

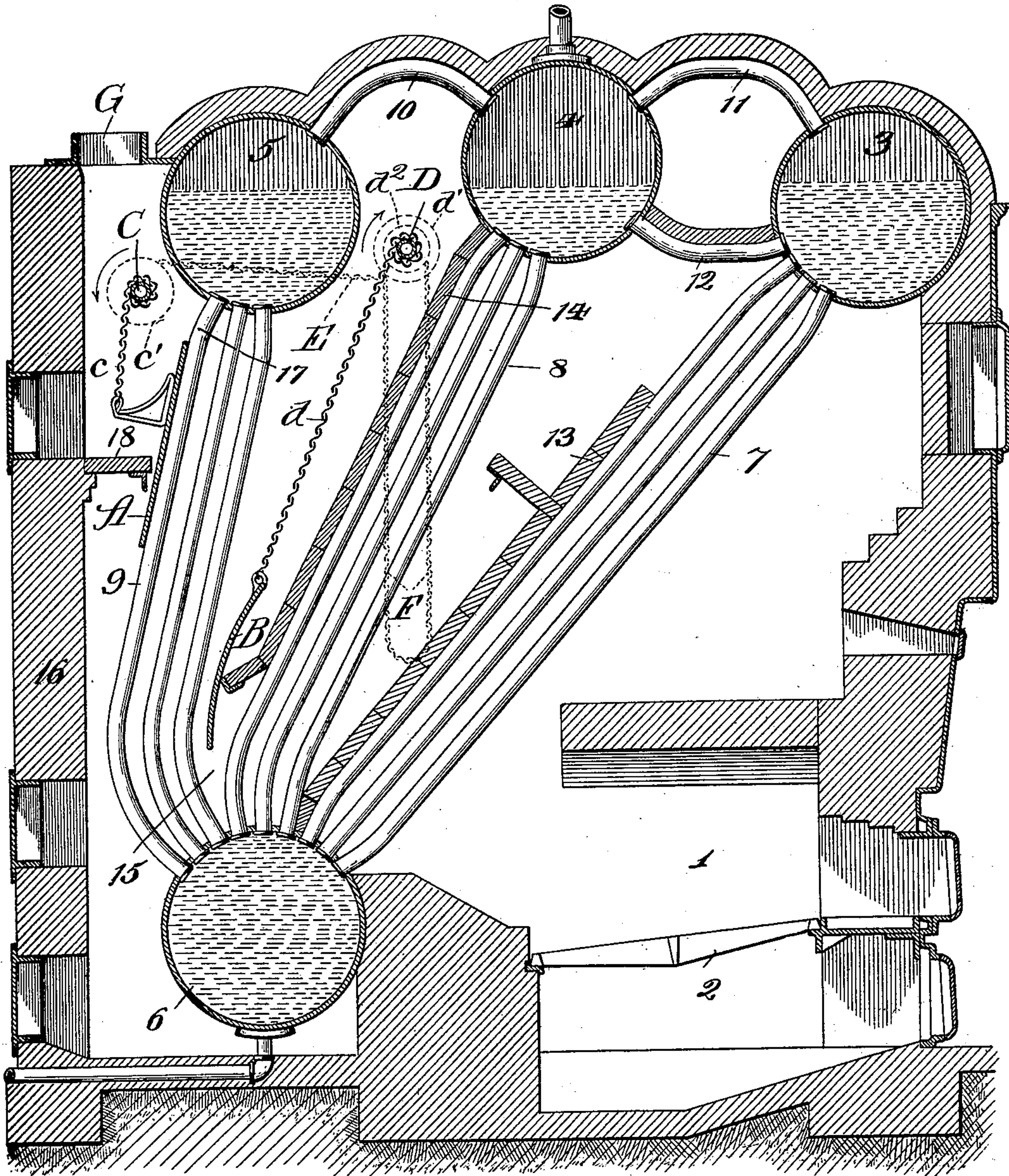
No. 626,754.

Patented June 13, 1899.

F. M. FABER.
STEAM BOILER.

(Application filed Mar. 21, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

FRANK M. FABER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE STIRLING COMPANY, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 626,754, dated June 13, 1899.

Application filed March 21, 1898. Serial No. 674,593. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. FABER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

My invention relates to boilers provided with water-tubes arranged in such a manner as to be contacted by the heated gases and products of combustion on the way from the furnace to the outlet in a smoke-stack, and particularly to the means by which the gases are guided and deflected in their course through or among the tubes.

The object of the invention is to provide a boiler having water-tubes with means for controlling and regulating the passage of gases through and between the tubular parts of the boiler.

Further objects of my invention will appear from an inspection of the accompanying drawing and the following description and claims.

The invention consists principally in the combination, with a boiler, of a movable or adjustable baffle wall or walls for controlling, guiding, and deflecting the passage of gases through and between the boiler-tubes.

The invention consists, further and finally, in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawing the figure illustrates a vertical sectional elevation of a water-tube boiler of the "Stirling" type equipped with my improvements.

In the art to which this invention relates it is well known that boilers provided with water-and-steam drums and having tubular portions connected therewith at one or more points for the passage of water and arranged to be contacted by the heated gases and products of combustion are very economical in the generation of steam in that they present a large surface for the absorption of heat and materially assist in circulating the water, thus enabling the steam globules to more readily escape. It is further well known that the volume of the gases varies with the temperature and that when the temperature is

exceedingly high the gases require a larger passage than when the temperature is relatively low, and when the boiler is being "forced" a larger volume of gas or products of combustion passes through the setting than when operated at or below rating, and consequently larger passages should be provided when operating under these conditions. The ordinary tubular boiler of the present day is provided with baffle-walls arbitrarily and immovably fixed, and while they in a measure accomplish the object desired—the guiding and deflection of the gases—they do not when thus immovably fixed give the highest economical results under varying loads. This method of arranging the baffle-walls is also objectionable in that they must be fixed at a point giving the highest average economy, and consequently cannot give the highest possible economy for any particular output.

The principal object of my invention, therefore, is to overcome the objections above noted and to provide the baffle-walls with a movable portion by which the size of the openings for the passage of the gases may be controlled.

In illustrating and describing my improvements I have shown and will describe them in connection with a boiler of the Stirling type for the purpose of disclosing my invention and enabling those skilled in the art to practice the same; but I do not desire to be limited to the combination with this kind of a boiler any further than is pointed out in the claims, for the reason that my improvement may be adapted to various kinds of tubular boilers by making slight mechanical changes and without departing in the least from the spirit of the invention.

In constructing a boiler in accordance with my improvements I use a furnace 1, of desirable size and shape, provided with grate-bars 2 for the purpose of generating a sufficient quantity of heat in order to evaporate the water and generate steam.

This boiler, as shown in the drawing, is of the ordinary Stirling type and is provided with several elevated steam-and-water drums 3, 4, and 5 and a lower mud-drum 6. These elevated drums are connected with the mud-drum by means of several banks of tubes 7,

8, and 9, so as to assist in the circulation of the water and permit the easy escape of the steam globules. The elevated steam-and-water drums are also connected together by means of pipes 10, 11, and 12, which connect such drums above and below the water-level, all of which is thoroughly understood by those skilled in the art and forms no material part of my invention.

In order to deflect and guide the heated gases and products of combustion which issue from the fire-box or fuel-chamber to pass out through the stack G, I provide the baffle plates or walls 13, 14, and 18. The baffle-wall 13 is arranged adjacent to the first bank of tubes and the lower mud-drum, so that the heated gases must pass up through and between the first bank of tubes to contact the same and assist in the evaporation of the water. I arrange the second baffle wall or plate 14 adjacent to the second bank of tubes at the farther side thereof and to contact the middle elevated steam-and-water drums, so that the heated gases and products of combustion must pass down around the same and through an opening 15, which exists between the lower end of the baffle-wall and the lower mud-drum. The rear wall 16 and the shelf 18 of the furnace form the rear baffle-wall, so that the heated gases and products of combustion must pass up through the rear bank of tubes before they can pass into the smoke-stack. For purposes of economy in construction I prefer to make a portion of the baffle-walls immovable or fixed. To regulate the size of the openings 15 and 17, that are between the second baffle-wall and the lower mud-drum and the rear baffle-wall of the furnace and the elevated steam-and-water drum, I provide movable portions A and B, which are really portions of the baffle-walls in that they deflect the heated gases and products of combustion in the desired manner. In a measure they act as dampers in that being movable they regulate the size of the opening through which the heated gases must pass. For instance, the temperature of the heated gases and products of combustion as they pass through the opening 15, between the second baffle-wall and the lower mud-drum, is higher than when they pass through the opening 17, between the elevated steam-and-water drum and the rear wall, as the water in circulating through the pipes has absorbed or taken up a quantity of the heat, so that it is necessary that the first opening should be larger than the second. When but a small volume of gases is produced in the furnace, they will not fill the baffle-openings 15 and 17, and consequently the lower portion of the

tubes at 15 and the upper portion of the tubes at 17 will not be contacted by the gases or products of combustion unless these openings be reduced or contracted. By raising the movable damper A and lowering B, thus cutting off a portion of the openings and compelling the gases to contact substantially every part of the tubes throughout their length, the boiler may be adjusted to the most economical point for each particular load. In order to operate these movable portions of the baffle-walls and raise and lower them whenever it is desired, I arrange two shafts C and D, running through the boiler-walls at or near the top of the structures, and suspend the movable portions of the baffle-walls to these shafts by the chains *c* and *d*, which may be attached to them in any desired manner. It will thus be seen that by turning the shafts the movable portions of the baffle-walls are raised and lowered, as desired. On the outside of the furnace the shaft C is provided with a wheel *c'* and the shaft D with a wheel *d'*, while a chain E connects these wheels together, so that as one is operated the other will be operated. To rotate the shaft D, and thus the other shaft, through the medium of the chain E, I provide a second wheel *d''*, around which a chain F is passed, which may extend downwardly, so as to be within the reach of the stoker, and thus allow him to manipulate the movable portions and suit different circumstances and conditions. The two dampers may be thus moved at the same rate or at different rates, as desired.

I claim—

1. In a boiler, the combination of water-tubes, a plurality of mechanically-connected movable baffle-walls adjacent to the water-tubes for guiding and deflecting the heated gases and products of combustion, and mechanism for moving the baffle-walls simultaneously, substantially as described.

2. In a water-tube boiler, the combination of elevated steam-and-water drums, a lower mud-drum, banks of tubes connecting the elevated steam-and-water drums with the lower mud-drum, two movable baffle-walls for controlling the course of the heated gases through the banks of tubes to which they are adjacent, a shaft and pulley for each movable baffle-wall, a chain connecting the two shafts and pulleys, and a chain extending downwardly outside the boiler for operating the movable baffle-walls, substantially as described.

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Witnesses:

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