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G. FLEISSNER
APPARATUS FOR CONTINUOUS WET TREATMENT OF FIBROUS
MATERIAL IN BAT AND LIKE FORMATION
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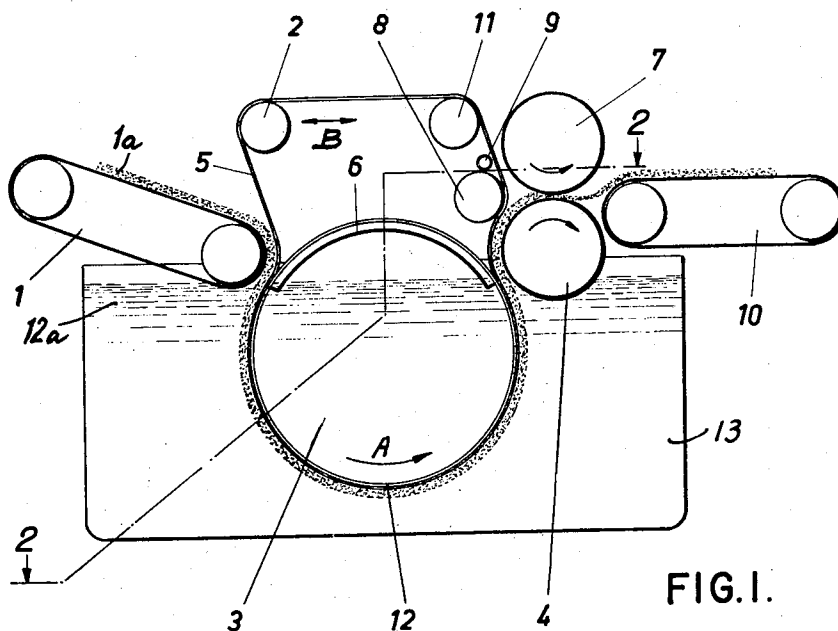


FIG. 1.

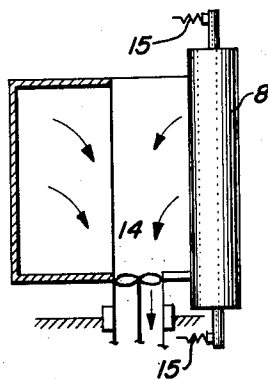


FIG. 2.

INVENTOR:
GEROLD FLEISSNER
BY *Leon M. Strauss*
AGT

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Gerold Fleissner, Egelsbach, Germany, assignor to Fleissner & Sohn, G.m.b.H. & Co., Maschinenfabrik, Egelsbach-Frankfurt am Main, Germany, a German firm

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3 Claims. (Cl. 68—158)

This invention relates to an apparatus for wet treatment of materials, in particular of loose fibrous materials or materials in bat formation or like condition, such as textiles, fibrous masses, such as wood, paper, granulated goods, such as granules of chemicals and the like.

In accordance with the present invention the material in the aforesaid condition is first supplied to a sieve or perforated drum and is then guided through a bath substance or mixture of liquids of any known impregnating, bleaching and like composition.

Approximately at a location coinciding with the level of said bath substance a cover or shield is disposed in the interior of the drum. Near this location the material, after washing thereof has taken place in a tank or vat will then not be anymore supported by the drum due to this arrangement of said cover, so that a squeeze press may be immediately disposed adjacent this location. The press arrangement can be removed sufficiently from the drum and the cover in said drum is so arranged that a conveyor sieve band will already be released from said drum when suction is applied in the interior of said drum, whereby the bat material will be deviated and further directed on to a lower roller of said press assembly.

The aforesaid press roller may, however, extend so closely to the periphery of the sieve drum that said lower roller is capable of gripping and entraining the bat which was previously released from said sieve drum. The distance between the periphery of the pressure roller and that of the sieve drum is so calculated that the material can pass unimpededly at the aforesaid location to the press rollers, while the material may still contact the periphery of the sieve drum despite the fact that an adjacent peripheral portion of the lower roller comes into action.

In order to aid in an operation and feed of the material without jamming or any disturbances, it is contemplated according to the invention that a perforated conveyor or sieve band is guided around the drum. The sieve band may be kept under tension, for instance, by means of a spring-loaded roller whereby the spring may be adjusted to different thicknesses of the bat. Preferably, the sieve band is deviated by a supporting roller, so that in the direction of the press roller which takes the bat off the drum sufficient tension is still maintained. This support roller is therefore springedly journalled, so that it maintains the tendency to move in the direction of the pressure roller arrangement.

Due to this construction the bat is positively directed toward the aforesaid press. The above mentioned support roller is therefore arranged at about the level coinciding approximately with the cross section of the bat material within the region of the pressure rollers.

In order to more easily remove the bat from the sieve band and in order to redirect any possible bat residues of the material to the sieve band, spray devices may be provided, which direct the bat material in a predetermined flow path.

It is preferred that the spray devices are supplied with a liquid fed through suitable pump or like device from

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the bath fluid. The employment of different media (such as inert gas, air, etc.) is also possible.

In order to remove and deviate the bat material from the drum, the invention further proposes spray means, if possible, without the endless band which is trained over the sieve drum.

In order that the bat material adheres to the sieve drum at portions thereof which are not covered up, a pump is provided which produces a vacuum or low pressure area within the interior of the drum. Simultaneously the aforesaid bath liquid will thus be continuously agitated. Any suitable conveyor or feed devices may be employed for supplying the material to and removing the same from the sieve drum adjacent the press.

It is therefore one of the primary objects of the present invention to provide means affording positive guidance and continuous feed and transportation of loose fibrous material in bat formation into and through a treatment bath prior to being subjected to the action of squeezing rollers for ensuing treatment steps.

It is another object of the present invention to provide means facilitating uninterrupted and smooth movement of a bat along a perforated drum within a bath liquid and thence to squeeze means to present thereafter said bat with a content of a predetermined amount of moisture to further treatment devices.

Still another object of the present invention resides in the provision of means contriving unimpeded deviation of movement and guidance of a uniform batch of loose fibrous material from one peripheral portion of a treatment drum which is rotatable in a bath liquid, to an adjacent peripheral portion of squeeze roller means preparatory to further treatment.

Yet a further object of this invention is to provide means redounding to simple tensioning and easy adjustment of endless conveyor band means for conducting loose fibrous and like material under treatment along a predetermined peripheral length of a washing or like perforated drum before the material is separated therefrom and pursues a deviatory path toward and between squeeze rollers, spraying means being further arranged adjacent said path to orient through through fluid spray said material in a desired direction, while substantially uniform layer formation and thickness of said material are maintained at all times.

Still another object of the present invention resides in the provision of means minimizing any loss of fibrous material during its passage through the treatment bath and ensuring any recovery of loose fibrous material during the course of movement of the conveyor band means for guiding and directing said material.

These and other objects of the invention will become further apparent from the following detailed description, reference being made to the accompanying drawing, showing a preferred embodiment of the invention.

In the drawings:

FIG. 1 is a schematic transverse section of an apparatus made in accordance with the invention; and

FIG. 2 is a section on reduced scale taken on line 2—2 of FIG. 1.

The device according to the invention permits in particular the treatment of loose or bat material 1a which is supplied via a conveyor belt or band 1 to the sieve drum 12. The latter is at least partially immersed in a bath liquid indicated 3 within the drum 12 and 12a outside the drum and contained in a tank 13. A pump 14 located within the interior of the hollow perforated drum 12 serves to constantly bring about movement of and agitation to said bath liquid to insure that the treatment liquid is of uniform composition before the material to be treated is fed therinto. The bath liquid 12a is then sucked out of the interior of the drum to completely empty drum 12

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so that in the latter a low pressure area is created and as a consequence thereof the material 1a adheres firmly to a portion of the drum periphery.

The sieve drum 12 is rotated by any suitable drive (not shown) in accordance with the direction of arrow A and orients the material 1a toward a lower press or squeeze roller 4, so that the material is guided to a location between the sieve band 5 and said lower roller 4 of a press arrangement 4, 7. The suction effect is, however, interrupted at this location, as in the interior of the drum 12 there is provided a suitable cover or shield plate 6 of suitable extension (preferably terminating level with the surface of bath liquid in tank 13).

The material is now delivered in upward direction along the sieve band 5 and arrives between the upper and the lower press or squeeze rollers 4, 7. It is advantageous that a stationary, but springedly journaled support roller 8 is disposed, as shown, which guides the material rather close to the location of contact of rollers 7 and 4, so that a danger of adhesion of the material to and entrainment by the sieve band 5 is considerably reduced or eliminated. The roller 8 is biased against band 5 by springs 15. Besides this, a spray pipe device 9 is provided, which aids in the deviation of the material during its transition from the sieve band and drum toward the aforesaid squeeze rollers or like treatment station.

After the material has passed the pressure or squeezing rollers 4, 7, further transmission of material to the band 10 will take place without any difficulties, from which the previously treated material can be supplied for other operational steps over the conveyor band 10.

Roller 11 functions as a fixedly arranged deviation roller, while roller 2 may be springedly displaceable in the direction of arrows B, so that the same may give, if the bat should vary with respect to its thickness.

The sieve band 5 does not have to be trained completely over hollow drum 12. It suffices if it becomes only effective at that peripheral portion thereof where the bat follows the sieve drum to a location near the squeeze or pressure roller 4. Consequently, the sieve band serves only then the purpose of guiding the material and it would therefore be also possible to employ a relatively strong spray device at such location as indicated at 9, whereby the liquid is utilized to lift the material off and to lead it from the sieve drum to the aforesaid pressure rollers.

Thus it can be seen that there has been disclosed by this invention an apparatus for wet treatment of material, in particular of material with loose fibers; comprising a hollow drum having a periphery with perforations for surface contact with said material, a tank for containing a bath liquid, said drum being partly immersed in said bath liquid when contained in said tank and arranged for rotation therein, band means at least partially trained over said drum for guiding said material therealong and within said tank, a treatment location disposed adjacent said drum and without said tank and to which said material is guided, and means associated with said drum for deviating said material from the latter to said treatment location.

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Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. An apparatus for the wet treatment of loosely piled fibrous material comprising a treatment liquid reservoir, a perforated drum rotatably mounted in said reservoir with at least a portion thereof disposed in said treatment liquid, means for producing a suction in the interior of said drum, a pair of cooperating pressure rollers rotatably mounted adjacent said reservoir at a location directly adjacent said perforated drum and with the nip therebetween located above the treatment liquid, a perforated endless belt for transporting said fibrous material directed around said perforated drum, means for feeding fibrous material to said perforated endless belt for transportation thereon around said drum under the holding action of said suction means, guide means for said endless belt including means adjacent said pressure rollers disposed to direct said perforated endless belt with the fibrous material thereon upwardly from said bath and then laterally and between said cooperating pressure rollers including roller means disposed adjacent said pressure rollers arranged to deflect said endless belt in a direction toward the nip of said pressure rollers, and spray means adjacent said pressure rollers arranged to direct a spray against the fibrous material to aid the transition of the material from said belt to said pressure rollers.

2. An apparatus according to claim 1, wherein said perforated drum includes an interior baffle disposed adjacent the upper portion to prevent suction at the interior of said drum from acting over such portion whereby material may be easily lifted from said drum at such location.

3. An apparatus according to claim 1, wherein said means for feeding said fibrous material to said conveyor belt includes an endless belt conveyor disposed adjacent said perforated endless belt and having a curved portion closely spaced to said endless belt for feeding fibrous material therebetween and onto said perforated drum.

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