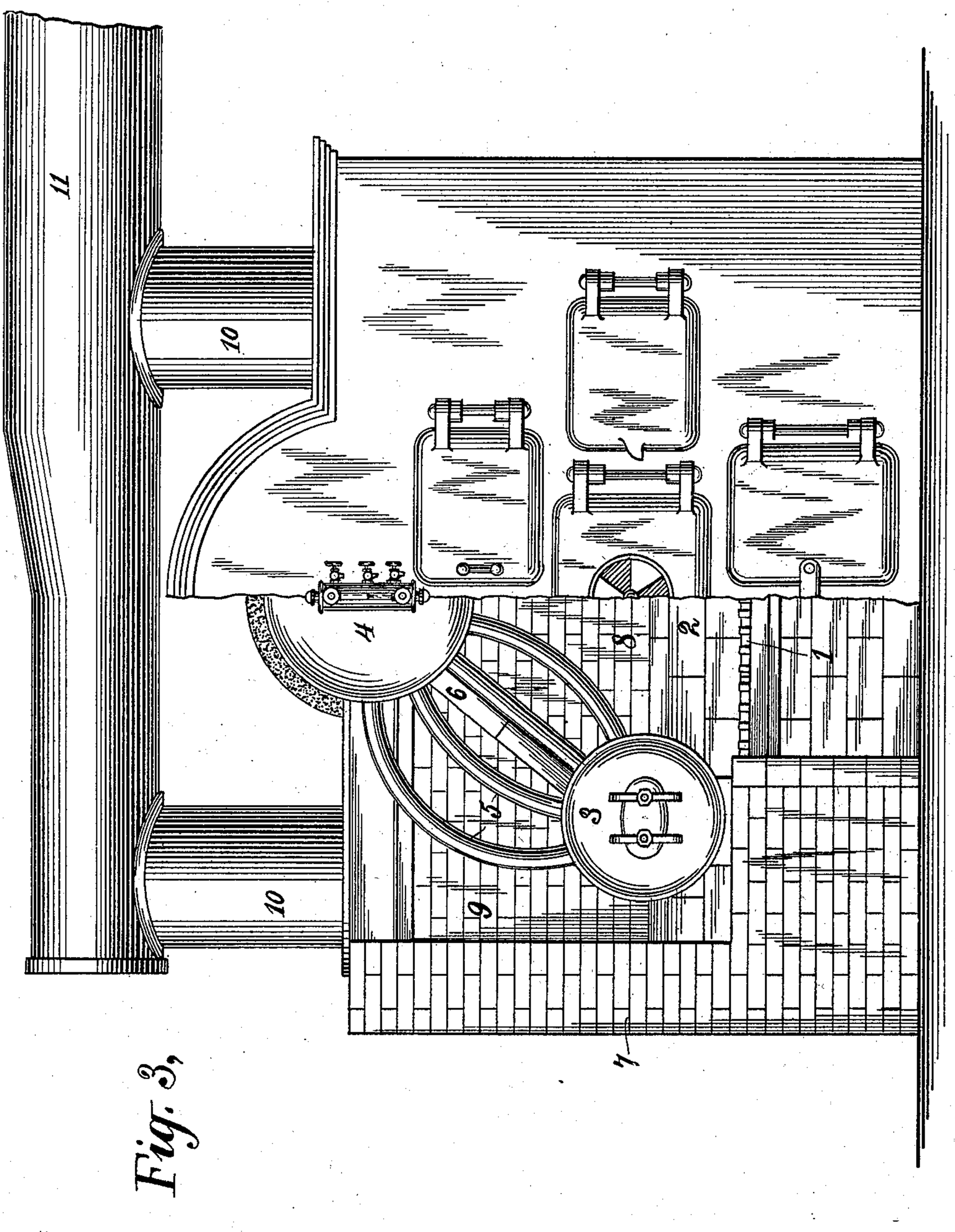

Fig. 3,

WITNESSES:

Benj. C. Teale.

M. M. Conover.

INVENTOR

John J. Kilshaw

BY

Chapin & Hayward

his ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN J. KILSHAW, OF BROOKLYN, NEW YORK.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 701,895, dated June 10, 1902.

Application filed June 26, 1901. Serial No. 66,144. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. KILSHAW, a citizen of the United States of America, and a resident of the city of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in steam-generators, and particularly to that class of steam-generators known as "tubular" or "water-tube" boilers.

My improved steam-generator comprises a casing having within it a suitable furnace and longitudinal water-drums arranged one each side of the furnace, a steam-drum above the water-drums, and generating-tubes connecting the steam and water drums. A single row of generating-tubes is provided between the steam-drum and each of the water-drums, comprising a plurality of generating-tubes, each of which is entirely straight throughout its length and which connect with the said drums in substantially radial lines thereof. The rest of the generating-tubes are curved and are preferably curved throughout their entire length upon arcs of circles. The curved generating-tubes are further preferably equally disposed upon opposite sides of the said generating-tubes, whereby a balance of pressure and strain is effected. Longitudinal dividing-walls are provided which are located within the nests of tubes connecting the steam and water drums and divide the space within the casing into a combustion-chamber and two return passages or flues.

The objects of my invention are generally to improve steam-generators of this type; to construct a generator in which there are long passages for the products of combustion and in which the generating-tubes are at right angles to the path of said products of combustion throughout their passage; to provide a construction whereby certain of the generating-tubes between the steam and water drums, being straight, will themselves form stays between the said drums, and the other generating-tubes arranged on opposite sides, being curved, will provide for the necessary contraction and expansion; to equalize or balance the strain and pressure by equally disposing the curved generating-tubes on opposite sides of the straight generating-tubes; to provide generating-tubes in which there are no sharp bends at which scale may deposit, and to provide a construction which shall be easy to manufacture, simple to assemble, and easy to clean and keep in repair.

My invention further consists in certain novel details of construction and combination of parts, as shall hereinafter more fully appear, and other advantages will appear hereinafter.

I will now proceed to describe a steam-generator embodying my invention and will then point out the novel features in the claim.

In the drawings, Figure 1 represents a transverse section of a steam-generator embodying my invention. Fig. 2 is a view in central longitudinal section of the same. Fig. 3 is a view in front elevation, with the casing partially broken away at one side, of a steam-generator embodying my invention, but having a structure slightly modified from that shown in Figs. 1 and 2.

In the embodiment of my invention herein illustrated I have shown the ordinary form of grate 1 and bridge 2, at the rear thereof, to form the fire-box of the furnace which is intended to deliver heat from burning coal; but it is within the purview of this invention to employ any form of furnace or heating medium, as may be desired. For instance, I may burn gas or oil, if desired, instead of coal or coke, and a special form of furnace for such purpose would then be provided.

I provide two substantially horizontal water-drums 3 3, arranged longitudinally along opposite sides of and extending beyond the grate 1 of the furnace. About the water-drums 3 I provide a steam-drum 4. The steam-drum 4 may comprise a single member, as shown in the structure illustrated in Fig. 3, or it may comprise two members, such as is shown in the structure of Figs. 1 and 2.

I provide a plurality of generating-tubes 5, connecting the steam and water drums, as shown. These generating-tubes 5 are arranged in two nests, each nest connecting one of the said water-drums 3 with the steam-drum 4. Each nest comprises a series or rows of

tubes, and for the purpose of manufacture and assemblage these tubes preferably connect with the said drums upon lines substantially radial thereof. The said tubes may be expanded into the drums in the usual manner, and it will be noted that the said tubes are all either straight or have a uniform and gentle curve throughout their length, so that there are no sharp bends therein at which scale may be deposited.

I provide two longitudinal dividing-walls or partitions 6, each of said dividing-walls being located within one of the nests of the tubes. A casing 7 surrounds the drums, generating-tubes, and furnace, and the said dividing-walls or partitions extend clear to the front wall of said casing, but do not extend entirely to the rear wall thereof. The said dividing-walls or partitions divide the space inclosed within the casing substantially into a combustion-chamber, which I have designated, as a whole, by the reference character 8, and two return flues or passages 9. The return flues or passages 9 connect with uptake connections 10, leading to a flue 11, which may connect with a suitable stack.

I have provided the drums with suitable manholes at their ends, through which access may be had to the interior thereof, and I have provided suitable doors in the casing by which access may be had to the said manholes, to the furnace, to the ash-pit, and to the other parts of the generator.

In locating the dividing-walls or partitions 6 within the nests of generating-tubes it will be seen that I have not only divided the space inclosed by the casing into a combustion-chamber and two return flues or passages, but I have thereby so arranged that a certain number of the said generating-tubes shall be within the combustion-chamber and shall receive the direct action of the products of combustion, while certain others of the tubes will be located within the return-passages and shall receive the action of the products of combustion only upon their return through the said return-passages. By this arrangement I obtain a complete and thorough circulation of the water within the generator while giving it the least movement in such circulation. It will further be seen that the generating-tubes are all at right angles to the path of the products of combustion, and hence are in the most effective positions for receiving the heat therefrom.

It is obvious that modifications of my invention may be resorted to without departing from the spirit and scope thereof, and I do not, therefore, desire to be limited only to the precise construction shown.

What I claim is—

In a steam-generator, the combination with a casing having within it a furnace, of water-drums at the sides of the furnace, a steam-drum above said water-drums, said steam-drum comprising two members arranged side by side, and out of water communication with each other except through the generating-tubes and water-drums, generating-tubes connecting the steam with the water-drums, and two longitudinal dividing-walls each located within the nest of generating-tubes connecting one of the said water-drums with one of the said steam-drum members, said longitudinal dividing-walls dividing the space into a combustion-chamber and two return-passages.

JOHN J. KILSHAW.

Witnesses:
D. HOWARD HAYWOOD,
A. H. PERLES.