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APPARATUS FOR THE DISTILLATION OF COAL.

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Fig. 1.

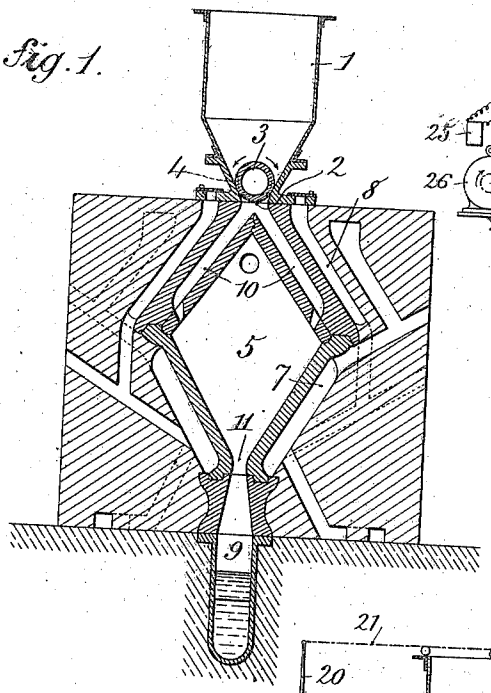


Fig. 3.

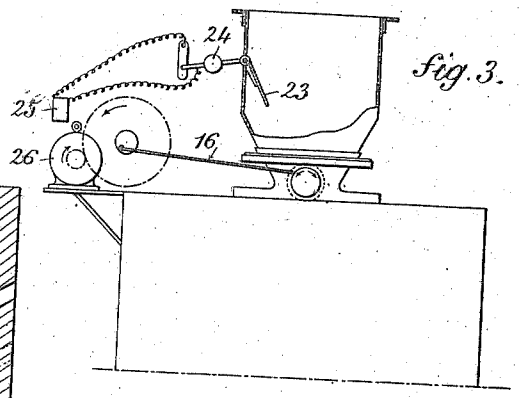
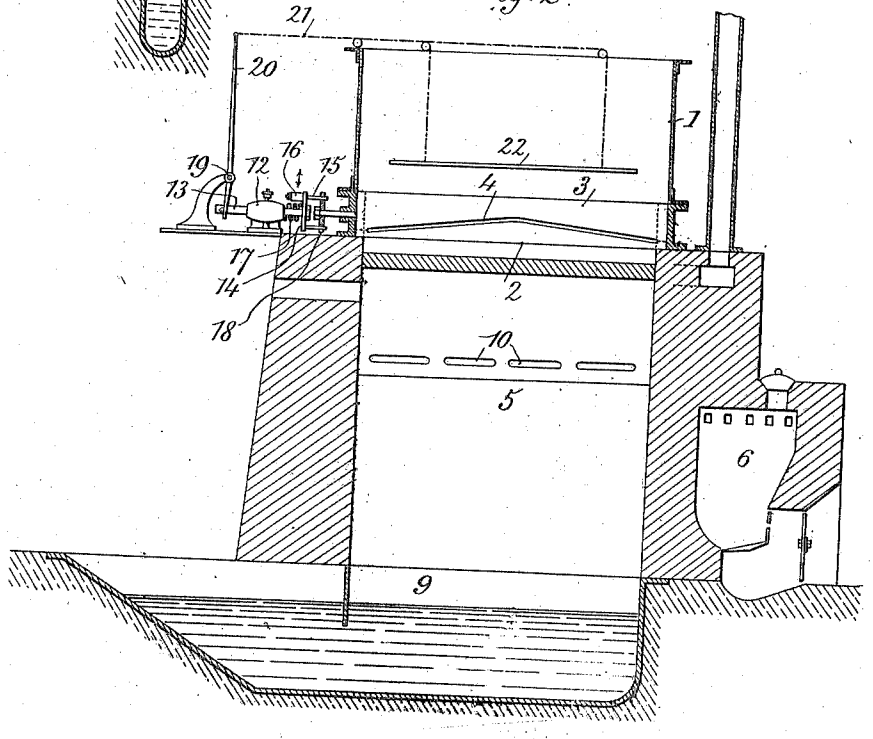


Fig. 2.



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APPARATUS FOR THE DISTILLATION OF COAL.

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To all whom it may concern:

Be it known that we, ALBERT PINET, engineer, of 42 Rue de Paradis, of Paris, and ALBERT DEBOUT, engineer, of 7 Cité Paradis, of Paris, in the Republic of France, and citizens of the Republic of France, have invented certain new and useful Apparatus for the Distillation of Coal, of which the following is a specification.

The present invention has reference to the industrial manufacture of coal gas. It consists in using coal previously crushed to a fine degree and even in a pulverulent condition, and in producing the distillation by passing the coal preferably in a very thin layer (so to speak misty) either upon an inclined plane made of refractory earth or any other suitable material, or between two vertical partitions located in proximity to each other, suitably heated and maintained at the desired temperature so that during the period the said coal slides or drops, the distillation may have entirely taken place.

Hitherto coal or illuminating gas, has been obtained by the distillation of coal in non-homogeneous mass; the penetration of heat and the progress of the distillation are variable in the different parts of the mass of coal owing to lack of homogeneity and to the thickness of the mass itself. The duration of an operation is necessarily long and the operation of the retorts could not have been rendered continuous heretofore in the real meaning of the word. On the contrary, with crushed or pulverized coal, in thin layers and in a heated condition and moving in the form of mist, the penetration of heat and the distillation are effected rapidly and similarly in all particles so that the duration of the operation may be considerably reduced. Moreover, the smallness of the pulverulent state of the material lends itself very well to the equal exposition of all the particles to the radiation of the heating partitions, so much more as the coal moves continuously in the distilling apparatus and that all the parts of the layer to be distilled may thus be subjected to an equal heating. The distillation is therefore uniform, almost instantaneous and the efficiency is high.

Fuel in the aforesaid condition is mechanically introduced in a substantially continuous manner into the distilling apparatus.

Owing to this continuity, rapidity and increased efficiency, it is possible to reduce the dimensions of the apparatus, the consumption in fuel and the cost of manufacture.

It must be well understood that the arrangement of the distilling apparatus may be as desired, and that the constructional form illustrated must be considered as having been given by way of example only.

Figure 1 is a cross-section of a furnace for the continuous distillation of pulverized coal.

Fig. 2 is a longitudinal section of the same.

Fig. 3 illustrates a modification of an automatic disengaging device forming at the same time, a safety device for preventing the introduction of air into the distillation chamber in the case of a stoppage in the supply of coal.

Coal which has been previously pulverized by means of any kind of crushers, is placed in a hopper 1, the lower opening 2 of which is obstructed by a cylinder 3 mounted in such a manner that it can rotate about its axis, and formed on its periphery, with a series of V shaped, narrow and shallow grooves 4. The said hopper is placed above a furnace comprising a distillation chamber 5 which has the shape of a horizontal prism having a lozenge-shaped section, a gas producer 6, combustion flues 7 and air heating flues 8 which extend into contact with the walls of the chamber 5, and a basin 9 intended to receive coke and located below the said chamber. Coal leaving through the opening 2, is distributed by the cylinder 3, reaches the chamber 5 by passing through the conduits 10 formed in the upper walls of the same. The coal spreads then over the lower walls heated to a suitable temperature, and is distilled; coke passing through an opening 11 formed in the bottom of the distillation chamber, is received in the basin, 9. The length and the inclination of the partitions on which the coal slides, or between which it drops, are determined in such a manner that the drop is of a suitable duration for a certain temperature, so that the distillation should be complete when the coal reaches the opening 11.

In the illustrated constructional form, the cylinder 3 receives a rocking movement so that its grooves 4 distribute the coal in the

chamber 5 alternately on one face and on the other. Distilled gas leaves the chamber 5 through a conduit which can conduct the same to all suitable purifying and utilizing apparatus. It is obvious that the cylinder 3 may be provided with a plurality of grooves and rotate continuously so that the supply would be continuous on each heated partition.

The upper part of the hopper is open, so that the escape of gas through the grooves 4 is only impeded by the pulverulent coal contained in the hopper. It should be noted that this hermetic obstruction could not be obtained with coal in small pieces. Furthermore, it is convenient to avoid the hopper being completely emptied. To this end, a safety device may be provided, for automatically disengaging the operation of the cylinder as soon as the coal reaches a predetermined level. Fig. 2 shows, for example, a device of this kind; in a bearing 12, a shaft 13 is adapted to rock and slide, carrying a cross-member 14 provided with two tappets 15 and receiving a rocking movement under the action of a spring 17, in engagement with notches of a plate 18 secured to one of the trunnions of the cylinder 3 so that they impart to the latter the desired rocking movement. Further, upon a stationary shaft 19, a disengaging lever 20 is adapted to rock, one end of which is connected by chains 21 to a plate 22 resting on the coal in the hopper, while the opposite end thereof acts upon the shaft 13. When the plate descends below a predetermined level, the lever draws the shaft 13 and produces the disengagement of the tappets 15 from the plate 18 so that the cylinder 3 stops.

Fig. 3 illustrates another safety device. A plate 23 is pivoted on one of the walls of the hopper and is caused to lift or rise under the action of a counter-weighted lever 24; it is normally held in a depressed position by the mass of coal contained in the hopper; as soon as it is free, the said plate rises and the lever 24 closes the circuit of a relay 25 which controls the electric motor 26 imparting a rotary movement of the rod 16, so that the said motor stops. It must be understood, however, that the invention is not limited to the aforesaid devices.

The invention is also not limited to the manufacture of illuminating gas; it may be possible, for instance, to supply either to the basin 9 or to the chamber 5, steam or a hydrocarbon or any other gas, with a view to modifying the composition and the properties of distilled coal gas.

Claims:

1. An apparatus for distilling pulverized coal, comprising a distilling chamber having the shape of a horizontal prism of transversely lozenge-like section, means for heating the lower inclined walls of said chamber, channels made in the upper inclined walls of the chamber and opening into the chamber above the upper ends of said lower inclined walls, and feeding means for continually bringing pulverized coal to said channels, the inclination of said channels and of said lower inclined walls being such that pulverized coal may slide thereon by its own weight.

2. An apparatus for distilling pulverized coal, comprising a distilling chamber having the shape of a horizontal prism of transversely lozenge-like section, heating means for heating the lower inclined walls of the chamber, feeding means for continually bringing pulverized coal to the upper ends of said lower inclined walls, the latter walls having sufficient inclination for the coal to slide thereon by its own weight, and a large opening made underneath the lower ends of said inclined walls on the whole length of the chamber, through which opening the pulverized coal sliding on said walls can continually escape.

3. An apparatus for distilling pulverized coal, comprising a hopper, a feed device in the hopper a distilling chamber lozenge-shape in cross section and arranged below the hopper, said chamber having a discharge opening at its lower end and in its upper inclined walls channels leading into the distilling chamber above the upper ends of its lower inclined walls, and into the upper ends of which the pulverized coal is delivered from the hopper.

4. An apparatus for distilling pulverized coal, comprising a hopper, a feed device in the hopper, a distilling chamber lozenge-shape in cross section and arranged below the hopper, said chamber having an elongated discharge opening in its lower end and channels in its upper inclined walls, said channels receiving the coal from the hopper and leading into the distilling chamber above the upper ends of the lower inclined walls, combustion flues extending along the sides of the lower inclined walls, and air heating flues at the sides of the upper inclined walls of said chamber.

5. In an apparatus for distilling coal, comprising a lozenge-shaped chamber having a discharge opening in its lower end and provided in each of its upper inclined walls with a channel, said channels leading into the chamber above the lower ends of the lower inclined walls thereof, and means for feeding pulverized coal into said channels.

6. An apparatus for distilling pulverized coal, comprising a lozenge-shaped distilling chamber having a discharge opening in its lower end and provided in each of its upper inclined walls with a channel, the channels having their lower ends opening into the chamber, and means for feeding the pulverized coal alternately to said channels.

7. An apparatus for distilling pulverized coal, comprising a hopper, a lozenge-shaped distilling chamber below the hopper, said chamber having a discharge opening in its lower end and provided in each of its upper inclined walls with a channel, the channels merging at the top and having their lower ends opening into the chamber, and a grooved feed roller in the hopper for feeding the coal alternately into the channels.

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