

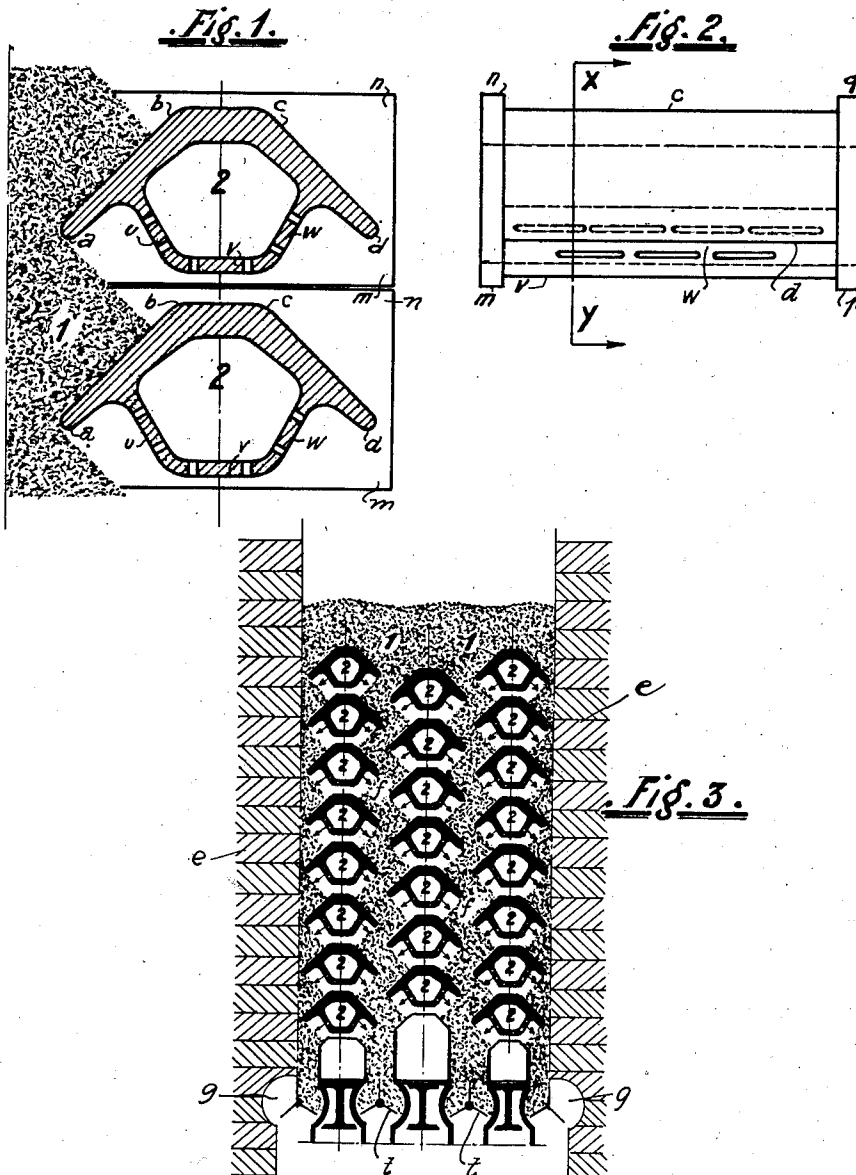
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APPARATUS FOR ACTIVATION OF CARBONACEOUS SUBSTANCES

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APPARATUS FOR ACTIVATION OF CARBONACEOUS SUBSTANCES

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This invention relates to apparatus for the activation of carbonaceous substances by gases.

The use of porous or permeable walls in the construction of activation retorts in order to allow the diffusion of gases through the said walls is already known, but all these devices as hitherto constructed present the drawback of becoming more or less rapidly encrusted and clogged with ash or other deposits, in consequence of the direct contact between the porous walls and the materials under activation.

The invention has for its object to provide an improved form of gas-circulation element for the introduction and diffusion of the heating and/or activating gases into the carbonaceous substance within the activation chamber or retort of the apparatus.

A further object of the invention is to provide a hollow gas-circulation element in which the walls through which the heating and/or activating gases are diffused into the chamber or retort are kept from contact with the carbonaceous substance within said chamber or retort.

Another object of the invention is to provide an improved form of gas-circulation element whereby the gas distribution channels can be built up to secure intimate and regular contact of the carbonaceous substances with the heating and/or activating gases.

The improved gas-circulation element consists of a hollow brick constructed in such a way as to allow circulation of the heating and/or activating gases in a direction parallel to the longitudinal edges, the said gases being diffused through a porous, apertured or perforated trough situated beneath an overlapping hood, out of reach of the carbonaceous substances undergoing the activation phase; the several bricks are adapted to be assembled in such a way as to allow the carbonaceous substances to come into contact with the gases without obstructing or encrusting the exterior sides of the trough.

Upon the accompanying drawing, to which reference is made in the subsequent description, there is represented by way of example one mode of carrying out the invention.

Figure 1 shows two superposed elements or bricks in transverse section upon the line $x-y$ of Figure 2.

Figure 2 is an elevation of one element.

Figure 3 represents by way of example in partial transverse section, the interior of an activation chamber or retort fitted with gas-circulation elements in accordance with the invention.

The improved element or brick comprises essentially the following parts:—

(1) A hood $a b c d$ formed with sloping upper surfaces $a b$ and $c d$ and intended to support the carbonaceous substance 1 in the course of activation and to direct its descent upon the two inclined faces $a b$ and $c d$ of the next lower element.

(2) A trough or gutter $u v w$ placed beneath the hood in such a way as to form with it a channel 2 for the passage of the heating and/or activating gases. The bottom and side walls of the said gutter may be perforated or apertured as shown in order to allow the outward diffusion of the heating and/or activating gases circulating at 2 into the carbonaceous substance 1 undergoing activation.

(3) End walls or flanges $m n$ and $p q$ intended to support the hood $a b c d$ and the trough $u v w$, to stiffen the structure and to allow its assembly in combination with other similar bricks or elements.

Upon the drawing, the bricks described above have been shown made in one piece but without departing from the scope of the invention, the trough $u v w$ can be made independent of the hood $a b c d$ or of the end walls $m n p q$; similarly the said end walls can be made independent of the hood and of the trough. As a result of this arrangement, the different parts of the elements can be constituted by various refractory materials each suited to the particular purpose.

Moreover, the perforated or apertured trough $u v w$ can be replaced by a porous trough, likewise allowing ready diffusion of the heating and/or activating gases circulating at 2 into the carbonaceous substance under treatment located at 1.

It will be noted that the arrangement of the trough $u v w$ beneath the overlying hood

a b c d allows of completely freeing the said trough from contact with the carbonaceous substances which descend from each edge *a d* of the hood according to their natural angle of slope, so that the porous, apertured or perforated walls of the trough are protected against any incrustation or clogging by the carbonaceous substances or the ashes resulting from activation.

10 In the construction of the retort or chamber for the activation of carbonaceous substances with the improved elements or bricks, there can be carried out simultaneously the following combinations:

15 (1) An end to end alignment of the elements, the end wall *m n* of one brick being fitted against the end wall *p q* of the adjacent brick in such a way as to form straight channels for the heating and/or activating gases, these gas-channels being of a length corresponding to that of the interior of the retort.

20 (2) A superposition of the rows or series of elements aligned as above, the end walls *m n* and *p q* of the bricks in one row resting upon the corresponding end walls of the bricks of the next lower row, in such a way as to constitute vertical stacks of the hooded elements, the said stacks being built up to the height of the interior of the retort. The vertical distance apart of the two successive elements must be such that the materials under activation in spreading out at their natural angle of slope below the inclined faces *a b* and *c d* of each hood can never reach the flat top or summit *b c* of the element next below.

35 (3) A juxtaposition of the vertical stacks in such a way as to leave between each two stacks (see Figure 3) free areas *f* for the falling of the substances 1 undergoing activation, the number of the stacks depending on the width of the interior of the retort between the walls *e e*.

40 The elements or bricks of two adjacent stacks can be set in the same horizontal planes, but are preferably staggered as represented in Figure 3.

In the interior of the retort containing the assemblies of elements or bricks as described above, the gases or vapors (for example steam) are admitted at one end of the horizontal channels 2 formed by each row of bricks, the excess (for example, steam mixed with carbon monoxide and hydrogen) after diffusion leaving at the other ends of the channels.

55 The said vapors or gases can likewise be made to pass several times along the length of the rows for example by employing suitable

baffles in the gas distribution mains at each end.

It will be noted that the carbonaceous substances undergoing activation are thus brought into intimate contact with the activating vapors or gases from the channels 2 penetrating through the perforated, apertured or porous walls as indicated by the arrows, and further that during their descent they are very thoroughly mingled with the vapors and gases, thereby ensuring great regularity of the activation process.

The carbonaceous substances, transformed into activated carbon, are withdrawn at the bottom of the retort in a continuous or discontinuous manner by any suitable means, such as screw conveyors, rotary traps or paddles *t*, or movable gratings or the like. These discharging means are preferably arranged at the bottom of the retort in line with the free spaces *f* between the stacks of bricks, but similar devices may also be provided (as shown) in the spaces *g* adjacent the side walls *e*.

It is naturally permissible, without departing from the scope of the invention to construct and to assemble together the improved elements or bricks in accordance with modifications affording substantially the same results as the particular constructions described above. For example the elements or bricks may be made up of several hoods fitted together and with troughs which are separate or fitted thereto.

What I claim is:—

1. A hollow refractory gas admission member for activation retorts, comprising parallel end walls and a connecting body portion, said body portion including a perforated trough and an overlying hood having a sloping upper surface, said upper surface extending to below the level of the top of said trough, and the width of said hood being substantially greater than that of said trough.

2. A hollow refractory gas-circulation element for admission of gas into activation retorts, comprising parallel end walls of rectangular shape and a connecting body portion, said body portion including a perforated trough and an overlying hood sloping down to two longitudinal edges, said longitudinal edges being below the level of the top of said trough, and the width of said hood across said longitudinal edges being substantially greater than that of said trough.

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