Oct. 18, 1927. 1,645,671

L. TRÉFOIS

SELF SCRAPING HEARTH FOR GAS GENERATORS AND OTHER FURNACES

Filed June 16, 1925

FIG. 1a.

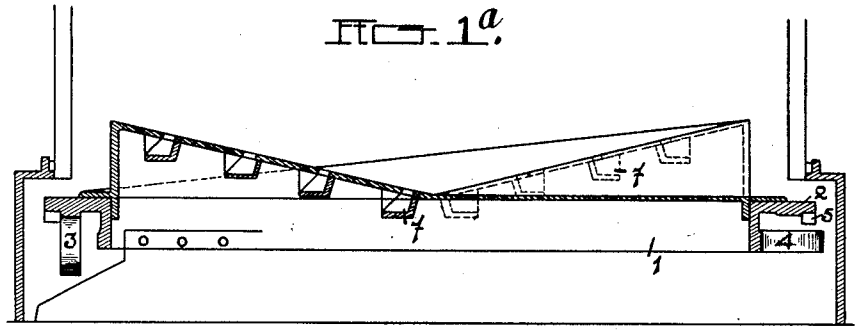


Fig. 1b

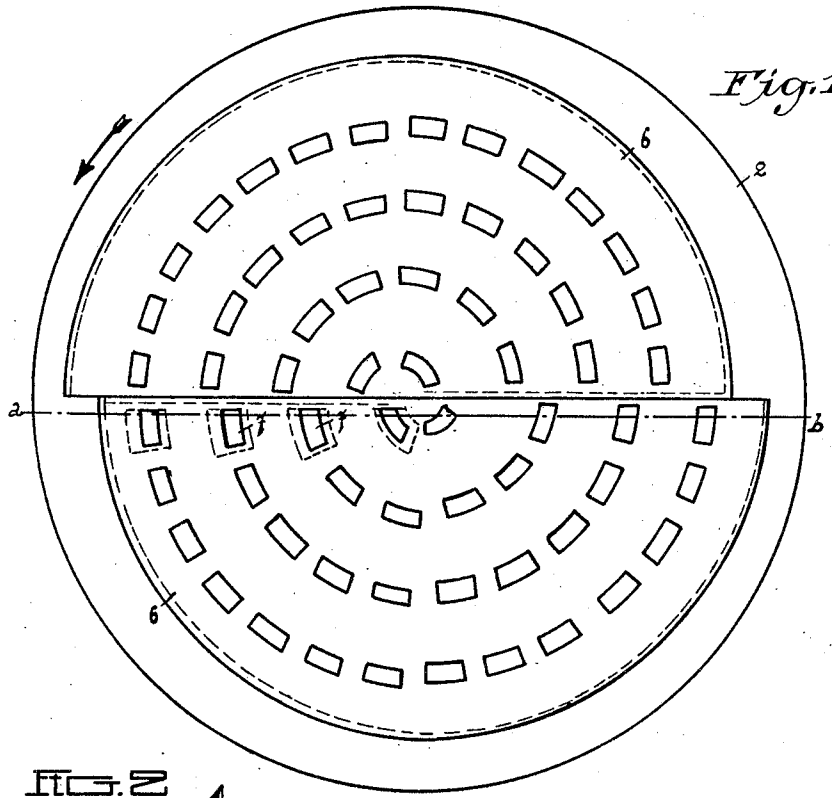


FIG. 2

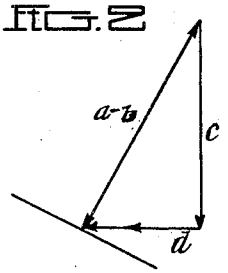
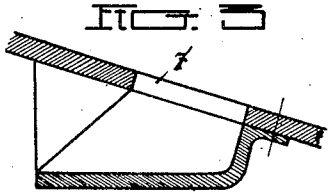


FIG. 3



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SELF-SCRAPING HEARTH FOR GAS GENERATORS AND OTHER FURNACES.

Application filed June 16, 1925, Serial No. 37,538, and in Belgium June 24, 1924.

All engineers are in agreement upon the necessity for keeping in movement the ignited mass of fuel with a view to preventing the formation of flame passages which produce carbon dioxide and clinkers, and to thus assist the descent of the charges.

The difficulties encountered are well known. They are chiefly due to the incomplete removal of the ashes, particularly those which remain imprisoned against the wall of the shaft and which produce the objectionable formation known as "the effect of the walls".

Several means are already known:

1. In revolving ash pits, the form of the central head through which the blowing is effected is varied greatly, the chief effect of which variation is to cause the clinkers to be broken up, certain apparatus being in addition provided at the base of the shaft with a lining for protecting the latter. These devices act upon the lower zone of the layer and oppose the descent of the ashes which accumulate near the walls due to the rotary movement produced by the rotation of the ash pit.

2. Revolving hearths with the surface of varied form, for raising the fuel. Their efficiency is very low due to the fact that, as in the previous case, the rotary movement compresses the mass against the walls and keeps the part which is nearest the latter stationary.

3. Mechanical stirrers in the form of arms raking the upper zone of the fuel. They serve no other purpose than to close up the flame holes produced and do not combat the causes of them.

4. Finally, revolving shafts, which have the advantage of releasing the mass of fuel from the effect of the friction which keeps it stationary and which, combined with one or other of the means indicated under 1 and 2 give the desired result. If the cost of construction were not prohibitive there would be no need to seek any other device.

The object of this invention is to obtain the same result by means of a simple revolving hearth the profile of which is such that it separates the mass of fuel from the walls by raising it, thus counteracting the effect of friction which is, in the devices mentioned hereinbefore under 1, 2 and 3, on the contrary greatly increased by the centrifugal effect of the rotation. For this purpose, according to the invention, each projection provided on the upper face of the hearth consists of a distorted surface the bounding lines of which bear on the one hand on one point of the axis of rotation on the hearth and on the other upon a peripheral curve having the path of a helix or the like traced in passing from a level on the same plane or higher than that of the center of the hearth and rising as it winds in a direction opposite to the direction of rotation of the hearth so that the movement of rotation neutralizes the effect of friction of the fuel upon the walls and ensures the desired regular descent of the charges.

The accompanying drawing illustrates by way of example one form of the invention.

Figure 1[a] is a vertical section through the center of the hearth;

Figure 1[b] is a plan view of the hearth;

Figure 2 is a diagrammatic representation of the forces acting on the fuel;

Figure 3 is a radial section through one of the ash outlets.

1 is a frame provided with a rolling track 2 carried upon rollers 3, guided by rollers 4. The same is provided with teeth 5 by means of which it may be driven by a pinion not shown, the shaft of which, extending outside of the ash pit, is driven in any suitable manner.

The frame 1 carries the hearth proper 6, which receives the charge of fuel.

The hearth 6 consists of two or more sections having a distorted surface the shape of which is determined by the displacement of a generating line having one end on a point of the axis of rotaton of the hearth, and the other upon a portion of a helix traced upon the inner surface of the shaft in passing from a plane at the same level or higher than that of the center of the hearth and rising as it winds in a direction opposite to the direction of rotation of the hearth.

If the whole arrangement is rotated in the direction of the arrow, the fuel will be raised by each of the sections in turn, and by suitably choosing the pitch of the helix, (see Fig. 2) the raising effort a neutralizes to the desired extent, in strength and direction, the resultant b of the vertical force c exerted by the weight of the fuel and the horizontal force d which is the sum of the horizontal component due to the charge of fuel and to the force due to the movement of rotation.

The force causing the friction upon the

wall being thus neutralized, there is nothing to oppose the uniform descent of the charges, while at the same time the whole mass is kept in continuous movement.

In order to completely evacuate the ashes, they must not only be removed regularly along the length of the walls but also at the same time from as large a number of points as possible upon the surface of combustion so that the said ashes may have the smallest possible distance to travel in order to reach the outlet.

These outlets for the ashes must also be arranged in such a way that the ashes fall out of them naturally that is to say in the direction of the path determined by the resultant of the forces in action.

Finally, each of these outlets must be exactly proportioned to the zone it has to serve.

The conditions are obtained in the present invention by the formation of outlet apertures 7 (see Figs. 1^a, 1^b and 3) provided over the whole surface of the hearth and arranged upon concentric circles, proportional in number to the surfaces comprised between them.

This arrangement allows of a number of air inlets, and effects, at the same time a practically perfect contact between the fuel and the oxidizing agent.

The inlet orifices of the passages through which the ashes are evacuated are circularly distributed and are formed in the hearth in a direction parallel to the resultant of the forces acting on the ashes in such a way that they fall through naturally.

In this way the forces which obstruct the descent of the charge and which are neutralized by the projecting sections provided at the upper part of the revolving hearth are therefore efficiently employed in order to produce an automatic and normal evacuation of the ashes.

What I claim as my invention and desire to secure by Letters Patent is:

1. A revolving hearth for gas furnaces and the like comprising a plurality of sections, each of said sections comprising a surface generated by a line one end of which pivots at a point at the hearth center and the other end follows an outer directing curve at the hearth periphery, said outer curve being at a higher level than the pivotal center, whereby the fuel is prevented from moving outward under the action of centrifugal force.

2. A revolving hearth for gas furnaces and the like comprising a plurality of sections, each of said sections comprising a surface generated by a line one end of which pivots at a point at the hearth center and the other end follows an outer helical curve at the periphery of the hearth, said outer curve rising as it winds in a direction opposite to the direction of rotation of the hearth.

3. A revolving hearth for gas generators and other furnaces provided on its upper face with projections causing the fuel to be raised during the rotation of the hearth, each projection comprising a distorted surface the generating lines of which bear on the one hand on a point of the axis of rotation of the hearth and on the other hand on a peripheral helical type curve rising as it winds in a direction opposite to the direction of rotation of the hearth.

4. A revolving hearth for gas generators and other furnaces provided on its upper face with projections causing the fuel to be raised during the rotation of the hearth, each projection comprising a distorted surface the generating lines of which bear on the one hand on a point of the axis of rotation of the hearth and on the other hand on a peripheral helical curve rising as it winds in a direction opposite to the direction of rotation of the hearth, said hearth having ash discharging passages distributed over the surface, the passages being inclined towards the center of the hearth.

In testimony whereof I affix my signature.

LÉON TRÉFOIS.