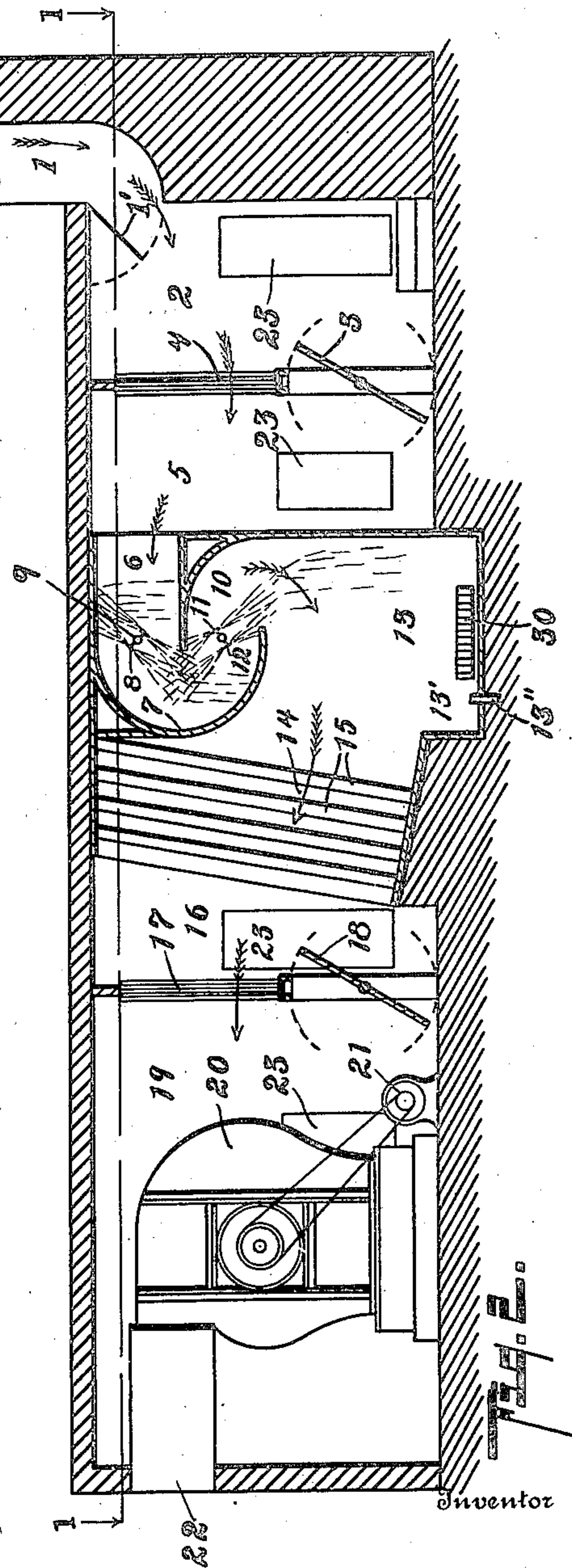
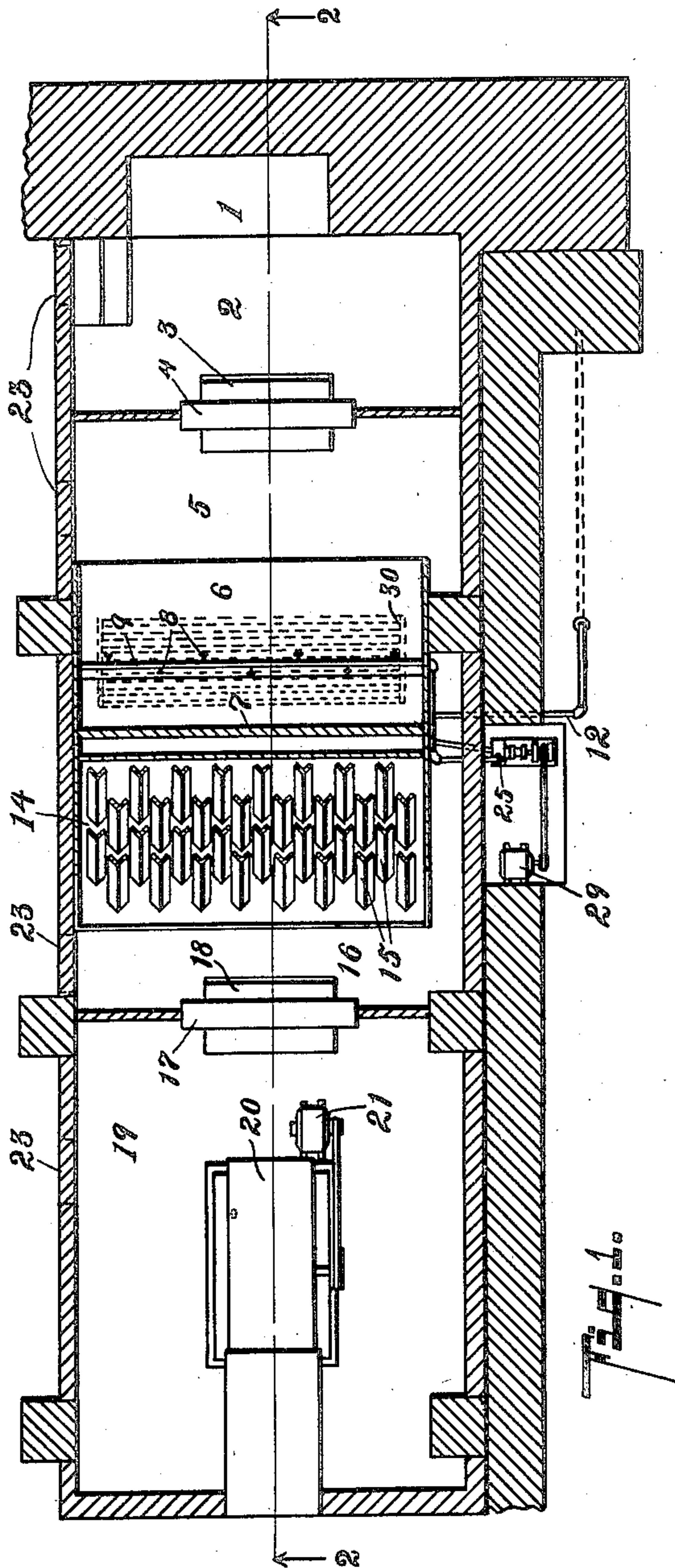


W. E. TAYLOR.  
 APPARATUS FOR TEMPERING AND PURIFYING AIR.  
 APPLICATION FILED MAR. 5, 1908.

917,185.

Patented Apr. 6, 1909.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR TEMPERING AND PURIFYING AIR.

No. 917,185.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed March 5, 1903. Serial No. 419,385.

*To all whom it may concern:*

Be it known that I, WILLIAM E. TAYLOR, a citizen of the United States, residing at the city of Toledo, county of Lucas, State of Ohio, have invented certain new and useful Improvements in Apparatus for Tempering and Purifying Air, of which the following is a specification.

This invention relates to improvements in apparatus for washing, purifying and tempering air to the proper degree of heat and humidity.

The objects of this invention are: first, to provide an improved apparatus for removing all dust and soluble impurities from the air and regulating its humidity and temperature. Second, in an apparatus of the class described, to provide an improved means of removing dust and soot; and third, to provide improved means of regulating the temperature and humidity of a current of air.

Further objects will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure 1 is a sectional plan view of my improved apparatus taken on a line corresponding to line 1—1 of Fig. 2; and Fig. 2 is a vertical sectional elevation taken on a line corresponding to line 2—2 of Fig. 1.

In the drawing similar numerals of reference refer to similar parts throughout the several views.

Considering the numbered parts of the drawing, I would state that my improved apparatus is intended for purifying, tempering and regulating the humidity of air that may be delivered to an office building, factory, auditorium, dwelling or the like.

It consists of a series of compartments or rooms through which the air is delivered.

An intake 1 takes the air from the outside and is controlled by the damper or door 1', the air entering a room 2 from which it delivers to a compartment or room 5. A tempering coil 4 is provided in an opening in the wall between these two rooms, and a damper 3 controls an aperture beneath the tempering

coil, so that, by controlling the damper 3, which may be automatically controlled by a suitable thermostat, if desired, the temperature of the air is very readily regulated independent of the temperature of the coil 4 through which a portion or all of the air may be forced to pass, depending on the position of the damper 3. The air thus tempered to any predetermined temperature is received in compartment 5, and in the winter time it is very necessary that this temperature be well above the freezing point in order to secure proper results. In the summer time a tempering coil is unnecessary to protect from outside influences of the air. The air thus tempered in the chamber 5 is passed through the flue 6 where it is directed against the regularly recurved wall 7, and its direction entirely reversed when it delivers backwardly against the recurved wall 10.

A water pipe 9 is provided with spray heads arranged to deliver a double curtain of water across the current of advancing air, and a similar water pipe 12 with spray head 11 is provided in the passage, where it is reversed, so that any air passing from the chamber 5 will be substantially reverted on itself twice. The complete curtain of water effectively dampens and carries down any ordinary particles of dust, but the peculiar lamp-black soot from soft coal, and other light, feathery impurities are not all thus effectively collected. The spray completely moistens the recurved surfaces, and the air in passing through these curved surfaces gradually reverts, so that substantially the entire column of air, where it is passed through one curved surface and then reversed to another curved surface, comes in contact with the thoroughly moistened surface, and as the air is passing rapidly along these surfaces, the light, feathery soot and other similar light dust is brought into contact with the wet surface, and the flow of water down over the same washes it down the surface of the wall of the compartment 13 into the tank 13' below, and, of course, when the same is once wet down and gathered in this way, it cannot again rise as dust and is effectively removed from the air. Any heavy dust, as from coal or heavy street dust, will be thrown into contact with the recurved surfaces by centrifugal force on account of its specific gravity. A drainage pipe 13'' is provided for the tank 13' at the bottom of this compartment, and



supply means is provided for maintaining the water at the proper level in this tank, as a suitable float or other means. The water from the tank is used over and over again, and passes through the spray heads, as I will hereinafter indicate, the spray heads being provided with means for throwing them open to flush out and wash away any sediment that might tend to clog the same. A tempering coil 30 is placed in this tank 13' to warm the water in winter or to cool it in summer, some refrigerating fluid being circulated through the same in the summer time. The spray head feature is not detailed here, as this invention does not pertain to its structure in detail. The air in passing from chamber 13 passes through baffle chamber 14, which is provided with the angular shaped upright baffle plates 15, the same being staggered in their relation to each other with the angles pointing in the direction of the flow of the air, so that the open rear sides collect the free moisture in the air and deliver it downwardly onto the ledge and back into the tank 13'. The air, without free moisture, thus enters the chamber 16 from which it is free to circulate and pass to the chamber 19, heating coils 17 being provided in the intervening wall with a damper 18 beneath, whereby the flow of air can be regulated and its temperature controlled. The air thus enters the chamber 19 where it is taken up by the fan or blower 20 and delivered through the passage 22 to the building or compartment to be supplied. The fan 20 is driven by a motor 21.

It will be seen that ample means are provided for controlling the flow of air and regulating its temperature, and by the regulation of the temperature and the flow, the exact degree of humidity of the treated and purified air can be regulated, as well as its temperature. All dust and soluble materials will then have been removed from the air in passing through my improved apparatus.

I desire to remark that the details of this apparatus and structure can be greatly varied without departing from my invention. I have provided an electric motor 29 for actuating a pump 25 for circulating the water from the tank through the spray heads, but it is clear that any kind of a motor can be used for that purpose, and that any pressure can be supplied for the spray heads; and also that the water can be drained away and used but once where for any reason the air is especially impure, or water is very abundant or inexpensive.

The damper or tempering coil which I have shown between the compartments I find to be best for the purpose, but other means might effectively be used for tempering the air, though it might not, of course, be so readily controlled as by the means which I have illustrated, because here the degree of the temperature can be controlled through a

wide degree by merely controlling the damper, which will compel more or less of the air to circulate over the tempering coil.

The tempering coils provided are for controlling the temperature of the air, and the temperature may be raised by a circulation of steam or hot water in these coils when the air is colder than desired, and when the air is warmer than is desired its temperature can be lowered by the circulation of suitable refrigerating mixtures or by cold water or brine, as the case may be. I desire to remark, however, that the humidity and temperature of the air for use in a dwelling room is best controlled by saturating the air with moisture at a lower temperature than is desired and then expanding the air somewhat by heat in the tempering coil 17, which has the effect of eliminating dampness and insuring the exactly correct degree of humidity.

The reverted passage-way for the air with the curved sides can be arranged in different positions so long as the air is compelled to pass in a current against the curved, wet surfaces and be reverted through substantially 180°, whereby its velocity will be checked except as it is passing rapidly in contact with the wet surfaces, which gathers up the light dust and impurities.

I have provided the fan or blower for drawing the air through the apparatus. Of course, air might be forced through the apparatus under pressure, but this would be found objectionable on account of the action not being so regular and effective as where the air is drawn through.

The term curtain of water, as here used, is intended to embrace a spray which extends substantially across the passage to thoroughly moisten the air and prevent any of the air passing without contacting with the water.

Having thus described my improved apparatus, what I claim as new and desire to secure by Letters Patent is,—

1. In an air purifying and tempering apparatus, the combination of a suitable chamber having a regulated inlet 1, a receiving compartment 2, a tempering coil 4 for controlling the temperature of said air, and a damper 3, in the wall thereof; a compartment 5 for receiving the tempered air; a reverted passage 6 with a regularly curved wall 7 and a further curved reverting wall 10; spray heads 8 and water pipe 9 for forming a curtain of water in said passage and wetting the curved surface thereof, and a water pipe 11 with spray heads 12 for forming a curtain of water in the lower part of said passage, to further wet the said curved surface and the recurved wall 10; a compartment 13 for receiving the damp and clarified air, with a tank 13' at the bottom with means for maintaining the



water level therein; a baffle chamber 14 beyond the said chamber 13, containing substantially upright angled baffle plates 15 arranged in staggered relation with their angles pointing in the direction of the air flow, for engaging and receiving the moisture in the grooves of said angles; a chamber 16 beyond the baffle chamber for receiving the air after free moisture had been collected; 10 tempering coil 17 with damper 18 in the wall thereof for controlling the temperature of the said air and expanding the same for securing the proper humidity and temperature; a chamber 19 adjacent to the said 15 chamber 16; and a fan or blower 20 with suitable motor 21 for driving the same, for delivering the said tempered and purified air through the passage 22; coacting substantially as described and for the purpose specified.

2. In an air purifying and tempering apparatus, a suitable chamber divided into compartments for receiving the air, means for controlling the temperature of said air, 25 a passage-way for conveying said air, having regularly recurved walls for reversing its direction; a recurved surface beyond said passage to further deflect said air current; spray heads within the said passage, 30 forming curtains of water therein and wetting the said recurved walls for collecting all impurities therefrom; a baffle chamber beyond the said passage, containing suitably arranged angular collecting plates staggered 35 in relation to each other arranged with their open sides toward the current to collect all free moisture; means for heating and expanding the air in a suitable space beyond the said baffle plates, whereby its 40 temperature and humidity are controlled; and means for delivering the said tempered air for use, as specified.

3. In an air purifying and tempering apparatus, a suitable chamber; a passage-way for 45 conveying the air, having regularly recurved walls for reversing its direction; a recurved surface beyond said passage to further deflect said air current; spray heads within the said passage, forming curtains of water there- 50 in and wetting the said recurved walls for collecting all impurities therefrom; a baffle chamber beyond said passage, containing suitably arranged angular collecting plates staggered in relation to each other with their 55 open sides toward the current to collect all free moisture; means for heating and expanding the air in a suitable space beyond the said baffle plates, whereby its temperature and humidity are controlled; and means 60 for delivering the said tempered air for use, as specified.

4. In an air purifying and tempering apparatus, a suitable chamber; a passage-way for 65 conveying the air, having regularly recurved walls for reversing its direction; spray heads

within the said passage, forming curtains of water therein and wetting the said recurved walls for collecting all impurities therefrom; a baffle chamber beyond said passage, containing suitably arranged angular collecting 70 plates staggered in relation to each other with their open sides toward the current to collect all free moisture; means for heating and expanding the air in a suitable space beyond the said baffle plates, whereby its tem- 75 perature and humidity are controlled; and means for delivering the said tempered air for use, as specified.

5. In an air purifying and tempering apparatus, a suitable chamber divided into com- 80 partments for receiving the air; means for controlling the temperature of said air; a passage-way for conveying said air, having regularly recurved walls for reversing its direction; a recurved surface beyond said pas- 85 sage to further deflect said air current; spray heads within the said passage, forming curtains of water therein and wetting the said recurved walls for collecting all impurities therefrom; means for heating and expanding 90 the air, whereby its temperature and humidity are controlled, and means for delivering the said tempered air for use, as specified.

6. In an air purifying and tempering apparatus, a suitable chamber; a passage-way for 95 conveying the air, having regularly recurved walls for reversing its direction; a recurved surface beyond said passage to further deflect said air current; spray heads within the said passage, forming curtains of water therein 100 and wetting the said recurved walls for collecting all impurities therefrom; means for heating and expanding the air, whereby its temperature and humidity are controlled; and means for delivering the said tempered 105 air for use, as specified.

7. In an air purifying and tempering apparatus, a suitable chamber; a passage-way for 110 conveying the air, having regularly recurved walls for reversing its direction; spray heads for said passage, forming curtains of water therein and wetting the said recurved walls for collecting all impurities therefrom; means for heating and expanding the air, 115 whereby its temperature and humidity are controlled; and means for delivering the said tempered air for use, as specified.

8. In an air purifying and tempering apparatus, a suitable chamber divided into 120 compartments for receiving the air; means for controlling the temperature of said air; a passage-way for conveying said air, having regularly recurved walls for reversing its direction; a recurved surface beyond said pas- 125 sage to further deflect said air current; spray heads within the said passage, forming curtains of water therein and wetting the said recurved walls for collecting all impurities therefrom; a baffle chamber beyond said pas- 130 sage, containing suitably arranged angular



collecting plates staggered in relation to each other arranged with their open sides toward the current to collect all free moisture; and means for delivering the said tempered air for use, as specified.

9. In an air purifying and tempering apparatus, a suitable chamber; a passage-way for conveying the air, having regularly recurved walls for reversing its direction; a recurved surface beyond said passage to further deflect said air current; spray heads within the said passage, forming curtains of water therein and wetting the said recurved walls for collecting all impurities therefrom; a baffle chamber beyond said passage, containing suitably arranged angular collecting plates staggered in relation to each other with their open sides toward the current to collect all free moisture; and means for delivering the said tempered air for use, as specified.

10. In an air purifying and tempering apparatus, a suitable chamber; a passage-way for conveying the air, having regularly recurved walls for reversing its direction; spray heads within the said passage, forming curtains of water therein and wetting the said recurved walls for collecting all impurities therefrom; a baffle chamber beyond said passage, containing suitably arranged angular collecting plates staggered in relation to each other with their open sides toward the current to collect all free moisture; and means for delivering the said tempered air for use, as specified.

11. In an air purifying and tempering apparatus, a suitable chamber divided into compartments for receiving the air; means for controlling the temperature of said air; a passage-way for conveying said air, having regularly recurved walls for reversing its direction; a recurved surface beyond said passage to further deflect said air current; spray heads within the said passage, forming cur-

tains of water therein and wetting the said recurved walls for collecting all impurities therefrom; and means for delivering the said tempered air for use, as specified.

12. In an air purifying and tempering apparatus, a suitable chamber; a passage-way for conveying the air, having regularly curved walls for reversing its direction; a recurved surface beyond said passage to further deflect said air current; spray heads within the said passage, forming curtains of water therein and wetting the said recurved walls for collecting all impurities therefrom; and means for delivering the said tempered air for use, as specified.

13. In an air purifying and tempering apparatus, a suitable chamber; a passage-way for conveying the air, having regularly recurved walls for reversing its direction; spray heads for said passage, forming curtains of water therein and wetting the said recurved walls for collecting all impurities therefrom; and means for delivering the said tempered air for use, as specified.

14. In an air purifying and tempering apparatus, the combination of a recurved passage-way with a deflecting, curved wall at its discharge end, of spray heads within the said passage-way for forming a curtain of water therein and dampening the walls for the collection of impurities, as specified.

15. In an air purifying and tempering apparatus, the combination with a recurved passage-way of spray heads within the said passage-way for forming a curtain of water therein and dampening the walls for the collection of impurities, as specified.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

WILLIAM E. TAYLOR. [L. s.]

Witnesses:

WALTER N. CHASE,  
JAMES F. TRACY.