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[54] **GAS COLLECTING APPARATUS FOR COKE OVENS**

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[51] **Int. Cl.** **C10b 27/06**

[58] **Field of Search** 202/254–261, 202/269

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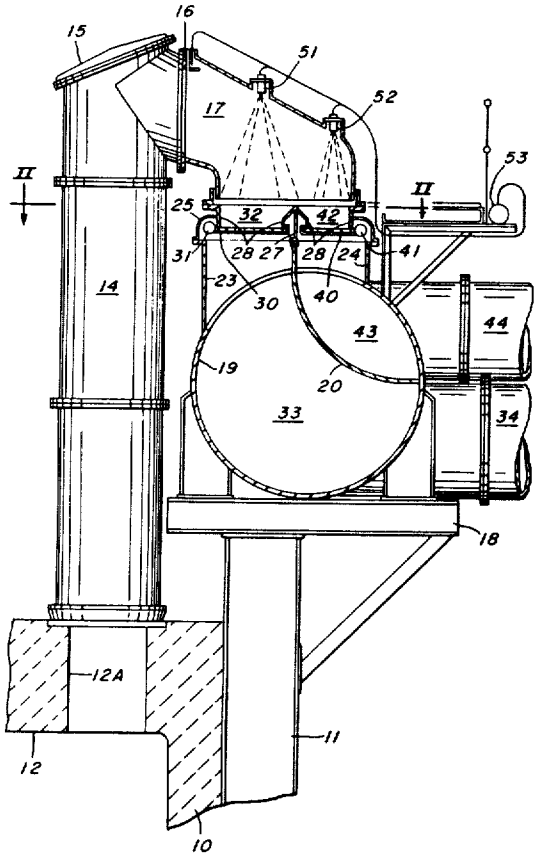
[57] **ABSTRACT**

A gas collecting apparatus for a battery of coke oven chambers each having a gas discharge opening connected to a header pipe which is in turn connected to an elbow. At its outlet end, the elbow is divided into two side by side outlet pipes, each of which is provided with a valve for selectively blocking the flow of gas into a two chamber manifold pipe. These chambers are formed by a dividing wall extending along the length of the pipe. The valve for each outlet pipe includes a closure plate attached to a shaft having a lever contacting a guide bar which includes an inclined surface for actuating the valve. The inclined surface on the guide bar for each valve is separated by a distance greater than the distance separating the shaft for each valve, so that both valves or one valve can be closed depending upon the position of the guide bar.

7 Claims, 7 Drawing Figures



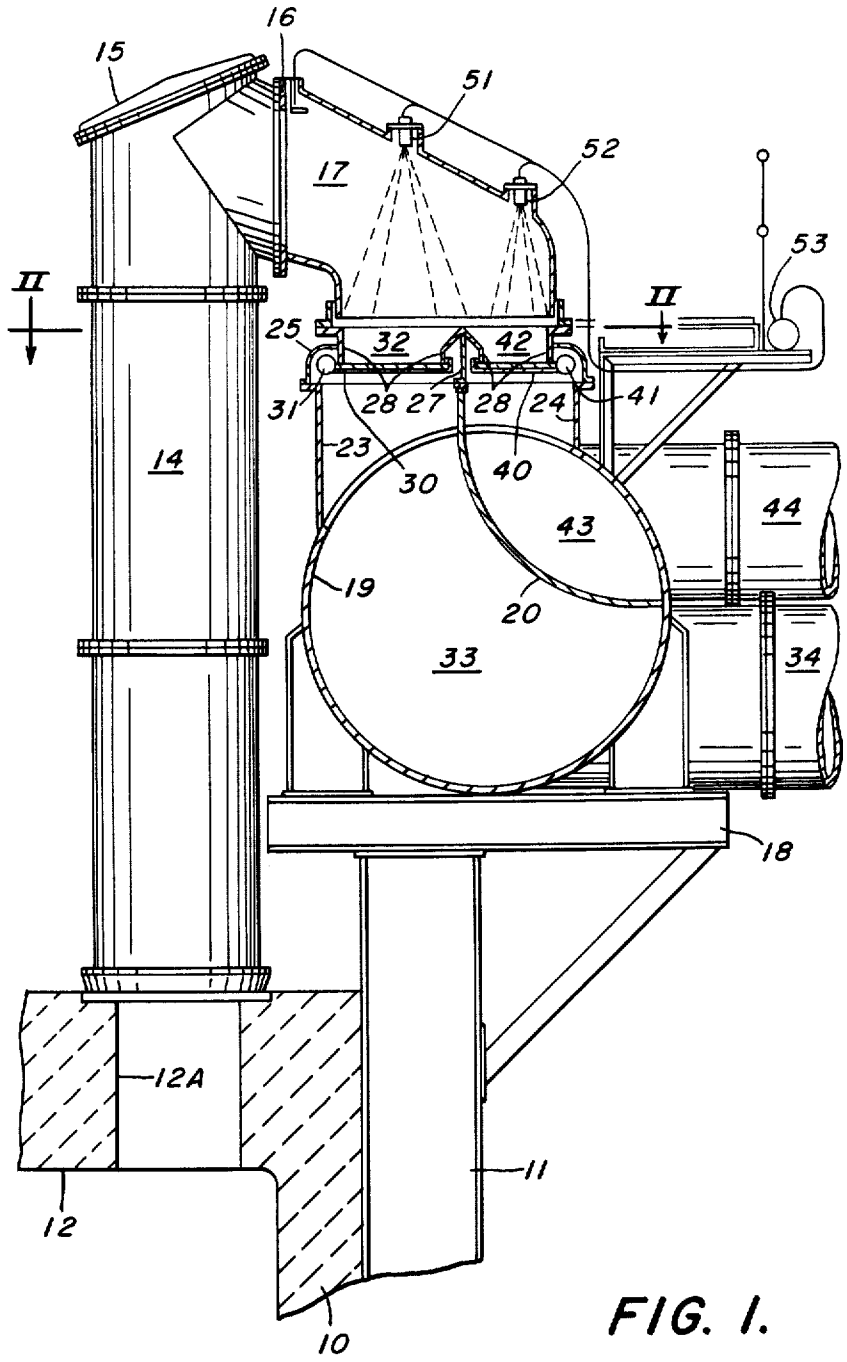

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FIG. 1.

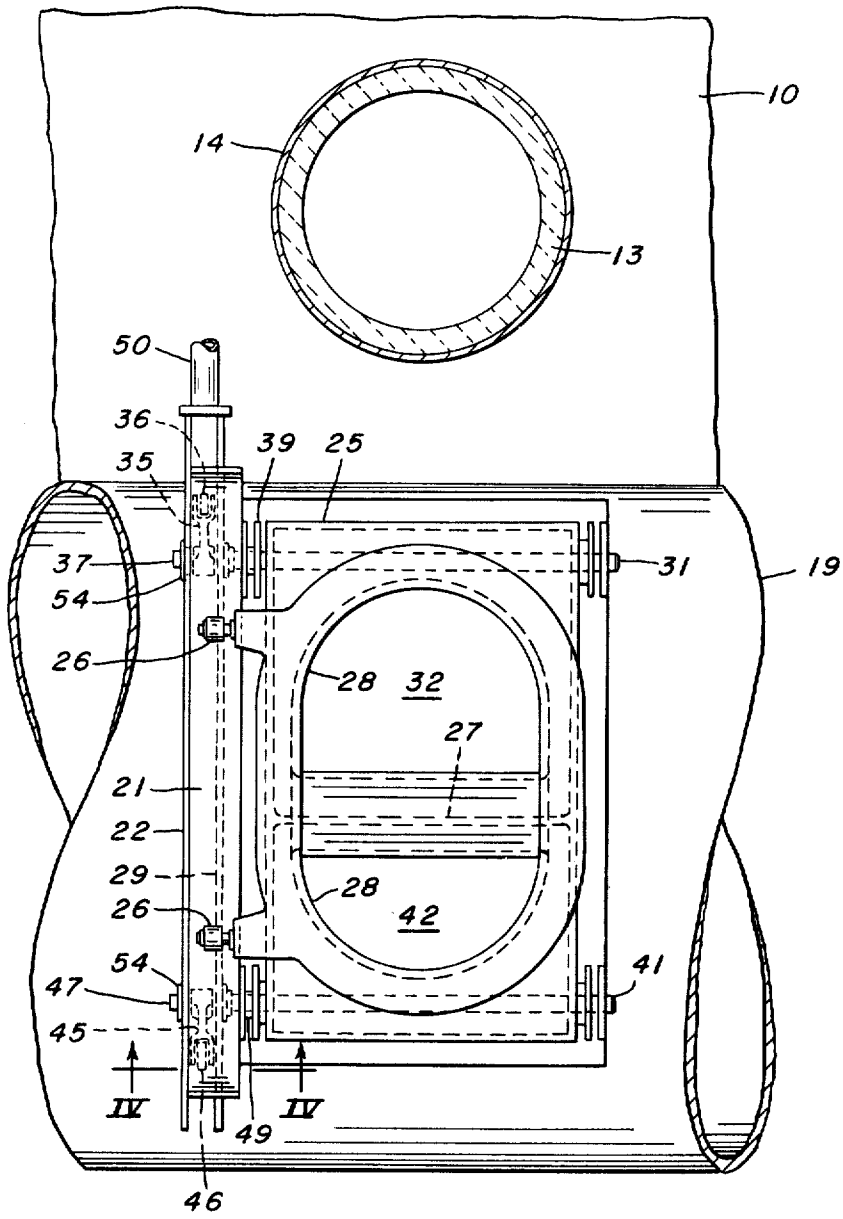
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FIG. 2.

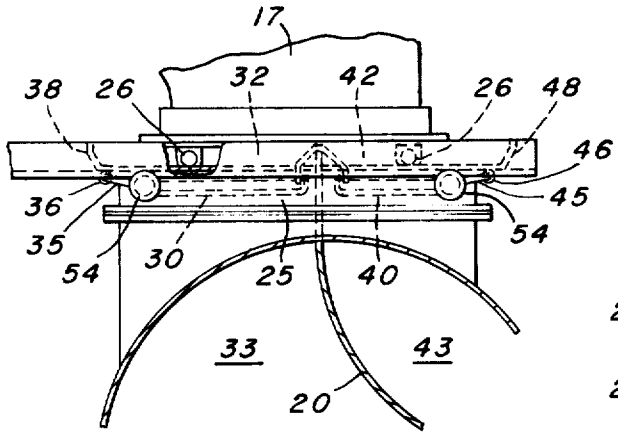

FIG. 3A.

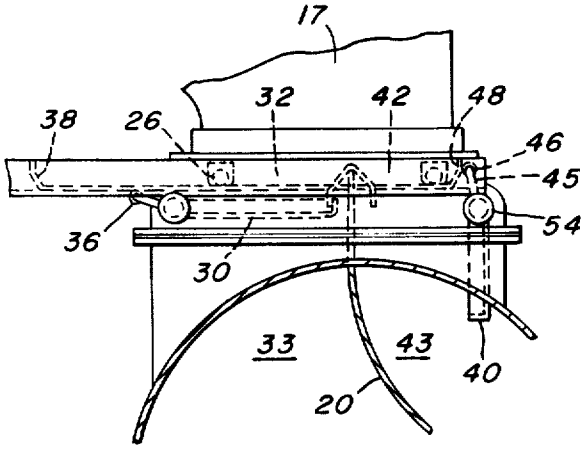

FIG. 3B.

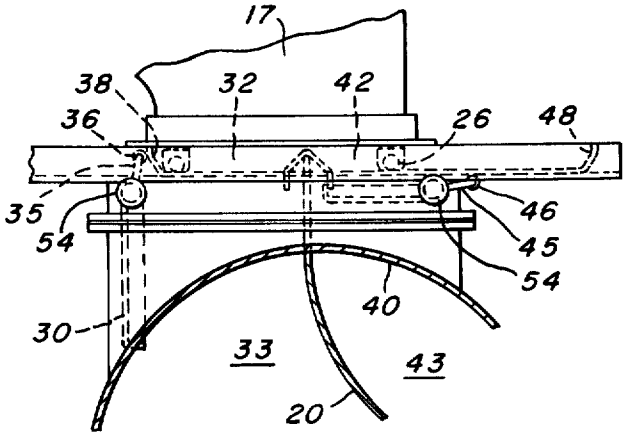

FIG. 3C.

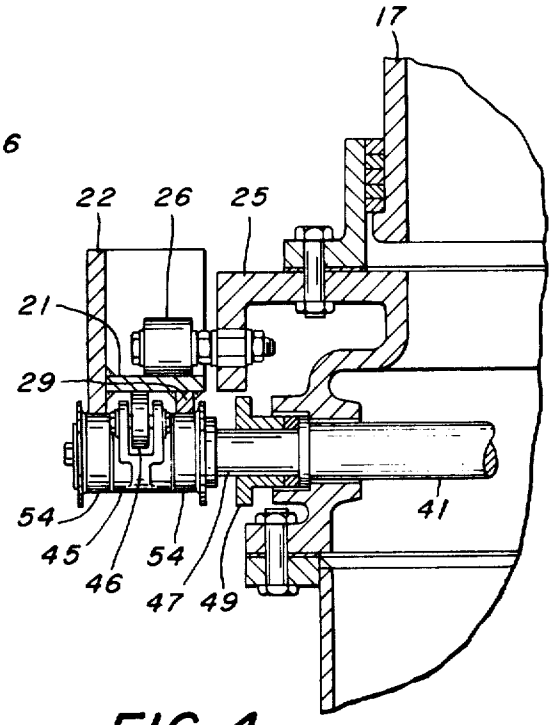

FIG. 4.

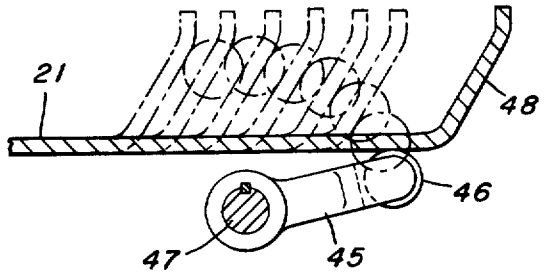

FIG. 5.

GAS COLLECTING APPARATUS FOR COKE OVENS

BACKGROUND OF THE INVENTION

This invention relates to a gas collecting apparatus for coke ovens, and more particularly to apparatus employed to collect gas from the coke chambers of a coke oven by means of a pipe system connected thereto and selectively discharge the gas into one of two separate manifold chambers.

Different coke oven operating conditions and processes give rise to the need to provide several gas take-off pipes with the provisions for connecting every individual oven chamber to one or the other of these pipes. The nature of the gas which is formed during the coking operation is very variable throughout the entire coking time. In view of this, subjecting the gas which is formed during certain periods of the coking time to separate treatment in order to recover certain preferred substances give rise to most desirable possibilities concerning these operations.

When coal, after sufficiently reduced in size and preheated, is introduced into an empty oven chamber and the doors are closed in a well-known manner, there occurs a current of water vapor or other inert gas that produces a violent gas formation which extends over a long period of time. This is because the coal is brought into contact with the hot oven chamber walls. Moreover, the gas carries along with it fine-grained coal in the form of a dense dust which can reach specific quantities of up to 1 percent of the weight of the coal which is introduced into the oven chamber. Therefore, it is logical and very desirable to discharge the gas containing large quantities of dust formed during the charging of preheated coal, by means of a special pipe system to remove to a large extent, the coal dust from the gas before being subjected to further cooling and recovery of the valuable substances making up the gas.

When two gas piping systems are provided, the structure making up such an installation should be as far as possible constructed in a simple manner so that the two main pipe lines extend parallel and adjacent to each other along the battery of oven chambers. In this manner, the necessity of changing the connection to each oven chamber from one main pipe line to the other can be effected in a short time. This relationship of parts also permits the use of apparatus to draw off the gas from the individual oven chambers such as vertically extending header pipes with elbows connected to both of the main pipe lines.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a gas collecting apparatus for coke oven chambers which is constructed and arranged in relation to the coke ovens so as to meet the various requirements heretofore discussed, and provide apparatus to greatly improve the gas collecting operations.

According to the present invention, there is provided two gas discharge pipes each communicating with a main manifold pipe. The gas discharge pipes are arranged at the discharge end of an elbow where they are positioned in a side-by-side relation whereby gas which is discharged from the coke oven chamber passes through a vertically arranged header pipe and then through the elbow and into one of two manifold pipes. These pipes extend in a parallel relation below the elbows for each oven chamber. Each elbow is preferably provided with sprinkling nozzles.

The present invention further provides that the aforesaid two manifold pipes are formed into a single manifold structure which extends along the battery of coke ovens. The internal chamber of the manifold structure is divided into two chambers by means of a continuous intermediate wall which is arranged in a perpendicular manner from the upper part of the wall. Each of the manifold chambers is positioned below the gas discharge end of the elbows wherein there is provided valves which connect the header pipes to each of the manifold chambers. The valves are actuated by means of shafts which extend parallel to each other so that they can be rotated about their axes outside of the pipes.

According to the present invention, the aforesaid valves control the flow of gases through the elbow into one of the manifold chambers by providing levers attached to the outer ends of the valve shafts for positioning valve closure plates. The ends of the levers rest upon a horizontal guide bar which is adjustable in its longitudinal direction. The guide bar includes spaced inclined surfaces that are used to adjustably position the levers and thereby displace one or both of the valve closure plates into a closed position. The arrangement of parts being such that the guide bar can be positioned so that both levers come to rest in a position whereby both valve closure plates are in the closed position, and when one lever travels along an inclined surface on the guide, one valve closure plate is closed while the other is open and vice versa.

These features and advantages of the present invention as well as others will be more apparent when the following description is read in light of the accompanying drawings, in which:

FIG. 1 is an elevational view, partly in section, of the apparatus according to the present invention;

FIG. 2 is a sectional view taken along line II—II of FIG. 1;

FIGS. 3A, 3B and 3C are elevational views illustrating the different positions of the valve apparatus according to the present invention;

FIG. 4 is a sectional view taken along line IV—IV of FIG. 2; and

FIG. 5 is an enlarged view illustrating details of the apparatus shown in FIGS. 3A-3C.

With reference now to FIG. 1, there is illustrated the masonry 10 forming part of a battery of coke ovens which are supported by buckstays 11. Each coke oven chamber 12 is provided with an opening 12A in the roof thereof that communicates with a header pipe 14 which is provided with a lining 13, shown only in FIG. 2. The pipe 14 can be closed at its upper end by a valve 15. The header includes a flange 16 to which there is secured a pipe elbow 17.

A manifold pipe 19 is shown having a circular cross section and supported on horizontal beams 18 that are carried by the buckstays 11. The manifold pipe 19 includes an intermediate wall 20, which extends along the length thereof and divides the pipe into a lower, larger manifold chamber 33 and into a smaller, upper manifold chamber 43. The intermediate wall 20 extends vertically where it joins the top wall of the manifold pipe in a perpendicular manner. While the manifold 19 has a circular cross-sectional shape, other forms

can be employed with equal success such as an oval, pear-shaped or U-shaped cross section.

A valve housing **25** is connected to the gas discharge end of the elbow **17**. The valve is divided by a crosspiece **27** which extends in a direction parallel to the axis of the manifold pipe **19**. As shown in FIG. **1**, the crosspiece **27** joins with the intermediate wall **20** of the manifold pipe. Wall parts **23** and **24** form a cylindrical jacket which is employed to connect the valve **25** with the manifold **19**. The valve has a circular shaped seating surface **28** which forms part of two outlet pipes. An outlet pipe **32** communicates with the manifold chamber **33**, and an outlet pipe **42** communicates with a manifold chamber **43**.

The outlet pipe **32** can be blocked by a valve closure plate **30** which is supported for rotation by a shaft **31** extending parallel to the axis of the manifold pipe **19**. The outlet pipe **42** can be blocked by a valve closure plate **40** which is rotatably supported by a shaft **41** extending parallel to the axis of the manifold pipe **19**. Arranged in the elbow **17** directly above the valve closure plate **30** and above the valve closure plate **40** are nozzles **51** and **52**, respectively. Both of these nozzles are connected to a water supply line **53**. The water is delivered onto the valve closure plates **30** and **40** which, as best shown in FIG. **3A**, both take the form of a cup-shaped plate whereby the water flowing over the rims of the plates passes into the manifold chambers **33** and **43**, from where the water drains within the chambers by reason of the inclined position of the pipe **19** along the length of the coke ovens. The gas from the coke oven chambers, after delivery into the manifold pipe **34** or **44** at various locations along its length, is received by gas discharge pipes **34** and **44**, respectively.

Depending upon which of the valve plate **30** or **40** is open, the gas which rises in the header pipes **14** reach either of the manifold pipes **33** or **43**. As shown in FIGS. **2** and **4**, the shafts **31** and **41** project from the housing **25** at one side thereof where they include end portions **37** and **47**, respectively. At the point where these shafts project through the housing, packing **39** and **49**, respectively, form a seal between the shafts to the housing. To the ends of the shafts **37** and **47**, there is attached a pair of guide rollers **54** which is best shown in FIGS. **2**, **3A-3C**, and **4**. A lever **35** is attached to the shaft **37**, and a lever **45** is attached to the shaft **47**. Each of these levers is arranged between the guide rollers **54** and has on their ends rollers **36** and **46**, respectively, which are supported in a manner for rotation.

On the shaft ends **37** and **47**, there is provided a guide bar consisting of a horizontal rail **21** which is welded to a vertical rail **22** along one edge thereof and a vertical rail **29** welded along the midportion of the rail **21**. The vertical rails **22** and **29** engage the guide rollers **54** on the shaft ends **37** and **47**. The valve housing **25** supports two rollers **26** for horizontally supporting and guiding the upper surface of the horizontal rail **21**. The position of the guide bar is adjustable in its longitudinal direction where it is supported for movement between the rollers **26** and **54**. As best shown in FIGS. **3A-3C** and **5**, spaced apart guide plates **38** and **39** define inclined surfaces and are attached at the opposite ends of the guide bar. The inclined surfaces on these guide plates are separated by a distance greater than the space between the shafts **31** and **41**.

The position of the valves shown in FIG. **3A** corresponds to the center position of the guide bar wherein the contact rollers **36** and **46** are both in engagement with the plate **21**. In this position, both valve closure plates **30** and **40** are in their closed or gas blocking position. When the guide bar is shifted horizontally to the left as one views FIG. **3B**, the guide roller **36** maintains the closure plate **30** in its closed position, and the guide roller **46** travels up the inclined surface of the plate **48** as clearly shown by FIG. **5**. This causes a rotation of the shaft **54** and a corresponding rotation of the valve closure plate **40** to open the outlet pipe **42** for communication with the manifold chamber **43**. When the guide bar is positioned to the right as shown in FIG. **3C**, the guide roller **46** causes the closure plate **40** to assume a closed position with the outlet pipe **42**, and the roller **36** travels up the inclined surface of plate **38** and thereby produces a clockwise rotation of the shaft **35**. This, in turn, causes the closure plate **30** to assume an open position whereby the outlet pipe **32** is in communication with the manifold chambers **33**. In order to effect such a displacement of the guide bar, a rod **50** is provided which may be attached to a manually operated lever or the like. The rod **50** may be secured to a piston and cylinder assembly or motor-driven apparatus mounted on one side of the valve housing.

Although the invention has been shown in connection with a certain specific embodiment, it will be readily apparent to those skilled in the art that various changes in form and arrangement of parts may be made to suit requirements without departing from the spirit and scope of the invention.

We claim as our invention:

1. A gas collecting apparatus for coke oven chambers each having a gas discharge opening, said apparatus comprising:

a header pipe connected to the gas discharge opening of the coke oven chamber for receiving gas produced during the coke processing operation;

elbow means connected to said header pipe for receiving the gas conveyed thereby;

first and second outlet pipes arranged in a side-by-side relation in the gas delivery path of said elbow means;

first and second valve closure plates for said first and second outlet pipes respectively to separately control the flow of gas through said outlet pipes;

water discharge nozzle means above said closure plates for continuously spraying water onto each of the valve closure plates;

a first gas conducting manifold extending along the coke oven chambers for receiving gas controlled by said valve closure plates to pass into the first manifold from the first outlet pipe;

a second manifold extending along the coke oven chambers in an independent gas conducting relation to said first manifold for receiving gas controlled by said valve closure plates to pass into the second manifold from the second outlet pipe;

a shaft secured to each of said first and second valve closure plates for the pivotal support thereof at the gas discharge side of said outlet pipes, an end of the shaft for each closure plate extending outwardly through the walls which define the gas conducting path into the respective ones of said first and second manifolds; and

valve control means connected to the extended ends of each shaft for selectively positioning both of said first and second valve closure plates with respect to said outlet pipes such that when one valve closure plate is positioned for the discharge of gas from the oven chamber into one manifold then at the same time the other valve closure plate is positioned to block the discharge of gas from the oven chamber into the other manifold, said valve control means maintaining at all times at least one valve closure plate closed.

2. A gas collecting apparatus according to claim **1** wherein said first and second manifolds are further defined to include a manifold pipe, a wall extending within said manifold pipe along a predetermined length thereof to thereby define said first and second manifolds, said wall including a vertically extending portion joined to the internal surface of the manifold pipe and extending in a plane passing between said first and second outlet pipes.

3. A gas collecting apparatus according to claim **1** wherein said valve control means includes a lever secured to each of said shafts, and a guide bar movably supported for displacing the lever secured to each shaft to selectively position the valve closure plate and thereby selectively block the passage of gas from said outlet pipes.

4. A gas collecting apparatus according to claim **3** wherein said valve control means further comprises a roller carried by the lever secured to each shaft, and surfaces on said guide bar contacting said roller for controlling the position of each of the levers and thereby, said valve closure plates.

5. A gas collecting apparatus according to claim **4** wherein said surfaces on said guide bar are further defined as a first surface extending within a horizontal plane, and second and third surfaces extending in an angular relation to said plane at spaced positions along said plane.

6. A gas collecting apparatus according to claim **5** wherein said second and third surfaces are formed on said guide bar at spaced locations greater than the space separating said pair of shafts.

7. A gas collecting apparatus according to claim **6** further comprising a valve housing including means for guiding and supporting said guide bar during displacement of said first, second and third surfaces thereon.

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