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BOILER INSTALLATION.

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Fig. 1.

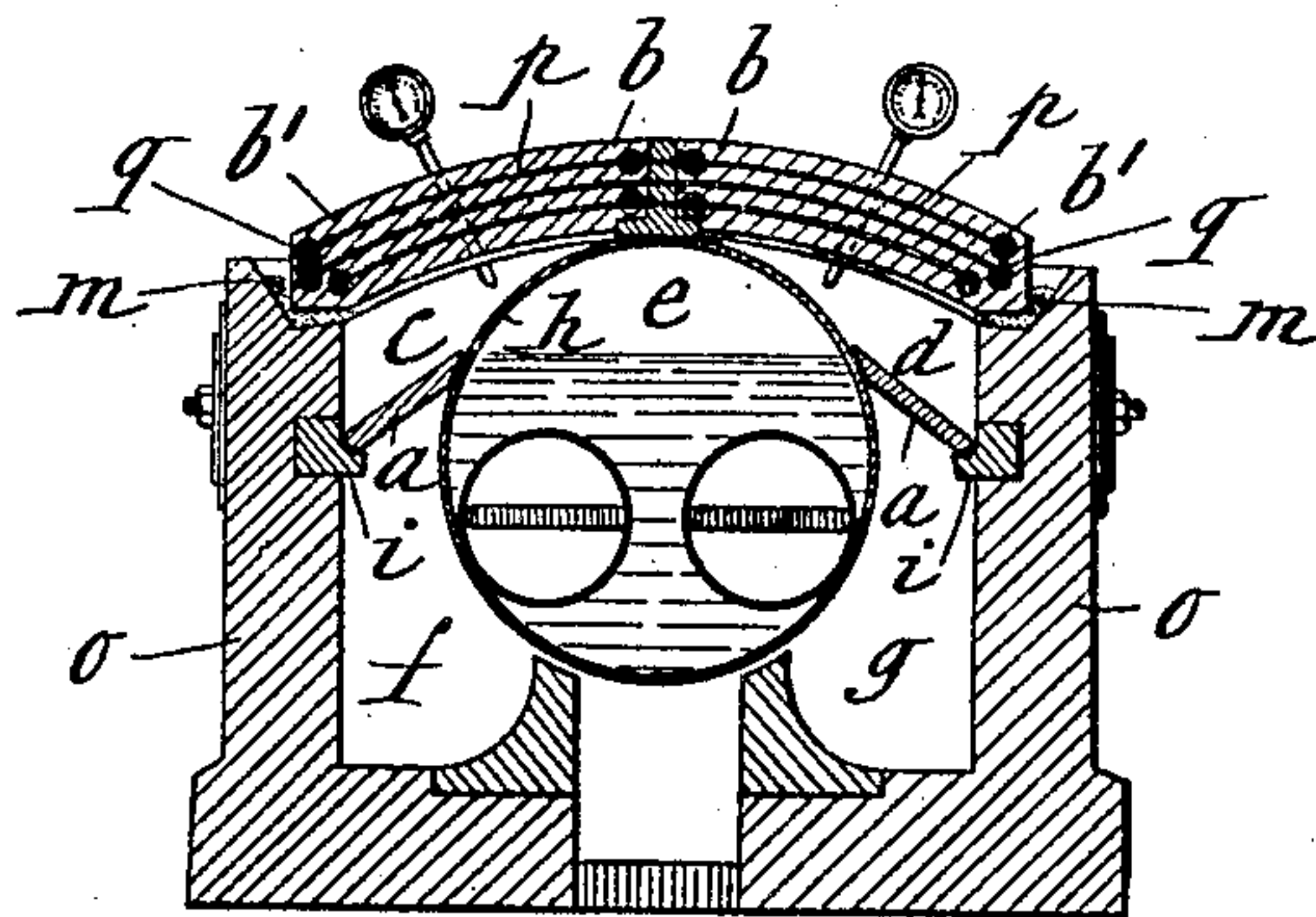
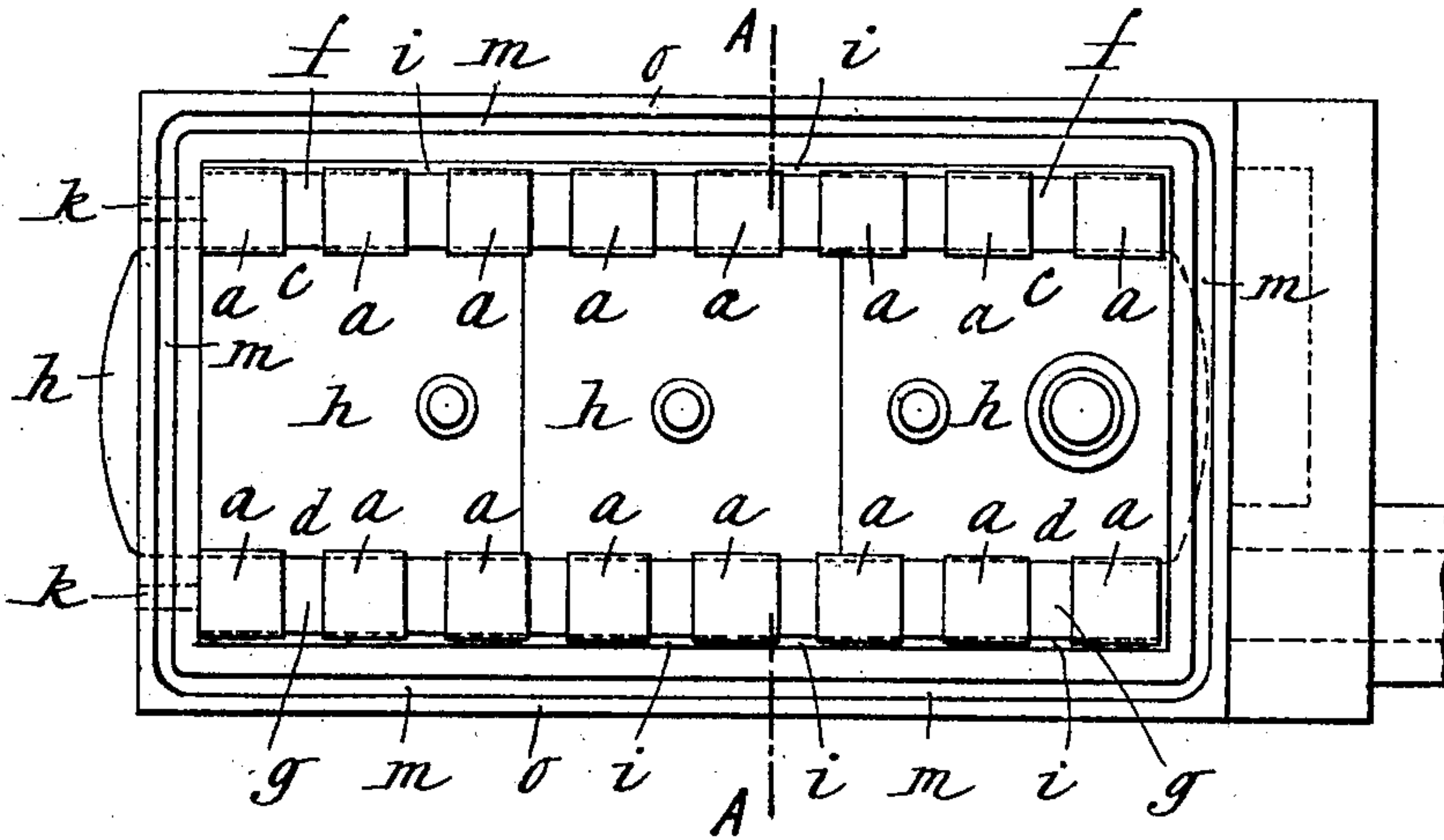


Fig. 2.



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UNITED STATES PATENT OFFICE.

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BOILER INSTALLATION.

No. 913,638.

Specification of Letters Patent.

Patented Feb. 23, 1909.

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To all whom it may concern:

Be it known that we, EMILE NICOLAS JOSEPH GERMEAU, a subject of the King of the Belgians, residing at Jumet, Belgium, and
5 ALBERT NICOLAS GHISLAIN BOUTON, a subject of the King of the Belgians, residing at Ixelles - Brussels, Belgium, have invented certain new and useful Improvements in Boiler Installations, of which the following
10 is a specification.

This invention relates to improvements in masonry seatings for steam boiler installations.

15 The invention relates particularly to boiler installations of the kind which comprise heating chambers for the upper portion of the boiler.

The object of the invention is firstly to limit and adjust the temperature, for the
20 upper portion of the generators, so as to bring about the superheating of the steam and to utilize in a rational manner the whole surface of the boiler as heating surface, and thus to obtain dry steam, while at the same
25 time effecting a considerable saving in fuel.

A further object of the invention is to so dispose the masonry as to prevent the heating chambers from being damaged by the expansion of the body of the generator, and to
30 enable their temperature to be regulated, more particularly at the beginning, without stopping the working of the generator.

Finally, it has for its object to provide reliable means of regulation not liable to be
35 affected or destroyed by the action of heat.

The improvements according to this invention chiefly consist in the arrangement of heating chambers surrounding the upper
40 portion of the generator (above the level of the water) in such manner that they should only communicate with the well known outside heating flues but not be connected directly to the chimney or other draft producing devices. In other words, there is no
45 direct draft through the upper chambers, the arrangement being such as to bring about a heating of the said chambers merely by their communication or contact with the said flues while not creating therein a real circulation of combustion gases or products, which circulation would be liable to develop in them excessive temperatures the regulation of which would require a continuous supervision and would be practically impossible.
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The improvements consist, moreover, in building the said heating chambers with movable arches supported on the one hand, by the generator, and resting on the other hand on the walls of the masonry seating, so
60 that the said arches can participate in the movements due to the expansion and contraction of the body of the generator, the production of any cracks and leaks which might modify the temperature of the chambers and the state of regulation arranged, being thus obviated.

Finally, these improvements consist in the construction of inner arches by means of movable separate elements, capable not only
70 of making a movement of oscillation (required to enable them to follow variations in the expansion of the body of the generator), but also of being moved in the longitudinal direction of the generator, or of being re-
75 moved completely during the working of the latter, so that the elements of the arch themselves constitute movable closing devices, the positions of which can be arranged during the working of the generator in such
80 manner as to bring about the initial regulation of the temperature of the chambers to suit the exact conditions of each individual case, such as the circulation of gas in the ordinary flues, the nature of the fuel, the
85 draft produced by the chimney or other existing devices, the average atmospheric pressure and other conditions which vary from one installation to another.

A construction of a brickwork or masonry
90 boiler seating according to this invention is illustrated by way of example in the accompanying drawing, in which—

Figure 1 is a cross-section through the installation on line A—A of Fig. 2 and Fig. 2 is
95 a plan, the upper arch being removed.

The improvements are chiefly applicable to installations of generators with one or more internal furnaces. They can, however, be also applied to installations of multi-
100 tubular boilers.

The drawing gives by way of example an installation for a boiler with two internal furnaces.

The boiler is surmounted by arches *a a* and
105 *b b* forming chambers *c d* surrounding the upper portion *e* of the generator, situated above the normal water level. These chambers communicate with the outer heating flues *f g* by means of suitable openings made in the
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arch *a a* but do not communicate directly with the chimney or other draft producing device, so that they are heated merely by contact of the air or of the gases contained in them, with the gases circulating in the ordinary flues *f g*, but no gases participating in the circulation pass through the said chambers.

The heat developed in the heating chambers is, therefore, limited to that which can be produced by contact and convection. The perforations are made in such manner that in practice the chambers *c, d* should be heated to a temperature of from 200—300° C. The jacket *c d* thus constitutes superheating chambers communicating a heat which completely dries the steam in the upper portion or steam space *e* of the generator.

The realization of the desired temperature depends to a large extent on general conditions which necessarily vary with different installations. The extent of communication between the chambers *c d* and the flues *f g* as well as the position of the openings must be arranged with due regard to the said conditions. This is rendered possible by the special construction of the arches *a a*. The latter consist, in fact, of movable separate elements *a* (Figs. 1 and 2) resting freely on the one hand on supports *i* and constituted if desired by grooved bricks projecting into the interior of the flues *f g*, and on the other hand, on the body *h* of the boiler. The said elements *a a* made preferably of fire-proof material can thus be removed from their supports and can also make a movement of oscillation about their lower point of rest *i* and can moreover be moved in the longitudinal direction of the generator.

The initial regulation of the extent and position of the contact openings is obtained during the working of the generator in the following manner: On the front wall of the brickwork seating are left openings *k k* through which a rod provided at the end with a fork and with a hook can be introduced. One or the other element *a* can be seized with the fork and swung so that it will fall on the bottom of the flues *f* and *g*, whence it can be subsequently removed during cleaning. The removal of one or more elements is obviously intended to increase the extent of the openings between the chambers *c d* and the flues *f g*. Moreover the elements *a a* can be moved one after another in the longitudinal direction for equalizing the open cross-section obtained by the removal of one or more elements, or for modifying the distances *n* between the various elements, according to the position of the opening, with due regard to the temperature etc. which generally obtains in the corresponding portion of the flues.

Indications of the pyrometers *ll* projecting into the chambers *c d* will be noted, and the

regulation is continued until the desired stable temperature is obtained. This initial regulation having been made, the holes *k* can be closed, the installation generally continuing to work under the same conditions. This construction of the inner arch enables the regulation to be effected by means of the elements of the arch, and does away with all valves, dampers or other expensive mechanisms which are, moreover, liable to deterioration under the continuous action of heat. This arrangement also enables the arch to follow the movement of the body of the generator due to the variations of the expansion of the latter. The upper arch *bb* is also movable for the same purpose. It is supported in the center by the body of the generator (Fig. 1) while its ends *b' b'* enter into or rest on the sand joints or packing *m m* made in the head of the masonry seating *o o*. These joints are made in such manner that sand should not be able to escape. The arch *b b* is preferably made of reinforced concrete, or of a combination of hollow bricks and concrete, strengthened by transverse iron fittings *p* passing from one end *b'* to the other *b'* where they are connected to longitudinal iron members *q*.

Under the action of movements due to the expansion or contraction of the body *h* of the boiler, the arch *b b* is raised or lowered on its joint of sand. In that way, the formation of cracks in the arch is precluded, and the heat chambers *c d* retain the desired heat.

What we claim as our invention and desire to secure by Letters Patent is:—

1. In a steam boiler installation, a boiler, heating chambers surrounding the upper portion of said boiler, movable arches inclosing the upper parts of said chambers, flues adjacent the lower parts of said chambers, openings for admitting heated gases to said chambers from said flues and means whereby the area of said openings may be adjusted.

2. In a steam boiler installation, a boiler, heating chambers surrounding the upper portion of said boiler, movable arches inclosing the upper parts of said chambers, flues adjacent the lower parts of said chambers, openings for admitting heated gases from said flues to said chambers and separate elements adapted to partially close said openings whereby the heat admitted to said chambers may be regulated.

3. In a steam boiler installation, a boiler, heating chambers surrounding the upper portion of said boiler, movable reinforced cementitious arches inclosing the upper parts of said chambers, flues adjacent the lower parts of said chambers, openings for admitting heated gases from said flues to said chambers and separate elements adapted to partially close said openings whereby the heat admitted to said chambers may be regulated.

4. In a steam boiler installation, a boiler, heating chambers surrounding the upper portion of said boiler, movable arches having inner ends supported by said boiler, and joints at the outer ends of said arches, flues adjacent the lower parts of said chambers, openings for admitting heated gases from said flues to said chambers and separate elements adapted to partially close said openings whereby the heat admitted to said chambers may be regulated.

5. In a steam boiler installation, a boiler, heating chambers surrounding the upper portion of said boiler, movable arches inclosing the upper parts of said chambers, flues adjacent the lower parts of said chambers, openings for admitting heated gases from said flues to said chambers and elements movable in both directions and adapted to partially close said openings whereby the heat admitted to said chambers may be regulated.

6. In a steam boiler installation, a furnace structure, a boiler, and adjustable devices arranged to form a partition with apertures,

for dividing the space between the boiler and the side walls of the structure into upper and lower compartments, said devices admitting of the expansion of the parts with which they are brought into contact.

7. In a steam boiler installation, a furnace structure, a boiler, chambers between said structure and boiler, the upper walls of the chambers arranged to permit of expansion with reference to the side walls and independently thereof, and means for dividing the chambers into upper and lower compartments, the lower compartments in direct communication with the draft means and also in communication with said upper compartments.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EMILE NICOLAS JOSEPH GERMEAU.

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