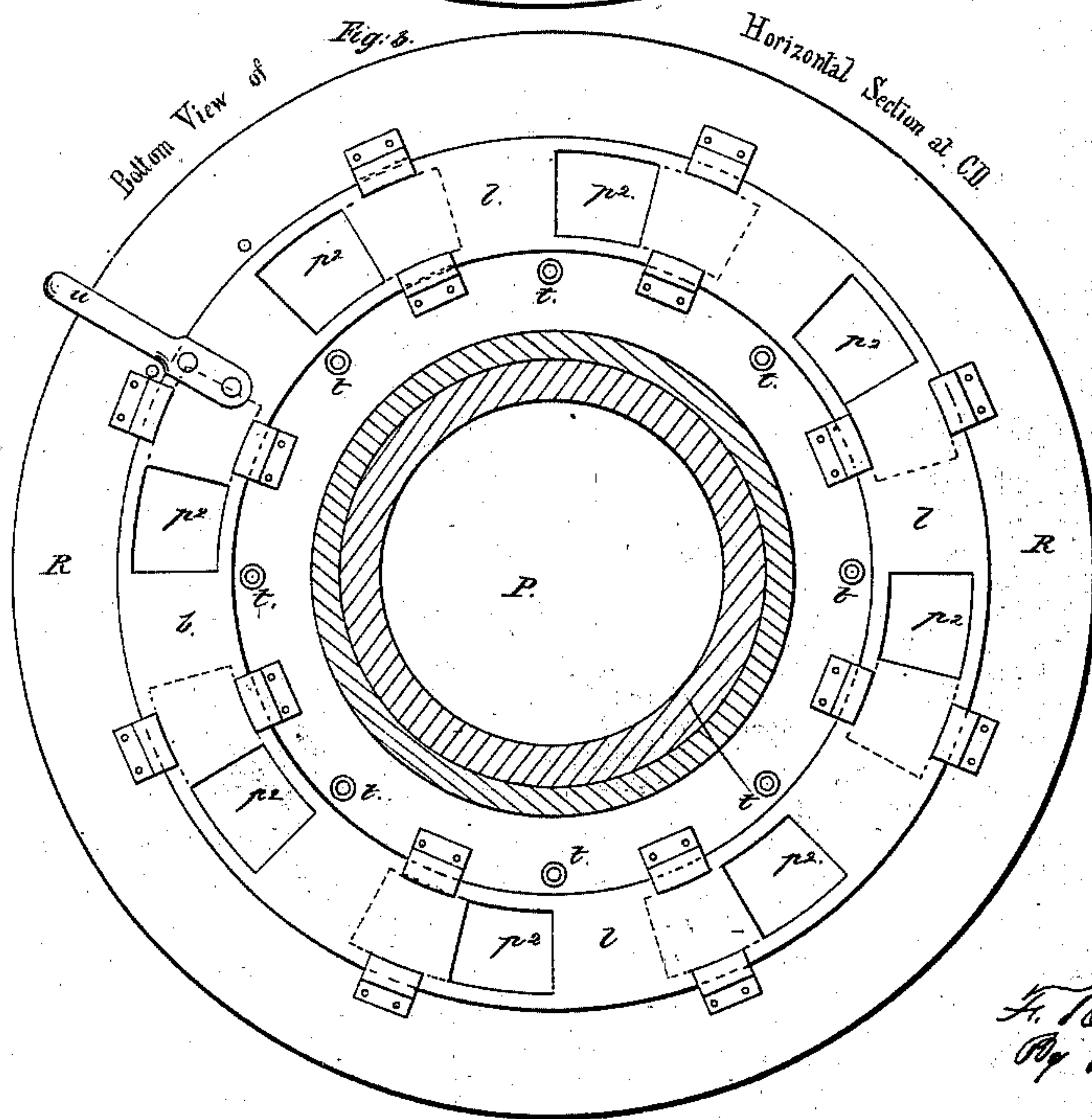
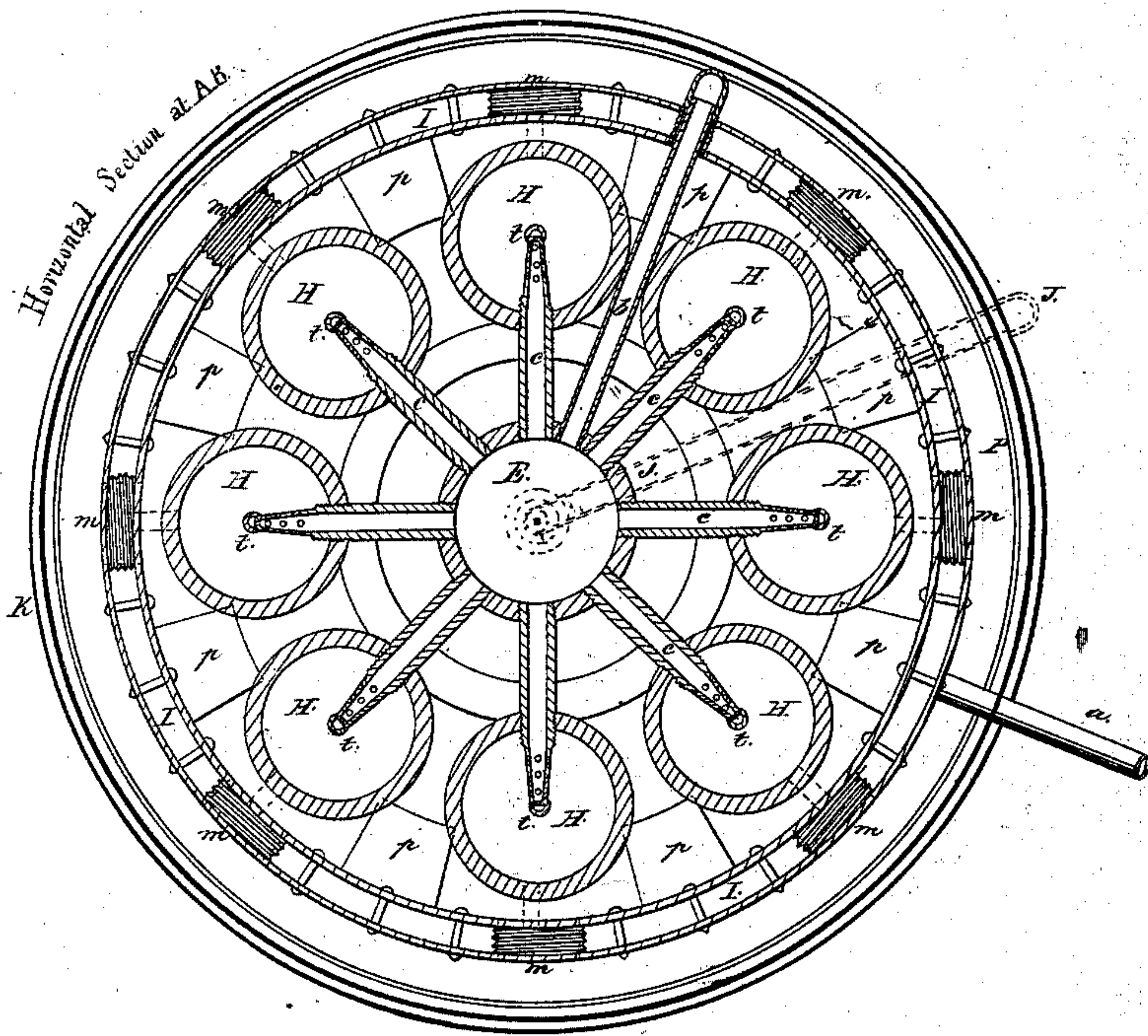


*F. Baumann,*  
*Steam-Boiler Flasher.*

*N<sup>o</sup> 59,947.*

*Patented Nov. 27, 1866.*

*Fig. 4.*



Witnesses:

*T. S. Proffer*  
*L. L. Bond*

Inventor:

*F. Baumann*  
*By W. C. Dodge*  
*Attorney*





# United States Patent Office.

## IMPROVEMENT IN STEAM GENERATORS.

F. BAUMANN, OF CHICAGO, ILLINOIS.

*Letters Patent No. 59,947, dated November 27, 1866.*

### SPECIFICATION.

#### TO ALL WHOM IT MAY CONCERN:

Be it known that I, F. BAUMANN, of Chicago, in the county of Cook, and State of Illinois, have invented certain new and useful improvements in Steam Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon—like letters indicating like parts, wherever they occur. To enable others skilled in the art to construct and use the invention, I will proceed to describe it.

My invention has for its object the construction of an apparatus in which steam can be generated rapidly with an economical use of fuel, and the steam be superheated more or less, as may be desired.

Figure 1 is a vertical section.

Figure 2, a vertical section of a portion detached.

Figure 3, bottom view, taken on the line C D of fig. 1; and

Figure 4 is a horizontal section, on the line A B of fig. 1.

I build a furnace in circular form, of metal, as shown in figs. 1 and 4, of which K represents the outer wall or shell. Within this I locate a circular, hollow shell or water-jacket I, having openings *m* through it near the bottom, as shown in fig. 1. Within the space enclosed by this water-jacket I, I arrange a circle of vertical vessels H, which are connected by pipes *c*, with a vessel E, located at the centre, and which I term a distributor; this vessel E being connected by a pipe *b* with the water-jacket I, as shown in fig. 1, the water-jacket being supplied with water through pipe *a*, either from a reservoir of suitable elevation, or by means of a force-pump. Directly over the distributor E, I locate a vessel G; to receive the steam as it flows through the connecting pipes *o* from the generators H; and still above this receiver I locate another steam vessel F, which I term the regulator or supply-chamber, this latter being connected by a pipe *d* and valve *e* with the receiver G. This supply-chamber is provided with a safety-valve *g*, and also a steam-pipe *h*, to convey the steam to the engine. P represents the fire-box, which is located at the centre of the bottom, and below the level of the bottom, R, as shown in fig. 1. The bottom, R, is pierced with a series of ports or openings *p*, arranged in a circle, around the fire-box, as shown more clearly in fig. 4; and on the under side of the bottom is placed a register or damper *l*, provided with a corresponding series of openings *p*<sup>2</sup>, as shown in fig. 3. This register, *l*, is provided with a handle, *u*, so that by turning it, the register may be made to open or close the openings *p*, to regulate the admission of cold air, as hereinafter explained. At the top of the water-jacket is secured a cover or diaphragm T, which is provided with a similar series of openings *p*<sup>1</sup>, and which are closed by a similar register *l'*, shown in section in fig. 1. In each of the generators H, I place a quantity of loose metallic shavings or turnings, as represented in fig. 1, the end of the pipes *c* being located so as to deliver the water into the midst of the mass of shavings in the generators. The ends of these pipes are reduced in size, and they are pierced with a large number of small holes, for the purpose of distributing the water in the form of small jets or spray amongst the mass of material in the generator, the object being to bring the water in a finely-divided condition into contact with a large mass of heated surfaces, and thus to convert it instantly into steam. As it is not intended to let any water remain in the generators H after the apparatus is once fully heated, it will be seen that all the interstices between the particles composing the mass of shavings will be filled with steam; and that the jets of water coming in contact with this steam, and with the extended surfaces of the mass, will, by their joint action, be instantly converted into steam.

The operation will be as follows: The water will flow from the water-jacket, where it will already have become more or less heated, through pipe *b* into the distributor E, where it will be still further heated, and from thence it will pass through pipes *c* into the generators H, where it will be instantly converted into steam. From thence the steam will pass through the pipes *o* into the receiver G, where it will be superheated, and from thence will pass through pipe *d* into the receiving-chamber or regulator F, from which it will be conveyed by pipe *h* to the cylinder of the engine. As this chamber F is also located in the upper portion of the furnace, it will be kept hot, and thus not only prevent the steam from becoming condensed, but will also tend to superheat it still more. In order to regulate the quality of the steam in this chamber F, I connect it by a pipe J, shown in dotted lines in fig. 1, with the distributor E, so that by opening the valve *f*, water may be admitted from E into the chamber F, for the purpose of saturating the steam in F, in case it should become too highly superheated. By this arrangement of the steam generators and all the steam vessels, together with the water-jacket, within the furnace, I am enabled to utilize to an unusual degree the heat produced by the fuel consumed. When the fire is



first started, the register or damper *l'* at the top is opened in order to have a direct draft, and cause the fire to burn briskly; but when it has become thoroughly kindled, the register *l'* is closed, when the flame and smoke and hot gases will follow the course indicated by the red arrows, passing up in the centre, down outside of the generators in contact with the inside of the water-jacket, through the openings *m*, and thence up between the outside of the water-jacket and the shell *K*, up around the receiver *G*, pipe *d*, and chamber *F*, and finally out of the smoke-stack or pipe *L*. When it is desired to reduce the temperature of the furnace, the register *l*, at the bottom, is opened, and cold air admitted, the draught through the fire-box being, of course, also lessened by this operation. When the engine is not running, the damper at both top and bottom may be opened, which will permit a current of cold air to pass directly up through the furnace, and the fire may thus be kept in readiness to start up at any moment. It is obvious that the supply-pipe *b* may be coiled around the vessels *H*, or in the centre between them, either above or below the receiver *E*, whereby the water will be forced to travel a longer distance exposed to the heat of the furnace before entering the vessel *E*, and become so heated that it will be converted into steam in the vessel *E*, in which case the vessels *H* will become super-heaters of the steam thus formed. When such an arrangement is adopted, I propose to construct the distributor *E* as shown in fig. 2, in which case the supply-pipe *b* will enter below, and the steam will pass off through the pipes *c'* arranged above. When this plan is adopted, the receiver *G* may be dispensed with, and the steam conveyed direct from the vessels *H* to the equalizing chamber *F*, which may, if desired, be located lower down, and made to protrude partially through the diaphragm *T* into the interior of the furnace, it taking the place of the receiver *G*. In some cases I propose to dispense entirely with the distributor *E*, and admit the water direct from the water-jacket *I* into the generators *H*, through pipes indicated by the red lines in figs. 1 and 4. I also provide a tube *t*, with a cock, for each of the generators *H*, for the purpose of withdrawing any water that may accumulate therein from condensation or otherwise, when the furnace is allowed to cool down.

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

1. Generating steam by the injection of heated water through pipes *c* into a generator *H*, in which is placed loose metallic substance as described.
2. The combination of a number of heated metallic vessels *H* with water-injecting pipes *c* and outlet-pipes *o*, connecting with a common receiver *G*, arranged to operate substantially as set forth.
3. I claim the water-jacket *I*, arranged in combination with the generators *H* and receivers *G*, as shown and described.
4. The combination and arrangement of a receiving and distributing vessel *E*, supplied with water from the water-jacket *I*, with a series of generating vessels *H*, all located within the furnace, substantially as set forth.
5. In combination with the heating and distributing vessel *E*, generator *H*, and receiving-vessel *G*, I claim the use of a receiving and equalizing chamber *F*, arranged to operate substantially as herein described.
6. I claim, in combination with a steam-generating furnace constructed substantially as described, the dampers *l* and *l'*, arranged to operate as set forth.

FREDERICK BAUMANN.

Witnesses:

L. L. BOND,  
EDM. F. BROWN.