May 17, 1927.

1,628,980

F. T. HOPE

DRAFT REGULATOR

Filed Aug. 4, 1924

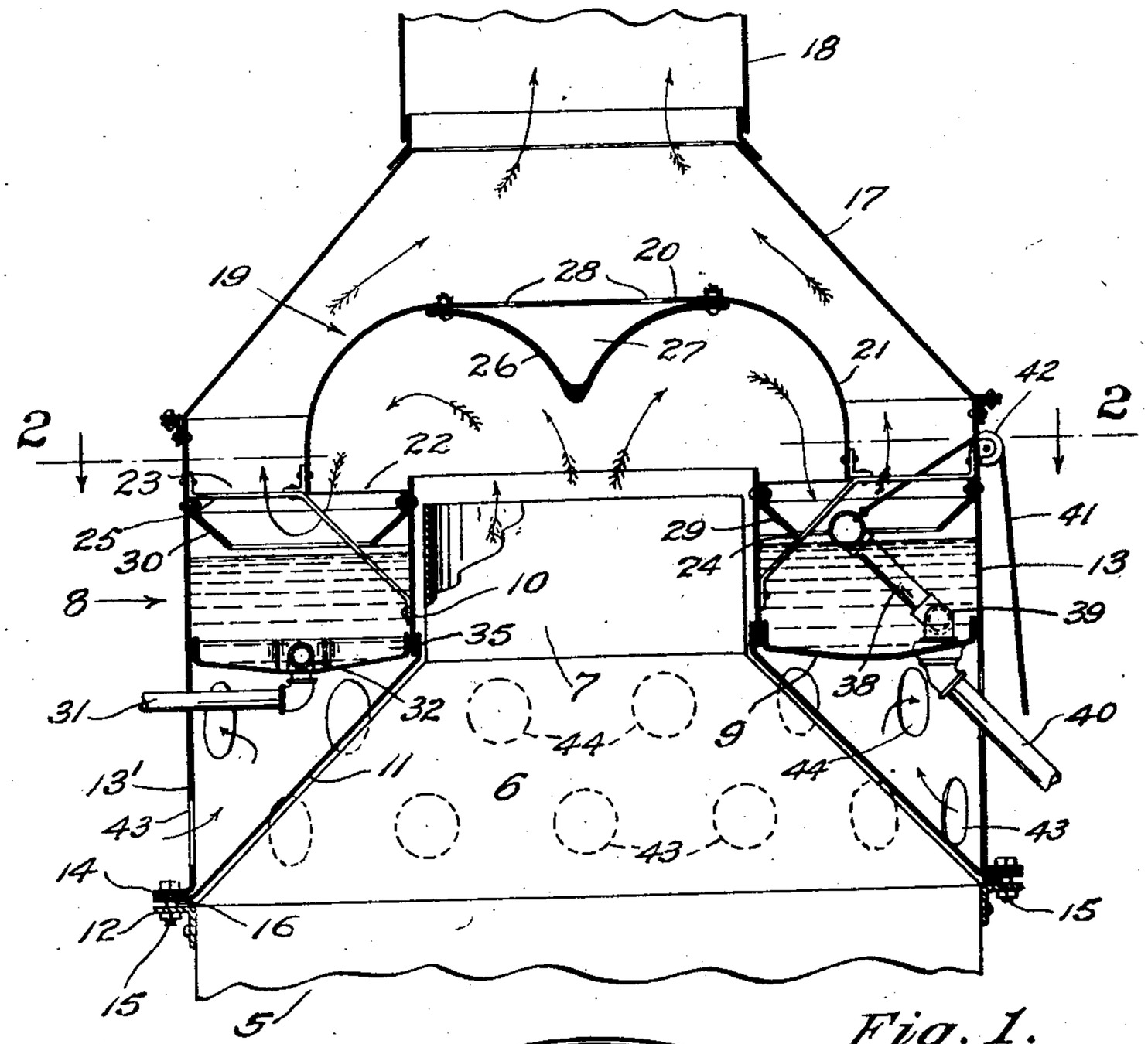

Fig. 1.

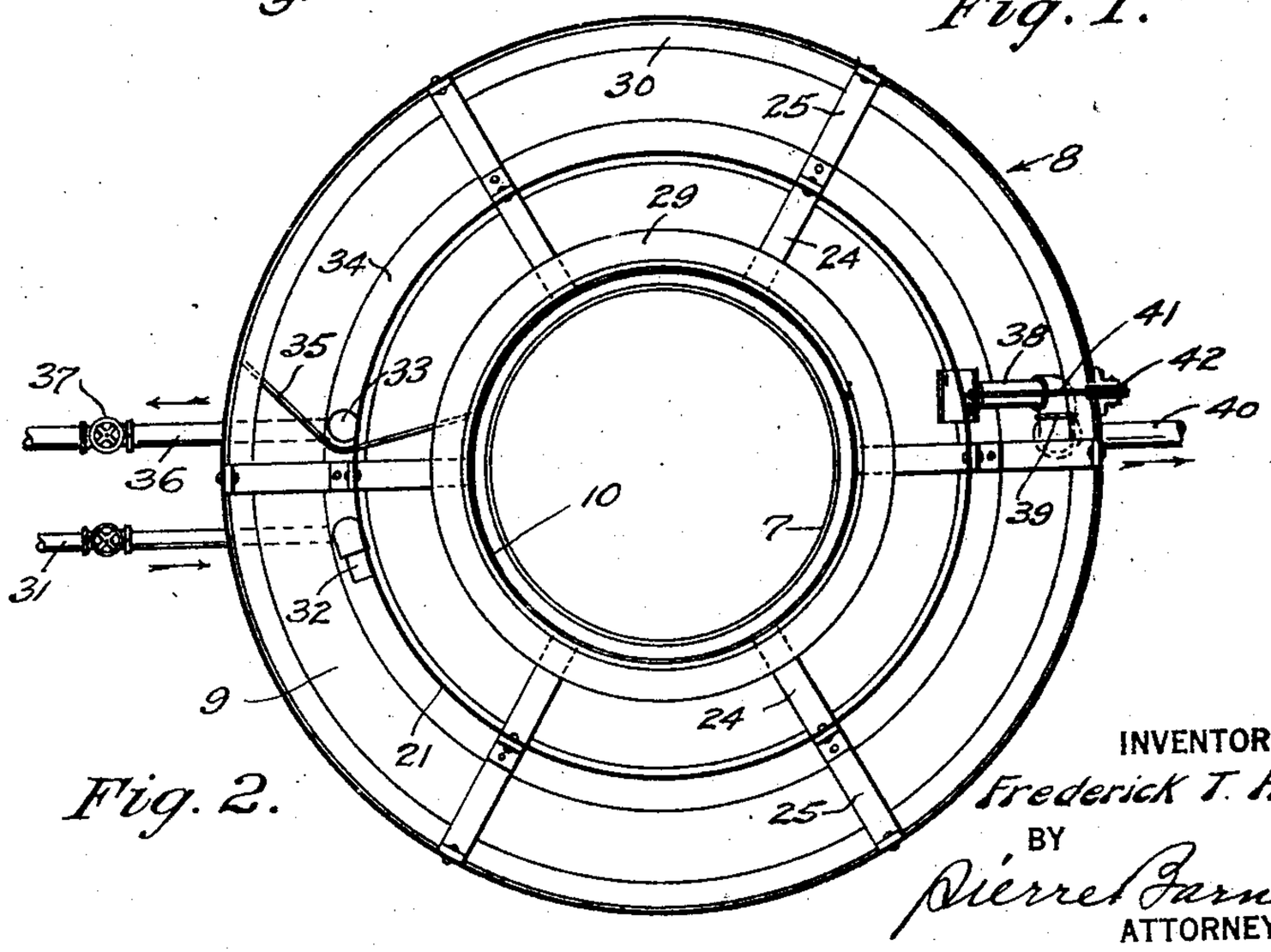

Fig. 2.

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Patented May 17, 1927. 1,628,980

UNITED STATES PATENT OFFICE.

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DRAFT REGULATOR.

Application filed August 4, 1924. Serial No. 730,046.

This invention relates to draft regulators and spark arresters and, more especially to improvements in apparatus illustrated and described in my prior patent, No. 1,465,475, dated August 21, 1923.

The object of the invention, generally, is to simplify the construction and improve the efficiency of draft regulators and spark arresters of the character above referred to.

More specific objects and advantages of the invention, which will appear in the following specification, being attained by the means and devices hereinafter described and claimed.

An embodiment of the invention is illustrated in the accompanying drawing, wherein,—

Figure 1 is a transverse vertical section of my improved apparatus mounted upon an upright steam boiler; and Fig. 2 is a horizontal section on line 2—2 of Fig. 1.

In said drawing, the reference numeral 5 represents the shell of a cylindrical upright steam boiler such as utilized with logging engines or the like. As shown, said boiler shell is provided with a conical portion 6 through which smoke, sparks and other combustion products travel to a cylindrical stack flue 7.

According to the present invention there is provided about the flue 7 an annular tank 8 which is open at the top and is provided with a floor 9 of a trough shape, preferably, in transverse section. The inner peripheral wall 10 of said tank, as shown, projects upwardly from a frusto-conical shaped bearing plate 11 which is supported upon an angle iron attachment 12 of the boiler shell.

The outer peripheral wall of the tank consists of a plate 13 which, as shown, extends as at 13^1 below the tank and terminates in a flange 14 to receive coupling bolts 15 which serve to unite the plates 11 and 13 with the boiler attachment 12.

Gaskets 16 of asbestos or other suitable material are desirably inserted between said boiler attachment and the plate 11 to afford a noiseless cushion connection therefor.

The plate 13 also extends upwardly above the tank proper and is secured to and supports a frusto-conical smoke uptake 17 leading to a second stack 18 which is disposed in axial alignment with the flue or primary stack 7 and provides communicative connection between the two stacks.

Positioned between the two above named stacks 7 and 18 and concentrically of their axis is a dome shaped hood 19 having, preferably, a plane central roof portion 20 and a rounded peripheral portion 21 substantially as shown in Fig. 1.

The hood extends diametrically to about midway between the peripheral walls of the tank 8 thereby affording passage at 22 and 23 of approximately equal widths. As shown, the hood is supported and maintained against lateral displacement by suitable means such, for example, as bracket pieces 24 and stays 25 secured to the inner and outer walls 10 and 13, respectively, of the tank.

Secured to and depending from the roof portion 20 of the hood is a detachable hollow conoidal deflector, preferably of cast iron, which is arranged to have its axis coincide with the axis of the opposing flue 7.

The chamber 27 within said deflector serves as a heat insulating space which is advantageously provided with vent openings 28.

Secured to the inner and outer walls 10 and 13, respectively, of the tank and adjacent to the top of the latter are rings 29 and 30 constituting baffles which converge downwardly toward the center of the tank cavity.

For operation, the tank is charged with water by means of a valved service pipe 31 extending upwardly through the floor 9 and within the tank said service pipe is provided with a nozzle 32 which is disposed to direct a stream of water upon the floor circumferentially of the tank.

33 represents a drain or outlet provided in the central or gutter portion 34 of the tank, said drain being located in the floor 9 in proximity with the service pipe connection, but separated therefrom by a relative low partition 35.

The drain 33 communicates with a discharge pipe 36 having a valve 37 which is normally closed. Also provided within the tank is a water overflow pipe 38 having a pivotal connection at 39 with a waste-water pipe 40.

As shown, the pipe 38 is disposed in an

inclined position to enable the pipe to be swung downwardly by the force of gravity subject to the action of a controlling cable 41 which passes over a guide pulley 42 to a fastening means (not shown) convenient to the attendant. 43 and 44 represent ventilating opening provided at different elevations in the plate part 13[1] to afford a circulation of air to and from and within the space below tank 8 for cooling the floor 9 thereof.

To further prevent the tank from becoming unduly hot the wall 10 and the bearing plate 11 are of internal diameters sufficient to provide air insulating spaces between the same and the boiler members 6 and 7.

Such insulating of the tank and the supporting structures pertaining thereto is of importance as a means for obviating an excessive evaporation of water from the tank, especially in places where water may be obtained only with difficulty.

In operation, the gaseous combustion products, oftentimes including sparks and small particles of burning fuel, emitted from the flue 7, are deflected by the hood 19 and deflector 26 downwardly through passage 22 into water containing tank, wherein the greater part of the solids are deposited and the remainder—principally smoke or gas—escapes beneath the rim of the hood 19 and thence upwardly through passage 23, uptake 17, and stack 18 into the atmosphere.

The travel of the combustion products delivered from the boiler stack or flue 7 are clearly indicated by feathered arrows in Fig. 1.

The baffles 29 and 30 not only serve as side walls to the portion of smoke passage within the tank, but also serve to effectually prevent swashing of the water within the tank due to vibratory or tilting movements of the associated boiler. Normally the tank drain 33 is closed by means of the valve 37 and water is supplied through the service pipe 31 into the tank to an elevation determined by the elevation of the inlet end of the overflow pipe 38 which, as illustrated, is regulated by means of the cable 41.

By raising or lowering the overflow pipe the water level within the tank is raised or lowered to diminish or increase the effective sizes of the passage way below the lower edge of the hood to correspondingly decrease or promote the boiler draft. Under ordinary operating conditions the water is preferably fed into the tank in a small continuous stream.

When the tank is to be cleaned the valve 37 is opened for drawing the water through drain 33 from the tank, whereupon the valve for the service pipe 31 is opened to its fullest extent to effect a large delivery of water through the nozzle 32 for cleaning the floor 9. Such water discharge upon the floor flushes the latter to cause dirt or sedimentary matter to be washed into the gutter 34 and thence discharged into the drain 33.

While I have illustrated the preferred embodiment of the invention, I do not wish to confine myself to the specific construction shown except as limited by the claims.

What I claim, is,—

1. In a draft controller for stacks, a water tank surrounding the stack in spaced-apart relation, a smoke uptake mounted on said tank, a hood located within said uptake and extending over the stack and a portion of the tank, said hood having vent holes in the top thereof and a hollow conoidal deflector detachably connected to and depending from the top of the hood, the chamber within said deflector having direct communication through said vent holes with the space thereabove in said uptake.

2. In a draft controller for stacks, an annular water tank surrounding the stack, a hood provided above the stack flue and extending over the inner portion of the tank, and circular baffles being disposed at substantially the same elevation and secured to the inner and outer walls respectively of the tank said baffles converging downwardly with relation to each other to provide a restricted opening in the top of the tank and below the peripheral outlet of the hood.

3. In a draft controller for stacks, a water tank surrounding the stack, said tank being provided with an annular trough shaped floor, a partition provided upon the tank floor, a drain pipe connected to said floor at one side of the partition, a water supply pipe at the other side of the partition, said supply pipe terminating in a nozzle arranged to discharge water circumferentially of the floor for flushing the same, a hood provided above the stack and extending partly over the tank, and means for regulating the depth of water in the tank for controlling the gas discharge area beneath the lower edge of the hood.

4. In a draft controller for stacks, an annular water tank surrounding the stack, a hood positioned above the stack for directing combustion products therefrom into the tank, means for controlling the gas discharge area beneath the lower edge of the hood, said means consisting of a water supply pipe and a vertically adjustable overflow pipe, and means for flushing the floor of the tank, said last named means including said supply pipe and a valved drain pipe arranged and located with respect to each other that the flushing water is caused to travel circuitously upon the floor of the tank for almost the entire circumference thereof.

5. In a draft controller for stacks, an annular water tank surrounding the stack, a smoke-uptake extending upwardly from said tank, a hood positioned above the stack for

directing combustion products therefrom into the uptake by way of the tank, means for controlling the gas discharge area beneath the lower edge of the hood, and means for flushing the floor of the tank, said last named means including a water supply pipe and a valved drain pipe arranged and located with respect to each other that the flushing water from the supply pipe is caused to travel circuitously upon the floor of the tank for almost the entire circumference thereof.

6. In a draft controller for stacks, an annular water tank surrounding the stack, a smoke-uptake extending upwardly from said tank, a hood positioned above the stack for directing combustion products therefrom into the uptake by way of the tank, means for controlling the gas discharge area beneath the lower edge of the hood, said means consisting of a water supply pipe and a vertically adjustable overflow pipe, and means for flushing the floor of the tank, said last named means including said supply pipe and a valved drain pipe arranged and located with respect to each other that the flushing water is caused to travel circuitously upon the floor of the tank for almost the entire circumference thereof.

7. The combination with a boiler shell having a conical upper portion surmounted by a stack, of an annular water tank surrounding the stack, a support for the tank, said support consisting of plates for the inner and outer walls respectively of the tank, the plates for the outer wall being provided with vent openings for the circulation of cooling air within the space below the tank, means for securing said plates to the boiler shell, an uptake connection supported upon the outer wall of the tank, a hood provided within said uptake connection and above the stack, said hood extending partly over the tank, and means for regulating the depth of water in the tank for controlling the gas discharge area beneath the outer periphery of said hood.

Signed at Seattle, Washington, this 2nd day of July, 1924.

FREDERICK T. HOPE.