Aug. 27, 1929. L. WILPUTTE 1,726,092

WASHING HOT GAS VALVES

Filed March 25, 1922 2 Sheets-Sheet 1

Fig. 1,

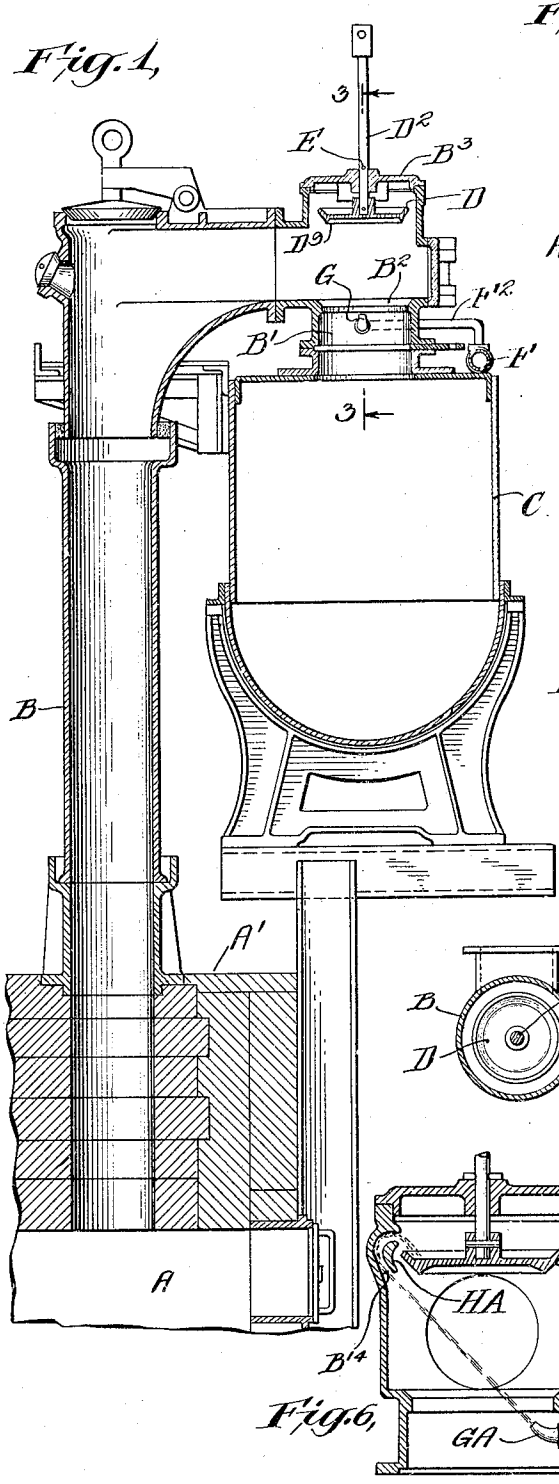


Fig. 2,

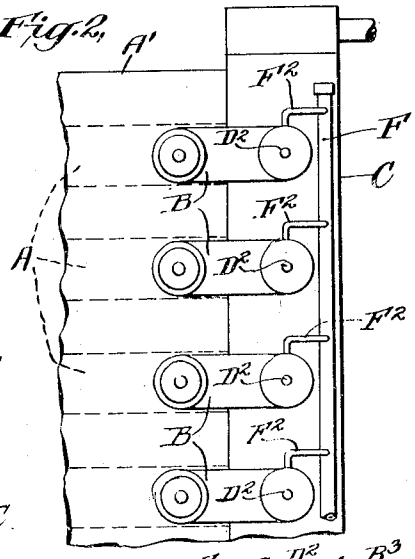


Fig. 3,

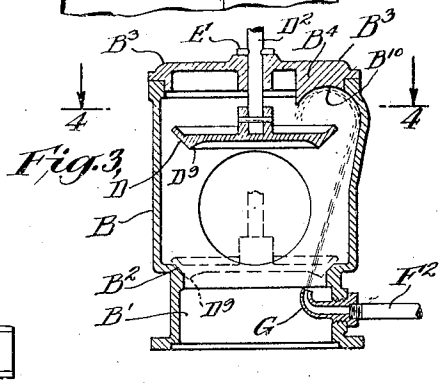


Fig. 4,

Fig. 5,

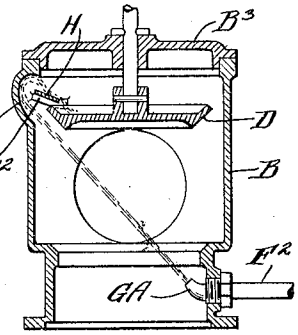


Fig. 6,

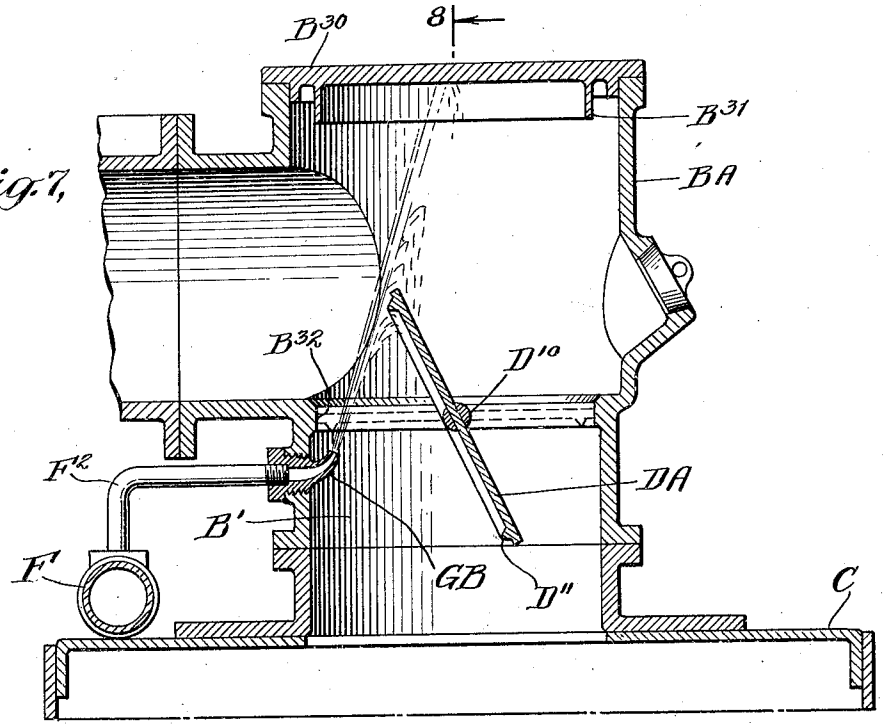
INVENTOR
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BY John E. Blubbell
his ATTORNEY

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Filed March 25, 1922 2 Sheets-Sheet 2

Fig. 7,



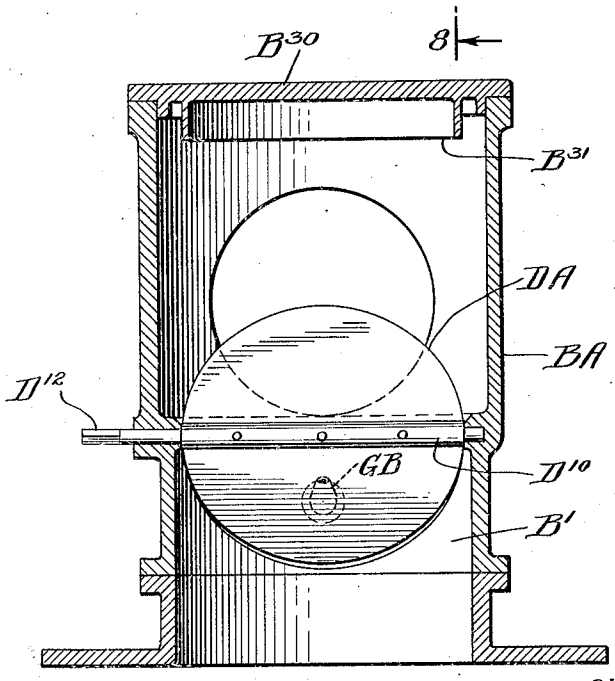


Fig. 8,

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Patented Aug. 27, 1929.

1,726,092

UNITED STATES PATENT OFFICE.

LOUIS WILPUTTE, OF NEW ROCHELLE, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WILPUTTE COKE OVEN CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF MAINE.

WASHING HOT GAS VALVES.

Application filed March 25, 1922. Serial No. 546,546.

The general object of my present invention is to provide simple and effective means for keeping valves swept by hot gases free from tar, pitch and dust deposits interfering with the operation and tight closure of the valves. My invention was especially devised and is especially adapted for use in connection with the valves controlling communication between the collecting main and coking chambers of a by-product coke oven plant.

In an ordinary by-product coke oven plant the various coking chambers of a coke oven battery are connected each by an individual ascension pipe to the collecting main which receives the hot gases of distillation generated in the coking chambers. At the end of each coking operation carried out in any one coking chamber of an ordinary coke oven battery, the coking chamber must be opened to the atmosphere to permit the discharge of the coke which it contains. When the coking chamber is thus opened to the atmosphere it is necessary, of course, to close communication between the coking chamber and the collecting main to prevent the influx of air into the latter. For this purpose a cut-off valve is ordinarily provided in each ascension pipe. This valve is open most of the time, but at the end of each coking period, which ordinarily is something like 20 to 30 hours, the valve must be closed for a few minutes at least, and under some conditions of operation may remain closed for an hour or so. The gases which pass through the ascension pipes carry large amounts of tarry substances and carbon dust some of which tends to collect on the cut-off valve and valve seat. Tar, if allowed to remain for any appreciable time on the valve and valve seat is converted into pitch by the heat of the gases passing through the ascension pipe. Pitch thus formed is admixed with carbon dust and forms a hard deposit which interferes with the operation of the valve and makes it difficult, if not impossible, to close the valve tightly. Troublesome deposits on the cut-off valve and valve seat may be prevented by bathing the valve and valve seat with a suitable liquid continuously while the valve is in its open position.

My present invention consists in provisions for preventing the troublesome deposits on the cut-off valve and valve seat by discharging an upwardly directed jet of wash liquor on to each cut-off valve through the port controlled by the latter from a nozzle or orifice located on the outlet or collecting main side of the valve seat. Preferably I employ an ascension pipe and cut-off valve arrangement of such character that the liquid discharged on to the valve and not vaporized by the hot gases sweeping through the pipe will drain down over the valve and valve seat into the collecting main. The wash liquid which I prefer to use for this purpose is tar and ammonia containing gas liquor such as is commonly circulated through the collecting main to prevent the latter from clogging up. With the ordinary ascension pipe and cut-off valve arrangement which I prefer to employ the cut-off valve is opened by a vertical movement upward from its seat at the top of a vertical port through which the ascension pipe communicates with the collecting main. In this arrangement the jet of wash liquor cannot be directed directly on to the top of the valve but must be directed against a deflecting surface at one side of the valve which may be formed by a portion of the wall of the ascension pipe.

My invention possesses an important practical advantage in that the discharge of the valve washing jet need not be interrupted when the valve is closed as in such case the jet will impinge against the underside of the valve and drop down into the collecting main and there is, in consequence, no danger of flooding a coking chamber with the wash liquor when the corresponding cut-off valve is closed as has been experienced with prior arrangements proposed for bathing cut-off valves with gas liquor.

The simplicity and value of the invention is enhanced by the fact that the velocity and volume of the valve washing jets need not be closely regulated, inasmuch as the discharge on to a valve of wash liquor considerably in excess of that required to keep the valve and valve seat clean, is unobjectionable from a practical standpoint. The portion of the liquor vaporized by the hot gases lowers the temperature of the latter but this is beneficial rather than otherwise.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For

a better understanding of the invention, however, and the advantages possessed by it reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described preferred embodiments of the invention.

Of the drawings:

Fig. 1 is a sectional elevation through a portion of a coke oven battery;

Fig. 2 is a diagrammatic plan view of a portion of a coke oven battery;

Fig. 3 is a partial section on the line 3—3 of Fig. 1 but taken on a considerably larger scale than Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a view taken similarly to Fig. 3 illustrating a modification;

Fig. 6 is a view taken similarly to Fig. 3 illustrating a portion of another modified construction;

Fig. 7 is a view taken similarly to Fig. 1, illustrating the use of my invention with a different form of cut-off valve; and

Fig. 8 is a section on the line 8—8 of Fig. 7.

In the drawings A represents the coking chambers of a by-product coke oven battery A′ of a well known type, and B the standpipe connections from the various chambers A to the usual gas collecting main C which extends longitudinally of the oven battery A′ and transversely of the individual coking chamber A. Each of the standpipe connections B, as shown, comprises a portion extending vertically upward from the oven structure and a horizontal portion which extends over the collecting main and is provided with a port B′ in its underside opening into the collecting main through the top wall of the latter. At the upper end of the port B′ is a seat B^2 for the cut-off valve D. The latter is of the disc type and is secured to the lower end of a valve stem D^2 which passes upward through a removable head B^3 normally closing an opening in the standpipe connection B above the port B′. Each valve D in its normal open position as shown in Fig. 1, is located in the ascension pipe just below the head B^3. It may well be locked in this position by means of a pin E passing through an opening formed for the purpose in the stem D^2. The valve D may be opened and closed manually or otherwise in known ways.

Liquid for bathing each cut-off valve D and the corresponding valve seat B^2 is supplied through a corresponding nozzle G and branch pipe F^2 from a supply main running alongside of the collecting main. As shown each nozzle G is threaded into an aperture in the wall of the corresponding port B′. Each nozzle G is of elbow shape with its discharge orifice so disposed that when the corresponding valve D is in its position the jet discharged from the nozzle will pass upward as indicated in Fig. 3 and will impinge against a deflecting surface B^{10} above the valve D and shaped to deflect the jet on to the top of the valve. As shown the deflecting surface B^{10} is concave and is formed in part by the wall of the ascension pipe B proper and in part by a lug portion B^4 of the head B^3. The liquid thus discharged on to the top of the valve drips off of the latter and drains back into the collecting main through the port B′. Preferably the parts are so proportioned and arranged that a considerable quantity of the liquid draining off the valve D and running down the ascension pipe wall eventually flows over the valve seat B^2. The constant flow of liquor over the valve and valve seat will wash off tar and carbon dust accumulating thereon from the gases passing through the ascension pipe, and will prevent the valve and the valve seat from becoming hot enough to cause tar or the like depositing thereon from adhering and becoming converted into pitch. When a valve D is closed, as shown in dotted lines in Fig. 3, the jet discharged by the corresponding nozzle G impinges against the underside of the valve and drops down into the collecting main. Advantageously the nozzle G should be arranged, as shown in Fig. 3, so that the jet discharged against the valve D when the latter is in its closed position, will be prevented by the lower edge D^9 of the valve from passing into the joint between the valve and valve seat.

It will be apparent that many modifications can be made in the form of the provisions used for bathing the valve and valve seat with wash liquor. For example, as shown in Fig. 5, the nozzle GA replacing the nozzle G of Fig. 3 is arranged to deliver a jet against a deflecting surface B^{11} located at the other side of the valve casing from that at which the nozzle GA is located. In Fig. 5 a plate or bar-like baffle H is mounted in the ascension pipe in position to minimize the portion of the liquor discharged against the surface B^{11} dripping down the adjacent side of the valve casing. This baffle H arranged as shown, should be made removable to permit the removal of the valve D when the top head B^3 is taken off for cleaning or repairs. For this purpose the ends of the baffle are removably held in notches or seats B^{12} formed in the housing.

In Fig. 6 somewhat the same result as is obtained with the removable baffle H of Fig. 5 is secured by forming a bent channel B^{14} in a projection HA from the inner wall of the ascension pipe.

The liquor with which I propose to bathe the ascension pipe cut-off valve and valve

seats is the mixture of tar and ammonia liquor condensing in the collecting main and in the subsequent cooling of the gases which is ordinarily employed for flushing out the collecting main. To keep the collecting main from clogging with tar, pitch and carbon dust, it is necessary to circulate through the collecting main a volume of flushing liquor much in excess of that required to wash the cut-off valves and valve seats. The wash liquor draining from the cut-off valves and valve seats down into the collecting main adds to the flushing liquor used in keeping the main clean. This makes it possible and convenient in practice to have the valve washing jets deliver appreciably more liquor than is really required to keep the valve and valve seats clean, since this makes unnecessary any close regulation of the volume and velocity and even the direction of the jets, and makes it unnecessary to design and construct the nozzles and jet deflecting surfaces with especial care in order to insure that enough of the liquor discharged by each jet will run over the surfaces of the corresponding valve and valve seat to keep them clean.

In Figs. 7 and 8 I have illustrated the use of my invention in an ascension pipe BA, in which the cut-off valve DA employed is a rotary or butterfly valve having its spindle D^{10} journalled at its ends in the side walls of the ascension pipe BA, one end of the spindle being provided externally of the ascension pipe with a squared end D^{12} for engagement by a wrench or lever or the like for turning the valve from the closed position shown in dotted lines, into the open position shown in full lines in Fig. 7. The port B′ of the pipe BA is restricted at its upper end providing a cylindrical surface B^{32} within which the peripheral edge of the valve BA lies in the closed position of the valve. In this form of my invention the wash liquor supply nozzle GB is advantageously constructed to discharge the wash liquor in the form of a spray so directed that some of the spray will strike the underside of the valve when the latter is in its open position, while the remainder will impinge against the casing head B^{30} above the valve and fall back on to the upper side of the valve and the lower portion of the ascension pipe at the margin of the surface B^{32} which is thereby bathed. Advantageously the head B^{30} is provided with a drip flange B^{31} arranged generally above the margin of the port B′. When the valve is closed the wash liquor then on the valve and the wall of the ascension pipe tends to provide an effective seal for the necessary clearance space between the periphery of the valve and the surface B^{32} to prevent objectionable leakage through this space with the small differential between the pressure of the atmosphere and the pressure in the collecting main.

While in accordance with the provisions of the statutes I have illustrated and described the best forms of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the apparatus disclosed without departing from the spirit of my invention as set forth in the appended claims.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination with a gas conduit having a hot gas inlet port and a cut-off valve controlling said port and movable between a closed position and an open position spaced from said closed position, of means for discharging a jet of wash liquor on to the cut-off valve when the latter is in its open position through said port from a jet orifice located at the opposite side of the closed position of the valve from the open position of the latter.

2. In a coke oven plant, comprising a coking chamber, a collecting main, an ascension pipe connection from the oven pipe to the main and opening into the main through a port, and a cut-off valve movable between a closed position and an open position spaced from said closed position, the improvement which consists in means for discharging a jet of wash liquor onto the cut-off valve when the latter is in its open position through said port from a jet orifice located at the opposite side of the closed position of the valve from the open position of the latter.

3. In a coke oven plant, comprising a coking chamber, a collecting main, an ascension pipe connection from the oven chamber to the main and opening into the latter through a port provided with a valve seat at its upper end, and a cut-off valve movable upward from said seat to open the port, the improvement which consists in means for discharging a jet of wash liquor upwardly through said port, said jet being so directed that when the valve is in its open position the jet will contact with the ascension pipe and be deflected on to the valve, and when the valve is in its closed position, the jet will impinge against the underside of the valve.

4. In a coke oven plant, comprising a coking chamber, a collecting main, an ascension pipe connection from the oven chamber to the main and opening into the main through a port provided with a valve seat at its upper end and a cut-off valve movable upward from said seat to open the port, the improvement which consists in means including an upwardly discharging jet orifice located below the valve when the latter is in its closed position for discharging a jet

of wash liquor through said port on to the cut-off valve, when the latter is in its open position.

5. The combination with a gas conduit having a hot gas inlet port and a cut-off valve controlling said port and movable between a closed position and an open position spaced from said closed position, of means for discharging a stream of wash liquor through said port on to the cut-off valve when the latter is in its open position from a point located adjacent the closed position of the valve

Signed at New York in the county of New York and State of New York this 22nd day of March A. D. 1922.

LOUIS WILPUTTE.