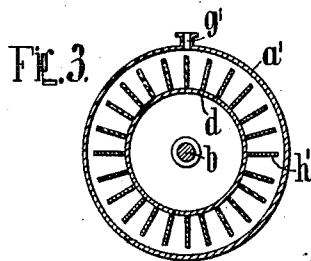
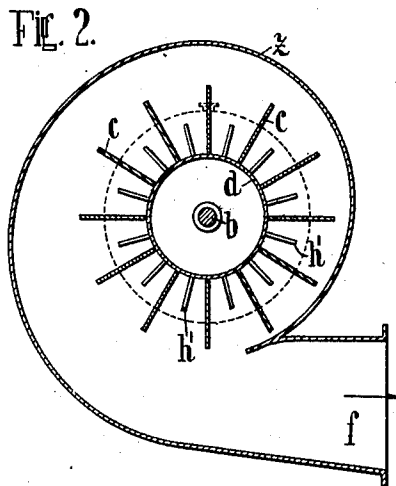
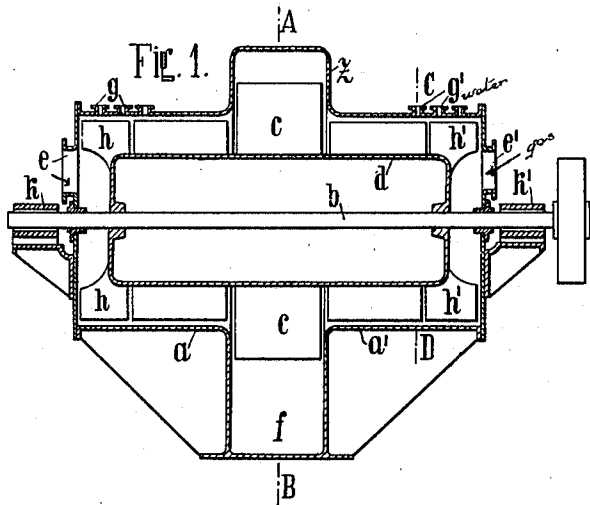


A. STOLTE.
 ROTARY GAS WASHER.
 APPLICATION FILED NOV. 18, 1910.

988,908.

Patented Apr. 4, 1911.

3 SHEETS—SHEET 1.



Witnesses:
 M. Schmid.
 C. Heymann

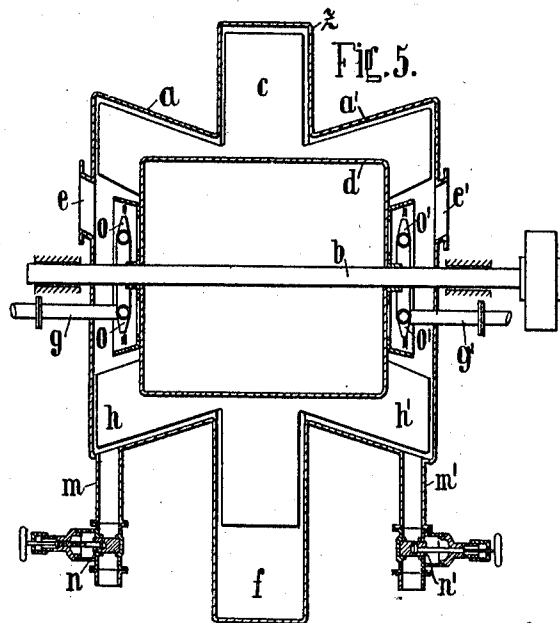
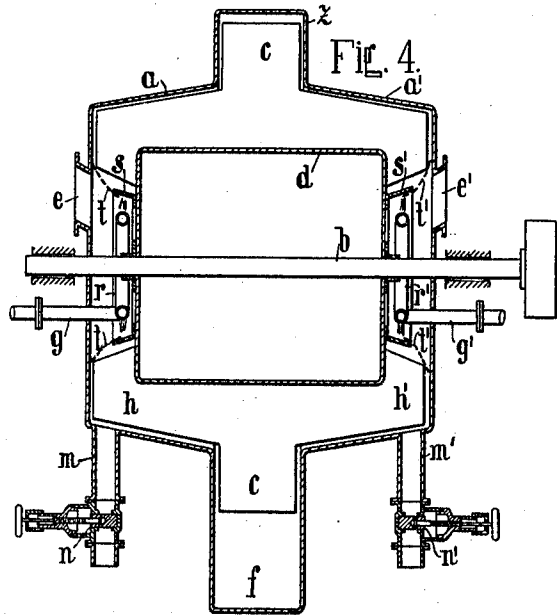
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3 SHEETS—SHEET 2.



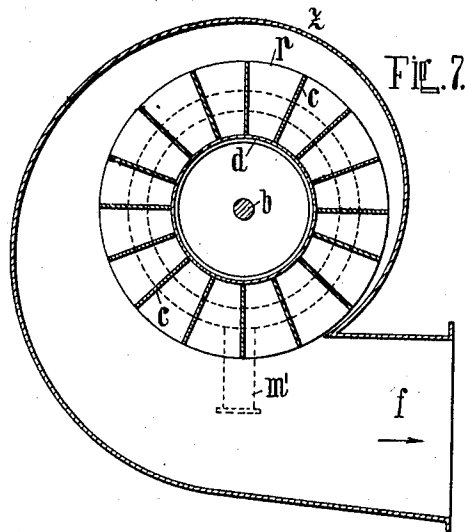
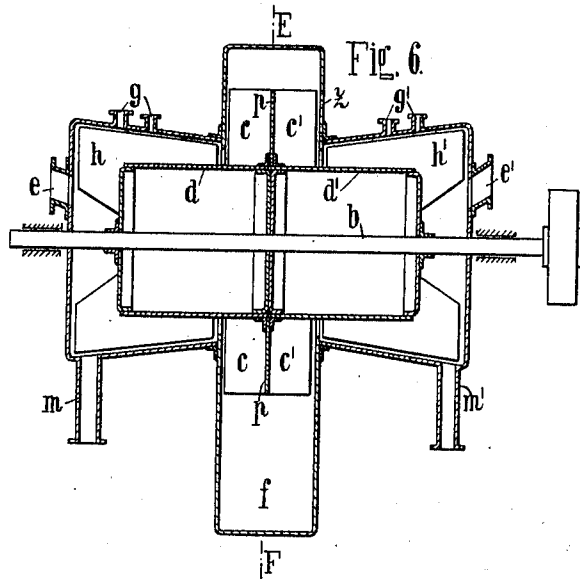
Witnesses:
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 3 SHEETS—SHEET 3.



Witnesses
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UNITED STATES PATENT OFFICE.

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ROTARY GAS-WASHER.

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Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed November 18, 1910. Serial No. 593,051.

To all whom it may concern:

Be it known that I, AUGUST STOLTE, a subject of the German Emperor, and residing at Zweibrücken, the Palatinate, Germany, have invented certain new and useful Improvements in Rotary Gas-Washers, of which the following is a specification.

The subject-matter of my invention is a rotating gas-washer comprising not only a revolvably mounted drum, on which a fan is secured, but also a casing surrounding the fan and two stationary casings incasing the drum, these casings extending up to that of the fan and being provided at their two ends away from the fan-casing both with inlet openings for the gas to be purified and also with inlet openings for the liquid employed for purifying the gas.

Important objects of my invention are to provide, firstly, that the thrust in the direction of the shaft arising in simple drum-washers is done away with, secondly that the volumetric output is increased and, thirdly, that the whole apparatus can be manufactured at a materially reduced price.

Between the rotating wash-drums and the stationary casings which surround the latter and are provided internally with roughened surfaces there are annular passages which permit both the gases and the water to move parallel to the axis of the wash-drum and open longitudinally of the wash-drum into the fan. Consequently, as the gas flows to the fan situated between the wash-drums it is always surrounded by an annular layer of liquid which extends into the spaces between the blades of the fan and is traversed in said spaces by the gases driven outwardly under the influence of the fan, so that not only is the gas intimately mixed with the liquid, but an extraordinarily effective cooling and washing effect is obtained. Without departing from the scope of my invention, I may vary the described arrangement by placing two drum-washers close together in axial alinement so that the two gas-supply openings are opposite one another and two fans adjoin one another in the center.

Several illustrative embodiments of my invention are represented in the accompanying drawings, wherein:—

Figures 1 to 3 show the first embodiment in vertical longitudinal section, in transverse section on the line A—B in Fig. 1, and in section on the line C—D in Fig. 1, re-

spectively; Fig. 4 shows the second embodiment in vertical longitudinal section, and Fig. 5 is a like view showing the third embodiment; Figs. 6 and 7 show the fourth embodiment in longitudinal section and in section on the line E—F in Fig. 6, respectively.

Referring firstly to Figs. 1 to 3, the first embodiment comprises the stationary wash-casings *a, a'*, in which the shaft *b*, carrying a belt-pulley or clutch and the drum *d*, is journaled in bearings *k, k'*, which may be firmly connected with the casings *a* and *a'*, respectively. The fan *c* secured on the drum *b* is surrounded by the fan-casing *e* to which the wash-casings *a, a'*, provided internally with a rough surface, are joined. The drum *d* also carries the blades *h, h'* which are formed as suction members. For the purpose of conducting the requisite liquid, *e. g.* water, for purifying the gas, into the stationary casings *a, a'*, these are provided with branches *g, g'*. At the two opposite ends of the casings *a, a'* the branches *e, e'*, respectively, are arranged for the admission of the gas to be purified. The branch *f* serves for conducting away the purified gas. This form of my machine operates as follows:—The liquid used for purifying the gas is introduced into the chambers or spaces inclosed by the stationary wash-casings *a, a'* through the branches *g, g'* and the gas to be purified through the branches *e, e'*. The gas and water move parallel to one another in the chambers or spaces which are formed by the blades of the wash-drum and rotate with the drum. Since, however, the gas is not able to take up all the liquid, even at the commencement of the washing process a portion of the water is thrown against the casing *a*. Owing to the action of centrifugal force the gas which rotates between the blades of the wash-drum is forced against the casings *a, a'*. The motion of the gas is imparted to the particles of liquid rotating in the casings. Said particles move on in the direction in which the gas is moving, *i. e.* parallel to the axis of the wash-drum. When the gas and liquid have passed the wash-drums the annular layer or film of liquid moves on into the fan-blades *c* in consequence both of its increased acceleration due to the velocity of flow of the gas, and of its inertia. Now, however, the gas also passing with the film of liquid between the blades of the fan *c* attains a greater

pressure or is at the same pressure as before. The consequence is that the gas penetrates the concentric film of liquid and therefore is again both intimately mixed therewith and also subjected to a thorough purifying operation. During this operation the gas and water fill up the spaces most distant from the axis of the wash-drum, whereupon the purified gas together with that portion of the water which still remains, passes to and issues from the outlet branch *f*.

The form illustrated in Fig. 4 principally differs from that just described in that the inlet branches *g*, *g'* for the washing-liquid open into perforated annular pipes *r*, *r'*, respectively, and each end of the drum *d* is provided in such a manner with a flange *s*, *s'*, respectively, surrounding the shaft that the water admitted through the annular pipes *r*, *r'* impacts against the flanges *s*, *s'*, slides over the latter in the direction of the dotted lines *t*, *t* and *t'*, *t'*, respectively, and forms a conical film of water extending above the inlets *e*, *e'* for the gas to be purified. Further, some of the utilized water is led away at *m*, *m'* and some escapes through the branch *f* which also serves for leading away the purified gas. Each of the wash-casings *a*, *a'* having internal rough surfaces is shaped like the frustum of a cone, the wider end of which adjoins the casing of the fan. Otherwise this embodiment is the same as that illustrated in Figs. 1 to 3, for which reason corresponding parts are provided with like reference characters. The mode of operation of this second form is as follows:—The gas to be purified enters at both sides through the branches *e*, *e'* and impacts on the annular or conical films of water, which are indicated by the dotted lines *t*, *t* and *t'*, *t'*, respectively, and rotate with the drum *d*. Consequently the water is uniformly mixed with the gas, so that the water is led more readily in the form of an annular film along the inner surfaces of the casings *a*, *a'*. If too much water is introduced through the branches *g*, *g'* into the casings *a*, *a'* the excess is led away through the outlets *m*, *m'* and does not pass along the wash-drum *d* to the fan *c*. Consequently, the consumption of power will not exceed a certain amount, because only so much water can pass to the drum *d* as is necessary for purifying the gas. The escape of water through the pipes *m*, *m'* can be regulated by the two valves *n*, *n'*. Owing to the casings *a*, *a'* widening toward the fan, the axial movement of the water will be faster than is the case when cylindrical casings are employed. The result is that the consumption of water is greater than is the case with cylindrical casings, when the peculiarity or nature of the gases renders it necessary to wash with a greater quantity of water. Otherwise the mode of

operation is the same as that described above with reference to Figs. 1 to 3.

The embodiment illustrated in Fig. 5 differs from that shown in Fig. 4 in that the conical casings *a*, *a'* surrounding the drum do not become wider toward the casing of the fan *c* but narrower. Owing to this arrangement the movement of the water in an axial direction is slower than is the case when cylindrical casings are utilized, so that the liquid used for washing the gases is enriched as much as possible with the materials to be washed out. Further, instead of the perforated annular pipes *r*, *r'* employed in the embodiment illustrated in Fig. 4, nozzles *o*, *o'* are used for introducing the water; these nozzles are connected by common annular pipes with the water-supply branches *g*, *g'*, respectively, so that so far as the formation of the conical film of water is concerned the same mode of operation as that obtaining in the embodiment illustrated in Fig. 4 is preserved.

The embodiment illustrated in Figs. 6 and 7 substantially differs from that just described in that two drums *d*, *d'*, each of which is provided with a fan *c*, *c'*, respectively, are placed together with their axes in one line. The two fans *c*, *c'* which run in the common casing *z* are separated from one another by a partition *p* which may, of course, be dispensed with. As in the case of the embodiments described above, each of the drums *d*, *d'* is provided with blades *h*, *h'* which also may act as suction-members. The gas-inlets are situated at *e*, *e'* and the water-inlets at *g*, *g'*. Part of the used water escapes, as in the embodiments shown in Figs. 4 and 5, through the pipes *m*, *m'* and part through the branch *f*, which latter also serves for conducting away the purified gas.

I claim:—

1. In a gas-washer of the character described, the combination of two drum-casings, a fan-casing between and adjoining the same, a shaft journaled in said drum-casings, a drum fixed on the shaft, and blades fixed on the drum projecting into the fan-casing, and blades on the drum projecting into close proximity with the internal periphery of the drum-casings, said drum-casings being provided at the ends thereof away from the fan-casing with inlets for the gas to be washed, and with inlets for liquid for washing the gas.

2. In a gas-washer of the character described, the combination of two drum-casings, a fan-casing between and adjoining the same, a shaft journaled in said drum-casings, a drum fixed on the shaft, and blades fixed on the drum projecting into the fan-casing, and into proximity with the internal periphery of the drum-casings, said drum-casings being provided at the ends thereof away from the fan-casing with inlets for the

gas to be washed and with inlets for liquid for washing the gas, said drum having a conical annular flange on each end thereof adjacent said inlets for the gas, the smaller end of each flange being attached to the drum, and means for supplying liquid through each of the inlets for liquid to each flange.

3. In a gas-washer of the character described, the combination of two drum-casings, a fan-casing between and adjoining the same, a shaft journaled in said drum-casings, a drum fixed on the shaft, and blades fixed on the drum projecting into the fan-casing and into proximity with the internal periphery of the drum-casings, said drum-casings being provided at the ends thereof away from the fan-casing with inlets for the gas to be washed and with inlets for liquid for washing the gas, said drum having a conical annular flange on each end thereof adjacent said inlets for the gas, the smaller end of each flange being attached to the drum, an annular perforated pipe in each flange, and a branch pipe connected with each perforated pipe passing through each of the inlets for liquid.

4. In a gas-washer of the character described, the combination of two drum-casings, a fan-casing between and adjoining the same, a shaft journaled in said drum-casings, a drum fixed on the shaft, and blades

fixed on the drum projecting into the fan-casing and blades on said drum projecting into close proximity with the internal periphery of the drum-casings, said drum-casings being provided at the ends thereof away from the fan-casing with inlets for the gas to be washed and with inlets for liquid for washing the gas, an outlet for water being provided in the periphery of each drum-casing.

5. In a gas-washer of the character described, the combination of two conical drum-casings, a fan-casing between and adjoining the same, the wider parts of the drum-casings adjoining the fan-casing, a shaft journaled in said drum-casings, a drum fixed on the shaft, and blades fixed on the drum projecting into the fan-casing and blades on said drum projecting into close proximity with the internal periphery of the drum-casings, said drum-casings being provided at the ends thereof away from the fan-casing with inlets for the gas to be washed and with inlets for liquid for washing the gas.

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

AUGUST STOLTE.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.