June 24, 1930. P. JANES 1,766,643

FLUID MIXING DEVICE

Filed March 1, 1928

Fig.1

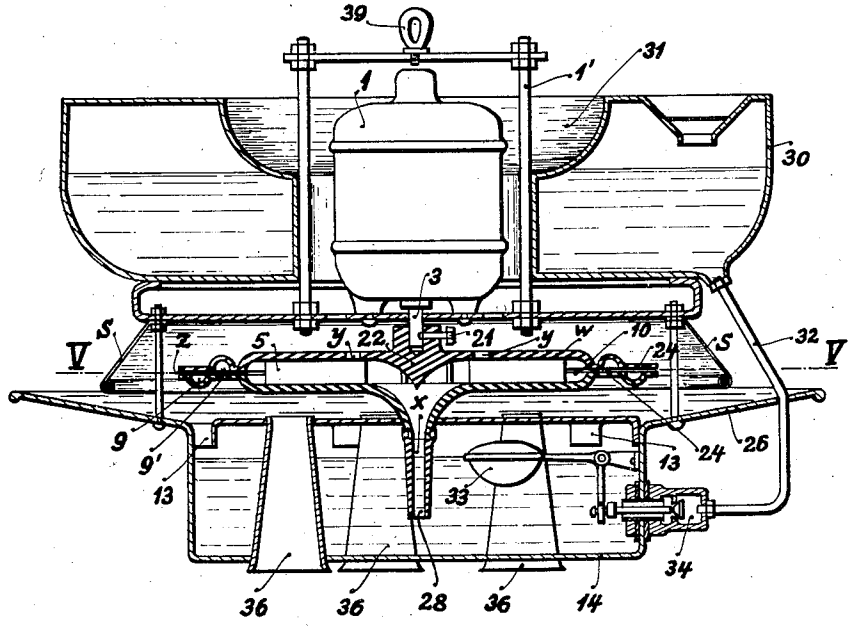
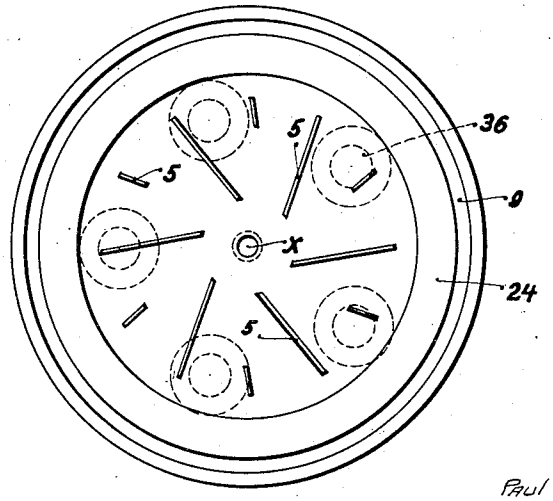


Fig.2



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UNITED STATES PATENT OFFICE

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FLUID-MIXING DEVICE

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My invention relates to an apparatus for the production of an intimate mixture of several media, for example, gaseous media with liquid or powdered media by use of centrifugal force.

One of the objects of my invention is to provide an apparatus of this class, which secures simultaneously with the mixing of a gaseous and a liquid media, an accelerated evaporation of the liquid or liquids contained in the mixture and thereby a cooling action.

The invention is illustratively exemplified by the accompanying drawings, in which, Figure 1 is a vertical central section of my improved apparatus, and Figure 2 is a section on lines V—V of Figure 1. In the drawings, 1 denotes a motor mounted in a frame 1′ and 3 designates a motor shaft connected to the shaft 22 of the running wheel by a screw 21. The rotatable wheel *w* itself is similar in construction to the running wheel of a centrifugal pump and is provided with a plurality of blades 5, a central suction opening *x* in the bottom for the liquid or pulverulent media and openings *y* in the top for the gaseous media. At the periphery of the rotatable wheel is provided the annular exit opening or nozzle *z*. 9, 9′ are the annular corrugations of the walls of the running wheel arranged in the outermost parallel flanges 24 of the rotatable wheel walls and staggered radially relatively to each other. The larger particles of the liquid or pulverulent media to be atomized striking against the deflecting means constructed as a stationary shield *s* of porous material, are deflected downwards and fall on the collecting flange 26 of the container 14 and thence through the opening 13 into the interior of the container. The suction pipe 28 is detachably secured to the running wheel *w*, that is to say, screwed to the same so that it may be readily removed and replaced by another of larger or smaller dimensions, as may be required for the atomizing effect desired, and by the conditions existing at any time.

A reservoir 30 is mounted above the running wheel and surrounds annularly, the motor 1; this reservoir is however, provided with a recess 31 giving free access to the motor for exchanging the brushes. The reservoir is connected to the container 14 located at a lower level by a pipe 32 and a governing valve 34 controlled by the liquid level in the container 14 through the medium of a float 33, so that the level of the liquid in the container 14 is maintained constant, as long as there is a sufficient quantity of liquid in the reservoir 30. If a plurality of apparatus is arranged on the same level in a room, only one reservoir and governing valve need be provided and will serve all the apparatus. The governing valve may be directly connected to a supply pipe, for instance, a water works pipe.

In the container 14, there are provided channels 36 extending from bottom to top, diminishing in diameter towards the top end serving for an additional supply of air to the exit point of the mixture, the rapidly revolving running wheel operating on the air below the same by friction, throws this air to the outside and the air thus discharged is replaced through by channels 36. On encountering the mistlike mixture escaping through the nozzle, this air is freed from any impurities that may be suspended in the same, such impurities being deposited on the flange 26 whence they are washed by the liquid back into the container 14. The latter is cleaned from time to time from these impurities.

As above mentioned, there is provided in the path of the flow of the escaping mixture, a shield *s* of porous material, which comprises a stationary shield in the form of a ring surrounding the revolving wheel, such ring being made of a porous material such as gauze, fabric or clay. As the jet of the mixture strikes against the shield the jet is not only deflected downwards along the shield, but there will also take place a considerable evaporation of the liquid contained in the jet, more particularly on the outside of the shield, such evaporation being accelerated owing to the way in which the mixture is fed. The heat required for the evaporation is withdrawn from the sur-

rounding air and thus a considerable cooling of the surrounding air is secured.

The entire apparatus is suspended by a cord or otherwise, so that it can freely adjust itself in space like a gyroscope. This is advantageous and even necessary for the reason that an extremely high speed is imparted to the running wheel up to 6,000 revolutions per minute. Therefore, all phenomena occurring in gyroscopes, may also occur in the present apparatus and a rigid support might readily lead to breakage.

The industrial use of the mixing apparatus is manifold. The apparatus can, in the first place, be used for atomizing liquids such as perfumes or disinfectants, for rooms, where the air is liable to be contaminated, and for such purposes, the present apparatus may be combined with an ozonizing apparatus. The apparatus may also be used in industrial works where a moistening of the air is desirable such as in spinning, weaving or tobacco factories and the like, and more particularly in such cases where it is desired to remove from the air, any obnoxious dust and fibre particles since by the present apparatus, also a thorough cleaning of the air may be secured. The impurities removed from the air are deposited partly in the apparatus itself and in part indirectly by deposition on the floor.

What I claim is:

1. In an apparatus for the production of an intimate mixture of several media comprising a rotatable wheel, means for supplying the media to such rotatable wheel, means for imparting to such rotatable wheel, a rapid rotary movement, means provided in the rotatable wheel for imparting to the media supplied to the said rotatable wheel a rapid rotary movement, an opening at the periphery of such rotatable wheel for the mixture of media to escape therethrough, and a shield provided in and inclined to the path of flow of the mixture, such shield consisting of a porous material.

2. In an apparatus for the production of an intimate mixture of several media comprising a rotatable wheel, means for supplying the media to such rotatable wheel, means for imparting to such rotatable wheel, a rapid rotary movement, means provided in the rotatable wheel for imparting to the media supplied to the said rotatable wheel, a rapid rotary movement, an opening at the periphery of such rotatable wheel for the mixture of media to escape therethrough and a stationary shield separate from the said rotatable wheel and surrounding the same, such shield being provided in and inclined to the path of flow of the mixture and consisting of a porous material.

3. In an apparatus for the production of an intimate mixture of several media comprising a rotatable wheel, means comprising inlet openings on one side of the rotatable wheel and a central suction pipe on the opposite side of the rotatable wheel for supplying the media to such rotatable wheel, means for imparting to such rotatable wheel a rapid rotary movement, means comprising a single set of blades provided in the rotatable wheel for imparting to the media supplied to the said rotatable wheel, a rapid rotary movement, an opening at the periphery of such rotatable wheel for the mixture of media to escape therethrough, and a shield provided in and inclined to the path of flow of the mixture, such shield consisting of a porous material.

4. In an apparatus for the production of an intimate mixture of several media comprising a rotatable wheel, means comprising inlet openings on one side of the rotatable wheel and a central suction pipe on the opposite side of the rotatable wheel for supplying the media to such rotatable wheel, means for imparting to such rotatable wheel a rapid rotary movement, means comprising a single set of blades provided in the rotatable wheel for imparting to the media supplied to the said rotatable wheel, a rapid rotary movement, an opening at the periphery of such rotatable wheel for the mixture of media to escape therethrough and a shield provided in and inclined to the path of flow of the mixture, such shield consisting of a porous material, the said opening at the periphery of the rotatable wheel being formed by two parallel circumferential parts, one on the top and the other on the bottom of the said rotatable wheel, each of such circumferential parts being provided with an annular corrugation concentric to the axis of the said rotatable wheel, the annular corrugations in the two circumferential parts being radially staggered relatively to each other.

5. In an apparatus for the production of an intimate mixture of several media comprising a rotatable wheel, means comprising inlet openings on one side of the rotatable wheel and a central suction pipe on the opposite side of the rotatable wheel for supplying the media to such rotatable wheel, means for imparting to such rotatable wheel a rapid rotary movement, means comprising a single set of blades provided in the rotatable wheel for imparting to the media supplied to the said rotatable wheel, a rapid rotary movement, an opening of the periphery of such rotatable wheel for the mixture of media to escape therethrough and a shield provided in and inclined to the path of flow of the mixture, such shield consisting of a porous material, a liquid container below the rotatable wheel, the said suction pipe dipping into the liquid in such container, a source of liquid, a pipe connecting

such source with the said container and a valve in such pipe controlled by liquid level in the said container.

6. In an apparatus for the production of an intimate mixture of several media comprising a rotatable wheel, means comprising inlet openings on one side of the rotatable wheel, and a central suction pipe on the opposite side of the rotatable wheel for supplying the media to such rotatable wheel, means for imparting to such rotatable wheel a rapid rotary movement, means comprising a single set of blades provided in the rotatable wheel for imparting to the media supplied to the said rotatable wheel a rapid rotary movement, an opening at the periphery of such rotatable wheel for the mixture of media to escape therethrough and a shield provided in and inclined to the path of flow of the mixture, such shield consisting of a porous material, the said suction pipe being detachably and exchangeably secured to the rotatable wheel.

7. In an apparatus for the production of an intimate mixture of several media comprising a rotatable wheel, means comprising inlet openings on one side of the rotatable wheel and a central suction pipe on the opposite side of the rotatable wheel for supplying the media to such rotatable wheel, means for imparting to such rotatable wheel a rapid rotary movement, means comprising a single set of blades provided in the rotatable wheel for imparting to the media supplied to the said rotatable wheel, a rapid rotary movement, an opening at the periphery of such rotatable wheel for the mixture of media to escape therethrough and a shield provided in and inclined to the path of flow of the mixture, such shield consisting of a porous material, a liquid container below the rotatable wheel, the said suction pipe dipping into the liquid in such liquid container, and channels open at both ends passing through the said container from its bottom to its top.

8. In an apparatus for the production of an intimate mixture of several media comprising a rotatable wheel, means comprising inlet openings on one side of the rotatable wheel and a central suction pipe on the opposite side of the rotatable wheel for supplying the media to such rotatable wheel, means for imparting to such rotatable wheel, a rapid rotary movement, means comprising a single set of blades provided in the rotatable wheel for imparting to the media supplied to the said rotatable wheel, a rapid rotary movement, an opening at the periphery of such rotatable wheel for the mixture of media to escape therethrough, and a shield provided in and inclined to the path of flow of the mixture, such shield consisting of a porous material and means for freely suspending the entire apparatus, whereby it is enabled to adjust itself freely in space.

In testimony whereof I affix my signature.

PAUL JANES.