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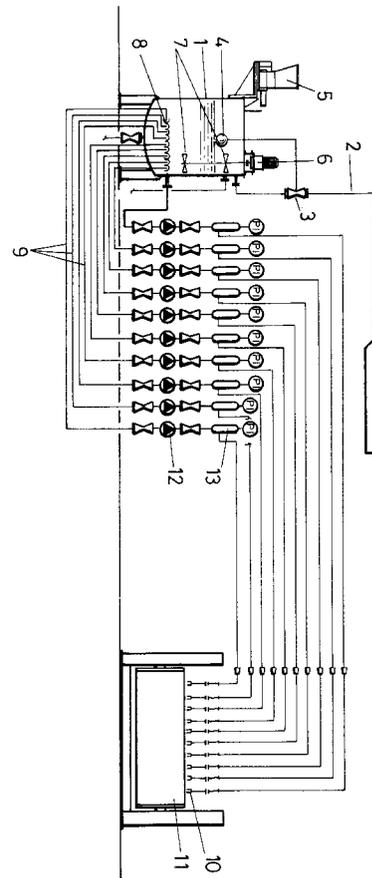
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Installation to make security documents and security documents made in such an installation.

The installation has a stirring tank (1) into which process water has access through a duct (2) working with level control means (3) and (4), and the planchettes from a batcher (5), the tank (1) having a double propeller (7) agitator (6) in order for the mixture to be perfectly homogenized. The stirring tank (1) is provided with a number of outlets (8) to which respective ducts (9) are coupled to link the said tank to a number of nozzles (10) that are in turn positioned over the mould (11) to make the security paper, a special feature being that each such duct (9) is provided with a pump (12) working with a pressure and flow regulator (13) in order in turn for the supply from the said nozzles (10) to be perfectly homogeneous.



OBJECT OF THE INVENTION

The present invention relates to an installation that is specifically designed to make security documents, such as paper used as a printing base to obtain banknotes, viz. paper money, and in particular security documents in which the pulp making up the paper will be provided with planchettes, or as appropriate also with fibrils that "personalize" the paper to enhance its security, which planchettes or fibrils are arranged as bands on the paper surface, in the flow direction of the sheet during production.

The invention also relates to the security documents that result from the practical use of the said installation.

BACKGROUND OF THE INVENTION

It is a known fact that in making paper for security documents of this kind it is a wholly widespread practice to provide planchettes and/or fibrils with special characteristics to the pulp making up the paper, in the latter's production process on the respective forming mould or cloth, in order for both the characteristics of the planchettes or fibrils and their specific apportionment to cause the document to be "personalized" as aforesaid.

Nowadays, and in applying the planchettes or fibrils in bands, these are allowed to move down towards the papermaking mould through flexible pipes and from a constant-level box, the downward movement of the planchettes being simply due to gravity, a twofold problem arising from a large deficiency in flow control which at times leads to jamming, and to the supply of planchettes being cut off, and at others to a similarly undesirable over-apportionment.

On the other hand and even in the merely theoretical event of the batching remaining constant in time, the latter may only be changed or regulated by changing the concentration or dispersion of the planchettes in the water of the planchette feed tank.

DESCRIPTION OF THE INVENTION

The installation to make security documents subject of the invention fully solves the above twofold problem, succeeding in particular to achieve an optimal flow regulation and to sustain such flow, once regulated, almost invariable in time.

Furthermore, the distribution of the planchettes on the paper is also more homogeneous and the same are better attached to the paper surface, to prevent the planchettes from becoming detached during the subsequent printing process.

More specifically, the installation to make security documents subject of the invention is structured with a stirring tank fed by the process water and a planchette batcher and with any other alternative or

supplementary additive that is deemed necessary or expedient, for instance security fibrils, the said stirring tank having a number of outlets to feed respective nozzles, that are arranged in a row and crosswise to the papermaking mould, a special feature however being that each of the ducts linking the said outlets and the relevant nozzles is provided with a drive pump, working with a pressure and flow regulator thereby to allow the flow or batching of planchettes onto the forming mould, to which the pulp fibres making up the paper are simultaneously applied, to be regulated at will, the planchettes being uniformly distributed by the likewise uniform distribution of the nozzles and the perfect flow regulation at each of them. The fact that the system relies on manifold nozzles means that they can each form a band.

Another characteristic of the invention is that the stirring tank has a double propeller agitator, viz. two propellers at a different height, their direction of rotation causing the contents of the said tank to move towards its bottom, thereby for the homogenization conditions within the said tank to be optimal.

It is also provided, as another characteristic of the invention, that the said drive pumps located at each of the outlets from the stirring tank are membrane or diaphragm pumps to avoid the same from damaging the planchettes or security elements.

Finally and as yet another characteristic of the invention, the nozzles batching the planchettes are positioned just where the sheet of paper begins to form, for the said planchettes to meet with the first fibres reaching the mould, and hence while most of the pulp fibres making up the paper remain under the planchette, some fibres remain above the same, to act as means holding the same and guaranteeing the stability thereof, in particular during the subsequent printing stage.

DESCRIPTION OF THE DRAWINGS

In order to provide a fuller description and contribute to the complete understanding of the characteristics of this invention, a single sheet of drawings is attached to the specification which, while purely illustrative and not fully comprehensive, diagrammatically shows an installation to make security documents, established in accordance with subject hereof.

PREFERRED EMBODIMENT OF THE INVENTION

The figure shows that the installation subject hereof is structured with a stirring tank (1) where the level of process water arriving through a duct (2) is kept constant with the assistance of a valve (3) controlled by a float (4) or like system, the process water being provided with the planchettes with the assistance of a batcher (5) and as appropriate with any other kind of adjuncts, such as the classic security fibrils.

The tank (1) is internally fitted with an agitator (6) having a double propeller (7), the direction of rotation of the agitator (6) shaft being such that the said propellers (7) tend to drive the mixture of water and planchettes towards the bottom of the tank (1), thereby to optimally stir the mixture and hence also to optimally homogenize the same.

The lower tank area is provided with a number of outlets (8) for the same number of ducts (9) that link the same to respective outlet nozzles (10) arranged in a transverse row on the mould (11) to make up the security paper.

Each such duct (9), and in accordance with one of the essential features of the invention, is provided with a pump (12) equipped with a flow and pressure regulator (13) in order for such regulators to afford a perfect control so that batching by the various nozzles (10) along the transverse working line they define is also perfectly homogeneous, or in other words, for the distribution of the planchettes on the surface of the security paper likewise to be perfectly homogeneous.

More specifically, the planchettes are incorporated to the paper in the last place, viz. from the nozzles (10) to the mould (11), when the water flows in which the planchettes are dispersed physically drop due to simple gravity, jointly with the indraught there is from outside at the forming cloth (the effect being the same causing paper to be formed when the pulp fibres are laid on the forming mould or cloth) to be integrated in the newly formed paper mass.

In this sense, as aforesaid and in accordance with yet another characteristic of the invention, by adjusting the nozzles (10) to batch the planchettes just where the paper sheet begins to form so that the planchettes meet the first fibres to reach the mould, while most of the paper fibres remain under the planchette in making the said paper, some remain above the said planchettes to act as a holding means therefor and, hence, afford a better attachment of the said planchettes.

A security document and in particular paper with which to prepare security documents is thus made, with the planchettes playing an essential role in providing paper with its security features being better attached to the same inasmuch as instead of being merely adhered to one of the faces thereof, they are held by some of the paper's pulp fibrils.

We feel that the description need be extended no further for any expert in the art to grasp the full scope of the invention and the advantages it offers.

The materials, shape, size and layout of the elements may be altered provided that this entails no modification of the essential features of the invention.

The terms used to describe the invention herein should be taken to have a broad rather than a restrictive meaning.

Claims

1.- An installation to make security documents, essentially characterized in comprising a stirring tank (1) with a channel (2) leading into the same to supply process water, and working with a planchette batcher (5) and as appropriate batchers for other alternative or supplementary elements, such as security fibrils, the said tank (1) being fitted with a double propeller (7) agitator (6) and the said stirring tank (1) having a number of outlets (8) connected with respective ducts (9) feeding the same number of nozzles (10) which pour the mixture of planchettes and process water onto the papermaking mould (11) for the relevant kind of security document at issue, a special feature being that each such duct (9) is provided with a pump (12) working with a pressure and flow regulator so that the pumps and flow regulators in all guarantee that the supply of planchettes will be perfectly uniform throughout the whole set of nozzles (10), regulation being absolutely individual for each of the nozzles.

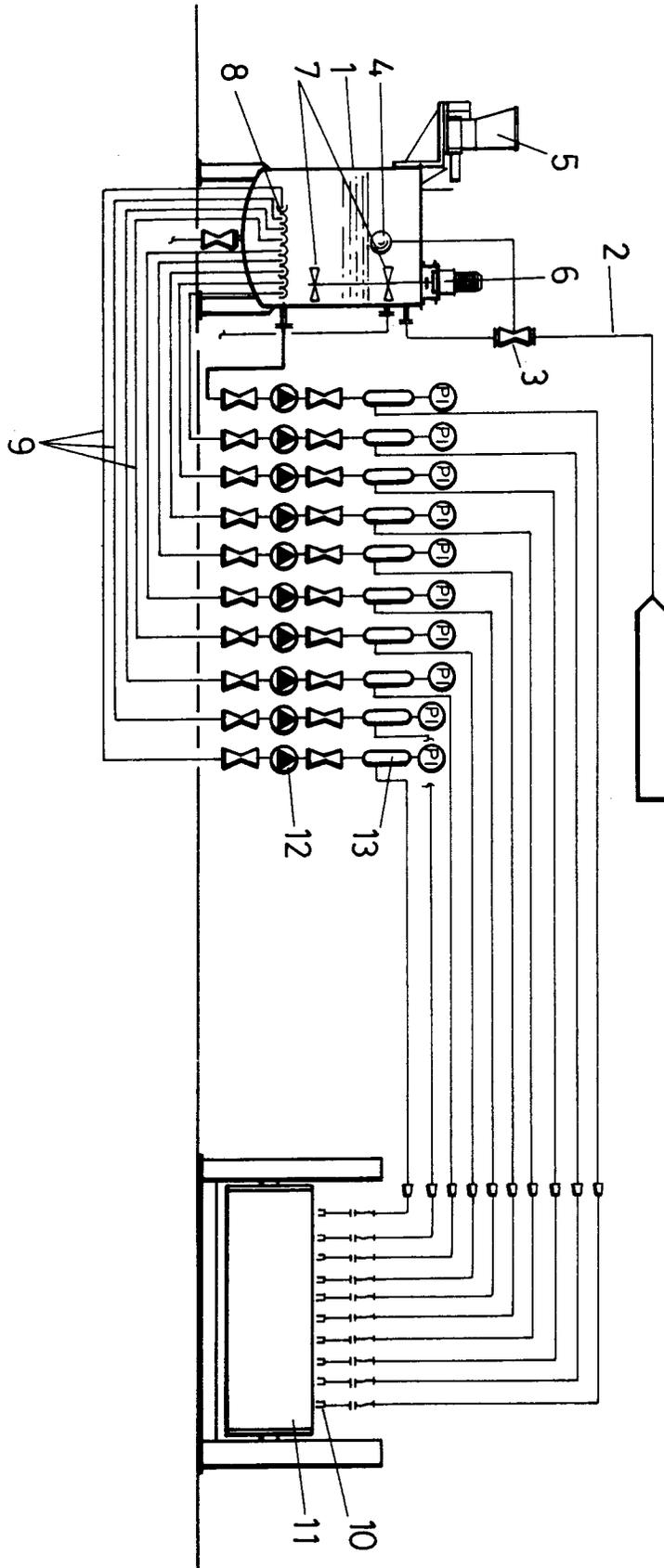
2.- An installation to make security documents, as in claim 1, essentially characterized in that the rotary movement of the agitator (6) is such that its double propeller (7) tends to move the mixture of planchettes and process water towards the bottom of the stirring tank (1).

3.- An installation to make security documents, as in the above claims, essentially characterized in that the drive pumps (12) established in each of the ducts (9) feeding the nozzles (10) are membrane or diaphragm pumps.

4.- An installation to make security documents, as in the above claims, essentially characterized in that the nozzles (10) feeding the mixture of planchettes and process water to the forming mould for the paper being the base of the document are positioned with regard to such mould just where the sheet of paper begins to form in order that the planchettes meet the first pulp fibres to reach the mould.

5.- An installation to make security documents, as in the above claims, essentially characterized in that the manifold nozzles (10) each determine the formation of a band.

6.- A document made with the installation of the above claims, being of the kind having a pulp base, specifically with a sheet of paper, to which security elements such as planchettes or as appropriate planchettes and fibrils are incorporated, essentially characterized in that the said planchettes and as appropriate also the security fibrils are positioned on a majority of the pulp cells making up the panel, but under a minority of such pulp fibrils, in order for the latter to act as means holding the planchettes and as appropriate the security fibres, to the general paper body.





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 50 0157

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.5)
A	CH-A-435 962 (SPRINGUEL) * the whole document * ---	1	D21F1/06 D21F1/44
A	US-A-3 123 520 (FISH JR.) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D21F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 MARCH 1993	Examiner ELMEROS C.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>..... & : member of the same patent family, corresponding document</p>			

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