

May 12, 1925.

1,537,065

A. E. BURDIN

HUMIDIFIER

Filed Oct. 23, 1922

2 Sheets-Sheet 1

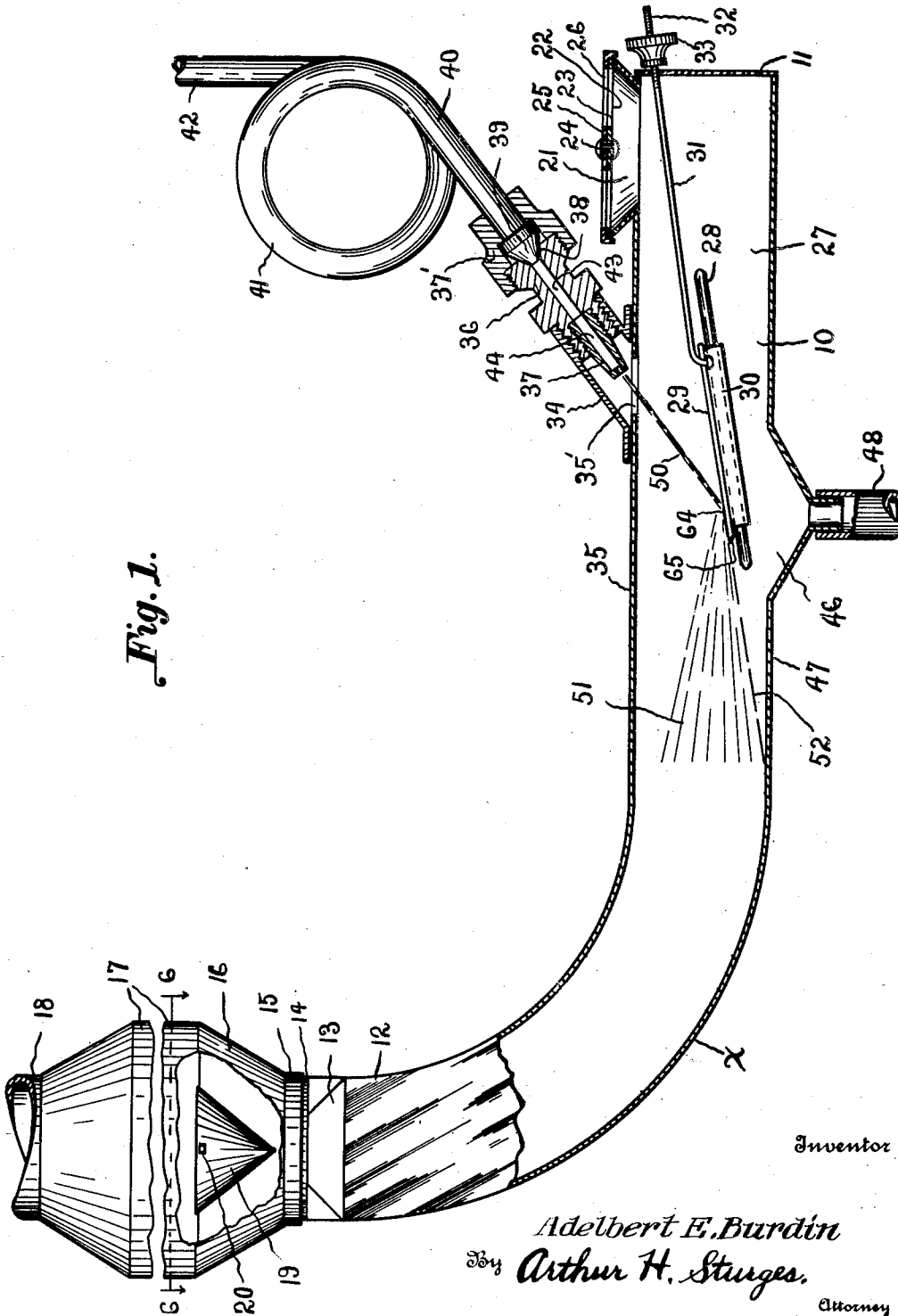


Fig. 1.

Inventor

Adelbert E. Burdin
by Arthur H. Sturges.

Attorney

May 12, 1925.

1,537,065

A. E. BURDIN

HUMIDIFIER

Filed Oct. 23, 1922

2 Sheets-Sheet 2

Fig. 2.

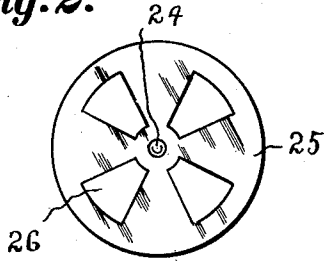


Fig. 3.

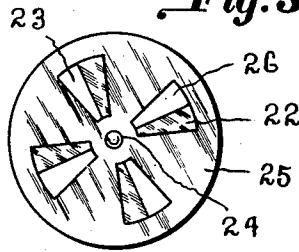


Fig. 4.

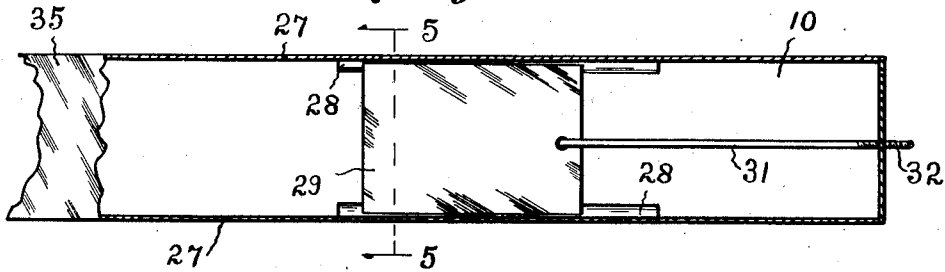


Fig. 5.

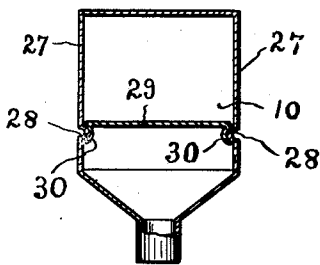


Fig. 6.

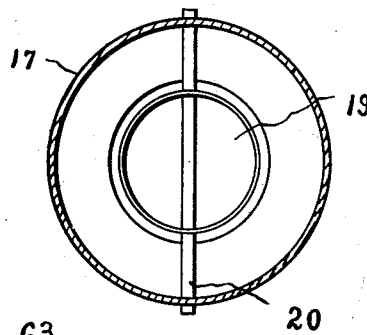


Fig. 7.

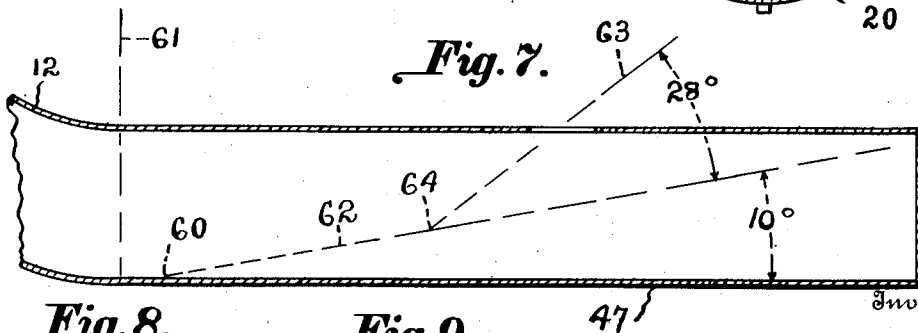


Fig. 8.

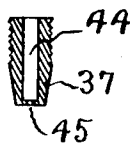


Fig. 9.



Adelbert E. Burdin
by Arthur H. Sturges.

Attorney

Patented May 12, 1925.

1,537,065

UNITED STATES PATENT OFFICE.

ADELBERT E. BURDIN, OF OMAHA, NEBRASKA, ASSIGNOR TO EVA D. BURDIN, OF OMAHA, NEBRASKA.

HUMIDIFIER.

Application filed October 23, 1922. Serial No. 596,336.

To all whom it may concern:

Be it known that I, ADELBERT E. BURDIN, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Humidifiers, of which the following is a specification.

The present invention relates to air humidifiers and has for an object the uniform moistening of the atmosphere indoors by the provision of a finely regulated device which utilizes the pressure of the water for creating a circulation of air which absorbs the water spray developed from the high pressure used.

Other objects of the invention are to provide means whereby an excess of water is automatically discharged from the device and wherein the device is continuous in operation, economical, sure and efficient in operation and simple and compact in construction having no moving parts and eliminating such devices as fans, motor blowers and the like which have been heretofore used to create forced drafts and which have been found to be costly, noisy and attended with a great deal of annoyance.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a fragmentary longitudinal section of an apparatus constructed according to the present invention.

Figure 2 is a plan view of an adjustable air inlet valve in open position.

Figure 3 shows the same partially closed, Figure 4 is a horizontal section taken through a portion of the mixing chamber.

Figure 5 is a cross section taken on the line 5-5 in Figure 4,

Figure 6 is a horizontal section taken on the line 6-6 in Figure 1.

Figure 7 is a diagrammatic illustration of the mixing operation,

Figure 8 is a sectional view through the nozzle, and

Figure 9 is a side view of the same.

Referring more particularly to the drawings, 10 indicates a mixing chamber, preferably rectangular in cross section as shown

in Figure 5. The chamber is formed of pressed sheet metal and has a closed end 11 which may be soldered thereto. It has an upturned or curved opposite end 12 which is a continuation of the chamber and which is also preferably rectangular in cross section. This portion 12 may be turned or shaped to substantially a right angle to the mixing or body portion.

The end 12 is reduced as at 13 and terminates in a circular throat 14 adapted to be received in the collar 15 of a spray arrester drum 16. The drum is preferably of greater area and diameter than the mixing chamber and its side walls 17 may be of any desired length or height. The drum is attached to a discharge pipe 18 which may be in the form of a multi-branched manifold for distributing the humidified air throughout the several rooms of a dwelling house or the several compartments of a cigar or show case. Within the drum is a deflecting member 19 preferably of an inverted conical shape having its apex adjacent the throat or collar 15. The deflector is held rigid by means of a pin 20 which is attached to the cone 19 after securing its ends to the walls 17 of the drum as best shown in Figure 6. The pin 20 is inserted through apertures formed through the side walls 17. The pin 20 is rectangular in cross section and therefore prevents swaying of the cone which after placement is held in a rigid position.

Adjacent the end 11 of the chamber is an air intake port 21 having a cover 22 soldered to its top edge. This cover is provided with apertures 23 for admitting air therethrough. A pivot pin 24 is placed in the center of the cover and has the function of securing a cap 25 (Figure 2) to the cover 22. The cap has similar apertures 26 adapted to register with the apertures of the cover and by turning or rotating the cap a desired quantity of air may be admitted to the mixing chamber 10.

The side walls 27 of the mixing chamber 10 are pressed inwardly forming the convex guides 28 which are best shown in Figure 5. These guides are at a predetermined angle with respect to the bottom of the mixing chamber as later explained. A deflecting plate 29 is adapted to have sliding movement in the guides 28 being supported thereby by means of the downturned flanges 110

30 of the deflecting plate 29. A shaft 31 is secured to the rear end of the plate 29 and its threaded end 32 projects through an aperture formed in the end wall 11. This threaded end is adapted to receive a rotatable nut 33 which may be used for adjusting the longitudinal position of the plate 29, its transverse position being secured by the guides 28 which prevent transverse movement.

A pipe 34 is soldered to the top 35 of the mixing chamber 10 thereby effecting a closure of the aperture 35'. The pipe 34 is interiorly threaded and adapted to receive a removable plug 36. A nozzle 37 is secured by threads within the plug 36 and is adapted to be removed and interchanged with other nozzles for purposes later described. The plug 36 is adapted to be threadedly received within a union nut 37' and has a seat 38 for the V-shaped end 39 of a soft copper pipe 40. Preferably the copper pipe is coiled as at 41 in order to secure the end 39 in alignment with the seat 38 before the union nut 37 is rotated for attaching these parts. The end 42 of the pipe is attached to a water supply pipe (not shown) by means of conventional fixtures.

The pipe is adapted to deliver water under pressure into the duct 43 of the nut 36, and also the duct 44 of the nozzle 37. The nozzles, as best shown in Figs. 8 and 9 are provided with an outlet port 45 of comparatively small area. The ports 45 are of various area and the nozzles are interchangeable in accordance with the varying amount of water pressure found in different localities.

A sump 46 is formed in the bottom 47 of the mixing chamber 10 adapted to deliver excess water to a drain pipe or hose 48. The hose may conduct excess water to a bucket or other vessel located below the mixing chamber. The end of the hose 48 should be placed in the vessel below the water level contained in the vessel in order that water will drain into the vessel but impure air will not be allowed to enter the mixing chamber through the hose 48. If desired a check valve may be placed in the pipe or hose 48 for the above purpose.

In operation the water under pressure is forced from the nozzle 37 and impinges against the deflecting plate 29 as shown by the jet of water 50. The impingement of the water breaks the same into a spray as shown at 51. The outer line 52 of the spray, after striking the bottom 47 of the chamber, may carom and become further broken up. It has been found by actual experiment that the most efficient results are obtained as follows:

Referring to Figure 7, the angle of the deflecting plate 29 (represented by the dotted line 62) is substantially 10° with respect

to the bottom 47 when, in operation the device is installed with the bottom 47 in a horizontal position. The axis of this 10° angle is a point at 60 which is slightly rearward of the line 61. The line 61 is the starting of the curved portion 12. The jet of water is represented by the dotted line 63 which is substantially 28° with respect to the line 62. The point 64 is the axis of rotation of the line 63 and this point is where the jet of water strikes the deflecting plate 29. It is important that in forming the device that these angles be carried out for the best results. Also that the water strikes the plate 29 at a point adjacent the edge 65 of the plate. If the water strikes, too far rearwardly of this edge a spray will not be produced to an adequate degree.

Sometimes the outlet duct 45 of the nozzle will direct the water jet too far rearwardly, of the edge 65 or the nozzle will seat inaccurately in the plug causing the same effect. To overcome this the nut 33 is rotated causing the plate 29 to slide until the proper adjustment is secured. Also, the nozzles may be interchanged for others having larger or smaller ports 45 in accordance with the city water pressure of 50 to 100 degrees as found in various localities. It is important to produce a spray similar to that shown at 51 for the purpose not only of breaking the water up into atoms but also to form a plug of water which is being constantly pushed forward toward the curved portion. This plug moving forward causes the air to be sucked in through the ports 26 continuously and ejected through the pipe 18. While passing through the mixing chamber the air will become saturated with water producing the humidity desired. On account of the upturned end 12 of the body portion the air is saturated with water to an appreciable extent before entering the drum. However without the use of this drum it has been found that where the pipe 18 is short in length a fog will exude from the pipe.

The function of the cone 19 is deflect the air currents against the side walls 16 and 17 with the result that more water will be taken out of the air than if the arrester were not used. The water falling back strikes the bottom 47 along the curved portion at x and reaches the sump 46. It is obvious that if the body portion were straight and long enough the curved portion 12 and the arrester could be dispensed with for the air would become saturated with water while traveling through a long pipe. However it is an object of the invention to provide a compact construction in order that the device may be installed in small spaces such as a cigar case. It is found in actual practice that the point 64 is best located slightly below the medial horizontal

line of the mixing chamber. The apparent reason why this is preferable is that the air will move freely along the top 35 since it is unobstructed by the returning water along
5 the bottom 47.

I do not wish to be restricted to the size, form, and proportions of the various parts, and obviously changes could be made in the construction herein described without de-
10 parting from the spirit of the invention, it being only necessary that such changes fall within the scope of the appended claims:

What is claimed is:

15 1. A humidifier comprising a mixing chamber having an air inlet and an air outlet and also having a water drain, a nozzle in communication with a source of water supply, said nozzle projecting angularly into said chamber, means to regulate the

amount of air entering said inlet, and an angularly disposed adjustable target plate in said chamber in the path of the water jet issuing from said nozzle.

2. A humidifier comprising a chamber having horizontal upper and lower walls, a
25 plate lying at an angle to the bottom wall in the chamber, a nozzle for directing a stream against an end portion of said plate, said stream being an angle to the plane of the plate, and a curved pipe connecting with
30 said chamber beyond the axis of the plate.

In testimony whereof, I have affixed my signature in presence of two witnesses.

ADELBERT E. BURDIN.

Witnesses:

ARTHUR H. STURGES,
HIRAM A. STURGES.