

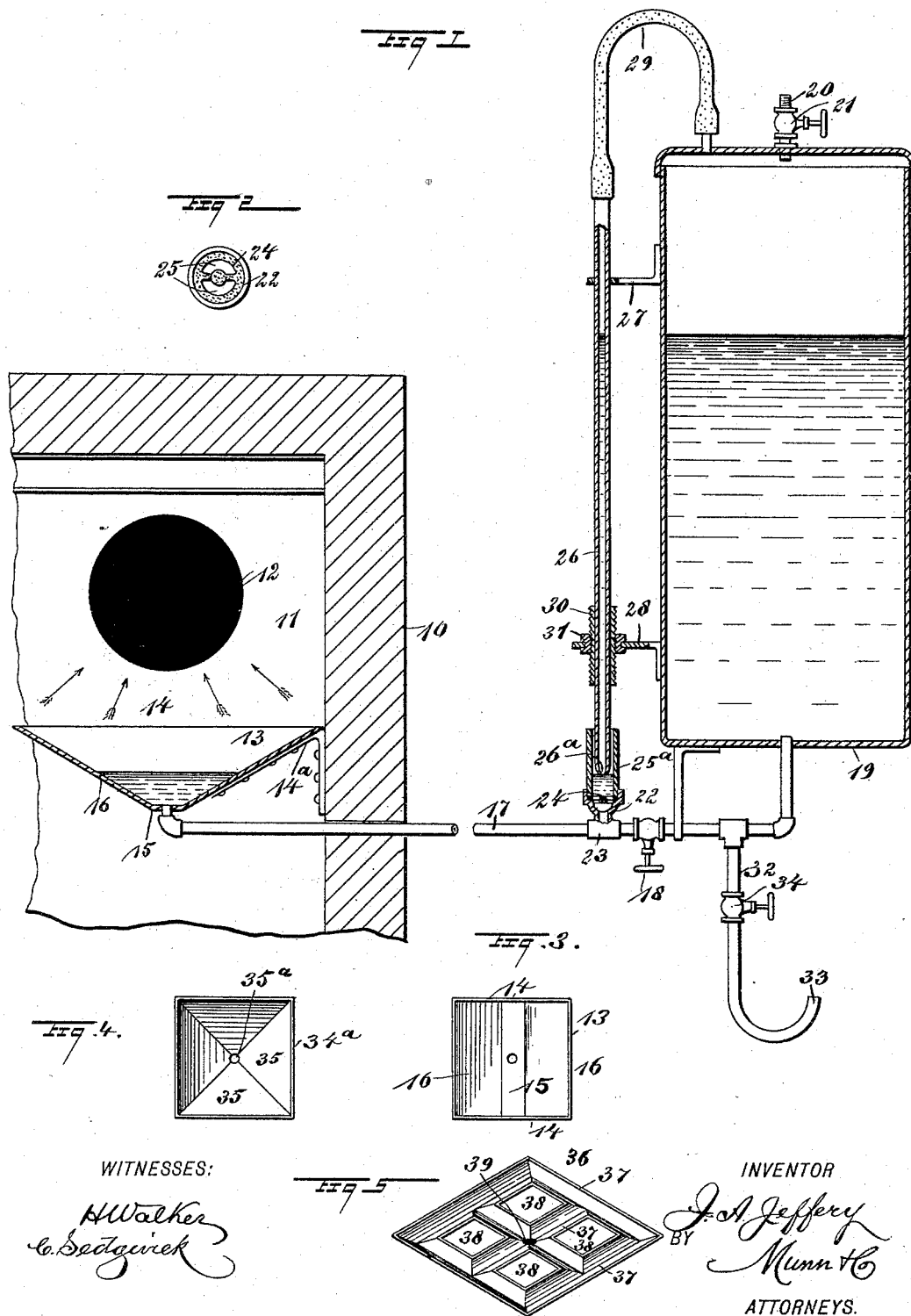
(No Model.)

J. A. JEFFERY.

APPARATUS FOR MOISTENING THE AIR IN HOT AIR FURNACES.

No. 492,296.

Patented Feb. 21, 1893.



# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR MOISTENING THE AIR IN HOT-AIR FURNACES.

SPECIFICATION forming part of Letters Patent No. 492,296, dated February 21, 1893.

Application filed September 28, 1892. Serial No. 447,171. (No model.)

### *To all whom it may concern:*

Be it known that I, JOSEPH A. JEFFERY, of Shell Lake, in the county of Washburn and State of Wisconsin, have invented new and  
5 Improved Apparatus for Moistening the Air in Hot-Air Furnaces, of which the following is a full, clear, and exact description.

My invention relates to improvements in an apparatus for moistening the air which is  
10 heated in a hot air furnace and delivered into the rooms of a building.

The object of my invention is to produce a simple apparatus by means of which just the desired quantity of water may be placed in  
15 the evaporating pans, to construct and arrange the apparatus so that the device may be arranged near or within the hot air flues and the evaporation controlled by the temperature and humidity of the air entering the flues  
20 rather than by the heat of the fire-pot, to construct the evaporating pans so that they may be made to evaporate more or less rapidly as desired, and in general, to produce an apparatus which may be cheaply made, easily controlled, and accurately regulate the quantity  
25 of moisture with which the heated air is charged.

To these ends, my invention consists in certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar figures of reference indicate  
30 corresponding parts in all the views.

Figure 1 is a broken sectional diagrammatic view, showing the general arrangement of the apparatus; Fig. 2 is a plan of the cup which is connected with the water delivery pipe of  
40 the apparatus; Fig. 3 is a plan of one of the evaporating pans which may be used; Fig. 4 is a plan of a modified form of pan; and Fig. 5 is a perspective view of still another modified form of pan which is adapted to be used  
45 in a comparatively low temperature, and which has therefore a very large evaporating surface.

The furnace 10 may be of any usual kind having the hot air chamber 11, from which  
50 lead the usual flues 12, these being adapted to deliver in the ordinary way to various parts of the building. Adjacent to the flue and in

the hot air chamber is an evaporating pan 13, or one of the other pans described below may be used, and the pan 13 has a relatively wide  
55 top and straight end pieces 14, with converging side pieces 16, and a flat narrow bottom 15. This pan is secured upon a suitable supporting bracket 14<sup>a</sup>, and it is supplied with water by means of a pipe 17, which leads  
60 horizontally through the furnace wall, is controlled by a valve 18, and connected with an air tight water tank 19. This tank 19 may be supported in any convenient place, but its height must be regulated so that the right water  
65 pressure may be provided and the correct height of water maintained in the evaporating pan. The tank has an inlet pipe 20 at the top, which is controlled by a valve 21, and the tank may be filled by hand by means of a  
70 bucket, or the pipe 20 may connect with any source of water supply.

On the upper side of the pipe 17, and near the tank 19, is an open-topped cup 22, which is connected with the pipe 17 by means of a  
75 suitable coupling 23, and this cup carries a leather covered disk 24 within it, which disk has water passages 25. Within the cup, and fitted tightly therein and upon the edges of the disk, is an open-topped tube 25<sup>a</sup>, which is  
80 preferably of glass, and extending downward into this tube is a smaller tube 26 which is also of glass, and this latter tube is arranged parallel with the tank 19, and is of about the same height as the tank. The tube 26 extends, as before remarked, down into the  
85 tube 25<sup>a</sup>, and its lower or delivery end is reduced, as shown at 26<sup>a</sup>. The tube 26 is held in guides 27 and 28 arranged one above the other and secured to the tank 19, and the upper  
90 end of the tube connects by means of a hose 29 with the upper portion of the tank 19, although any suitable connection may be provided between the tank and tube. The tube is provided with a threaded sleeve 30,  
95 which is secured firmly to it at a point adjacent to the guide 28, and a wheel nut 31 is held to turn upon the sleeve, this nut having a grooved edge which is fitted to turn on the guide 28. It will thus be seen that the nut  
100 has no vertical movement, and by turning it, the sleeve and consequently the tube 26 may be adjusted up and down.

Leading downward from the pipe 17, at a

point between the valve 18 and the tank 19, is an adjusting pipe 32, which has its lower end 33 bent upward, and this pipe is controlled by a valve 34. The object of the pipe 5 32 is to enable water to be withdrawn from the tank until the water pressure within the tank is balanced by the exterior air pressure as this is necessary to properly control the supply of water in the evaporating pan.

10 In Figs. 3 to 5, I have shown the several forms of evaporating pans having flaring tops and still other forms may be used if desired. The form of pan shown in Fig. 3 has been already described, and the pan 34<sup>a</sup>, shown in 15 Fig. 4, is of an inverted pyramidal shape, the pan having converging sides 35, which form its bottom, and the pipe connection is made at the bottom and at the center of the pan, as shown at 35<sup>a</sup>. The pan 36, shown in Fig. 5, 20 is adapted for relatively low temperatures, and consists of a series of connected troughs 37, air spaces 38 being left between the troughs so that they will be exposed on all sides to the heated air, and will evaporate 25 readily. The pan has a central opening 39 in the bottom, adapted to connect with the pipe 17.

In carrying out the invention, any suitable pan having a flaring top may be used, although the kinds shown are preferably employed, and any number of pans may be connected with the tank, but in each case the extreme bottom portions of the evaporating pan must be on the same level as the top of 35 the cup 22.

The pans being connected up as shown, the operation of the apparatus is as follows: The valves 18 and 34 are closed, the valve 21 opened and the tank 19 filled, or partially filled with 40 water. By means of the nut 31 and sleeve 30, the tube 26 is adjusted so that its lower end is a trifle below the level of water desired in the evaporating pan. The valve 18 is then opened and the water flows from the tank 45 through the pipe 17 and recesses in the evaporating pan and cup 22 until it reaches the lower extremity of the tube 26, when by the weight of the outside atmosphere the water is driven into the tube 26 until it reaches a 50 height in the tube corresponding with the height of water in the tank. At this point the water ceases to flow into the evaporating pan. The tube 26 is now raised until its lower extremity is at the level of the surface of the 55 water desired in the evaporating pan. As the water in the pan evaporates, the water in the tube 25<sup>a</sup>, which is really an extension of the cup 22, lowers also, and the water surfaces in the pan and tube maintain the same level; 60 but as soon as the surface in the tube 25 is low enough to allow a bubble of air to pass into the tube 26, the usual level is restored, as this will permit a little water to flow through the pipe 17; this action is repeated until the 65 supply of water in the tank is exhausted. If it is desired to increase the evaporating surface in the pan, the tube 26 is raised and this

will permit more water to flow into the pan. If it is desired to diminish the evaporating surface, the tube 26 is lowered and the valve 70 34 opened until the surface in the tube 25<sup>a</sup> falls to the extremity of the tube 26, when the valve 34 is closed. If at any time it is desired to open the valve 21 while there is water in the tank, the valve 18 is closed, the tube 75 26 is screwed down until its extremity 26<sup>a</sup> impinges closely on the leather covered top of the disk 24, and this closes the tube so that when the valve 21 is opened and air admitted to the reservoir, the air pressure will not cause 80 the pan 13 or cup 25<sup>a</sup> to overflow.

It will be noticed that with this apparatus the evaporating surface in the pans may be very accurately adjusted, that the pans may be arranged in any desired part of the hot 85 air chamber or flues of the furnace, that the apparatus may be made to regulate the water supply for a large number of pans, that shallow pans having a large evaporating surface may be used, and that by using either 90 of the forms shown in Figs. 3, 4, and 5, the evaporating surface may be greatly varied.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An apparatus of the character described, comprising an evaporating pan arranged in the hot air chamber or flues of a furnace, a water tank arranged outside the furnace, a valve controlled pipe leading from the tank 100 to the pan, an open-topped cup arranged upon the pan supply pipe, a tube extending from the cup and connected with the top of the tank, and a valve-controlled waste pipe connected with the tank and adapted to regulate the air pressure therein, substantially as 105 described.

2. An apparatus of the character described, comprising an evaporating pan arranged in the hot air chamber or flues of a furnace, an 110 air tight water tank arranged outside the furnace, a valve-controlled pipe leading from the bottom of the tank to the evaporating pan, a valve controlled pipe connected with the tank bottom and opening into the outer 115 air, an open-topped cup connected with the air supply pipe and arranged upon the same, and a vertically adjustable tube arranged parallel with the tank, the lower end of the tube extending into the cup and the upper end 120 having connection with the tank top, substantially as described.

3. The combination, with the evaporating pan, the water tank and the pipe leading from the tank to the pan, of the cup secured upon 125 and connected to the water pipe, the bridge or disk secured within the cup, the open-topped tube held within the cup above the disk, and the vertically adjustable tube, the lower end of the tube extending into the open- 130 topped tube and adapted to impinge upon the disk in the cup and the upper end of the vertically adjustable tube being connected with the tank top, substantially as described.

4. In an apparatus of the character described, the combination with the evaporating pan, the water tank and the water pipe leading from the tank to the pan, of the open-  
5 topped cup secured to and connected with the water pipe, the transparent tube arranged parallel with the tank and having its lower end reduced and extended into the cup, a  
suitable connection between the top of the tube and the top of the tank, and a screw mechanism for adjusting the tube vertically, substantially as described.

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Witnesses:

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