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(54) A unit formed by a washing water distributor and a capture plate

(57) The washing water distributor (1) is in the shape of a pipe within another one, where the outer pipe (3) bears a number of holes (4) distributed along its lower generatrix and the inner one (5) is longitudinally within the outer pipe and longitudinally bears a number of aper-

tures (7) to allow the washing water received from an external source to pass within the outer pipe that distributes it through its holes (4) onto the capture plate (2) located plumb below the distributor.

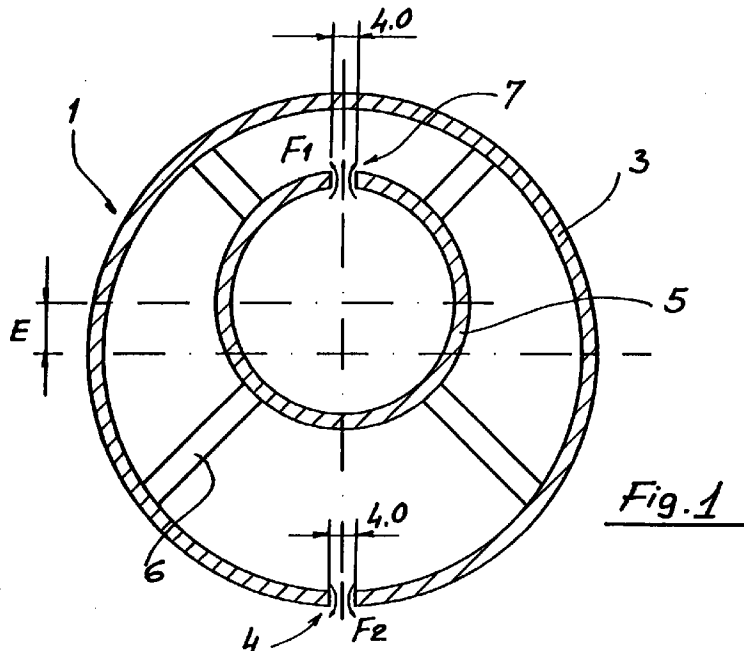


Fig. 1

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Description

The present invention concerns a unit formed by a washing water distributor and a capture plate, especially for a combustion smoke depurator by means of electrostatic precipitators (hereafter defined simply as EPs) with wet-plate capture plates (WET-EP) for desulphurization and denitration plants (DESO_x - DENO_x / WESP), for a gas and aereiforms in general cleansing plant, for plants in which it is necessary to keep walls cool, to de-humidify and/or condense.

In general, said washing and cleansing are performed with water or a convenient fluid in the liquid stage or with water containing convenient additives or tenso-active substances. Hereafter we shall simply define the liquid used in the invented system for the washing and/or cleansing as - cleansing water -.

For what concerns the depuration of combustion smokes by means of EP, the state of the art essentially comprises the use of sprayers to diffuse tiny water droplets into the smoke by means of EP in order to inglobe the solid particles and part of the gasses present in order to then deposit them on the capture plates of the PE owing to the effect of the electric field; at the upper ends of said plates there are additional water sprayers that produce and maintain a convenient veil of water that washes the surface of the plates flowing along them owing to gravity. The liquid formed by this wash is removed from the bottom of the EP to be treated and recycled. It is known that these plates are built in different shapes and of different materials: smooth or bent sheeting, mesh, fabric, pipes, etc. of steel, stainless steel, "corten" steel, plastic materials, etc.

The main drawbacks in the state of the art arise from: requiring great quantities of water to be sprayed throughout the volume of the EP, in addition to the surface of the plates; considerable quantities of water lost by evaporation of the micronized droplets in the hot fumes issued through the chimney; the sprayers are subjected to clogging and consequent malfunctioning; corrosion involves most of the structures of the EP.

The invention obviates most of the above mentioned drawbacks; it is a unit formed by a washing water distributor and a capture plate in which, as characterized in the claims:

- the washing water distributor, located at the upper end of the capture plate, is in the shape of one pipe within another pipe, the outer pipe bearing a number of holes distributed along its lower generatrix and the inner pipe being longitudinally fixed within the outer pipe and longitudinally bearing a number of apertures in order to allow the passage of washing water received from an external source to the outer pipe that distributes it on the surface of the capture plate through said holes;
- the capture plate is a conventional continuous flat surface capture plate;

- as an alternative, the capture plate is a mesh plate formed by a steel mesh or plastic materials with a rectangular weave in which the shortest side of each rectangle lies in the EP horizontally and its length is equal or less than 3 mm., the longer side is greater than 3 mm. and the diameter of the mesh-wires is less than 1.2 mm.;
- a program modulating the water delivery controls the feeding of the washing water to the inner pipe of said distributor according to a program that varies the ratio "time of washing water presence / time of washing water absence" and/or varies the delivery of washing water in time for each plate as a function of the dimensions of the same in order to obtain a quantity of washing water flows upon them for a time that satisfies the thermo-fluiddynamic conditions of functioning of each plate and of the overall EP.

Preferably, the inner pipe is positioned eccentrically towards the top compared to the outer pipe; in said distributor of washing water the ratio between overall internal section of the outer pipe and the internal section of the inner pipe is greater than 2; the holes along the lower generatrix of the outer pipe have a diameter equal to or less than 4 mm. and are at a distance of no more than 30 mm. from one another; the apertures along a generatrix of the inner pipe are at a distance from one another in a constant or variable manner according to the length of the pipe and their overall cross section shall be greater than the total cross section of the holes in the outer pipe.

The main advantages of the invention lie in the fact that the veil of water that washes the plates, in consideration of the brief permanence of the water in the hot part of the plant, exerts a de-humidifying action from a thermo-fluid-dynamic viewpoint by causing a cooling and condensing of the gasses that slide along the plates and this leads to a meaningless loss of water by evaporation; the positioning above the plates of the holes distributing the washing water limits the corrosion of the same plates and of the washing water gathering means, if of steel.

The invention is described in further detail with reference to the drawings attached that represent an embodiment and in which

- Fig. 1 is a cross section of a washing water distributor,
- Fig. 2 is a view of a mesh of a capture plate in stainless steel mesh, and
- Fig. 3 is a functional diagram.

From Figure 1 it is evident that the washing water distributor 1 is held above a capture plate 2 held by a bar B to which it is fixed by means of rivets C; said distributor is formed by an outer cylindrical pipe 3 that bears a number of holes 4 along the lower generatrix having 4 mm. diameter and spaced at 30 mm. from one another and by an inner pipe 5 positioned with eccentricity E compared to outer pipe 3 and fixed to the latter by means of distance rods 6 and that bears a number of holes 7 along

the upper generatrix having 4.2 mm. diameter and spaced at 28 mm. from one another. The ratio between the surface of the total section of the outer pipe (that is to say net of the surface of the inner pipe) and the surface of the section of the inner pipe is = 2. The inner pipe 5 receives washing water from an external source at one of the two ends; as shown by arrows F1, the washing water penetrates into the outer pipe 3 from through holes 7 of the inner pipe 5 and, as shown by the arrows F2, falls onto the capture plate 2. The vertical drawn from the centre of holes 4 passes through the middle plane of capture plate 2.

Fig. 2 shows a rectangular mesh 8 of a capture plate 2 made of stainless steel; the shorter, horizontal, side is 3 mm. long, and the longer, vertical, side is 3.3 mm. long while the diameter of mesh-wires 9 is 1.2 mm.

Fig. 3 shows that a programmer P controls the quantity of washing water sent to the inner pipe 5 of distributor 1; the programmer P is linked by cable W to a motorized modulating valve V set in the pipe 10 that carries the washing water to distributor 1.

Claims

1. A unit formed by a washing water distributor (1) and by a capture plate (2) characterized in that:

- the washing water distributor (1), located at the upper end of said plate (2), is formed by two pipes (3, 5), one within the other, the outer pipe (3) bears a number of holes (4) distributed along its lower generatrix and the inner pipe (5) that is longitudinally fixed within the outer pipe (3) and that longitudinally bears a number of apertures (7) that let washing water received from an external source into the outer pipe (3) that distributes it onto the surface of the plate (2) through said holes (4);
- said capture plate (2) is a conventional capture plate;
- a modulator programmer (P, V) controls the delivery of water to the inner pipe (5) to establish distribution intervals according to a programme that varies the ratio "time of presence of washing water / time of absence of washing water" and/or varies the delivery of washing water in time for each plate (2) as a function of the dimensions of the same so as to make flow on each of them a quantity of washing water that remains for a time that satisfies the thermo-fluid-dynamic requirements for the functioning of each plate and of the overall electro-static precipitator.

2. A unit according to claim 1 characterized in that said plate (2) is a plate made of a rectangular mesh (8) in which the shorter side of each rectangle is positioned horizontally in the electro-static precipitator and it's length is equal or less than 3 mm., the longer

side is longer than 3 mm and the diameter of the mesh-wire (9) is equal or less than 1.2 mm.

3. A unit according to claim 2 characterized in that said mesh plate (2) has mesh (8) of a square shape with sides around 3 mm.

4. A unit according to claims 1, 2 and 3 characterized in that said inner pipe (5) is fixed eccentrically (E) towards the upper side of the outer pipe (3).

5. A unit according to claims from 1 to 4 characterized in that inside said distributor of washing water (1) the ratio between the total internal section of the outer pipe (3) and the internal section of the inner pipe (5) is equal at least to 2; the holes along the lower generatrix of the outer pipe (3) have a diameter no greater than 4 mm. and are spaced at no more than 30 mm. from one another; the apertures (7) in the inner pipe (5) are spaced from one another in a constant or variable manner according to the length of the pipe and their total section is at least equal to the total section of the holes (4) in the outer pipe (3).

6. A unit according to the previous claims characterized in that said plate (2) is a capture plate of a combustion smokes depuration plant.

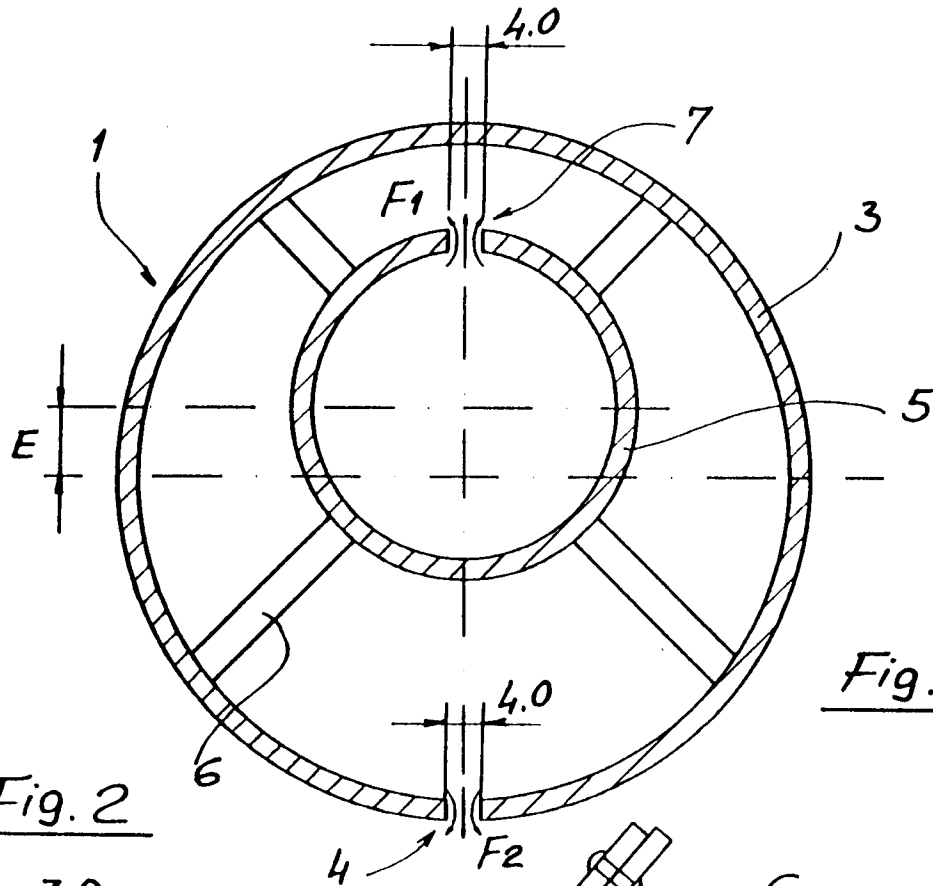


Fig. 1

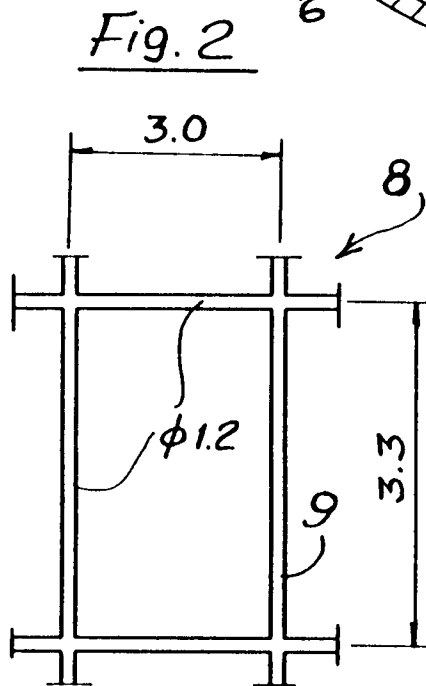


Fig. 2

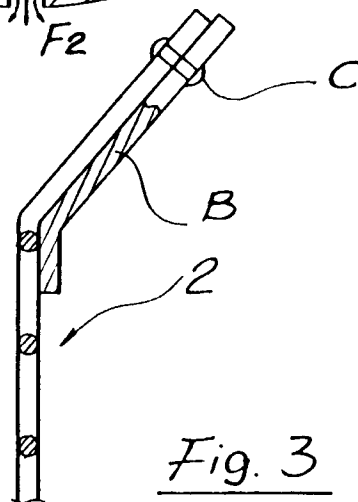
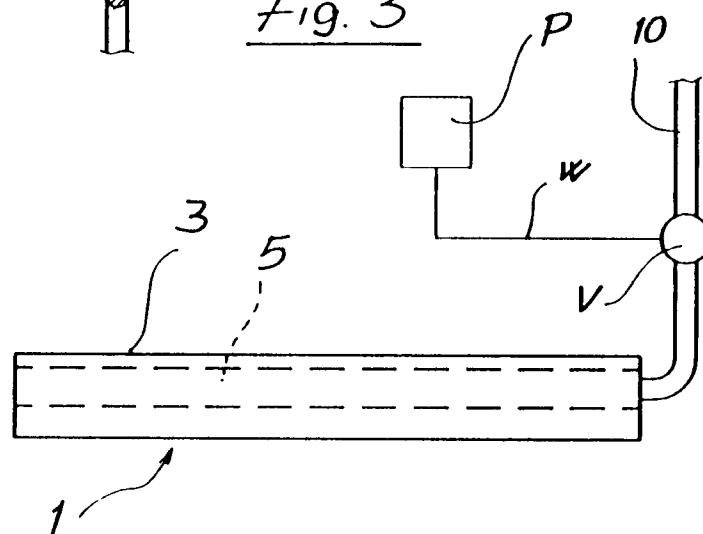


Fig. 3





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EUROPEAN SEARCH REPORT

Application Number
EP 95 11 7483

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FR-A-1 139 151 (COMPAGNIE POUR LA FABRICATION DES COMPTEURS ET MATERIEL D'USINES A GAZ) * the whole document *	1,4	B03C3/78 B03C3/53
A	CH-A-362 682 (GEMA AG) * page 2, column 1, line 15 - line 31 * * page 2, column 2, line 57 - line 77; figures 2-4 *	1-3	
A	DE-C-850 598 (METALLGESELLSCHAFT AG) * claim 1 *	1,6	
A	US-A-3 856 476 (DE SEVERSKY A) 24 December 1974 * column 10, line 51 - column 11, line 55; figure 11 *	1	
A	DE-A-22 35 332 (ELBA WERK MASCHINEN GMBH & CO) 16 May 1974		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B03C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 6 March 1996	Examiner Decanniere, L
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