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PATENTED MAY 29, 1906.

S. W. CRAMER.
HUMIDIFYING AND VENTILATING APPARATUS.

APPLICATION FILED JUNE 1, 1905.

2 SHEETS—SHEET 1.

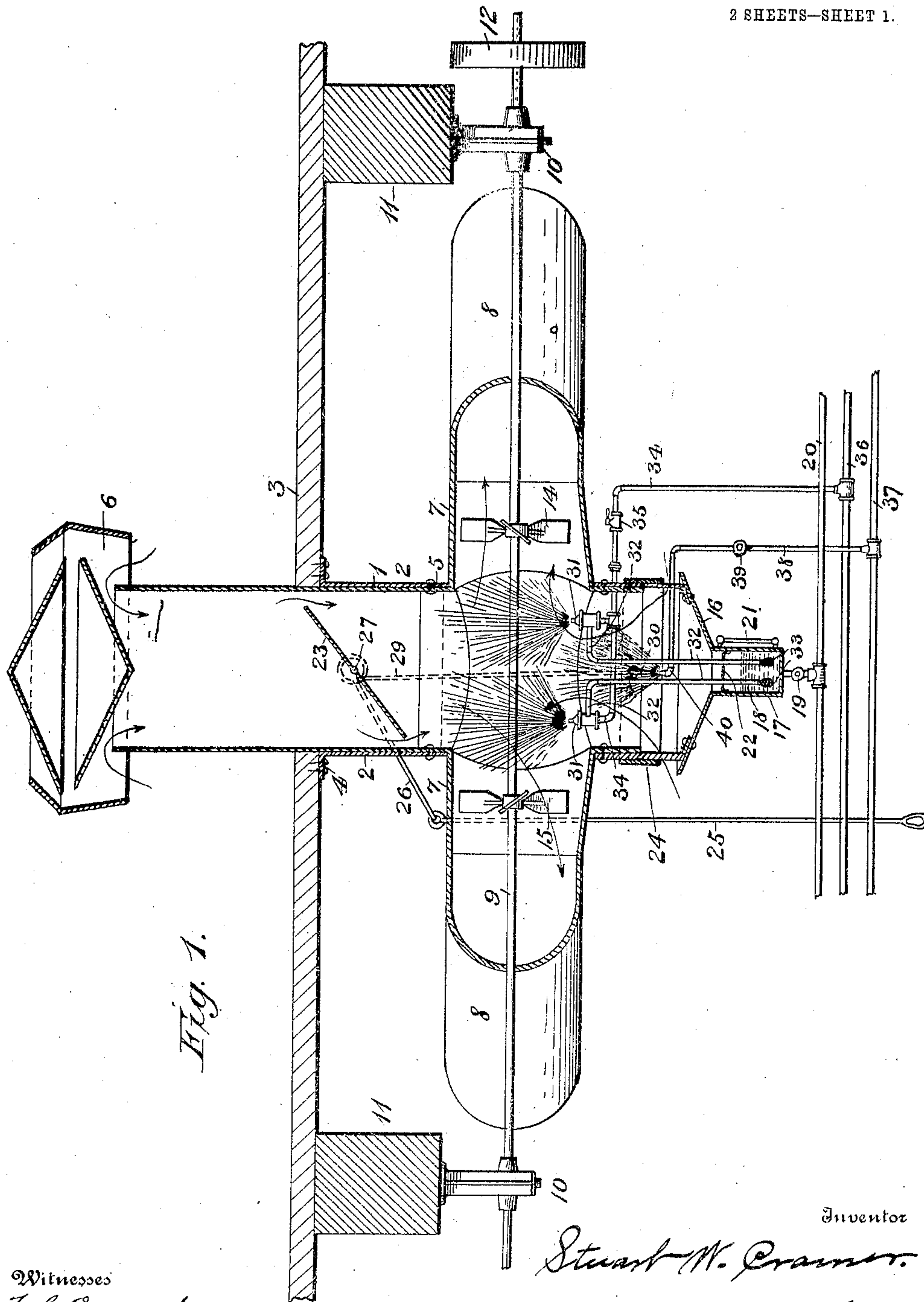


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

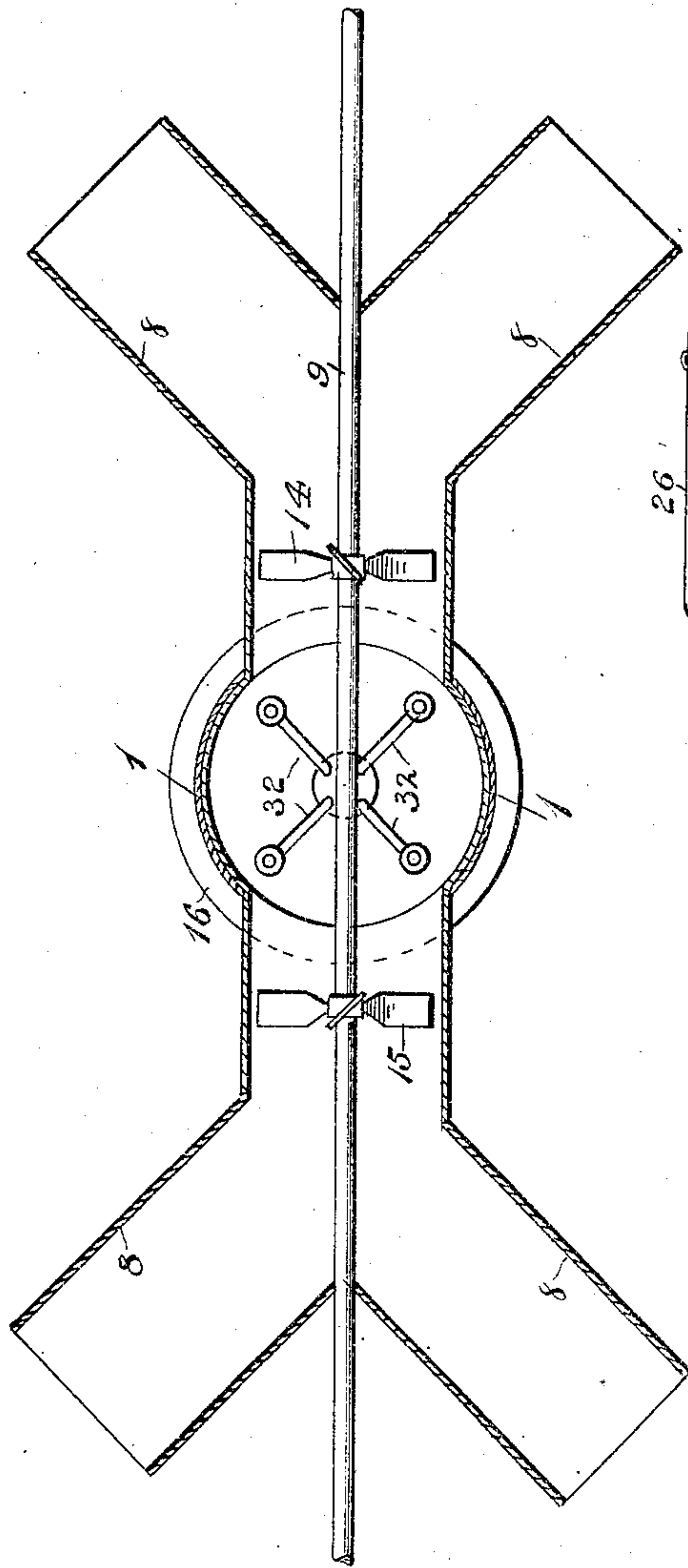


Fig. 3.

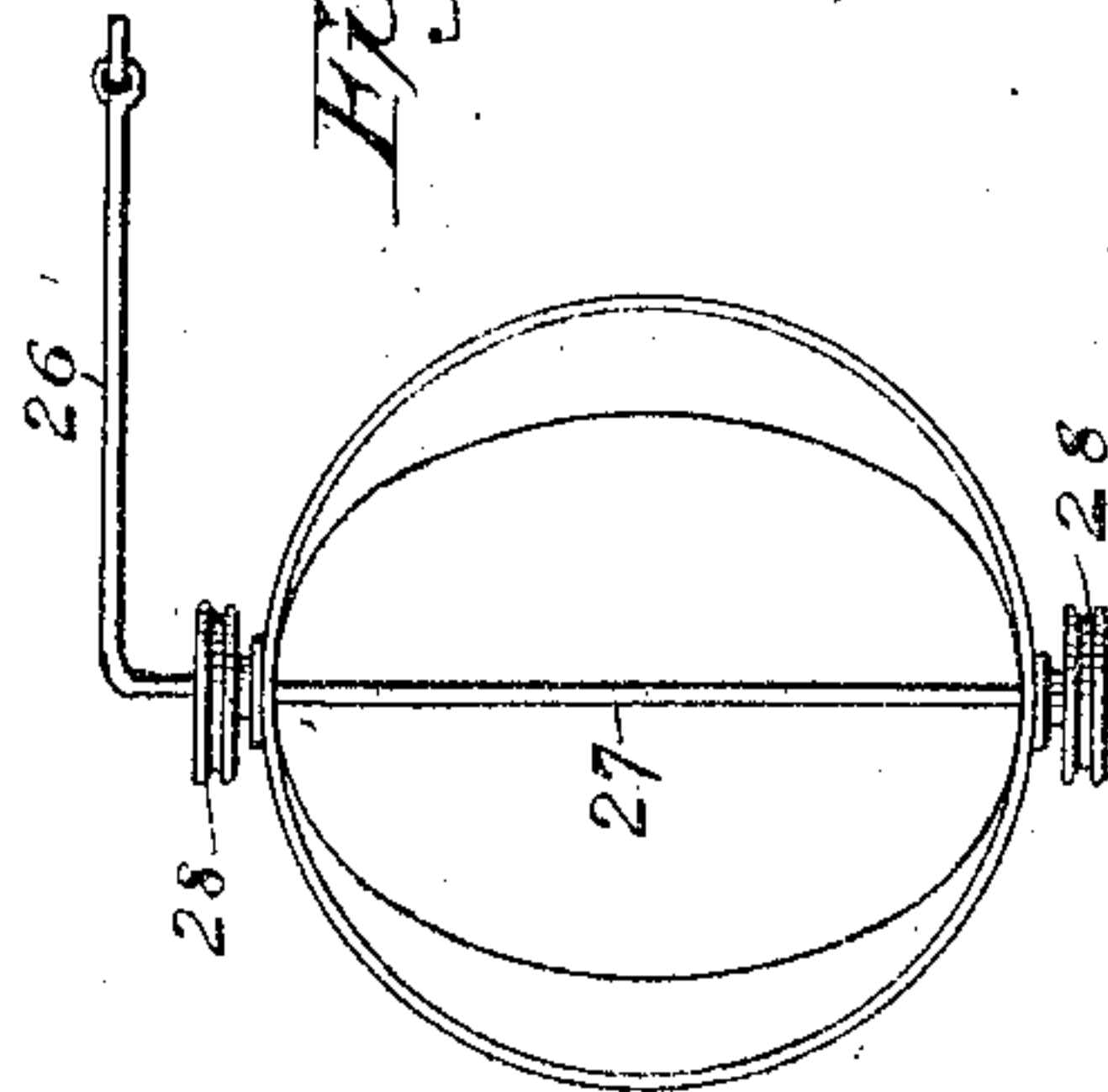
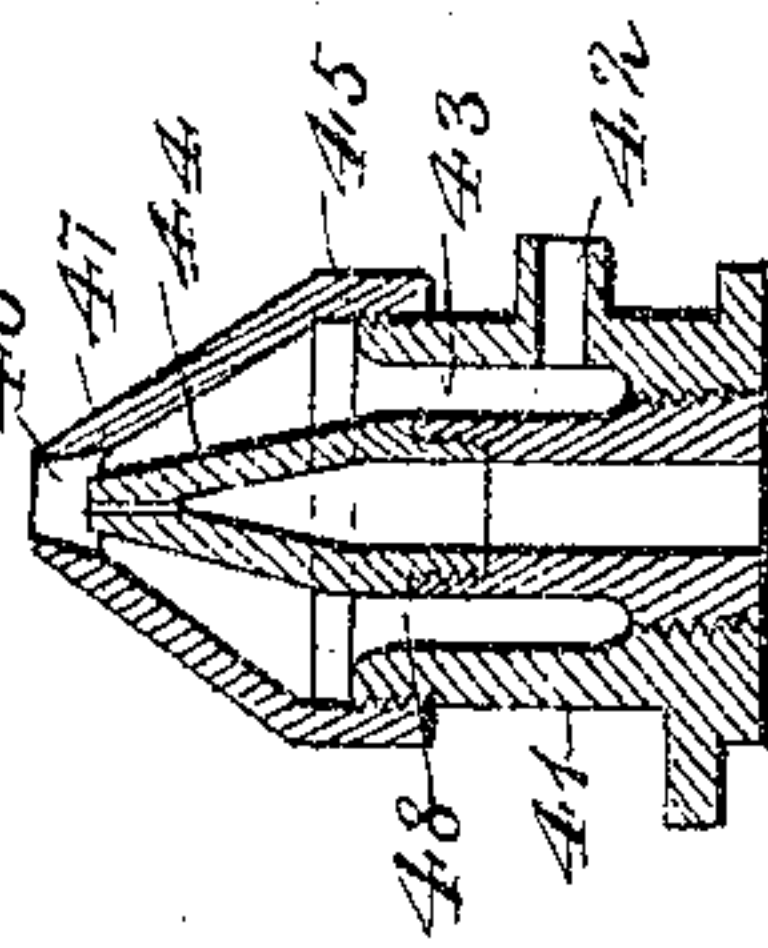


Fig. 4.



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HUMIDIFYING AND VENTILATING APPARATUS.

No. 821,989.

Specification of Letters Patent.

Patented May 29, 1906.

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To all whom it may concern:

Be it known that I, STUART W. CRAMER, a citizen of the United States, residing at Charlotte, in the county of Mecklenburg and State of North Carolina, have invented certain new and useful Improvements in Humidifying and Ventilating Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to means for treating the air in a room or factory, and has for its object to provide an apparatus which shall keep the air in said room constantly in circulation and supplied with any preferred amount of moisture; also, that it shall add fresh air from the outside, which, too, is to be supplied with moisture, and at the same time incidentally therewith to cleanse, cool, and warm the air, as may be desired.

The invention consists in certain improvements in construction, which will be disclosed in the following specification and claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a vertical longitudinal section with some of the parts shown in side elevation; Fig. 2, a horizontal longitudinal section of the same; Fig. 3, a detail, on an enlarged scale, of the damper in the upper vertical member of the casing; and Fig. 4, a vertical section of one of the spray-heads, on an enlarged scale.

Reference being had to the drawings and the designating characters thereon, the numeral 1 indicates the casing of the humidifier, which is supported by a frame 2, which is secured to the ceiling of the roof 3 by the screws 4. The casing is divided into an upper and lower part riveted together at 5. The upper part extends through the roof 3 and terminates in a ventilator of the usual type 6. Intersecting the casing 1 at practically right angles is a cylindrical casing 7, with branched outlets 8 on each end. Extending axially through the horizontal casing 7 is a shaft 9, independently supported on hangers 10, attached to overhead timbers 11 in the usual manner. This shaft is revolved by a pulley 12, driven by a belt. (Not shown.) On the shaft are two fans, one a right-hand fan 14 and the other a left-hand fan 15.

At the bottom of the framework 2, supporting the casing 1, is a conical-shaped funnel-like bottom 16, terminating in a recepta-

cle 17, in which water is maintained at a constant level 18 through the medium of a valve and connections 19 and a supply-pipe 20 to a tank (not shown) which is automatically kept filled by a float-feed of the usual type. The water-level in the receptacle is shown by a gage-glass 21. Over the water in the receptacle is a gauze strainer 22 to keep any lint that may get in the apparatus from clogging up the water in the receptacle 17.

23 is a damper in the upper vertical member of the casing 1, which regulates the amount of inflow of air from the outside.

24 is a sleeve on the lower vertical member of the casing, which is raised and lowered and which regulates the amount of air admitted to the casing from the room. The intention is that when the damper 23 is wide open, admitting all the required air from the outside through the ventilator 6, the sleeve 24 at the bottom is closed, preventing any air from entering the casing from the room, and when the sleeve is raised to its full extent it admits all the air required for the apparatus from the room, the damper shuts off the inflow of air from the outside through the ventilator 6, and in intermediate positions the damper and the sleeve are correspondingly opened or closed, so that more or less air is let in at the top or the bottom of the casing, as may be required.

25 is a handle attached to an arm 26, which opens and closes the damper 23.

27 is a shaft or axle on which the damper is supported. On each end of this shaft 27 are small drums 28, on which a cord or chain 29 winds and unwinds as the arm 26 is moved up and down by the handle 25, the winding and unwinding of the cord 29 raising and lowering, as the case may be, the sleeve 24, to which it is attached on each side at 30.

31 represents spray-heads, which take water from the receptacle 17 by sucking up through the supply-pipe 32, terminating in a gauze bag-strainer 33. The water is sucked up through the spray-head and converted into spray by air, steam, or other elastic fluid under pressure through the branch pipes 34 and the valve 35 and the air-service main 36, to which it is supplied and maintained at a constant and uniform pressure by an air-compressor of any of the usual well-known types provided with an automatic pressure-regulator.

The spray-head 31 (shown in detail in Fig. 4) is briefly described as follows: The spray-

head comprises a body 41, having a water-supply branch 42, to which the water-pipe 32 is connected, a member 43, provided with a detachable nozzle 44, on the outer end thereof, and is connected at its inner end with a fluid-supply pipe 34.

45 indicates an adjustable and detachable cap secured to the body 41 and is provided with a combining-nozzle or discharge-orifice 46, concentric to the end of the nozzle 44 and the wall of the orifice 46, through which the water passes from the chamber 48 within the body 41, and is met by the fluid under pressure issuing from the nozzle 44, commingling in the outer end of the orifice 46 and delivering or discharging in the form of a minutely-divided spray or aqueous vapor. The quantity of water discharged by the spray-head is regulated by the adjustment of the cap 45, and the supply of fluid, air under pressure, or steam is regulated by the valve 35, which fluid serves to raise the water, as already explained, from the reservoir 17 below through the pipe 32 on the principle of the operation of an ejector.

The spray-heads are adjusted by hand, and to afford access thereto the casing is provided with a door. (Not shown.)

37 is a steam-pipe having a branch 38 provided with a valve 39 and terminating in a contracted nozzle 40 within the casing.

The operation of the apparatus may be briefly explained as follows: A current of air is constantly delivered through the branch outlets 8, on each end of the horizontal cylindrical casing 7, by the right and left hand fans 14 and 15, revolved by the pulley 12 on the shaft 9. The amount of air flowing through the casing is intended to be practically uniform. The proportion of air from the outside is regulated by the position of the damper 23, which admits air supplementary to that admitted through the opening between the conical bottom 16 and the sliding sleeve 24. So far it is evident that the function of the apparatus is largely that of ventilating. On chilly days when it is not desired to run the heating apparatus a small or moderate amount of steam can be turned in through the steam-jet 40 to temper the incoming air from the outside through the ventilator 6.

While the function of the apparatus is largely one of ventilating, it is primarily that of air-moistening and air washing or cleaning. This result is accomplished by the spray from the spray-heads 31, which constantly maintain a dense cloud of spray within the casing 1, through which the air must pass, whether drawn from the outside through the ventilator 6, or from the room itself through the opening between the sleeve 24 and the bottom 16.

It is obvious that the spray-heads can be set so that the amount of spray can be regu-

lated, so that the air delivered by the fans 14 and 15 through the branched outlets 8 can either be air simply saturated or it can be surcharged by a fine vapor which will quickly evaporate and be taken up by the air through the room into which it is forcibly projected. It is also evident that ventilation through this apparatus can be continuously and constantly carried on, even through the process of air-moistening may be intermittently carried on at the same time for the purpose of regulation. This is accomplished by the simple device for cutting off the air-supply to the spray-heads, either automatically or by hand, the shaft 9, with its fans 14 and 15, revolving continuously and uninterruptedly. I distinctly propose finely dividing the water into a state of more or less elastic vapor in the spray-heads, so that it will be more readily absorbed, such construction providing for an apparatus of the maximum capacity, as well as a maximum cleaning effect. Furthermore, in my improved apparatus above described I provide means for regulating the amount of outside air that is mixed in the apparatus, it not being a matter of hit or miss, but of actual adjustment.

By my invention ventilation is maintained continuously and uninterruptedly, whereas air-moistening is provided intermittently as the circumstances may require.

Having thus fully described my invention, what I claim is—

1. An air-tempering device having a casing provided with a vertical inlet and horizontal discharge members, a shaft extending through the horizontal members, a fan on said shaft, and a spray-head for supplying fluid to said casing.

2. An air-tempering device having a casing provided with a vertical inlet and horizontal discharge members, a shaft extending through the horizontal members, a fan on said shaft, and a plurality of spray-heads for supplying fluid to said casing.

3. An air-tempering device having a casing provided with a vertical inlet and horizontal discharge members, a shaft extending through the horizontal members, a fan on said shaft, a spray-head, means for supplying fluid to said spray-head, an air-inlet at the top, and an air-inlet at the bottom of the casing, means for controlling the supply of air admitted through said inlets, and a bifurcated discharge at the outer end of the horizontal members of the casing.

4. An air-tempering device having a casing provided with a vertical inlet and horizontal discharge members, a shaft extending through and supported beyond the horizontal members, opposite fans on said shaft, a spray-head, means for supplying fluid to said spray-head, air-inlets at the top and at the bottom of the casing, means for controlling the supply of air to the casing, an extension

to the casing, a ventilator on said extension, and a bifurcated discharge at the end of each horizontal member.

5 5. An air-tempering device having a casing provided with a vertical inlet and horizontal discharge members, a shaft extending through the horizontal members and provided with right and left fans, means for sup-

plying spray, and means for supplying steam to said casing.

In testimony whereof I affix my signature in presence of two witnesses.

STUART W. CRAMER.

Witnesses:

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C. L. McLEAN.