

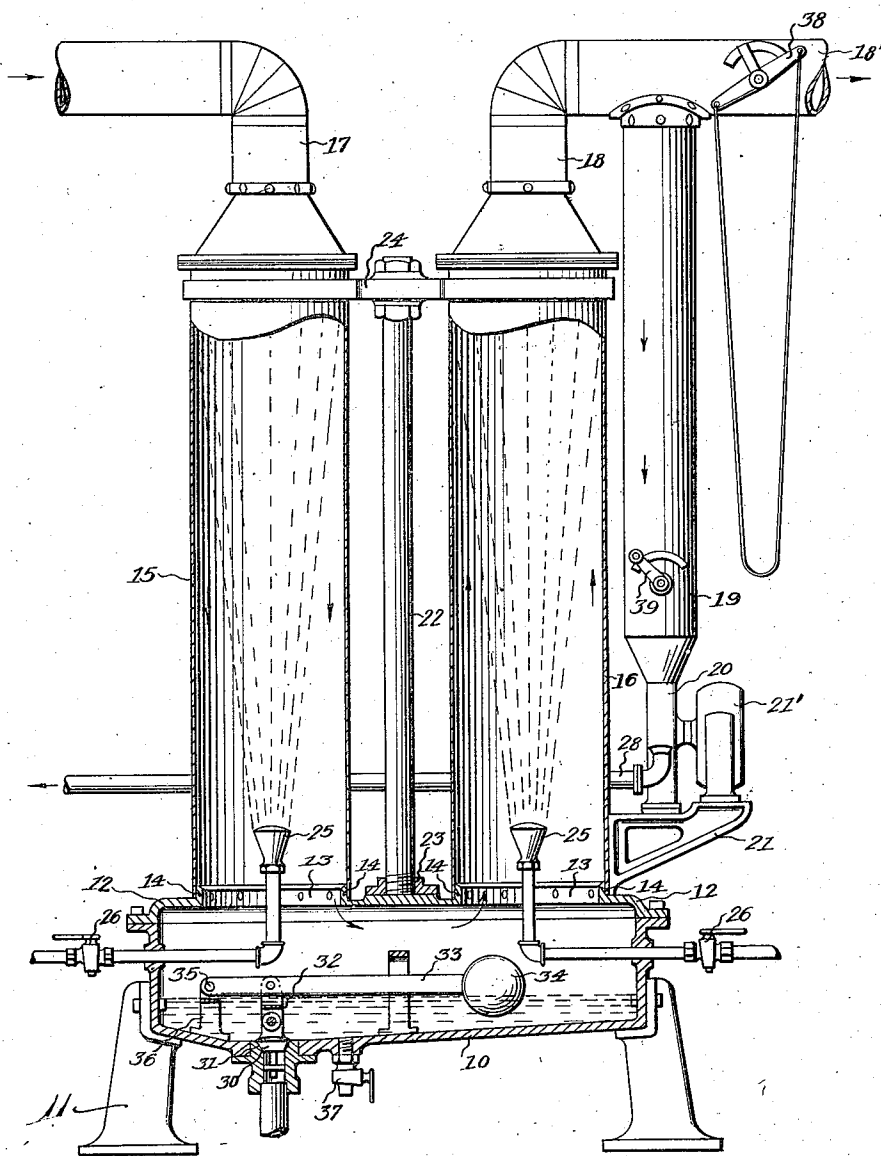
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K. MATHEUS

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GAS WASHER

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Inventor

Karl Matheus.

By *Cushman, Bryant & Warby*
Attorneys

UNITED STATES PATENT OFFICE.

KARL MATHEUS, OF CHICAGO, ILLINOIS.

GAS WASHER.

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The present invention relates to means for purifying products of combustion so that the same may not be objectionable, and the gaseous constituents of the same may again be utilized for combustion if desired.

It is broadly old to treat smoke and other products of combustion to separate from the gases of combustion the ashes, soot and other particles in suspension, and various processes for accomplishing this have been suggested.

The present invention relates to that general type of apparatus in which the products of combustion are directed through a sinuous path and subjected to the action of a purifying or washing agent which removes the particles in suspension and permits the gases to pass on for return to the seat of combustion or for discharge. When thus treated, obviously the purified gases are not as objectionable as in their original condition mixed with ashes, soot and other foreign matter.

An object of the invention is to provide an apparatus for purification in which the smoke may have all impurities removed therefrom by the action of the water, and without mixing with the smoke, steam or other vapors which tend to delay the purifying process and materially increase the expense of its operation.

A further object of the invention is to afford an apparatus which is relatively compact in structure, enabling it to be installed in a comparatively small space, and is adapted to purify the smoke thoroughly by subjecting the same within a limited path to the positive action of a water-spray as a purifying agent.

Another object of the invention is to provide a device which may be conveniently installed adjacent a furnace or other seat of combustion and in communication with the discharge smoke stack whereby the gases may be either returned to the furnace to be further utilized for combustion, or discharged through the stack.

The above, and other objects of the invention will become clearer as a preferred embodiment of the invention is described, the same being illustrated in the accompanying drawing which is a vertical section of the apparatus with certain details shown in elevation.

It has heretofore been proposed to treat products of combustion by the combined

action of steam and water, the steam condensing and causing deposit of the carbonaceous and other impurities, and also serving to assist in the passage of the products of combustion through the path in which they are treated. It has been found that in the treatment of products of combustion, it is not desirable to mix with the same any other vapors, the form of which must be modified, since this materially delays any treatment, and, often, does not permit continuous action upon the products of combustion as fast as they are produced. In the present apparatus, the products which are discharged from the furnace or other seat of combustion are thoroughly subjected to the action of a water spray, and are passed through a sinuous course under a forced draught, preferably a suction, created by a power driven fan. The ashes, soot, and other foreign matter are quickly and positively separated from the gases of combustion, and the latter when thus purified, may be returned to the furnace for re-combustion, or, since they are not as offensive as in their original unpurified state, may be discharged through the stack.

The apparatus comprises a tank 10, which preferably forms a base for the remainder of the apparatus, and is provided with suitable supporting legs 11. The top 12, which, in the present instance, is separately formed, is provided with a plurality of openings 13, surrounded by upstanding flanges 14 to which may be secured stacks 15, 16 forming vertical passages opening at their lower ends into the tank, and through which the passages are in communication with one another. The stack 15 is connected at its upper end by means of a pipe 17, with a furnace or any other source of products of combustion which are adapted to pass downwardly through the stack 15, and upwardly through the stack 16, the latter being connected by a pipe 18 and a branch 19 with a fan 20 for creating a suction through the stacks. The fan is mounted upon a bracket 21, carrying an electric motor 21', which serves to drive the fan. It will be understood that any suitable means for creating a draught, either by suction or pressure, may be employed.

The stacks may be maintained in position by any suitable bracing means such as a standard 22, which at its lower end is threaded into a socket 23, and at its upper end carries a crosshead 24 provided with

openings through which the stacks extend.

The products of combustion follow an alternate downward and upward course through the stacks, and while passing there-
 5 through, are subjected to the action of a water spray which serves as a purifying agent. Sprayheads 25 are positioned above the bottom of the tank 10, and direct the spray
 10 upwardly through all the stacks. The spray in each stack may be regulated independently by means of valves 26, and it will be noted that the stacks are of circular forma-
 15 tion, whereby the water spray will substantially fill the same transversely or in horizontal planes. Each valve 26 should be regulated so that the spray will be projected
 20 upwardly to substantially the upper end of each stack, and in the stack 15 will meet the products of combustion as they enter. The water projecting from the sprayheads is,
 25 preferably, cool, and due to the fact that it passes upwardly and then gravitates downwardly in each stack, is thoroughly mixed with the products of combustion
 30 which intermingle with the water moving upwardly, as well as that which drops into the tank or reservoir 10. It will be clear therefore, that although the smoke will pass through a comparatively short path, the
 35 length of which, of course, may be varied as desired, since the stacks may be of any height, it is, nevertheless, thoroughly subjected to the action of the water and all particles in suspension, such as soot and ashes,
 40 are carried by the falling water into the tank 10. The gaseous constituents of the products of combustion pass upwardly through the stack 16, and after passing the fan 20, are forced through a pipe 28,
 45 which is connected with the furnace (not shown) in which the gases may again be utilized.

It will be observed that the interior of the tank 10 is unobstructed, and means is
 45 provided for permitting an accumulation of the water carrying the foreign matter removed from the smoke until it reaches a certain level, when the tank is automatically drained. For this purpose a valve 30 con-
 50 trols a discharge opening 31, and is connected by means of a link 32 with a lever 33, carrying a float 34, the lever being fulcrumed at 35 upon a bracket 36. By means of the float 34, the valve 30 will be auto-
 55 matically operated when the water in the tank reaches a predetermined level. A manually controlled discharge valve 37 is provided for the purpose of draining the tank should the automatically operated valve
 60 fail to operate at any time.

Moreover, in order that the products of combustion may be discharged in the event

that there should be any interference with the normal operation of the device, the pipe 18 has an extension 18' past the branch 19, 65 which may be connected with the usual smoke stack. A damper in the extension is provided with a control lever 38 by means of which the extension may be opened or closed as desired. 70

In the operation of the device, it may at times be desirable to regulate the suction of the fan 20 in accordance with the volume of the products of combustion introduced into the apparatus. For this purpose a 75 damper 39 is positioned in the branch 19.

It will be clear that the apparatus provided is extremely simple in construction. Although only two stacks are provided, which ordinarily will be sufficient, due to the fact that the spray is directed upwardly in both compartments and, therefore, mixed with the smoke in both its upward and downward path, additional stacks may be provided as required, and the length of the 85 stacks may, of course, be varied.

In the operation of the apparatus its action may be modified by control of the damper 39, which varies the force of the suction fan and also by regulating the spray 90 valves 26.

Obviously the invention is not limited to the construction illustrated and described, and such changes may be made therein as come within the scope of the following 95 claim.

I claim:

In a gas washer for the purpose specified the combination of a hollow base member establishing a liquid chamber, a roof cover- 100 ing over said base member and chamber and having a pair of upwardly facing ports, vertical flues reaching upwards from said ports, a gas inlet connection to the upper end of one of said flues, a gas delivery connection from the upper end of the other flue, spray nozzles in both flues for the introduction of suitable spray liquid, a down-comer from the gas delivery connection, a motor driven fan supported on the adjacent flue and serving to draw the waste gases from said gas delivery connection through said down- 105 comer, a liquid discharge connection from the lower portion of said liquid chamber, and a float valve and float within the liquid chamber to control said liquid discharge connection whereby to maintain a predeter- 110 mined liquid level in said chamber against the surface whereof the gas impinges in passing from the first flue to the second, substantially as described. 120

In testimony whereof I have hereunto set my hand.

KARL MATHEUS.