Feb. 14, 1933. C. J. BYBOTH 1,897,298

HUMIDIFIER

Filed Sept. 1, 1931 2 Sheets-Sheet 1

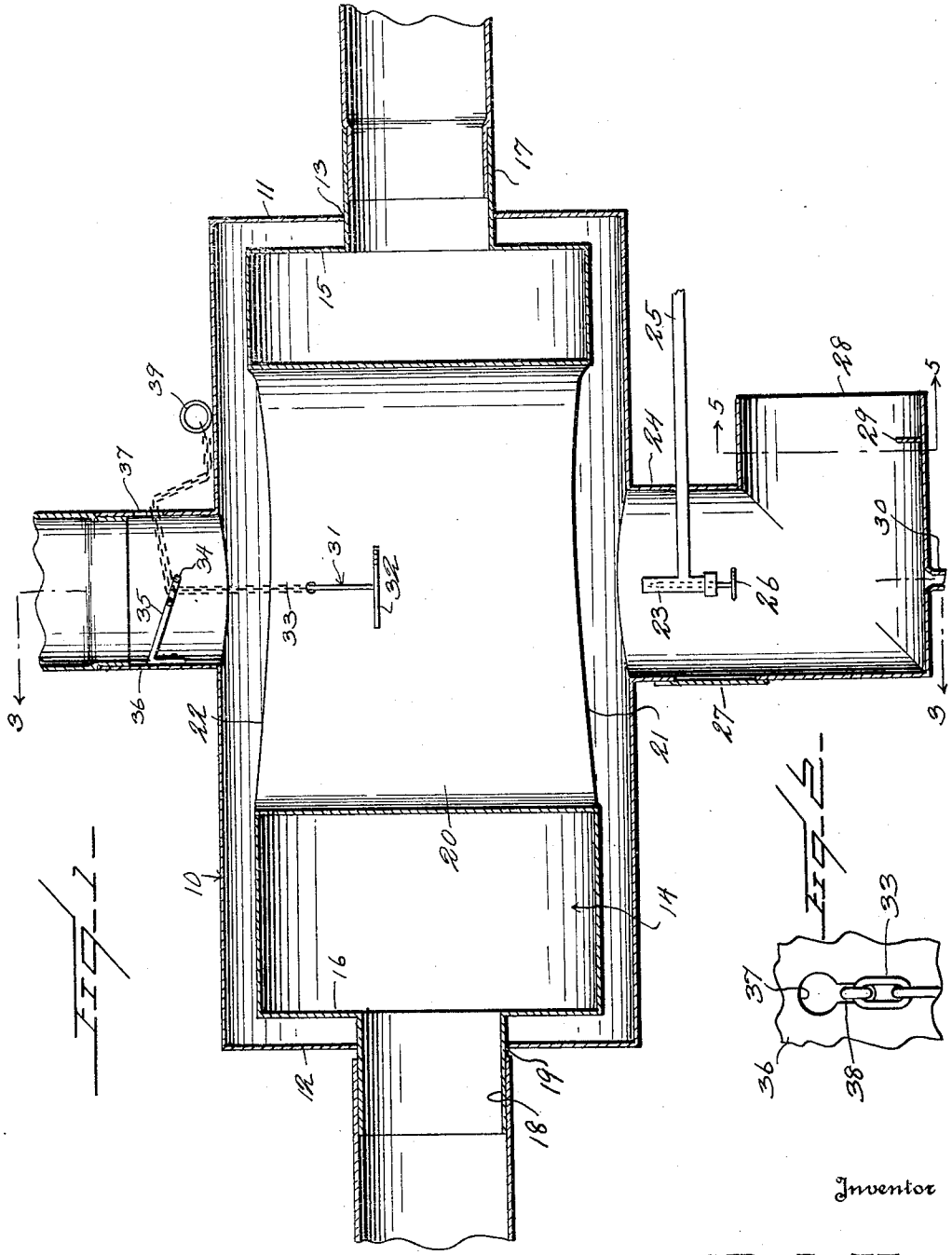

FIG. 1

FIG. 2

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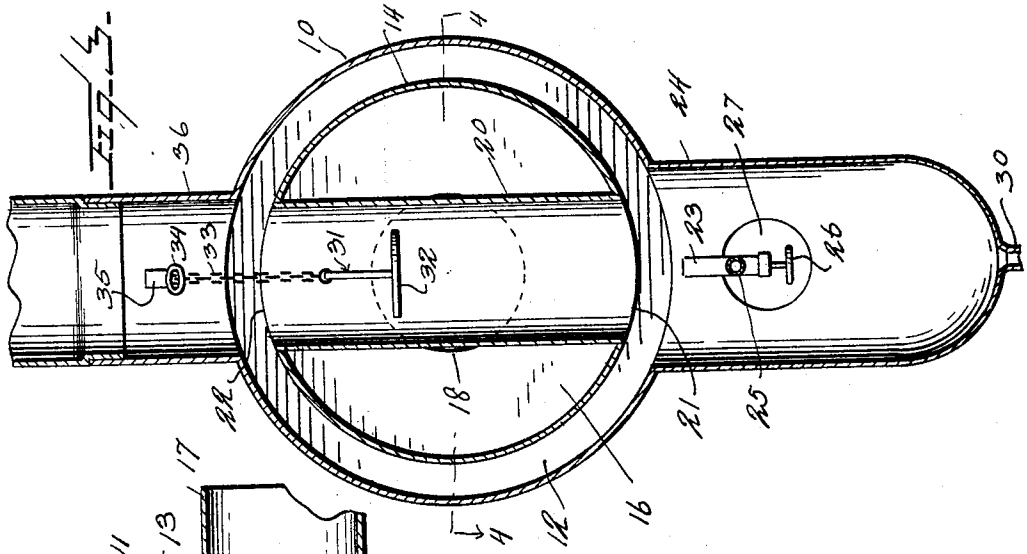

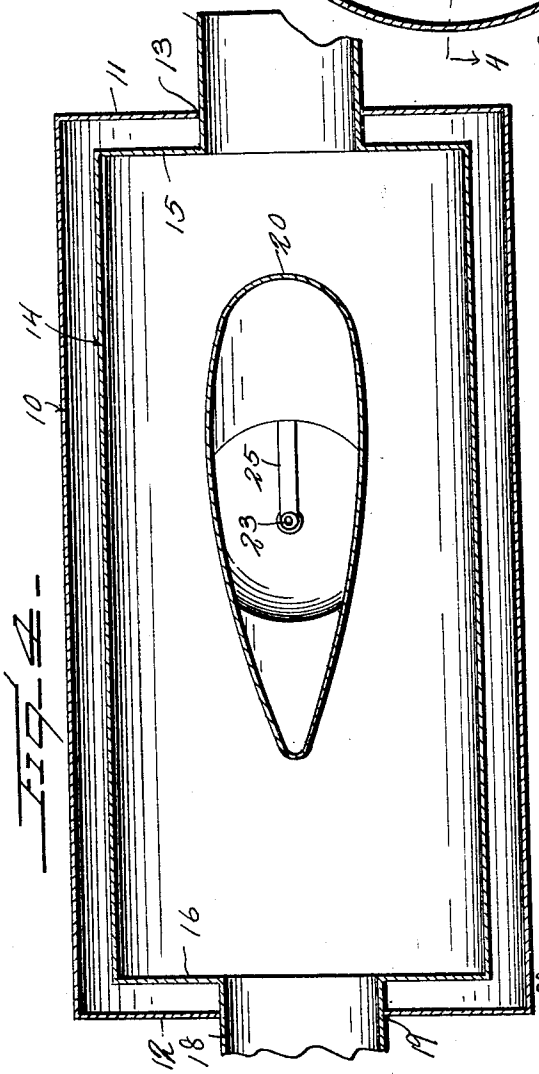

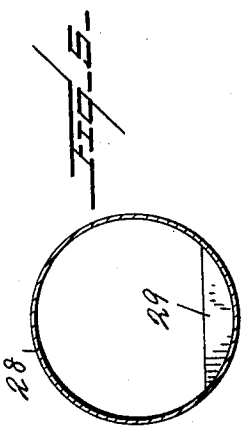

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UNITED STATES PATENT OFFICE

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HUMIDIFIER

Application filed September 1, 1931. Serial No. 560,597.

This invention relates to humidifiers, and more particularly to a humidifier which may be used in combination with any conventional heating unit or element without interfering with the normal operation of the element or disturbing any of the conventional parts thereof.

An object of this invention is to provide a humidifier which is so constructed that it will provide the desired humidity or moisture in the air of the heated rooms.

Another object of this invention is to provide in a device of this kind means whereby the humidity of the air passing through the device is automatically controlled depending upon the heat generated in the furnace or heating element.

A further object of this invention is to provide a device of this kind which can be readily and cheaply manufactured, the device being relatively small so that it will not occupy a great amount of space, but being of sufficient size to provide the desired humidity in the heated rooms.

A still further object of this invention is to provide a device of this kind which is so constructed that it will not require any additional amount of heat applied to the furnace so as to operate the device.

The above and various other objects and advantages of this invention will in part be described in and in part be understood from the following detailed description of the present preferred embodiment, the same being illustrated in the accompanying drawings, wherein:—

Figure 1 is a longitudinal section partly in detail taken through a device constructed according to the preferred embodiment of this invention;

Figure 2 is a fragmentary detail side elevation showing the means for locking the baffle adjusting member;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a sectional view taken on the line 4—4 of Figure 3, and

Figure 5 is a sectional view taken on the line 5—5 of Figure 1.

Referring to the drawings wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 10 designates generally a drum or outer casing which is provided with end walls 11 and 12, and the numeral 14 designates generally an inner drum or heating member which is disposed within the outer drum 10 and in spaced relation thereto, this inner drum 14 being provided with end walls 15 and 16. The end wall 11 of the outer drum 10 is provided with an opening 13 therethrough for receiving an intake pipe or connection 17 which communicates with the interior of the inner drum 14, being connected at one end to the end wall 15 and the opposite end of this pipe connection 17 is adapted to be connected to the conventional smoke pipe or smoke outlet of the heating element (not shown).

An outlet pipe 18 is connected to the end wall 16 of the inner drum 14 and extends through an opening 19 in the end wall 12 of the outer drum, this outlet pipe connection 18 being connected to the outlet pipe for the smoke of the furnace. The inner drum 14 has disposed therein a heating member 20 which is constructed in substantially stream line form or of elongated and substantially elliptical form, being disposed across the path of smoke and gases passing through the inner drum 14. This heating member 20 is open at each end thereof and the inner drum 14 has openings 21 and 22 therethrough so as to permit the passage of air through the interior of this heating member 20. Preferably, the forward end of the heating member 20 is relatively blunt and is disposed closely adjacent the inlet pipe connection 17 so that the heat passing through this inlet 17 will strike the heating or baffle member 20 and pass therearound and through the inner drum 14.

In order to provide the desired moisture in the rooms of the building which is being heated, I have provided a spray nozzle, generally designated as 23, which is mounted in a pipe connection 24 opening into the space between the inner and the outer drums and opening into the passage or opening 21 in the lower end of the heating member or baffle 20.

This nozzle 23 is connected to a suitable source of water or the like by means of a pipe connection 25 which extends through the wall of the pipe connection 24. The spray nozzle or member 23 has a valve 26 of the needle type which controls the amount of water passing outwardly of the upper end of the nozzle. The pipe connection 24 has a hinged door 27 in a wall thereof oppositely from the nozzle 23 so as to permit the regulation of the valve 26 by projecting a hand through the opening in the pipe.

The pipe 24 is preferably of L-shaped construction, being in the form of an elbow or the like, and the lower or horizontal leg 28 may be connected to a suitable source of air intake and is open to the atmosphere at all times. If desired, this leg 28 may be relatively short where the atmosphere adjacent the heating element is not filled with a great amount of dust particles or if the dust particles are excessive, the leg 28 may be connected to a suitable length of pipe and extended to a point where it will not draw dust particles through the heating member 20.

An inner vertical wall 29 is disposed transversely across the horizontal leg 28 extending upwardly a slight degree from the bottom, this wall 29 operating to prevent the unevaporated water or moisture from running out of the horizontal leg 28. A drain pipe 30 which is open at all times is connected to the horizontal leg 28 so that any moisture or water collecting in the lower end of the L 24 will run out therefrom.

An adjustable baffle or target, generally designated as 31, is supported within the interior of the heating baffle or member 20, this baffle 31 comprising a baffle plate 32 which is suspended from a flexible member 33 in the form of a chain, cable or the like, which passes through a guide loop 34 carried by a bracket arm 35. This bracket arm 35 extends inwardly of a pipe connection 36 which is connected at one end to the outer drum 10 and communicates with the space between the inner and the outer drums and is preferably diametrically opposed to the air intake connection 24.

The chain or flexible member 33 is passed through this guide loop 34 and extends outwardly of the pipe connection 36 through an opening 37 formed in the wall of the pipe connection, which opening may be of a configuration so that the chain, where such is used, can be readily held in adjusted position. The opening 37 has a slot 38 communicating therewith within which one link of a chain may be disposed, this link being at right angles to the link connected thereto and positioned on the outer side of the pipe 36. A loop 39 may be attached to the end of the chain or flexible member 33 so as to permit the ready adjustment thereof.

In the operation of this device, the valve member 26 is so adjusted that a very fine or thin stream of water will be projected from the nozzle 23 in an upward or vertical direction within the interior of the heating member 20. This stream of water will strike the baffle 32 and the stream will thereby be broken up into fine particles and evaporated by the heat within the interior of this heating member 20. By adjusting the baffle plate 32 for the desired distance within the heating member 20, the quantity of moisture evaporated by this heating member 20 can be controlled or regulated. That is, if the baffle plate 32 is suspended in a position adjacent the lower end of the heating member 20, the quantity of water evaporated will be relatively small, but as this baffle plate 32 is moved upwardly, the heat within the heating member 20 will evaporate a greater quantity of water and only a relatively small amount of water will be unevaporated and flow downwardly into the catch basin formed by the wall 29.

It will be obvious, from the foregoing, that a relatively simple but at the same time practical humidifier has been disclosed which is so constructed that it may be readily attached to a smoke pipe of a furnace and that the degree of temperature of the heating member 20 will automatically control the quantity of moisture evaporated therein. In this manner, the valve 26 of the nozzle 23 may be adjusted so that a relatively fine stream of water will be projected upwardly, this stream being sufficient to provide the desired moisture to be evaporated when the furnace is operating at its full capacity. When the furnace or heating element is operating at less than its full capacity, the unevaporated moisture or water will fall into the catch basin of the device and pass outwardly thereof.

It is, of course, understood that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:—

1. A humidifier of the character described comprising an outer drum, an inner drum mounted in spaced relation to the outer drum, means for connecting the two drums to a smoke pipe whereby to permit the heat from the smoke pipe to pass through the inner drum, a heating member disposed diametrically of the inner drum and interposed in the path of heat passing therethrough, and means for spraying a liquid within the heating member whereby to evaporate the liquid upon heating of the member.

2. A humidifier of the character described comprising an outer drum, an inner drum,

means for connecting the inner drum to a heating element whereby to permit the heat from the element to pass through the interior of the inner drum, a heating member disposed diametrically of said inner drum and interposed in the path of the heat passing therethrough, means for spraying a liquid within the heating member, and means for drawing off the unevaporated liquid.

3. A humidifier of the character described comprising an outer drum having apertured end walls, an inner drum mounted in spaced relation to the outer drum, pipe connections extending outwardly from each end of the inner drum and through the apertures of said outer drum, a hollow heating member mounted within the inner drum and having the end portions thereof connected to the wall of the inner drum, a pipe connection carried by the outer drum in alinement with the hollow heating member, a second pipe connection carried by the outer drum and disposed diametrically of the first pipe connection and communicating with the opposite end of the heating member, and means for projecting a spray or liquid within the heating member.

4. A humidifier of the character described comprising a hollow heating member, means for spraying a liquid within the member, a baffle disposed within the member and in the path of the spray, flexible means for suspending the baffle within the member and above the spray.

5. In a humidifier, a nozzle, a baffle supported above the nozzle and in the path of a liquid projected therefrom, and flexible supporting means for adjustably holding the baffle with respect to the nozzle.

6. A humidifier comprising a hollow heating member, means for spraying a liquid within the member, a baffle disposed within the member and in the path of the spray, and means for supporting the baffle for adjustment relative to the spraying means.

In testimony whereof I hereunto affix my signature.

CARL J. BYBOTH.