June 26, 1934. P. VAN ACKEREN 1,964,546

SAFETY DEVICE FOR PRODUCERS AND THE LIKE

Filed Aug. 17, 1931

Fig. 2.

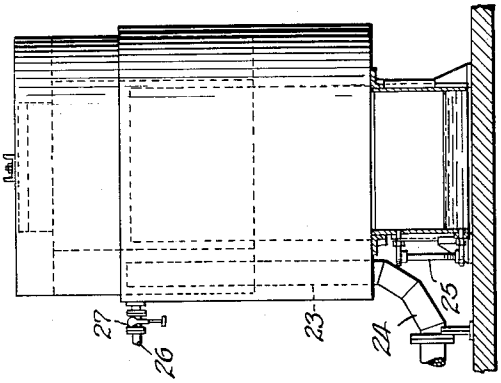


Fig. 1.

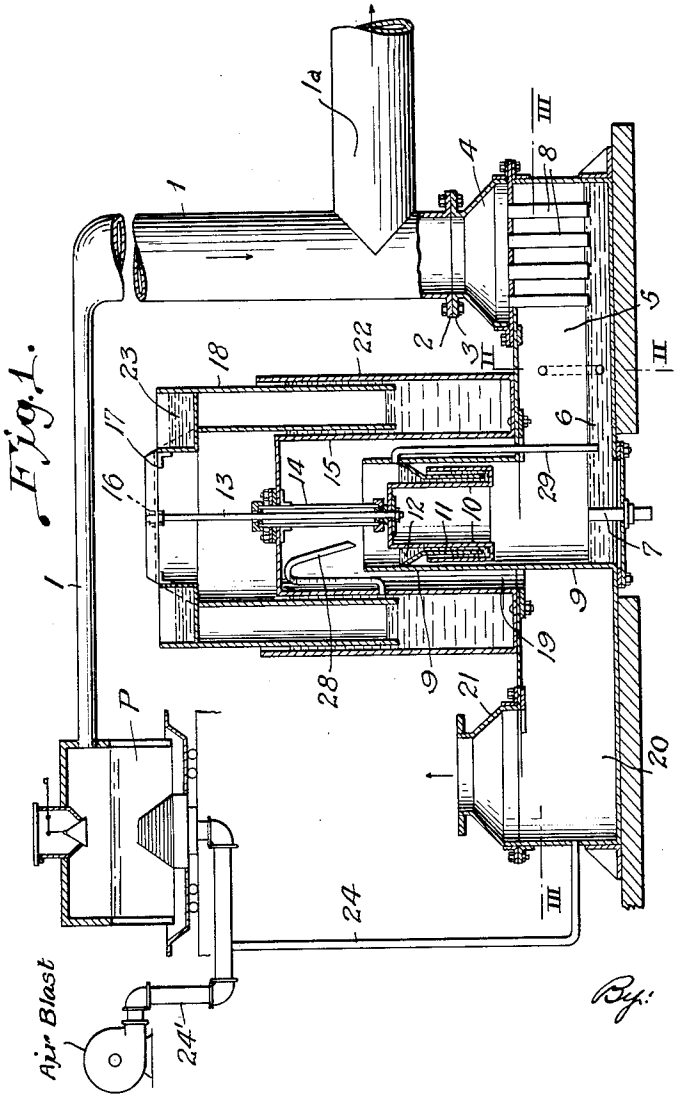
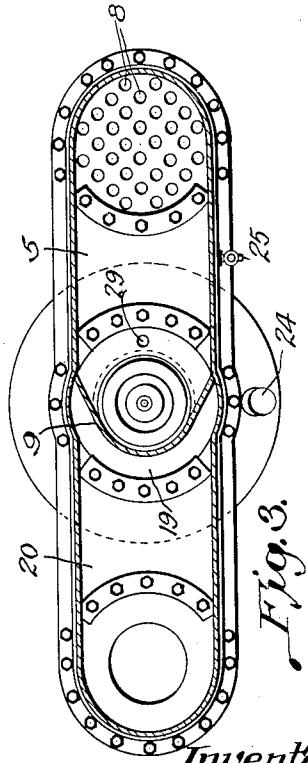


Fig. 3.



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SAFETY DEVICE FOR PRODUCERS AND THE LIKE

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8 Claims. (Cl. 48—87)

The invention relates to oven plants heated by gas and provided with regenerators, for instance heated ovens with regenerators for the production of gas and coke, which are heated by means of producer gas or the like, which is produced in a gas producer plant built separately independent of the oven, which is connected up with the oven with a pipe line and more particularly to such ovens with regenerators, which are connected up with the gas producer plant, in cases where the gas producers are run with a blast under the fire bed which is for instance produced by a blower.

In the case of ovens with regenerators, there is, as is well-known, periodically a change-over of the direction of the heating gas in the ovens in such a way that in the one working period lean gas and combustion air are preheated in a pair of regenerators and during this time another pair of regenerators is preheated by the hot waste gases and in the other running period, the lean gas and the air or the waste gases take a contrary direction. For the reversing of the direction of the gas current one usually makes use of valves inserted in the path traversed by the gas which are closed and opened periodically in a certain sequence. When the valves are reversed, the valves controlling the supply of weak gas to the regenerators are for a very short time all shut off so that during this time the gas produced in the producer cannot escape. In the case of producers run with an artificial blast, the intermediate periods when the off-flow of the producer gas is hindered, there is no danger arising as the blowers serving to produce the blast are of such measurement that they can during a short time produce a still higher gas pressure and at the same time a higher concentration of the produced gas in the gas pipe lines so that during the period when the gas supply valves of the ovens are closed, the gas produced in the producer can be stored in the pipe line.

As long as the contrivance for the production of the blast in the oven plants described connected up with gas producers is in action, the running of the plant does not offer any danger. Should, however, for any reason the blast producer go out of action, then there arises under certain circumstances a high degree of danger as the producer gas during the time in which the gas supply valves of the ovens are closed and which in consequence cannot leave the fire box of the gas producer in the normal way, highly explosive gas and air mixtures are formed by its passage through the fuel bed and in the blowers connected up with the fuel bed and in the working rooms surrounding same.

The object of the invention is now to provide an improvement in the plant described at the commencement by which the dangers, which in certain cases arise, when the blast producer goes out of action, are removed to the fullest extent. For the above purpose there is provided according to the invention in the connection pipe lines of the gas producers connecting up with the ovens to be heated a gas draw-off opening which is controlled by a valve which by the pressure of the blast serving to produce the producer gas is held in its final position and which in the case of the blast pressure being reduced for instance in consequence of the failure of the blast producer automatically opens so that the producer gas from the gas connecting pipe line between the producer and the oven can reach the outside air, a gas holder or any other desired point.

According to the invention, there is further inserted in the path taken by the gas which leads to the safety draw-off valve a dip. This consists of a row of comparatively narrow pipes which are connected up at the top end with the producer gas pipe line and which at their lower end dip to a certain extent in a barrier fluid held in a container which is of such dimensions that the comparatively narrow dip tubes without the gas or air passing into the dip pipes can take up to such a degree the barrier fluid, which corresponds to the draught to the chimney provided in the plant or to the draught inside the connecting pipes between the gas producers and the ovens.

On the accompanying drawing there is shown in a preferred form an embodiment of the present invention and I will now describe with reference to the acompanying drawing in which Fig. 1 represents a vertical section through the safety contrivance inserted in the connecting pipe line between the gas producer and the oven.

Fig. 2 is a vertical side view and a partial section on the line II—II of Fig. 1 of the safety contrivance and

Fig. 3 is a horizontal section of the lines III—III of the Fig. 1.

In Fig. 1 the supply of the gas is effected through the pipe line 1 connected up with the gas producer P shown conventionally in the drawing to which is linked up the pipe line 1a to the regenerators of the ovens likewise not shown in the drawing. The pipe line 1 carries under a flange 2 to which the flange 3 of the gas supply

branch 4 of the safety contrivance is connected up.

The gas safety arrangement has in its lower part a flat on all sides closed in tank 5 which serves for the taking up of the barrier liquid 6, the height of which is limited by the adjustable run-off pipe 7. In the barrier liquid 6 there dips from the inlet branches 4 out of a row pipes 8, open on both sides and to such a small extent that the gas which passes through the pipe 8 and goes through the barrier liquid 6, has not to overcome any considerable pressure. Moreover, the section of the dip pipes 8 is so measured that in case that any underpressure during the running of the oven arises in the inlet branches 4 the barrier liquid without the gas passing over out of the tank 5 into the dip pipes 8 in which the latter is drawn up to a certain height which corresponds exactly to the underpressure existing in the pipe branch 4.

The gas space of the tank 5 has a tubelike widening 9 on the opposite side of the dip, in which a wet trap is arranged out of a cup 10 and the dip ring 11. As customary, in the cup 10 of this wet trap a barrier liquid 12 is provided.

The cup 10 is closed above and is fixed to a guiding rod 13 which passes through a stuffer box 14 of the casing shell 15 which surrounds the dip trap, bringing about a tight fit and above by means of a screw 16 is attached to a cover 17 of a dip bell 18. Fuller references will be made later to this dipping bell 18.

The inside of the casing 15 which surrounds the dip trap is in connection with the room 20 provided for at the underpart of the safety contrivance which has a pipe branch 21 serving to connect up with a gas holder or a chimney.

The dip bell 18 is formed by the ring channel like form construction shown and dips into a liquid space of ring form which is made up in the inside by the wall of the casing 15 and outside by the shell 22 attached to the outside of a safety contrivance on the underpart.

The ring shaped space of the dip bell is opened below. At one point as is seen from Fig. 2, a pipe 23 enters from below which outside stands in connection with the blast air supply pipe line 24' of the gas producer by means of the pipe line 24. During the working of the blast producer air is blown in through the pipe 24 in the ring shaped space of the dip bell 18 corresponding to the air pressure of the blast, in which connection the dip bell 18 corresponding to the pressure of the compressed air is raised to such an extent that the dip ring 11 dips into the dip ring 10 in the connection between the casing room 5 and the interior of the casing 15 or with the casing room 20 is interrupted. In order to adjust the weight of the valve in this case exactly to the pressure of the blast a ring form tank 23 is provided at the upper end of the dip bell, 18 which serves to take up a loading fluid or to carry weights or otherwise pieces of metal.

Outside on the tank 5, there is a water levelling indicator 25 by means of which the height of the barrier liquid 6 can be observed in the tank 5. Should the barrier liquid sink below the necessary level, then the barrier liquid is supplied through a pipe line 26 attached to the outer wall 22 of the tank containing the dip bell 18 which is served by a shut-off mechanism 27 which then flows out of the dip holder of the dip bell 18 through the siphon pipe 28 into the cup 10 of the safety valve and from there through a pipe line 29 into the tank 5. The siphon pipe 28 as well as the overflow pipe line 29 are in this connection arranged at such a height that in each of the tanks through which the fluid passes, the barrier fluid is automatically maintained at the necessary height.

The manner of working of the contrivance shown in the drawing is as follows:

Should for any reason the blast producer go out of action, then the dip bell 18 which up to then has been held in its upper permanent position by the blast pressure, sinks and at the same time the dip trap of the safety arrangement is opened so that in case of the simultaneous changing of the direction of the heating of the regenerators of the ovens at the moment when the gas valves on both sides of the oven are closed, the gas from the pipe line 1 can reach the casing room 5 through the dip ring 11 released and the connecting channel 19 can get into the casing room 20 and from there into the waste air pipe line connected up with its pipe branches 21 so long as the pressure in the pipe line 1 is approximately equal to the outside air pressure. Then in the absence of the blast of the producer, the gas through the open valve of the change over contrivance of the regenerators of the oven through the chimney draught reaches further into same and then the barrier fluid 6 of the tank 5 will be sucked up into the pipe line 8 so that the outer air can no longer be sucked up through the open dip trap 10, 11.

It is, of course, understood that in connection with the contrivance in accordance with the invention instead of the wet trap for the safety valve a dry trap can be employed. Likewise it is also possible instead of the fitting to prevent the backstreaming of outside air into the pipe line, any other contrivance of suitable efficiency can be made use of.

The invention as hereinabove set forth is embodied in a particular form of construction, but may be variously embodied within the scope of the claims hereinafter made.

I claim:

1. A safety device for gas producers comprising: an air blast inlet line into a producer, a gas outlet line from the gas producer, and a purge valve communicably connected with said outlet line for purging the same comprising an exit valve leading to a point outside the outlet line other than through the producer and means for sealing said exit valve by the air blast pressure in the air blast inlet line whereby the air blast pressure operates to seal the purge valve.

2. Apparatus as claimed in claim 1 and in which a dip seal is provided in the line of communication between the gas outlet line and the exit valve through which vented gas may pass to the exit valve.

3. Apparatus as claimed in claim 1 and in which a dip seal is provided in the line of communication between the gas outlet line and the exit valve, and the surface of the barrier liquid portion of the dip seal is equal to many times the effective cross-sectional area of the dipping portion of the dip seal.

4. A safety device for gas producers comprising: an air blast inlet line to a producer, a gas outlet line for the gas producer, venting means for venting said line to a point outside the same other than through the gas producer therefor, and means controlled by the air blast pressure flowing into the producer for said line for closing the venting means and operable by the decrease of such pressure to open the same.

5. A safety device for gas producers comprising: an air blast inlet line to a producer, a gas outlet line from the gas producer, a vent conduit communicating therewith and leading to a point outside the same other than the producer for said gas outlet line, a valve for closing the vent conduit, means for operating the valve to opening and closing position, and means for diverting a portion of the air blast pressure fluid passing into the gas producer through the air inlet line to the means for operating the vent conduit valve to seal the latter by the air blast pressure.

6. A safety device for gas producers comprising: an air blast inlet line to a producer, a gas outlet line from the gas producer, a vent conduit communicating therewith and leading to a point outside the same other than the producer for said gas outlet line, a valve for closing the vent conduit, means for operating the valve to opening and closing position, means for diverting a portion of the air blast pressure fluid passing into the gas producer through the air inlet line to the means for operating the vent conduit valve to seal the latter by the air blast pressure, and conduit means, and a liquid seal into which the conduit means dips interposed between the gas outlet line and the valve therefor.

7. A safety device for gas producers comprising: an air blast inlet line to a producer, a gas outlet line from the gas producer, a vent conduit therefor communicating therewith and leading to a point outside the outlet line, a bell valve for closing the vent conduit, a bell valve for operating vent conduit bell valve to open and close the latter, and means for diverting air blast pressure fluid passing to the producer line to the operating bell valve to operate the same to seal the bell valve by the air blast pressure passing to the producer.

8. A safety device for gas producers comprising: a gas outlet line from a gas producer, a vent conduit therefor communicating therewith and leading to a point outside the outlet line, a bell valve for closing the vent conduit, a bell valve for operating vent conduit bell valve to open and close the latter, means for diverting air blast pressure fluid passing to the producer through the air blast inlet line to the operating bell valve to operate to seal the vent conduit bell valve, by the air blast pressure, a dip seal interposed between the vent conduit bell valve and the gas outlet line, means for conveying liquid sealing medium from the operating bell valve to the vent conduit bell valve, and means for conveying liquid sealing medium from the vent conduit bell valve to the dip seal.

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