Feb. 18, 1936. T. C. VINCENT, JR 2,031,437

GAS WASHER

Filed Feb. 21, 1933 2 Sheets-Sheet 1

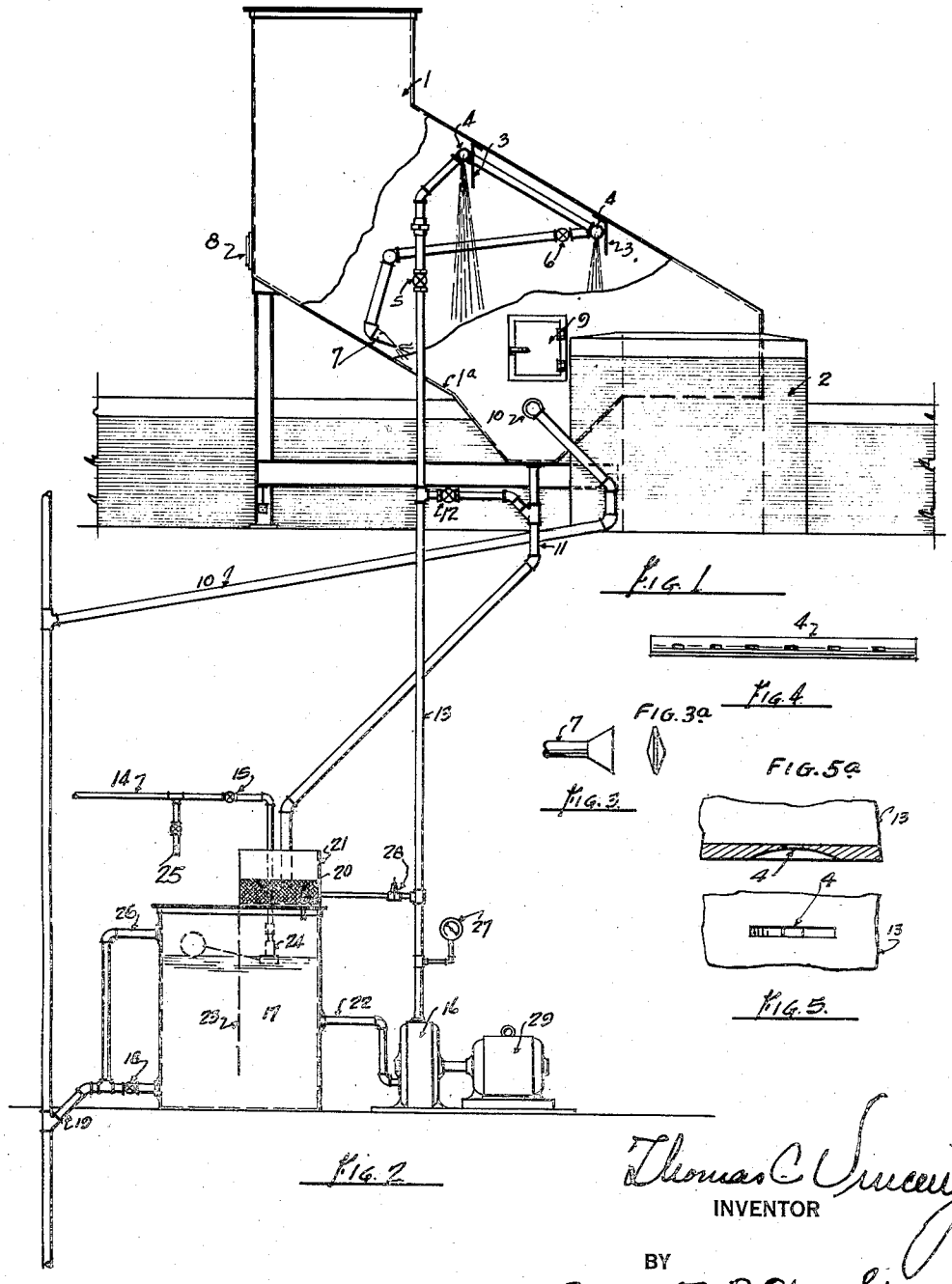


FIG. 1

FIG. 4

FIG. 3a

FIG. 3.

FIG. 5a

FIG. 5.

FIG. 2

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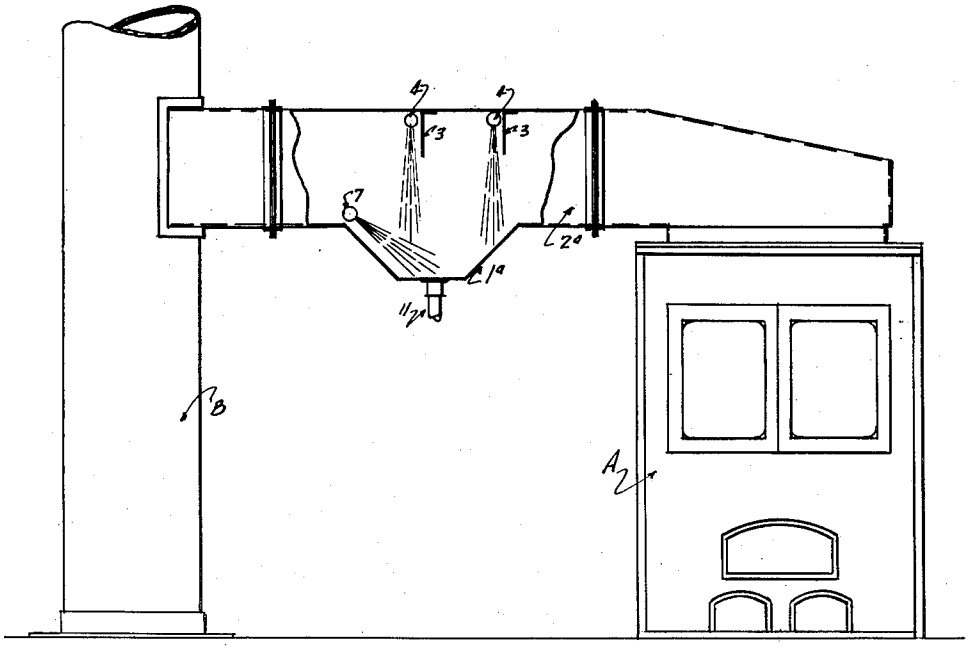


FIG. 6.

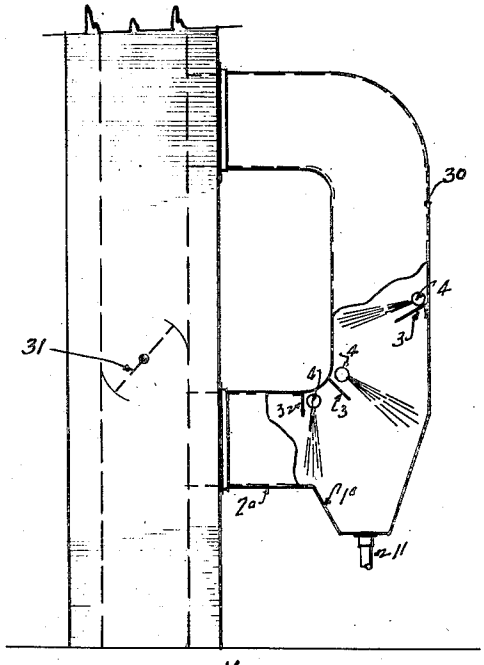


FIG. 7.

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GAS WASHER

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Application February 21, 1933, Serial No. 657,823

2 Claims. (Cl. 261—118)

The principal objects of the present invention are to provide a simple, efficient and comparatively inexpensive apparatus for washing down, or removing particles carried by, gases or air, and which is applicable to new or existing chimneys, smoke flues, or gas passes; to provide for screening out the particles, and to provide for reclaiming the water employed and for compensating for water evaporated.

Other objects of the invention will appear from the following description at the end of which the invention will be claimed.

Generally stated, the invention consists in a wash box having a trough or well provided with a bottom wall and arranged at the lowest portion of the box and said box open at its chimney end to receive gas and at its other end to emit washed gas, nozzles of which some are directed to discharge crosswise of the box and of which others are directed towards the closed bottom wall of the trough or well, baffles in the box disposed to fill the voids between some of the nozzles and arranged generally parallel with the direction of discharge of the sprays from the nozzles, a pump and circulating system including a pressure pipe supplied by the pump and communicating with the nozzles and including a gravity drain from the bottom wall of the trough or well to the pump, a reservoir included in the gravity drain and having a float valve and its connections to a water supply and a screen basket, a relief valve and connections between the pressure pipe and reservoir, an overflow connection from the trough and reservoir, and a valved drain from the reservoir.

The invention also comprises the improvements to be presently described and finally claimed.

In the following description reference will be made to the accompanying drawings forming part hereof and in which

Figures 1 and 2 taken together illustrate partly in section and partly in elevation gas washing apparatus embodying features of the invention; Fig. 1 generally illustrating the upper parts of the apparatus, and Fig. 2 generally illustrating the lower parts of the apparatus.

Fig. 3 is a view drawn to an enlarged scale and showing in side elevation a nozzle of fan design.

Fig 3A is an end elevation of the nozzle shown in Fig. 3.

Fig. 4 is a diagrammatic face view of a group of self-cleaning spray nozzles.

Fig. 5 is a view drawn to an enlarged scale and showing front elevation one of the self-cleaning spray nozzles.

Fig. 5A is a cross-section of the nozzle shown in Fig. 5.

Fig. 6 is a view partly in section and partly in elevation illustrating a modification, more particularly in respect to the upper parts of the apparatus, and

Fig. 7 is a view similar to Fig. 6 illustrating another modification.

In the drawings and referring more particularly to Figs. 1 and 2, 1 indicates a water tight box having at its lowest portion a trough or well provided with a bottom wall and arranged to catch water and particles brought down by the spray. This box is open at the chimney end 2 to receive the gas and at its top or other end to emit the washed gas. The gases travel along the top of the box and flow or are deflected downward in front of each vertical baffle 3. The baffles cover up the voids between the nozzles 4 and direct the flow of the gas in the direction of the spray. A door 9 in the wash box wall affords access to the interior and a door 8 affords a means of observation. The spray nozzles 4 are of the self-cleaning type and they are machined into the portion of the feeder line 13 which is within the washer box. The only internal piece of feeder pipe not containing spray nozzles is that connecting the two spray lines which are fitted with the nozzles 4. The feeder line 13 originating at the rotary pump 16 supplies the water or liquid to the spray nozzles 4, and the pump 16 is of sufficient capacity to furnish water in excess of that which will pass through the nozzles and flush the lines, keeping the spray nozzles and feed lines clean. The feeder line terminates within the washer box 1 and close to the bottom in nozzles 7 of fan design which wash down the accumulation at the bottom of the box. A gravity drain 11 is taken from the bottom of the trough or well 1^a, and it carries away the water and particles to a screened basket 20 arranged over the reservoir 17. The closing of valve 6 in the feeder line 13 builds up a higher pressure on the spray nozzles 4. The closing of the valve 5 and opening of valve 12 furnishes water through the feeder line 13 for washing down the drain 11.

An overflow connection 10 is taken out of the wash box 1 to the waste. This is provided, so that water, if stoppage occurs, will not pass over the lip of the trough and down through the core of the chimney.

The apparatus is designed for continuous operation, and requires little attention, for example, only once daily. The opening of the valve 18 will result in blowing the accumulation of sludge

in the reservoir through the waste line 19. The larger particles carried with the water through the drain line 11 are retained in the screen basket 20. This catch basket is surrounded by a splash apron 21. The supply line 22 to the rotary pump 16 is taken above the bottom of the reservoir 17 and the intake is protected by a screen 23 which extends to within a short distance from the bottom of the reservoir. This aids in settling the sludge. 14 is a fresh water supply line and it is controlled by a float valve 24 which maintains the level in the reservoir 17 and compensates for water or liquid evaporated in contact with the high temperature gases.

The closing of valve 15 on the fresh water supply line 14 and opening of valve 25, which is to be connected with a flexible hose, provides a tap or supply of fresh water under city pressure for washing down the screens and bottom of the reservoir 17.

A connection 26 to the reservoir 17 is an overflow line which joins or ties into the waste line 19. 27 is a pressure gauge arranged in the feeder line 13, and it indicates the head and water pressure and is a telltale of the cleanliness of the spray nozzle. The pipe line and relief valve 28 taken off the feeder line 13 is connected back to the reservoir 17 and is a protection for the rotary pump 16 and motor 29 in the event of clogging in the feeder line 13 or spray nozzles. The electric motor 29 may be controlled from any convenient point or points.

From the foregoing description it is evident that the apparatus is complete in providing water through a pressure spray for washing down the particles in gas or air, screening out the particles, reclaiming the water, and compensating for water evaporated.

The construction and mode of operation of the modification illustrated in Fig. 6 are as above described except that the apparatus of the invention is applied in such a way that the box 1a having an inlet 2a is interposed in a horizontal duct, flue or breeching between a gas generator or incinerator A and a stack B which receives the washed gas or air. It will be understood that the pumping unit, reservoir and pipe connections, illustrated more particularly in Fig. 2, are applied to the box 1a.

The construction and mode of operation of the modification shown in Fig. 7 are as above described except that the box 30 is arranged for vertical operation and is connected to a flue above and below the damper 31 so that the gas or air will travel through the box 30. The connections illustrated in Fig. 2 are provided in connection with this modification illustrated in Fig. 7.

It will be obvious to those skilled in the art to which the invention relates that modifications may be made in details of construction and arrangement and matters of mere form without departing from the spirit of the invention which is not limited to such matters or otherwise than the prior art and the appended claims may require.

I claim:

1. In a gas washer having a source of water, a water reservoir, and means for recirculating the water from the reservoir so that only sufficient water is drawn from the source to compensate for that evaporated by the heat of the gas being washed: the combination of, a water-tight box having an inlet for unwashed gas at one end and an exit for washed gas at the other end, a trough arrranged in the lowest part of said box, a plurality of nozzles arranged to discharge generally crosswise of said box, baffles in the box arranged so as to direct gas through the spray from the nozzles and disposed generally parallel with the direction of discharge of the nozzles, another nozzle arranged adjacent said trough so as to wash precipitate into said trough, means for removing liquid and precipitate from the bottom of said trough, and an overflow connection for said trough adjacent to but spaced above the bottom of said trough.

2. In a gas washer having a source of water, a water reservoir, and means for recirculating the water from the reservoir so that only sufficient water is drawn from the source to compensate for that evaporated by the heat of the gas being washed: the combination of, a water-tight box having an inlet for unwashed gas at one portion thereof and an exit for washed gas at another portion thereof, a trough arranged in the lowest part of said box intermediate said inlet and said exit, a plurality of pipes extending transversely of said box and having orifices through the walls thereof and having flared openings therein cooperating with said orifices so that said orifices and said openings co-operate together to form spray nozzles of the self-cleaning type, said spray nozzles discharging generally crosswise of said box, baffles in said box arranged so as to direct gas through the spray from said nozzles and disposed generally parallel with the direction of discharge of the nozzles, another nozzle of fan-shape in side elevation and of diamond-shape in end elevation arranged adjacent said trough so as to wash precipitate into said trough, means for removing liquid and precipitate from the bottom of said trough, and an overflow connection from said trough adjacent to but spaced above the bottom of said trough.

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