(No Model.)

V. W. BLANCHARD.

SUPERHEATER FOR STEAM BOILERS.

No. 289,964. Patented Dec. 11, 1883.

Fig. 1.

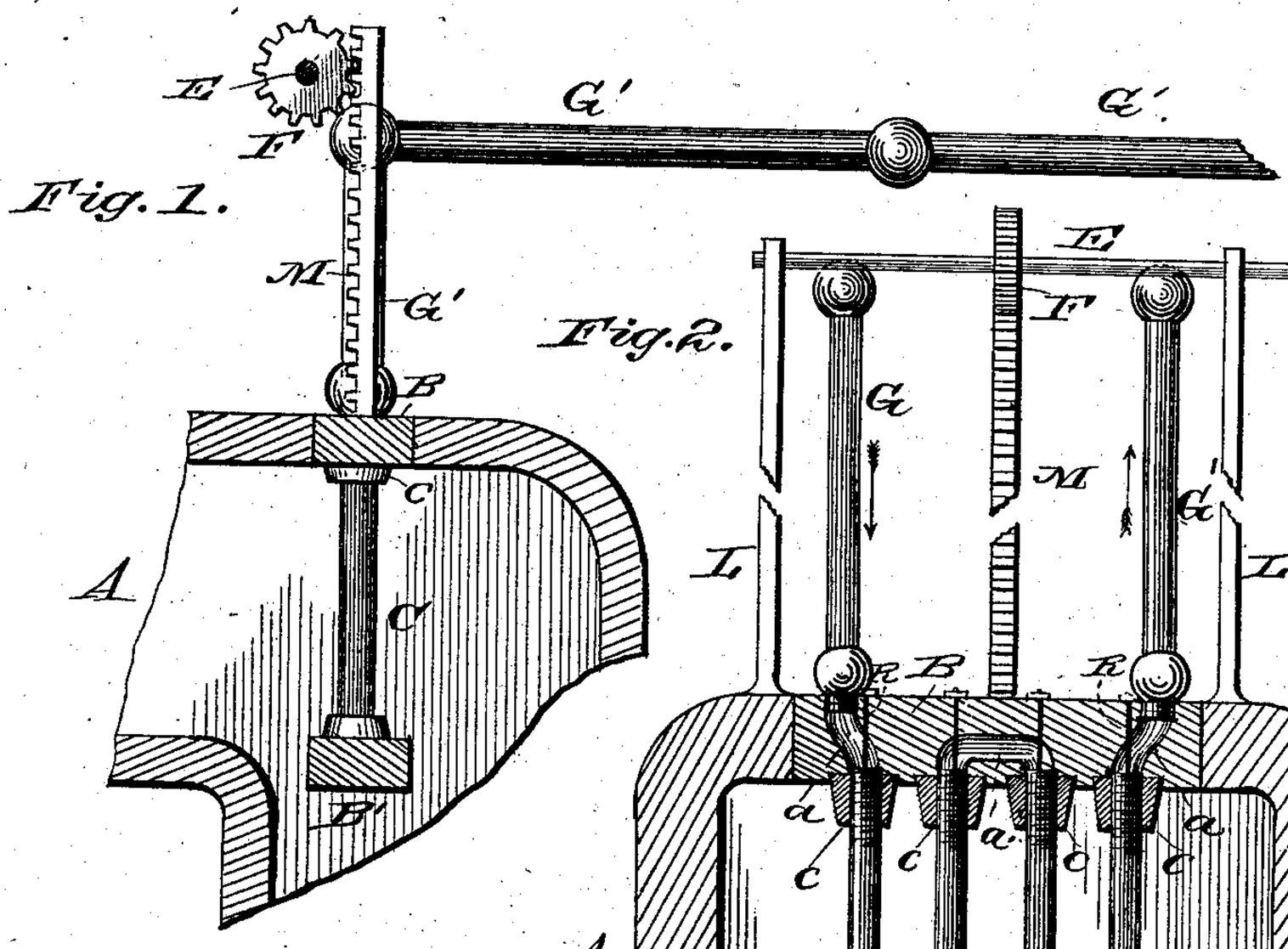
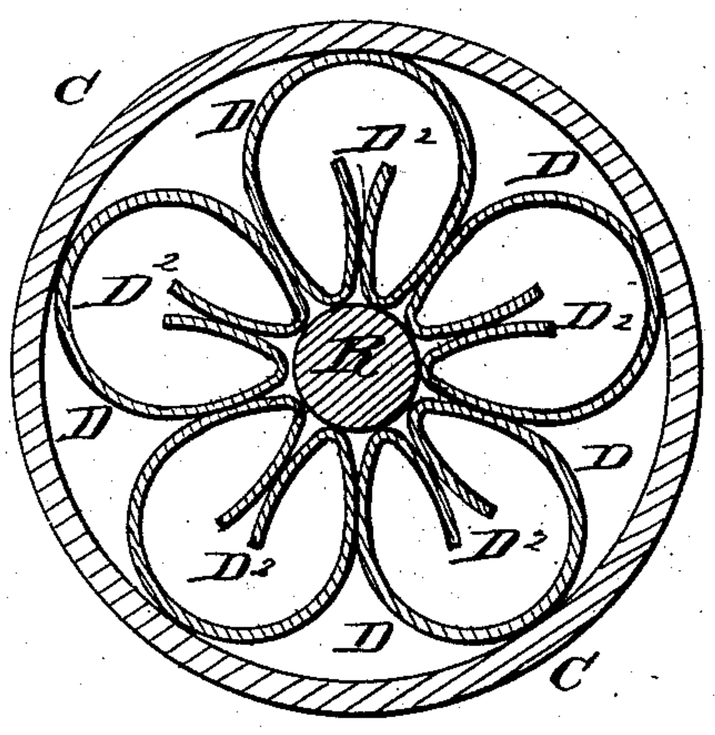


Fig. 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

VIRGIL W. BLANCHARD, OF NEW YORK, N. Y.

SUPERHEATER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 289,964, dated December 11, 1883.

Application filed January 2, 1883. Renewed November 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, VIRGIL W. BLANCHARD, of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Superheating Apparatus for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to novel means for superheating steam in any steam-boiler wherein the products of combustion are passed from a furnace into a combustion-space containing the water-holding tubes or chambers.

The gist of my invention consists in a suspended superheater which can be moved at will out of the fire-flue when the engine is stopped, so that it will not be burned out; also, in means for moving out of a fire-flue a superheater for the purpose of preventing it from being burned out.

My invention also consists in a superheater composed of two heads or plates of equal area, cast with channels and cored, so that by means of pipes a communication is made through said channels. The connecting-pipes and inlet and outlet steam-pipes will establish a continuous current of steam from the boiler through the superheater to the engine, substantially in the manner and for the purposes described.

The invention further consists in the employment of a superheater which is vertically movable, and which is applied in an inlet-space leading to a steam-boiler, the steam from the boiler acting through the medium of a flexible pipe, as will be hereinafter explained.

This invention also consists in a series of copper tubular and flanged fillings in the superheating-pipes, for the purpose of increasing the heat-radiating surfaces, as will be hereinafter explained.

Other features of my invention, together with those which have been above briefly set forth, will be hereinafter described more fully when taken in connection with the annexed drawings, in which—

Figure 1 is a vertical sectional view, showing my new superheater applied at the inlet-mouth of the wall of the furnace in which I inclose my steam-generator. Fig. 2 is a vertical cross-section, enlarged, showing my steam-generator in position for receiving the heated products of combustion on their way to the steam-boiler and chimney of the furnace-chamber. Fig. 3 is an enlarged cross-section of one of the steam superheating-pipes, showing the spider-tubes and flanges arranged therein, in combination with the central tie-rod, which I prefer to make of steel.

This invention and improvement has been referred to in an application filed January 29, 1883, and marked "Case 13," wherein I have claimed a new construction of the steam-generator. I now take from the steam-dome of the generator described in said application the steam generated in the pipes composing the same and conduct this steam, which is known as "common steam," through the superheater, which I shall now explain.

A designates a flue leading to a steam-boiler, which latter may be constructed in any manner suitably adapted for the generation of steam.

This invention has especial relation to the application which bears date January 29, 1883, as above referred to, wherein I have shown a steam-generator of novel construction.

B B′ designate two heads, which are of even diameter or area, and which are cored out at *a a′* for the purpose of establishing communications between pipes C, through which tie-rods R pass for the purpose of securely uniting the said heads.

Inside of the pipes C, I apply a series of copper tubes, D, formed with internal reflecting flanges D^2. The object of this arrangement is to increase in a great degree the heating-surfaces. This, it will be observed, I do by the multiplication of heating-surfaces without materially reducing the space or bulk of the boiler. I screw the pipes C into the base-plate B′, and I secure the upper ends of these pipes into the cap or top plate, B, by means of nuts *c*, or in any other equivalent manner.

Communicating with the left-hand pipe C is a jointed pipe, G, which leads steam from the steam-dome of a boiler to the superheater; and leading from the last pipe of the series is

another jointed pipe, G′, which is carried to the engine and connected to the steam-chest thereof. This arrangement forms a continuous channel through which steam passes on its way from the boiler, and is superheated or reheated by reason of the direct heat to which this superheater is subjected.

It is desirable, when the engine is stopped, that the superheater should be removed from the influence of the intense heat of the products of combustion passing through the flue A. This I effect by the following contrivance, to wit: on top of the tube A, I erect two standards, L L, which are rigidly fixed, and at the upper ends of these standards I form boxes for a horizontal shaft, E. Between the said standards is a vertical rack, M, which is secured to the upper head, B, of the superheater, and which engages with the teeth of a pinion, F, keyed on said shaft. This shaft E is adapted to receive rotation from a beveled wheel, *f*, (on which is a hand-crank, K,) acting through the medium of beveled spur-wheels *f′*, shaft J, and beveled spur-wheels *d d′*, as clearly shown in Fig. 2. By this arrangement of devices an attendant can at will raise the superheater out of the flue A, and without the influence of the heated products passing through it, and cause the lower head, B′, to occupy the space through the said flue which was filled by the upper head. It will thus be seen that the superheater can be readily removed from the flue A when the engine is stopped.

The enlarged view of my superheater shown by Fig. 2 represents pipes C, which are somewhat smaller in diameter than the pipes C of Fig. 1, but it is obvious that pipes of various diameters and lengths may be used.

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

1. The combination of a fire-flue, a superheater suspended therein and constructed with closing-heads B B′, of an equal size and shape, and an elevating and supporting device, substantially in the manner and for the purposes described.

2. In combination with a fire-flue and a vertically-movable superheater, flexible steam-pipes, one leading from a steam-dome to the superheater and the other leading from the superheater, all adapted to operate substantially in the manner and for the purposes described.

3. The combination, with a fire-flue, of a superheater consisting of chambered heads, pipes communicating with the chambers in said heads, tie-rods securing the whole together, and an elevating and supporting device, all constructed and adapted to operate substantially in the manner and for the purposes described.

4. The combination of steam-superheating pipes, chambered heads having the same superficial area adapted to fill the aperture through the crown of the flue A, and means for raising and lowering this superheater, all constructed and adapted to operate substantially in the manner and for the purposes described.

5. The combination, with a fire-flue, of a superheater applied in the throat of this flue, and means for removing the superheater out of the flue, substantially as described.

6. The combination of a steam-superheating tube, the central tie-rod, and the metal tubes D, formed with reflecting-flanges D^2, substantially in the manner and for the purposes described.

7. The combination, with a superheater constructed and adapted to be flexibly connected by steam-pipes to a steam-dome and to an engine, of the perforated fire-flue, the standards L, the shaft bearing a pinion, F, and a bevel-gear, *d*, the vertical shaft J, bearing the bevel-wheels *d′* and *f′*, and the bevel-wheel *f*, having a crank-handle, all constructed and adapted for moving the superheater out of and adjusting it into the fire-flue, substantially in the manner and for the purpose described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

VIRGIL W. BLANCHARD.

Witnesses:

H. P. SISSON,

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