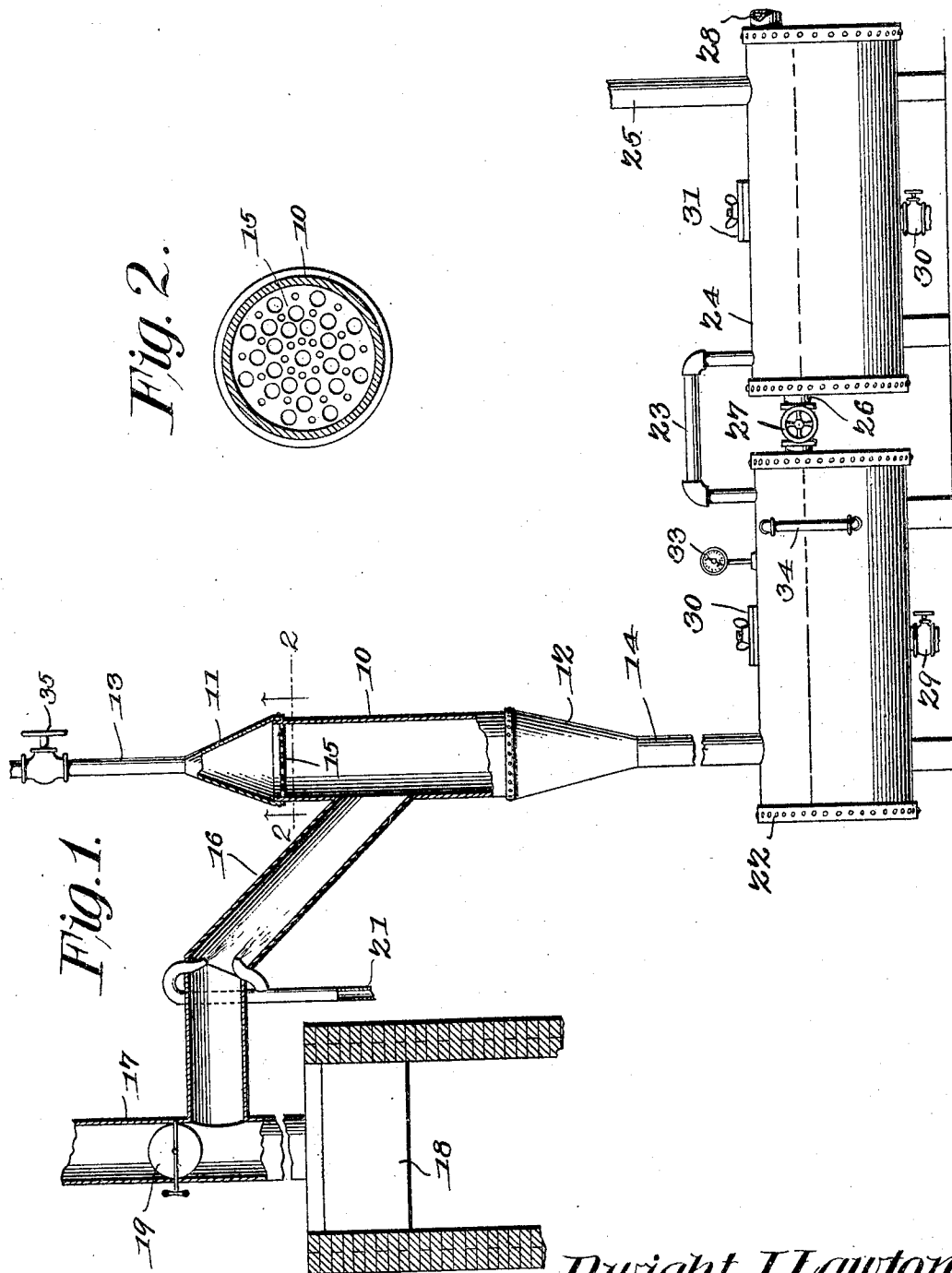


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D. J. LAWTON & H. I. REYNOLDS.
SMOKE PURIFIER AND GAS COLLECTOR.
APPLICATION FILED DEC. 30, 1904.



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UNITED STATES PATENT OFFICE.

DWIGHT J. LAWTON AND HOMER I. REYNOLDS, OF GRANTS PASS, OREGON.

SMOKE-PURIFIER AND GAS-COLLECTOR.

No. 798,287.

Specification of Letters Patent.

Patented Aug. 29, 1905.

Application filed December 30, 1904. Serial No. 239,013.

To all whom it may concern:

Be it known that we, DWIGHT J. LAWTON and HOMER I. REYNOLDS, citizens of the United States, residing at Grants Pass, in the county of Josephine and State of Oregon, have invented a new and useful Smoke-Purifier and Gas-Collector, of which the following is a specification.

This invention relates to improvements in apparatus for arresting and purifying smoke, gases, and other products from the combustion in furnaces of various kinds, coke-ovens, smelters, and similar apparatus, and all the various operations wherein fuel is employed and wherein smoke, gases, fumes, and similar products result from the combustion, and has for its object to produce a simply-constructed apparatus into which the smoke, gases, and other products of the combustion are caused to pass and wherein the heavier particles are precipitated and the heavier gases and fumes condensed and the residuum retained for future restoration and reduction to save the valuable portions, leaving the lighter and more volatile gases only to escape.

With these and other objects in view, which will appear as the nature of the invention is better understood, the same consists in certain novel features of construction, as hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which corresponding parts are denoted by like designating characters, is illustrated the preferred form of embodiment of the invention capable of carrying the same into practical operation, it being understood that the invention is not necessarily limited thereto, as various changes in the shape, proportions, and general arrangement of the parts may be resorted to without departing from the principle of the invention or sacrificing any of its advantages.

In the drawings thus employed, Figure 1 represents a side elevation, partially in section, of the improved apparatus applied. Fig. 2 is an enlarged transverse section of the receiving-drum on the line 2 2 of Fig. 1.

The improved apparatus comprises a drum 10, having conical ends 11 12 and with an intake-pipe 13 at one end to supply water under pressure and with a discharge-pipe 14 at the other end. The intake-pipe 13 is provided with a controlling-valve 35 to provide means for regulating the flow of the water to the drum. Disposed in the drum 10, preferably at the juncture of the conical portion 11

and the body of the drum, is a perforated plate 15, forming a grate or diaphragm transversely of the drum and through which the water entering by the pipe 13 pours in the form of jets or sprays. Leading into the side of the drum 10 is a relatively large conductor-pipe 16, the pipe entering the drum at a downward incline and with the outer end connected into the smoke-stack 17, rising from the smelter, furnace, or other structure from which the smoke, gases, and the like rise and which it is desired to purify and condense.

For the purpose of illustration a conventional form of the structure from which the products of the combustion arise is indicated at 18; but it will be understood that we do not desire to be limited in any manner in the application of the apparatus to any particular structure, as the source of the smoke, gases, fumes, and the like is no part of the invention.

The stack 17 is provided with a damper 19 to provide for a direct draft from the structure 18 when first starting the fires therein or at other times when required. Disposed in the pipe 16 are blower-nozzles 20, preferably two or more and pointing downwardly into the inclined portion of the pipe and connected to a pipe 21, through which steam or compressed air may be forced to produce strong artificial or induced air currents through the pipe to cause a strong draft from the structure 18 into the drum 10. The pipe 14 leads into one end of a receiver or tank 22, and this tank is connected by a branch 23 to another similar tank 24, from which an escape-pipe 25 leads, as shown. The tanks are connected by a branch 26, preferably supplied with a controlling-valve 27, and the last tank 24 is also supplied with an overflow-pipe 28, the valve 27 providing means whereby the water may be caused to flow through all the tanks uniformly. The tanks are provided, respectively, with discharge-pipes having controlling-valves 29 30 and also with "man-holes" 31 32 to afford means of access to the tanks for cleaning the same when required. The tank 22 is also provided with a pressure-gage 33 and water-gage 34 of the usual construction. Two of the tanks are shown connected, as described; but it will be understood that any required number may be employed, according to the condition or quality of the products of the combustion conducted to the drum 10.

In the operation of this device water is ad-

mitted to the drum 10 through the valved supply-pipe 13, the said water-supply being under pressure, as stated. The perforated diaphragm 15 within the drum is located at the widest part of this drum and quite a distance below the inlet, thus causing the entering water to fall heavily upon the perforated diaphragm and to pass through the latter in numerous jets. The escape-pipe 14 at the bottom of the drum is of sufficient diameter to enable the water to escape freely, and said water, thus rushing through the drum, will create a downward suction in the downward-inclined pipe 16, which forms a conductor for the products of combustion arising through the stack 18. Thus suction may be assisted when desired, and especially at the beginning of the operation, by introducing compressed air or steam into the conductor 16 through the nozzles of the pipe 21. The products of combustion will be carried rapidly through the drum 10 by the downward-rushing jets of water and will be conducted with the water into the first tank 22, the effect of the water being to suddenly condense the heated gases and smoke and precipitate the particles of unconsumed carbon and other heavier matter, leaving the lighter gases only to pass through the by-pass 23 to the second tank, where they come in contact with the water therein and are still further condensed and through as many tanks as may be required, leaving only the very light and volatile gases to escape at the final vent-pipe 25. When a sufficient quantity of the sediment has accumulated in the tanks, it is removed through the discharge members 29 30, and, if necessary, the manholes 31 32 may be removed to permit the operatives to enter the tanks and clear the same from the accumulations.

The material settling in the tanks often contains valuable matter, and after its removal it can be suitably treated for saving the desirable portions.

The device is simple in construction, efficient in action, and capable of a wide range of

application, as will be obvious, and can be constructed of any required size to adapt it to all the various sizes of furnaces and like structures manufactured.

The apparatus is especially valuable for preventing the escape of injurious and unpleasant fumes and gases from smelters and similar structures and from chemical-manufacturing plants and the like.

The apparatus may be associated with other forms of apparatus, such as settling-tanks and the like, either opened or closed; but this would not affect the invention or modify or otherwise interfere with its action.

Having thus described the invention, what is claimed is—

1. In a device of the class described, a vertically-disposed drum having conical ends, a downwardly-inclined smoke-conductor connected at its lower end with the cylindrical body of said drum and at its upper end with a smoke-stack, a perforated diaphragm mounted in the drum directly below the upper conical end, and means for supplying water under pressure to the upper extremity of said upper conical end of the drum.

2. In a device of the class described, the combination of a drum having contracted upper and lower ends, an inclined smoke-conductor connected at its lower end with the body of the drum and at its upper end with a smoke-stack, means for conducting water under pressure through said drum to thereby set up a suction in the smoke-conductor, and settling-tanks one of which is connected with the lower end of the drum; said settling-tanks being connected with each other by a valved pipe and by an arched by-pass.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

DWIGHT J. LAWTON.
HOMER I. REYNOLDS.

Witnesses:

J. M. BOOTH,
W. C. HALE.