Sept. 18, 1934. C. MARISCHKA 1,973,874

GAS GENERATOR

Filed Jan. 3, 1931

Fig. 1

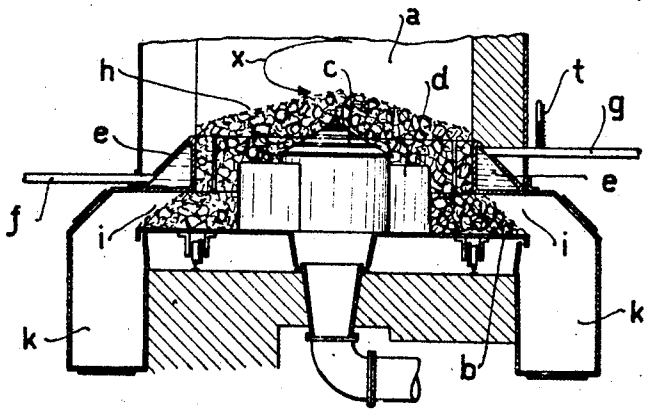


Fig. 2

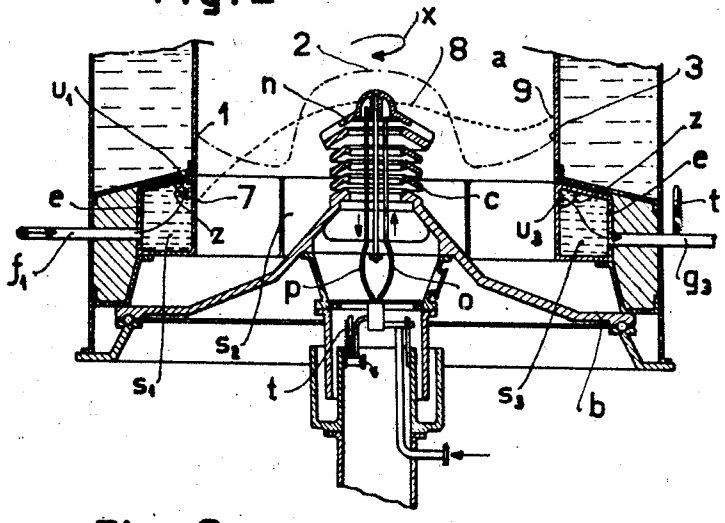
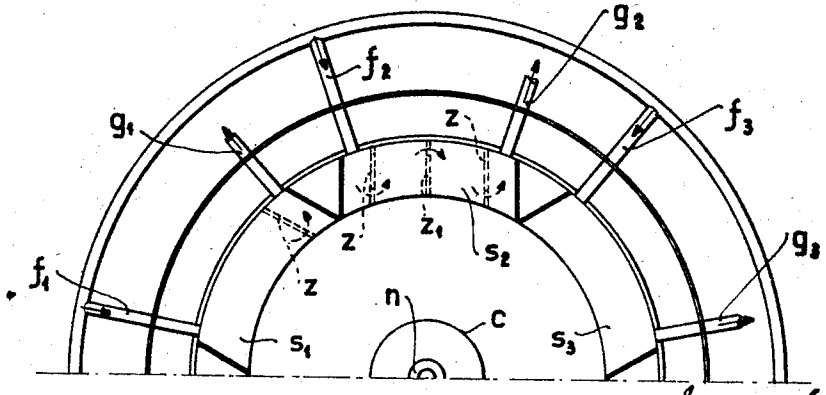


Fig. 3



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GAS GENERATOR

Carl Marischka, Vienna, Austria

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In Austria January 7, 1930

2 Claims. (Cl. 48—67)

My invention relates to gas generators with a stepped revolving grate and more particularly to arrangements for determining the temperature and height of the slag layer in such gas generators in the vicinity of the grate. The invention is especially concerned with devices of the type wherein such determination is made by means of the cooling liquid streaming through an appropriate zone of the grate such as the hood of the conical stepped grate. If said cooling liquid is fed in invariable quantity and with a constant temperature the temperature of the cooling liquid leaving the grate allows an approximate determination of the temperature and height of the slag layer. By means of known methods of this kind the working conditions in the centre of the generator within a given period may be observed, but it is not possible especially in the case of generators of larger diameter, to obtain, at the same time, a true idea of the temperature conditions in the zones located at a certain distance from the centre of the generator or at the periphery of the slag layer.

With such a method, therefore the working of the generator can only be regulated in an imperfect manner, because it is impossible to control properly the entire cross section of the generator. Moreover, the impossibility of observing the temperature distribution along the periphery of the generator involves the danger that the slag dish and especially those parts of the generator shell, where the revolving grate presses and disintegrates the slag lumps may be overheated and destroyed. The invention therefore has for its object to avoid the drawbacks of the known methods and devices and this result is obtained by feeding the cooling liquid in invariable quantity and with constant temperature to the cooling jacket surrounding the periphery of the generator shaft in about the same height as the grate. Thus, it is possible to have a reliable indicator of the temperature conditions in the circumferential zone of the combustible by observing the temperature of the cooling liquid leaving the generator and it is thus possible to control exactly the working of the generator.

It has proved to be especially of advantage to subdivide the cooling jacket into a plurality of chambers of segmental shape, each chamber having individual inlet and outlet conduits for the cooling liquid. This allows to determine exactly and clearly differences in the height of the slag layer in the different sections of the circumference of the generator shaft.

In the case of generators with very large or even of the largest diameter of the revolving stepped grate type it may be useful to provide the hood of the grate with a hollow space, which is also fed with cooling liquid in measured quantities and of constant temperature. If this is done, practically all the zones of the cross section are under control and the heat-conditions of the slag layer may thus be controlled across the entire section of the same.

The accompanying drawing shows two different examples of the apparatus according to the invention.

Fig. 1 shows a vertical section of a generator of the revolving grate type provided with a cooling jacket at its periphery.

Figs. 2 and 3 show a similar generator with a similar water jacket and a water cooled grate hood in a vertical and horizontal section.

In Figs. 1 and 2, *a* designates the generator shaft, *b* the slag dish, *c* the revolving grate which revolves together with the slag dish *b*, while the generator *a* is fixed. Disintegrating wings *d* are carried by and rotate with the revolving grate *c*. The lower part *e* of the generator jacket forms preferably an annular chamber provided with water inlet and outlet conduits *f* and *g*. The slag layer is shown at *h*.

The apparatus works as follows:

The grate *c* mounted on the slag dish *b* and provided with disintegrating wings *d* revolves within the fixed generator in the direction indicated by the arrow *x*. Between the annular chamber *e* and the disintegrating wings *d*, greater lumps of slag which may be produced are crushed and the debris are fed, together with the smaller particles of the slag, through the gap *i* into the ash receptacles *k*. The layer of slag or ashes *h* transfers its heat according to its height and its temperature to the water circulating through the annular chamber *e*. The water, which is supplied at *f* to this chamber with constant temperature is heated during its passage through this chamber, and its temperature at the outlet conduit at *g*, may be observed on a thermometer *t*. This temperature gives an indication as to the heat conditions within the lower part of the generator and the heat distribution of the same at is periphery.

The arrangement thus constitutes an indicator allowing to control the working of the generator. On the other hand, it provides a cooling of those parts of the generator shaft, where the slag is crushed, thus avoiding overheating and destruction of these parts.

Figs. 2 and 3 show another example of an apparatus according to the invention, especially adapted for use with generators of very large or even of extremely large diameters.

The generator shaft is designated by *a*, *b* is the slag dish, *c* the revolving grate and *e* the lower part of the generator jacket formed by an annular hollow space which is preferably subdivided into a plurality of segment shaped chambers s_1, s_2 . . . each of them having a water inlet and a water outlet conduit f_1, f_2 . . . and g_1, g_2 . . . respectively. Each chamber is provided with a partition wall z_1, z_2 . . . having an aperture or overflow u_1, u_2 . . . near its upper end. This ensures the contact of the cooling liquid with substantially the entire surface of the wall of the chamber adjacent to the generator shaft and the heating of the liquid while flowing through this chamber.

It is also possible to provide a plurality of partition walls in the segment-shaped chamber, as shown in Fig. 3 in connection with the chamber s_2. This chamber is provided for example with two partition walls *z* of the kind described and with another wall z_1 between them, the wall permitting the passage of the cooling liquid at the bottom of the chamber, the liquid being thus compelled to flow through this chamber along a sinuous path.

According to this modification, the hollow hood *n* of the grate is also provided with conduits *o*, *p* for the inlet and outlet of the cooling liquid.

As the cooling liquid is fed to the chambers in the annular space *e* and the grate hood *n* in unchanging quantities and with constant temperature, the cooling liquid will absorb an equal amount of heat if the temperature conditions in the generator shaft do not vary.

It is assumed, that the dot and dash line 1, 2, 3 in Fig. 2 represents the border line between the slag and the layer of hot combustible, which corresponds to the desired distribution and height of the slag layer and that the slag layer has, in this case, the same height on every point of the periphery of the generator. In this case, the values indicated by the different thermometers *t*, corresponding to the temperatures of the cooling water leaving the individual chambers will be equal. If however the slag layer is distorted and the border line between the same and the combustible has a shape similar to the dotted line 7, 8, 9, the temperature of the cooling liquid leaving the chambers of the annular space *e* located near 7 will rise, because of the approach of the hot combustible layer to this chamber. The temperature of the cooling water leaving the grate hood will also rise, because of the lowering of the combustible layer near the center of the generator. The increase in thickness of the slag layer at 9 will cause a decrease of the temperature of the cooling water coming from the adjacent chambers. In this case an indication is given to the operators of the generator to stop the removal of slag and to wait until the slag layer has reached its normal height in the vicinity of the grate hood and the section of the periphery of the generator.

It is clear that the invention allows to supervise the temperature in the center and near the periphery of the generator and to retain the desired distribution and height of the slag layer across the entire section of the same.

What I claim is:—

1. An indicating means for ascertaining the temperature conditions of gas generators and the like, consisting of an annular casing through which water is circulated, having a series of internal walls dividing the same into arcuate chambers, each chamber having a water inlet and outlet, and a temperature indicator on each outlet whereby the temperature thereof may be ascertained and the temperatures of the several chambers may be compared.

2. An indicating means for ascertaining the temperature conditions of gas generators and the like, consisting of an annular casing through which water is circulated, having a series of internal walls dividing the same into arcuate chambers, a water supply pipe surrounding the casing and having a branch pipe leading to each chamber, an outlet pipe extending from each chamber, and a temperature indicator on each outlet pipe, whereby the temperature thereof may be ascertained and the temperature of the several chambers may be compared.

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