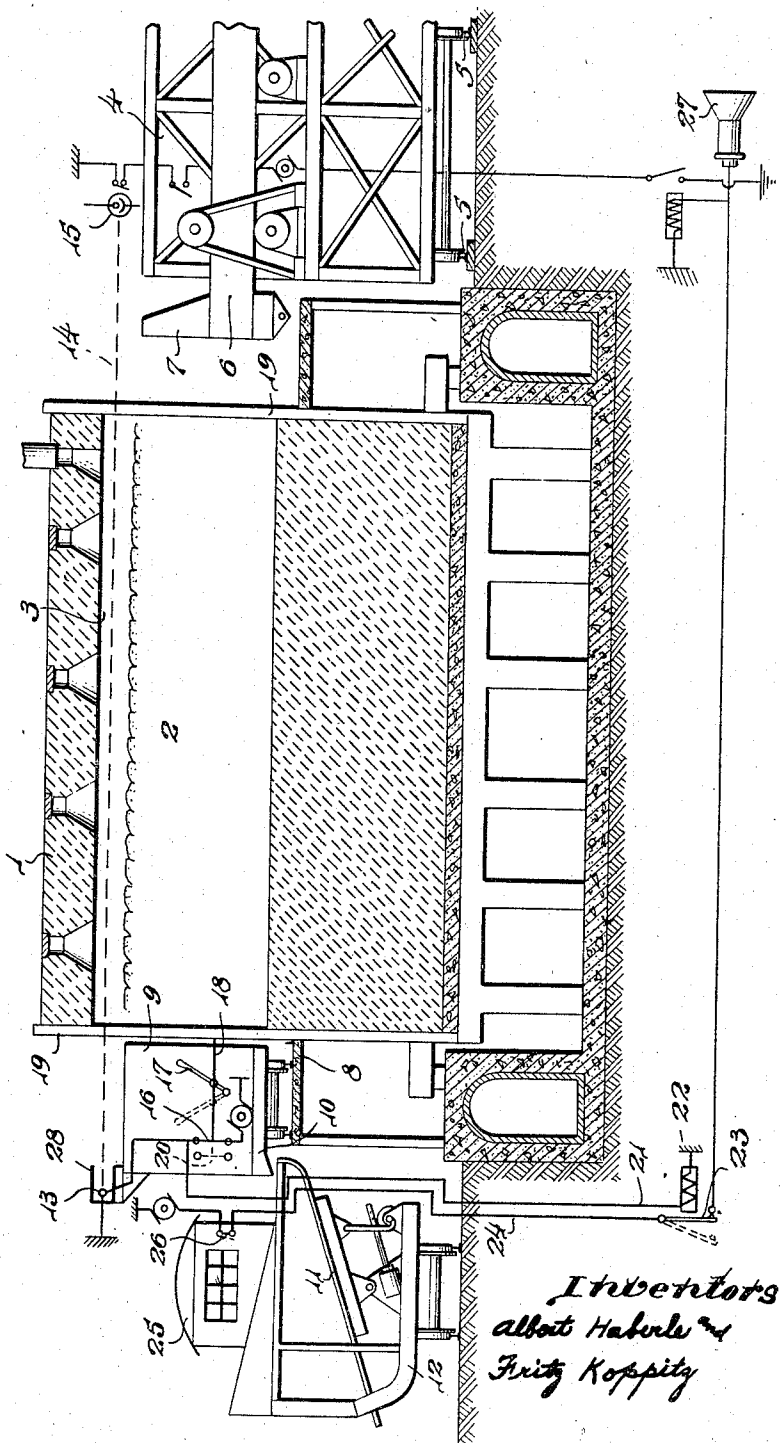
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COKE OVEN CHARGING MECHANISM

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COKE OVEN CHARGING MECHANISM

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The present invention relates to horizontal chamber oven batteries for the production of gas and coke in which the coking cake produced is pushed out of the coking chambers through a lateral chamber opening.

For the discharge of the coking cake from the chamber, a pushing device is used consisting of a ram fixed to a spur rack or the like which, after removing the chamber doors, travels into the coking chamber on one side so that the coking cake is pushed out through the opening provided at the other side of the oven chamber. On that side of the battery at which the coke is pushed out, the so-called "coke side," a travelling coke guide car is mostly used which transfers the coking cake from the chamber to be discharged into the quenching car. The coke guide car is generally combined with a suitable door extracting device by means of which the door on the coke side may be removed and then the coke-guide positioned in place, before the pushing out of the coke takes place. The pushing machine on the other side of the battery—the so-called "machine or pusher side"—may be fitted with a similar door extracting device.

At coke oven plants operating on a large scale it is difficult to have the operators of the pushing machine on the machine or pusher side of the batteries and the operators of the coke guide car on the coke side of the batteries serve always one and the same chamber at the same time.

The invention consists in providing, for the control of the position of the coke pushing machine at one side of the battery and of the coke guide car at the other side of the battery, a ray of light which is led from the pushing machine, or coke guide car, or from any other suitable point, through the gas collecting space of the oven after the two chamber doors have been opened. This light ray is visible, on the one hand, either on the other side of the battery or, after being reflected, also on the same side to the attendants. On the other hand it may effect a photo-electric cell which preferably influences the drive of the coke pushing machine.

The invention offers the possibility of a most appropriate safeguard as to the proper position of the coke pushing machine and of the coke guide car relative to each other when discharging the oven chamber, as the light ray led through the gas collecting space can only be observed at the other side of the battery or be reflected if both the doors of the oven chamber are opened. The source of light, or the reflector, is suitably arranged in such a manner that the ray of light only falls through the oven chamber if the coke pushing machine and the coke guide car are in the correct position.

If a photo-electric cell is combined with this protective device, which may also be used for signalling alone, it is possible to control the driving motor of the pushing machine, or to act on its current supply, or on any locking devices for the coke guide car and for the coke pushing machine. The photo-electric cell may be made of the known type and is suitably connected with an electric amplificator in order to disengage the desired mechanisms.

A further object of the present invention is to provide such improvements which will ensure that the coke guide car is in proper position in front of the coke oven door when the respective coking chambers are to be discharged and to prevent any discharging as long as the coke guide car is not in its correct position.

In this connection the invention provides means in which, by switching on the source of light from where the ray leads through the gas collecting space of the coking chamber to be discharged, another circuit is closed which connects a switch provided for the purpose on the quenching car with a signal, preferably an acoustic signal device arranged on the pusher machine side, or at any other suitable place of the battery.

Furthermore the invention provides for the connection of the contrivance for interlocking the coke guide car in the proper position in front of the coking chamber to be discharged with a contact device which controls the current supply to the source of light. In this way it is possible that the light ray of the signal only then lights up if the coke guide car stands exactly in front of the chamber to be discharged in its proper position.

With the above and other objects and features of the present invention in view, we will now describe a preferred embodiment thereof on the lines of the accompanying drawing showing schematically a cross-section of a coke plant modified according to the invention.

The horizontal chamber oven battery is marked 1 on the drawing and the section through the oven chamber is made in such a way that one recognises a coking chamber 2 and a gas collecting space 3 overlying the coal charge in the top of the coking chamber. The coking cake may be discharged from the coking chamber 2 to the left. For this purpose a pushing machine 4 is provided which travels over the tracks 5 along the right hand side of the battery (on the draw-

ing). The pushing machine 4 is provided with a ram 6 and a pusher head 7 the shape of which substantially corresponds to the front side of the coking cake to be discharged.

On the other side of the battery is arranged a platform 8 on which the coke guide car 9 travels. The coke guide car is preferably equipped with two vertical walls which guide the cake from the chamber 2 over the platform 8. The bottom, between the guiding walls of the coke guide car 9, is inclined towards the outer end, as indicated at 10, so that at this point the caked coke breaks off and falls upon the loading face 11 of the quenching car 12.

At the top of the coke guide car 9, preferably beyond that point at which the caked coke breaks off, due to the inclination of the bottom, there is arranged a pipe-like part 28 open at one side in which a source of light 13, for example an electric bulb, is situated. The part 28 opens towards the gas collecting space 3 of the oven chamber. The part 28 is preferably formed by a refractory or good insulating material, or it is at least lined with such a material, in order to protect the light source 13 from the heat of radiation of the oven chamber and of the glowing coke.

The part 28 is arranged in such a way relative to the top of the oven chamber that if the coke guide car 9 stands directly in front of the chamber to be discharged, the front opening of the part 28 lies in the direction of the gas collecting space 3 and in line therewith. If the light source 13 lights up, as indicated by the dashed line 14, a ray is conducted through the gas collecting space 3 which may be seen for instance by the operator on the pushing machine 6 as marked at 15.

The supply of current to the source of light 13 is controlled by a switch 16 which is operated by a hand lever 17. The hand lever 17 further actuates a lock 18 which engages into a recess of one of the buckstays of the oven battery if the coke guide car is in its proper position exactly in front of the open doorway of the oven chamber to be discharged. The lever 17 can therefore only be brought into the position shown on the drawing which lights the light 13 if the lock 18 may also be introduced into its recess. This means that the circuit for the signal light 13 can only be closed if the coke guide car is in its proper position. If the hand lever 17 is shifted to the left, the contact 16 is interrupted as indicated in dotted line at 20.

By closing the contact 16 the circuit 21 is also closed which acts upon an electric magnet 22. The contact lever 23 is thereby attracted so that the circuit 24 is closed. This circuit 24 transfers over the usual trolley wires onto the driver's cabin 25 of the quenching car 12. At the driver's cabin there is provided a hand switch 26 which is operated by the mechanic on the quenching car as soon as the quenching car stands in front of the oven chamber to be discharged. If the quenching car operator engages the switch 26 and if the coke guide car 9 has reached its proper position by pushing in the lock 18, the current passes across the line 24 to an acoustic signal 27 or to another suitable signal device which indicates to the operator on the pushing machine that the pushing of the coke from the oven chamber can now be commenced. Instead of using the optic or acoustic device 27 it is also possible to provide an electrical contrivance as shown which acts upon the drive of the ram 6 so that the ram 6 is only moved if the coke guide car and the coke quenching car have taken up the proper position in front of the oven chamber to be discharged.

We have now above described our present invention on the lines of a preferred embodiment thereof but our invention is not limited in all its aspects to the mode of carrying it out as described and shown, since the invention may be variously embodied within the scope of the following claims.

What we claim is:

1. Apparatus for aligning a coke-guide car and coke pushing machine at opened doorways at opposite ends of a horizontal coke oven comprising: electrical means on the coke-guide car for emitting a light-ray; means on the coke pushing machine for receiving the light-ray from the coke-guide car; and in which the light-ray emitting element is disposed on the coke-guide car so that the ray is led, when the coke-guide is in place at one end of a chamber to guide the coke therefrom, into the open doorway of the chamber from the coke-guide car through the gas collecting space below the top of the chamber above the charge therein, and emerges through the open doorway at the pusher side; and in which the means for receiving the light-ray comprises a photo-electric cell on the coke pushing machine disposed thereon in position to receive the ray only when the coke-guide and the pusher machine are both in proper cooperative position at opposite ends of the same oven chamber.

2. Apparatus for aligning a coke-guide car structure and coke pusher-ram machine structure at opened doorways at opposite ends of a horizontal coke oven comprising: electrical means for emitting a light-ray on one of said structures; and means on the other structure for receiving the ray; and in which the light-ray emitting element is disposed on the structure so that the ray is led, when its structure is in operative position at one end of a chamber, into the open doorway of the chamber through the gas collecting space below the top of the chamber and above the charge therein, and emerges through the open doorway at the opposite end of the chamber; and in which the means for receiving the light-ray comprises a photo-electric cell on the other structure disposed thereon in position to receive the ray only when said coke-guide structure and said pusher-ram structure are both in proper cooperative position at opposite ends of the same oven chamber, and means operable by the photo-electric cell for controlling the flow of electric power for driving the ram of the pusher-ram machine so that the ram is driven only when the light-ray is received by the photo-electric cell.

3. Apparatus for aligning a coke pushing machine on one side with a coke-guide car and coke-quenching car on the opposite side of a horizontal coke oven, comprising: electrical means for emitting a light-ray on the coke-guide car; and means on the coke pushing machine for receiving the light-ray from the coke-guide car; and in which the light-ray emitting element is arranged to cause a light-ray to traverse the crown-space of the oven chamber, and which the receiving means is disposed on the pushing machine to receive the ray as it emerges at the opposite end of the chamber, said electrical means for emitting light-rays including connections operable on closing of the light circuit to close a circuit having a switch on the coke-

quenching car, said circuit being connected with means for the pusher machine on the pusher machine side of the battery and being operable only when the switch on the coke-quenching car and the light-ray circuit are both closed.

4. Apparatus for aligning a pusher machine and a coke-guide machine at opened doorways at opposite ends of a horizontal coke oven, comprising: a pusher machine on the pusher-side of the oven and a coke-guide machine on the coke-side, light-ray sending means on one of said machines arranged to cause a light-ray to traverse the crown-space of the oven, and photo-electric cell means on the other machine arranged to receive said light-ray and to be actuated by the light-ray, said light-ray sending means and said photo-electric cell means being mounted on their respective machines so that the photo-electric cell means receives the ray from the sending means only when the pusher machine and coke guide machine are in correct position at opposite ends of the oven.

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