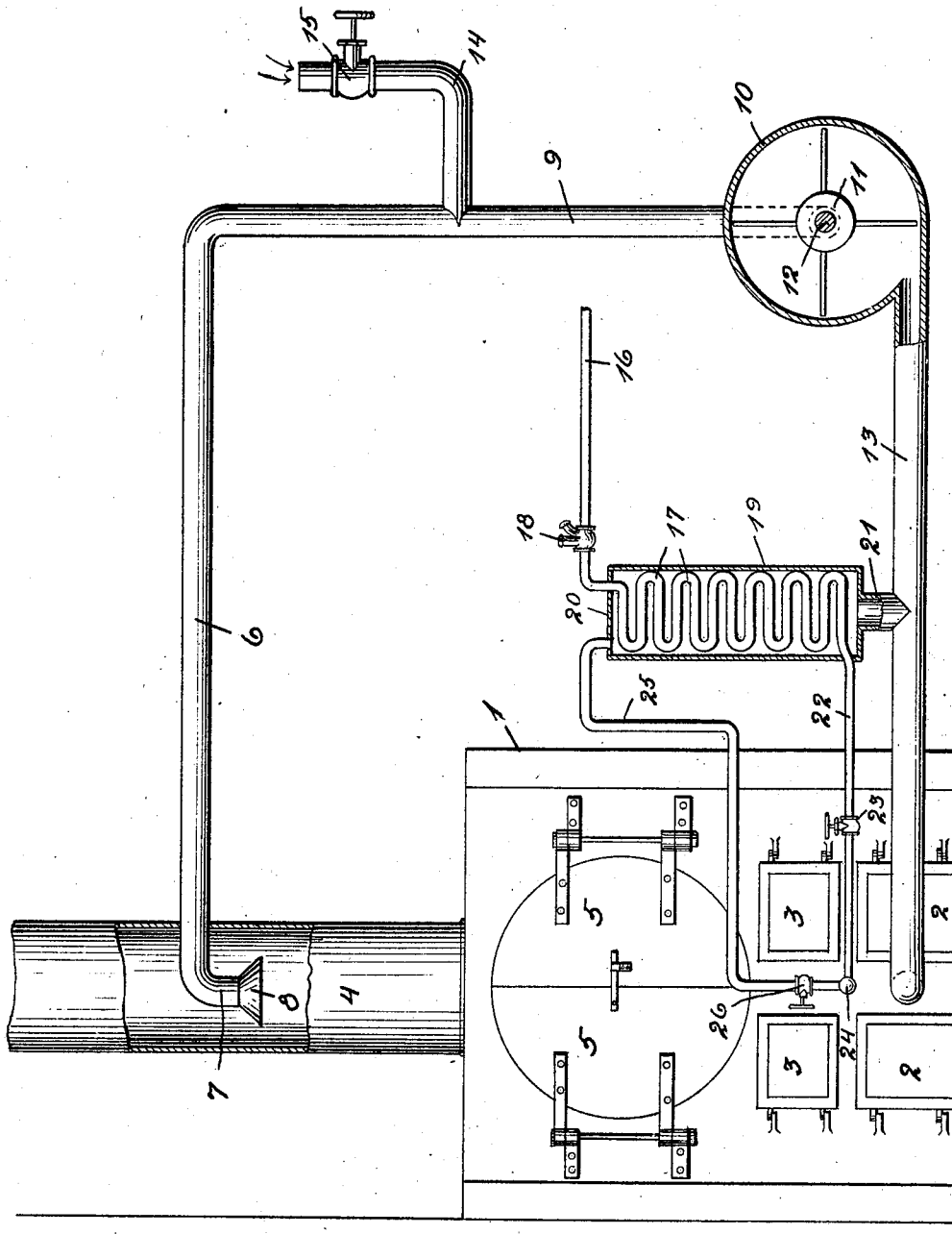


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 COMBINED SMOKE CONSUMER AND VAPORIZER.
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COMBINED SMOKE-CONSUMER AND VAPORIZER.

1,014,573.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OTHMAN DAVIS, a citizen of the United States, residing at Gainesville, in the county of Cooke and State of Texas, have invented certain new and useful Improvements in Combined Smoke-Consumers and Vaporizers of which the following is a specification.

This invention relates to a combined smoke consumer and liquid fuel gasifier, to be used in connection with furnaces employing coal, oil, or any other fuel.

The invention aims to provide means whereby hot air and gases are introduced under pressure in the ash pit, to cause the complete oxidation of the fuel, whereby a large per cent. of the fuel otherwise wasted, is saved.

An important object of this invention is to provide apparatus so constructed that a portion of the smoke and hot gases or products of combustion are withdrawn from the stack of the furnace, fresh air supplied to these products of combustion and the mixture subsequently introduced into the ash pit of the furnace. The apparatus is so constructed that a portion of the mixture of air and the products of combustion in their heated state, is employed to gasify liquid fuel which is subsequently introduced into the fire box of the furnace.

A further object of this invention is to provide means whereby the amount of the hot gases introduced into the ash pit and the gasified fuel introduced into the fire box may be regulated to meet the requirements of the particular case.

Other objects and advantages of this invention will be apparent during the course of the following description.

In the accompanying drawing forming a part of this specification, the figure is a front view of a furnace, showing my improved apparatus applied thereto, parts of such apparatus being shown in section.

In the drawing wherein is illustrated a preferred embodiment of my invention, the numeral 1 designates a furnace structure, comprising doors 2 and 3, which close openings that lead respectively into the ash pit and fire box of the furnace. The furnace structure includes the usual grate (not shown) dividing the ash pit and fire box. The furnace structure further comprises a vertical stack 4, through which are discharged the products of combustion.

The numeral 5 designates doors which close an opening in the wall of the furnace structure, within which opening is mounted a steam boiler (not shown).

The stack 4 has an opening formed there-through for receiving the horizontal portion of a pipe 6, said pipe being bent downwardly within the stack to provide a vertical portion 7, carrying a flaring hood or mouth 8. The hood or mouth is of a diameter to span substantially one-third of the internal area of the stack 4, with relation to the cross-section of the stack. The pipe 6 comprises an outer vertical portion 9, having communication with the interior of a casing 10 of a rotary blower. This blower further comprises a rotatable fan 11, rigidly mounted upon a shaft 12, that is journaled through the walls of the casing 10. Suitable means (not shown) are provided for rotating the fan 11 so that the same creates a draft to draw some of the products of combustion from the stack 4, through the pipe 6, and subsequently discharge the same into a pipe 13. This pipe has one end thereof in communication with the interior of the ash pit of the furnace structure, said pipe being shown preferably as passing through the front wall of the furnace structure.

Attention is called to the fact that when the device is in operation, the doors 2 remain closed and are to be constructed to fit snugly in their frames so that the hot gases discharged from the pipe 13 may remain under suitable pressure after being introduced into the ash pit. The vertical portion 9 of the pipe 6 has connection with an air supply pipe 14, which is provided with a cut-off valve structure 15 for regulating the amount of fresh air to be introduced into the pipe 6.

The numeral 16 designates a pipe having connection with a source of oil supply, such as a pump or the like, (not shown), and this pipe has one end thereof connected with a heating coil 17 through the medium of a check valve structure 18. The heating coil 17 is disposed within a casing or shell 19, the upper end of which is closed by a cap 20 and the lower end of which is connected with the pipe 13 through the medium of a pipe section 21. The lower end of the heating or vaporizing coil 17 extends through the wall of the shell 19 and is designated by the numeral 22. The pipe 22 is provided with a cut-off valve structure 23 and this

pipe is connected with a pipe 24 which extends longitudinally of and enters the furnace structure 1 to discharge its contents into the fire box.

5 Having communication with the upper end of the shell 19 is a pipe 25, provided intermediate its ends with a cut-off valve structure 26 and connected at one end with the pipe 24. The pipe 24 serves as common
10 means for supplying the gases delivered from the pipes 22 and 25 into the fire box of the furnace, it being understood that these gases become mixed before entering the fire box.

15 In the operation of the apparatus, it being assumed that coal or the like is employed for fuel within the furnace structure, the rotation of the fan 11 will draw a portion of the smoke or products of combustion
20 from the stack. A proper amount of fresh air is supplied to these products of combustion, through the pipe 14, while said products of combustion are in the pipe 6. The air and products of combustion become
25 thoroughly mixed and the heat from the products of combustion imparted to the mixture, which heated mixture then passes through the pipe 13 to be discharged into the ash pit of the furnace structure. This
30 heated mixture of gases supplied into the ash pit is retained at a pressure therein and aids in thorough combustion of the coal or other fuel.

It is obvious that my apparatus operates
35 in a sense as a smoke consumer. A portion of the heated mixture of gases in the pipe 13 passes into the shell 19 and by circulating in proximity to the coil 17 causes the oil therein to be vaporized. A circulation of
40 hot gases in the shell 19 is maintained, by virtue of the fact that these gases are introduced into the lower end of the shell and are discharged from the upper end thereof through the pipe 25 and subsequently into
45 the pipe 24. The vaporized oil or other fuel passes through the pipe 22 and is discharged into the pipe 24 where it mingles with and becomes thoroughly mixed with the hot gases from the pipe 25, subsequently to
50 which the mixture enters into the fire box of the furnace structure. The valves 23 and 26 are provided to independently regulate the amount of material discharged from the pipes 22 and 25, respectively.

55 I wish it understood that the form of my invention herewith shown and described, is to be taken as a preferred example of the same, and that certain changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit
60 of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:—

1. In apparatus of the character described, 65 a furnace structure, including a stack, fire box and ash pit, apparatus to draw the products of combustion from the stack and introduce the same into the ash pit, a device for holding liquid fuel to be gasified, means for
70 conducting a portion of the products of combustion circulating in the apparatus into proximity to said device for heating the same, and means for conducting the vaporized fuel into the fire box. 75

2. In apparatus of the character described, a furnace structure including a stack, fire box and ash pit, apparatus to draw the products of combustion from the stack and introduce the same into the ash pit, means 80 to supply air to the products of combustion before such introduction, a device for holding liquid fuel to be gasified, means for conducting a portion of the products of combustion circulating in the apparatus into
85 proximity to said device for heating the same, and means for conducting the vaporized fuel into the fire box.

3. In apparatus of the character described, a furnace structure including a stack, ash 90 pit and fire box, a blower mechanism, a conduit establishing communication between the stack and the blower mechanism, a conduit establishing communication between the blower mechanism and the ash pit, a
95 shell having communication with the second named conduit, a coil disposed within the shell to hold liquid fuel to be vaporized, a conduit connected with one end of said shell, and a conduit connected with the last named
100 conduit and a portion of said coil and extending within the furnace structure to discharge its contents into the fire box.

4. In apparatus of the character described, a furnace structure, a shell, a coil disposed 105 within the shell to hold liquid fuel to be gasified, apparatus for conducting the products of combustion from the furnace structure and introducing the same into said shell and the ash pit of said furnace structure, a conduit connected with the shell and
110 the furnace structure to deliver gases into the fire box, said coil having means of communication with the furnace structure to deliver the gasified fuel into the fire box, and
115 separate valves connected with said conduit and means of communication for controlling the passage of material therethrough.

In testimony whereof I affix my signature in presence of two witnesses.

OTHMAN DAVIS.

Witnesses:

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