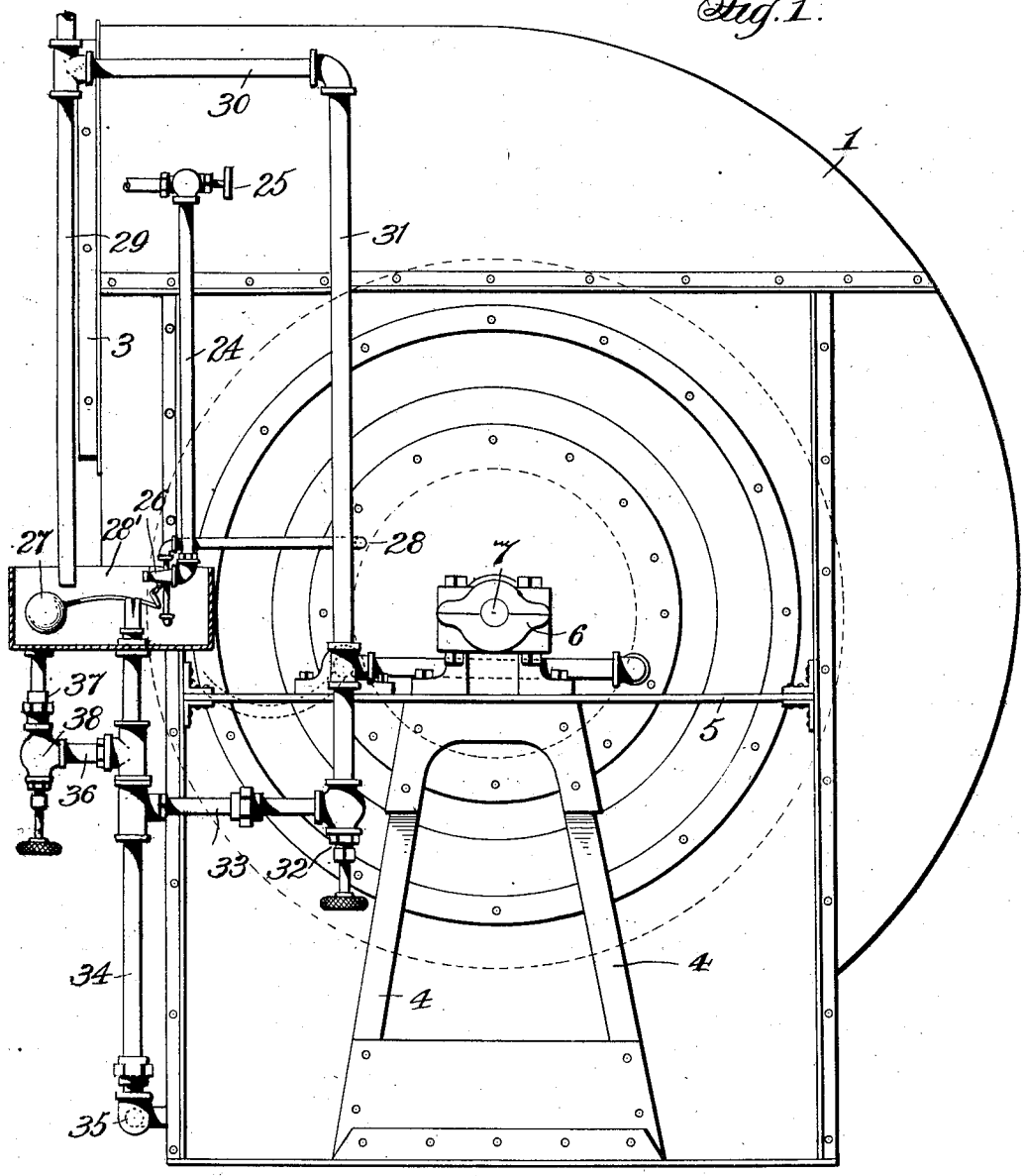
June 18, 1929. W. A. ROWE 1,717,412

AIR COOLING AND WASHING FAN

Filed Nov. 21, 1923 4 Sheets-Sheet 1

Fig. 1.



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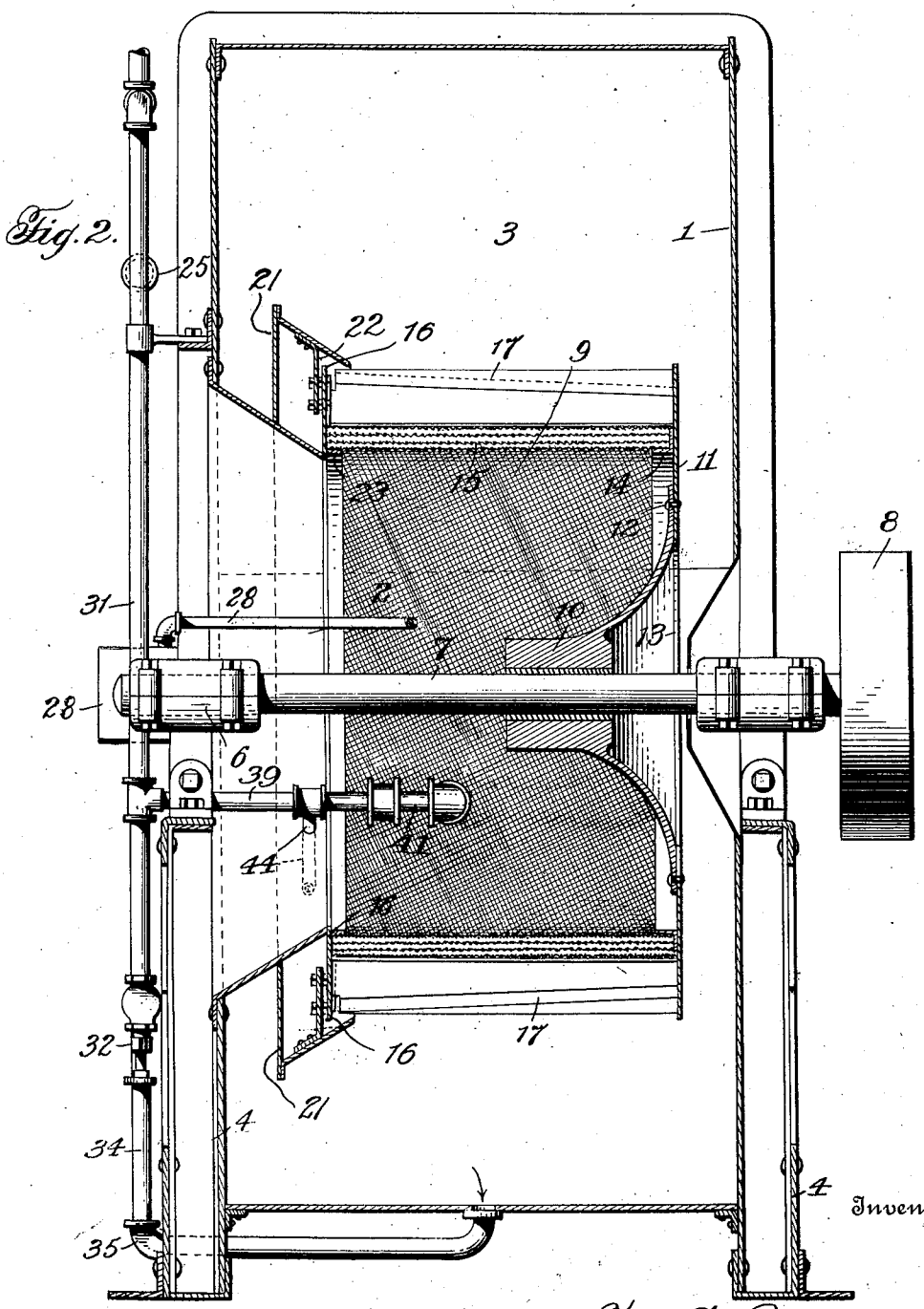
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AIR COOLING AND WASHING FAN

Filed Nov. 21, 1923 4 Sheets-Sheet 2

Fig. 2.



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AIR COOLING AND WASHING FAN

Filed Nov. 21, 1923 4 Sheets-Sheet 3

Fig. 3.

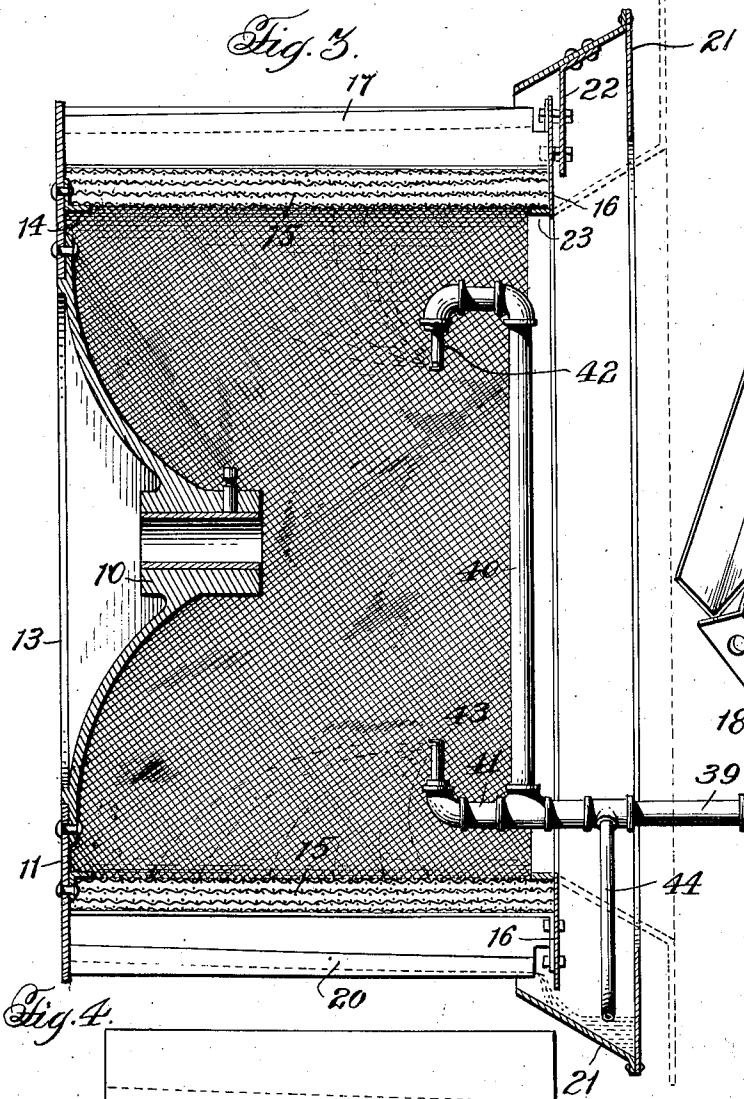


Fig. 5.

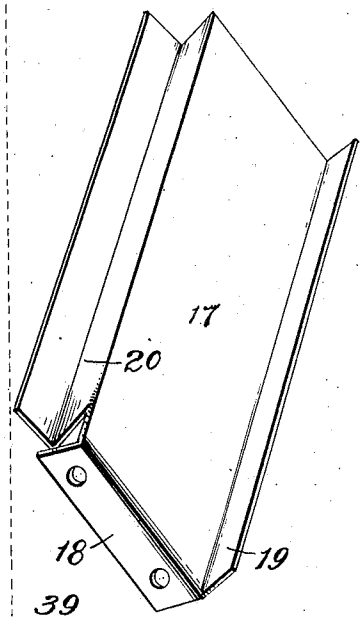


Fig. 4.

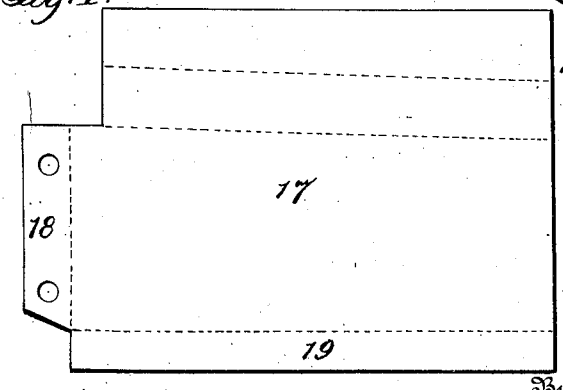
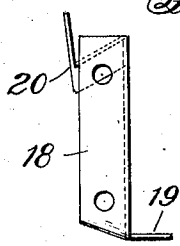


Fig. 6.



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AIR COOLING AND WASHING FAN

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Fig. 7.

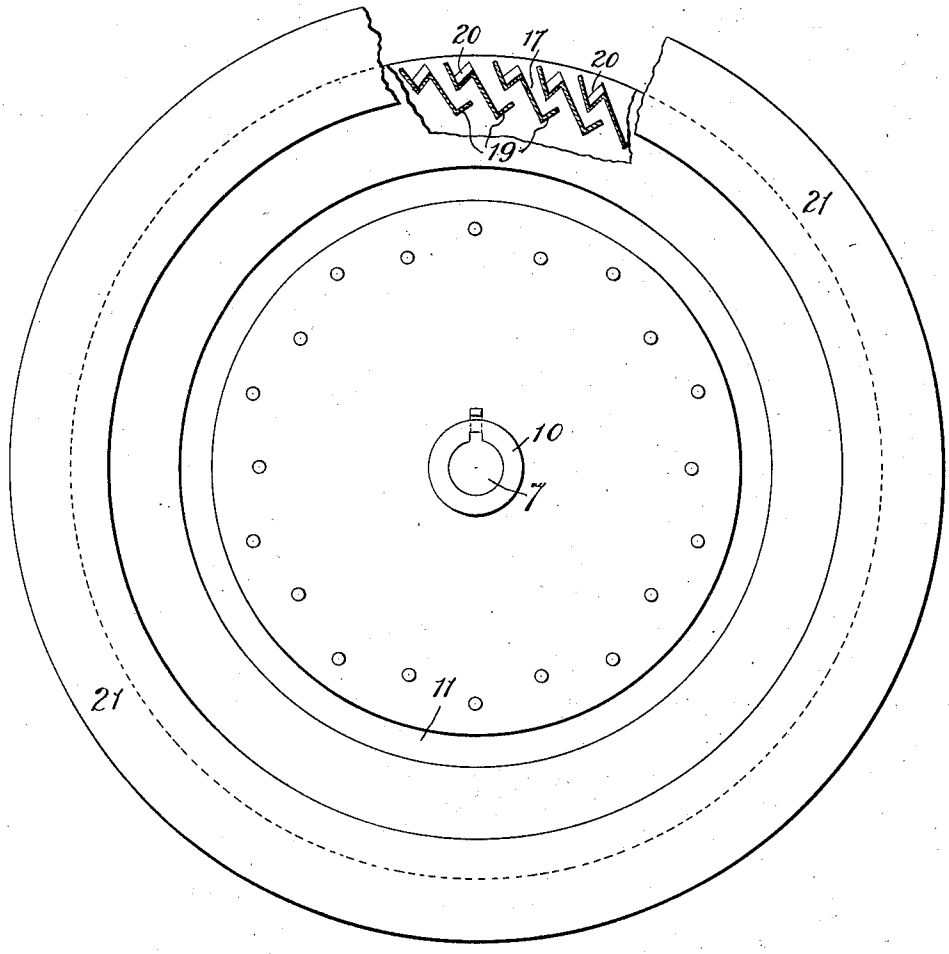
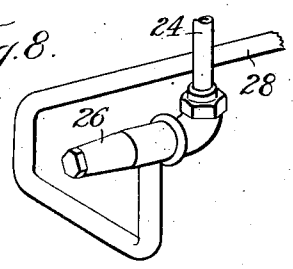


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM A. ROWE, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN BLOWER CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF DELAWARE.

AIR COOLING AND WASHING FAN.

Application filed November 21, 1923. Serial No. 676,050.

My invention relates to new and useful improvements in an air washing and cooling fan and more particularly to such a fan in which the air is purified and humidified by forcible contact with water during the rotation of the fan which has a filtering ring of several layers of wire screening and blades which propel the air and act as an eliminator.

The principal object of the invention consists in providing a fan made up of a relatively small number of parts so connected as to form a fan of great strength and of somewhat lighter weight than those fans now commonly in use.

Another object resides in forming the blades in a novel manner and connecting them to the back plate of the fan by the application of heat to cause cohesion of the parts, such cohesion being caused by welding, brazing, soldering or similar means, the construction and manner of connecting to the back plate providing a water tight fan and eliminating leakage between the ends of the blades and the side plates as would be caused if bolts, rivets or similar fasteners were used.

With the above and other objects in view, which will appear as the description proceeds, my invention consists in the novel details of construction and arrangement of parts described in the following specification and illustrated in the accompanying drawings, and while I have illustrated and described the preferred embodiments of the invention, as they now appear to me, it will be understood that such changes may be made as will fall within the scope of the appended claims.

In the drawings:—

Fig. 1 is a side elevation.

Fig. 2 is a transverse vertical section with parts shown in elevation.

Fig. 3 is a horizontal section with parts shown in plan.

Fig. 4 is a plan of the blank from which the fan blades are formed.

Fig. 5 is a perspective of one of the fan blades, and

Fig. 6 is an end view of one of the fan blades.

Fig. 7 is a detail front elevation of the fan wheel with parts broken away, some of the blades of the wheel being shown in section.

Fig. 8 is a detail view on an enlarged scale of the connection of some of the pipes for supplying water to the fan wheel.

In the drawings 1 indicates a casing having the inlet opening 2 in one side thereof and the outlet opening 3, at the top, and at right angles to the inlet. Forming a part of the casing are the standards 4 which support the cross bars 5 of the casing, said cross bars having the bearings 6 secured thereto. A shaft 7 extends through the casing and is supported in the bearings as shown, a pulley 8 being connected to one end of the shaft to receive a belt or other suitable driving connection.

Mounted on the shaft 7 within the casing 1 is a fan wheel 9, said fan wheel being fixed to said shaft to rotate therewith. The back plate 11 has an opening 13 which registers with the machined hub. Secured to the inner face of the back plate 11 is an angle iron ring 14 for holding in place the filtering screens 15. An end ring 16 forms the opposite or inlet side of the wheel and is secured to the back plate by means of the blades 17, the ends of which are secured to the plate by the application of heat such as in welding, brazing or soldering to cause cohesion of the parts and to the ring 16 by bolts, rivets or other suitable means.

As shown the blades are circumferentially spaced and arranged at an angle so that the outer edge of one blade overlaps the inner edge of the adjacent blade. Each blade is formed from a blank of metal one end of which is bent at right angles as shown at 18 to form a flange for bolting to the end ring 16, the opposite end being straight and as previously described will be connected to the back plate 11 by the application of heat. The inner edges of the blades are bent at right angles as shown at 19 and the outer edges are bent to form the troughs 20, said troughs being inclined longitudinally so as to direct water, which is accumulated in the trough, to run towards the end ring 16 into the collector ring 21 secured to the end ring 16 of the fan wheel 9 to rotate therewith by means of the braces or strips 22, the collector ring overlapping one end of the blades as shown. Secured to the inner face of the ring 16 in alignment with the angle iron ring 14, which is secured to the back plate, is a ring or band 23, this ring or band and the angle

iron strip, forming a support for the filtering screens 15 which are arranged just under the blades 17, these filtering screens preferably being made up of a plurality of layers of wire mesh and may or may not have filtering material arranged therebetween.

Water is sprayed into the fan wheel against the filtering screens and this water is supplied in the manner to be described. The water inlet pipe is indicated at 24 and the water supply thereto is regulated by the valve 25. Connected to the lower end of the pipe 24 is a valve 26 which is controlled by the float 27 operable in the tank 28'. The float 27 and valve 26 may be of any of the well known constructions and are only indicated in a general way. Leading from the valve 26 is a pipe 28 which extends into the fan wheel. A vertically extending pipe 29 is supported with its lower end extending a short distance into the tank 28' and leading from the pipe 29 is a pipe 30 which in turn is connected to a pipe 31 having the valve 32 at the lower end. A pipe 33 leads from the valved end of the pipe 31 to the pipe 34, the upper end of this pipe 34 extending into the tank 28' and the lower end being connected to the drain pipe 35. A branch pipe 36 leads from the pipe 34, below the tank, and in turn is connected to the outlet 37 from the tank. A valve 38 controls the flow of water from the tank to the pipes 36 and 34. Connected to the pipe 31 is a pipe 39 which is provided with the branches 40 and 41 which are provided respectively with the nozzles 42 and 43 which direct the water, as shown, to the filtering screens. Leading from the pipe 39, with its outer end received in the collector ring 21, is a skimmer 44 which gathers the water from the collector ring and delivers it to the branches 40 and 41 and their nozzles 42 and 43 respectively. In starting the fan the valves 32 and 38 will be closed and the valve 25 opened to admit water to the pipe 24. This water flows to the pipe 28 and is collected in the collector ring 21. After sufficient water is supplied the skimmer 44 will gather the water from the collector ring and it will be discharged through the pipes 40 and 41 and their nozzles towards the filtering screens. If too much water accumulates it passes up through the pipes 31 and 30 and down the pipe 29 into the tank 28'. The float 27 will raise and cut off the supply of water through the pipe 24 to the pipe 28. Surplus water will over-flow from the tank 28' into the pipes 34 and 35, the latter pipe being connected with a suitable drain pipe (not shown). With the new supply of water cut off the old water will be circulated but when the float again lowers the water inlet will be again opened. In stopping the fan the valve 25 will be closed and the valves 32 and 38 opened to drain.

From the above description it is thought that the construction of my fan will be understood and I will now endeavor to more fully bring out the operation and advantages. The fan is rotated through means of the pulley 8 and shaft 7 and as it rotates it draws in air through the opening 2 in the casing 1 and discharges it through the filter screens 15, blades 17 and the discharge opening 3 in the casing, the blades acting to propel the air through the discharge opening. Water is supplied in the manner previously described and discharged through the nozzles 42 and 43 against the inner surface of the filtering screens through which it passes and is thrown by centrifugal force and is caught in the troughs 20 of the blades. The troughs, 20 being inclined as shown, towards the outer end-ring 16 of the fan, discharge the water into the collector ring 21 from which it is drawn by the skimmer 44. It will be seen that the same water may be used over a number of times and the new supply of water may be automatically cut off when too much water is supplied and again turned on when the water gets low.

I wish to lay particular stress upon the advantages of having the blades secured to the back plate 11 by the application of heat to cause cohesion of the parts. By connecting the blades to the back plate in the manner described I may do away with the perforated plate or cylinder now generally used in fans of this character which perforated cylinder comes between the blades and filtering screens and is required to support the ring 16 from the back plate 11. At the same time the blades are connected to the back plate without the use of bolts, rivets or the like and there will be no holes for leakage but a water tight joint is provided. I therefore reduce the cost of manufacture and weight but at the same time add strength. Also by welding a water tight joint is provided and no water can leak between the ends of the blades and back plate. Also eliminating the resistance due to the presence of the perforated cylinder gives increased capacity and efficiency.

Where I have used the term welding in the appended claims I do so in the broadest sense to cover the connecting of the blades to their associated part by the application of heat in any manner such as by brazing to cause a cohesion of the parts.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. An air humidifying and washing fan including a rotary member comprising a back plate having a supporting hub part, and an end ring and peripheral blades supported by the back plate, each of said blades being in the form of a single metal strip and comprising a main flat strip part with a flange at its inner marginal portion disposed at an angle to said main flat strip part and at one

side thereof, and with an outer marginal angular trough portion disposed at an angle to the main strip part at the side thereof opposite the side at which said flange extends, and means for introducing a liquid into the zone of rotation of the blades.

2. An air humidifying and washing fan including a rotary member comprising a back plate having a hub part, and an end ring and peripheral blades supported by the back plate, each of said blades being in the form of a single metal strip and comprising a main flat strip part with a flange at its inner marginal portion disposed at an angle to said main flat strip part and at one side thereof, and with an outer marginal portion bent inwardly at an angle to the main strip part and then outwardly at an angle to form a trough, and means for introducing a liquid into the zone of rotation of the blades.

3. An air humidifying and washing fan including a rotary member comprising a back plate having a supporting hub part, an end ring, peripheral blades connecting the end ring and back plate, the blades having longitudinally extending trough portions inclined outwardly towards the end ring, and a filtering screen arranged inwardly of said blades, said blades being secured to the back plate by welding and means for spraying a liquid onto the filtering screen.

4. An air humidifying and washing fan including a rotary member comprising a back plate, an end ring, peripheral blades connecting the back plate and end ring, and a collector ring secured to one of the last mentioned parts, the blades having longitudinally extending trough portions inclined towards the collector ring, and the ends of the blades removed from the collector ring being secured to the part directly associated therewith by welding and means for introducing a liquid into the zone of rotation of the blades.

5. An air humidifying and washing fan including a rotary member comprising a back plate having a supporting hub part, an end ring, peripheral blades connecting the end ring and back plate, a filtering screen arranged inwardly of the blades, and means for spraying a liquid onto the filtering screen, said blades having longitudinally extending trough portions for conducting water off to that end of the rotary member at which the end ring is located, and said blades being secured to the back plate by the application of heat to effect cohesion of these parts and provide a water tight joint therebetween.

6. An air humidifying and washing fan including a rotary member comprising a back plate, an end ring, peripheral blades connecting the back plate and end ring, a collector ring secured to one of the last mentioned parts, a filtering screen arranged inwardly of the blades, and means for spraying a liquid onto the filtering screen, said blades having longitudinally extending trough portions to conduct water off to said collector ring, and the ends of said blades removed from the collector ring being secured to the part directly associated therewith by the application of heat to effect cohesion of these parts and provide a water tight joint therebetween.

In testimony whereof I hereunto affix my signature.

WILLIAM A. ROWE.