Aug. 30, 1960 G. FLEISSNER 2,950,540

WILLOW DRIERS

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Fig. 1

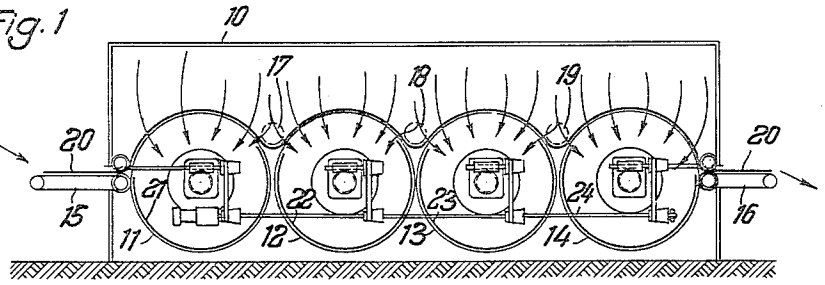


Fig. 2

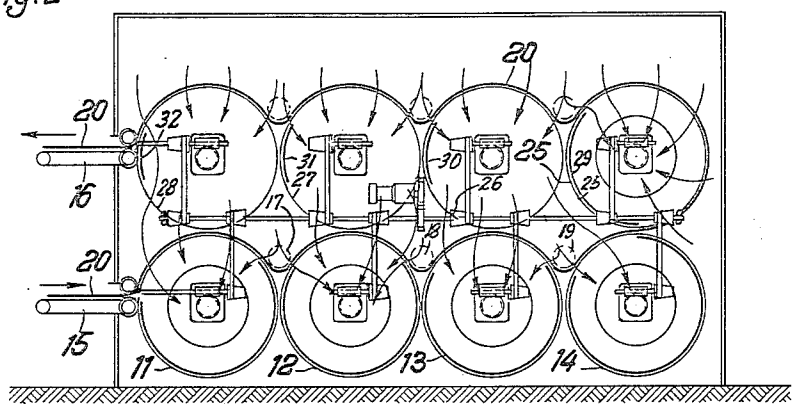
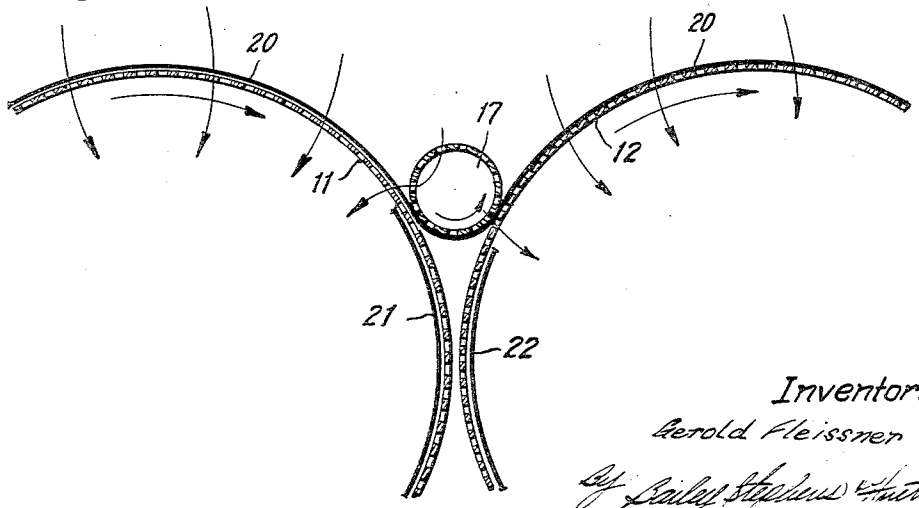


Fig. 3



Inventor:
Gerold Fleissner
By Bailey, Stephens & Hattig
Attorneys

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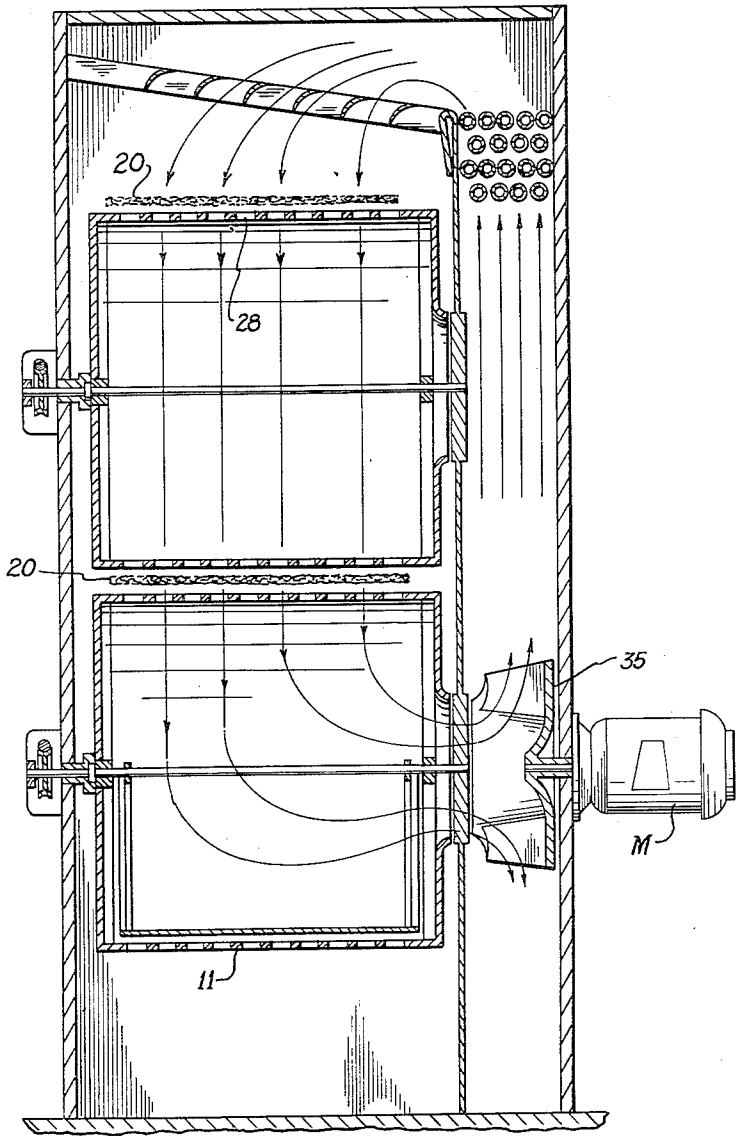


Fig. 4

INVENTOR

Gerold Fleissner

BY Bailey, Stephens & Huettig

ATTORNEYS

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WILLOW DRIERS

Gerold Fleissner, Egelsbach, near Frankfurt, Main, Germany, assignor to Fleissner & Sohn Maschinenfabrik, Egelsbach, near Frankfurt, Main, Germany, a firm of Germany

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5 Claims. (Cl. 34—115)

The present invention relates to new improvements in willow or sieve drum driers for drying loose fibrous material.

In driers of this type such as were known prior to this invention, the fibrous material or fiber bat was usually moved along a revolving sieve drum by being coiled partly over and partly under the upper and lower halves of the drums, respectively. Such movement of the material along the lower halves of the drums required considerable force in the form of suction merely for the purpose of holding the material attached to the drum surface. Therefore, since the suction required for the drying operation was also used for retaining the fibrous material on the lower drum surfaces, it was unavoidable that tufts of fibers dropped off these surfaces.

In order to be able to utilize the suction current entirely for the drying operation and to prevent fiber tufts from dropping off the drums, the attempt has already been made to dry the loose fibrous material merely on the upper sides of a series of perforated drums which are disposed adjacent each other and all rotate in the same direction. However, in carrying out such method, difficulties have been encountered in transferring the bat of loose fibrous material from one drum to the upper surface of the other. The bat was only partly picked up from the previous drum or it rolled together between the adjacent drums so that the following drum could only receive a part of it. Consequently, the material was likewise conveyed over the drums unevenly and could also not be dried uniformly.

It is therefore the principal object of the present invention to convey the bat of loose fibrous material uniformly along the upper surfaces of a series of perforated drums and to prevent the material from sticking to the individual drums, from being rolled up between adjacent drums, or from partly dropping off the drums.

A feature of the invention for attaining this object consists in providing a plurality of adjacent perforated drums which are rotated in the same direction and over the upper sides of which the bat of fibrous material is passed, and mounting a hollow perforated roller intermediate each pair of adjacent drums so as to rest and roll preferably under its own weight on the upper surface of the bat, so that the latter will be continuously in contact with and guided by the surfaces of either the surfaces of the drums or those of the intermediate rollers.

An additional advantage attained by the invention is the fact that the drying chamber in which the perforated suction drums are mounted may be of much lower height than required previously in previous driers of this type. This is due to the fact that heating elements are only required in the upper portion of the drying chamber. This advantage may be further utilized according to the invention by providing two or more rows of drums underneath each other so that the efficiency of the entire drier will at least be doubled and the outer dimensions thereof be considerably reduced.

Further objects, features, and advantages of the present invention will be apparent from the following detailed description which is to be read with reference to the accompanying diagrammatical drawings, in which—

Fig. 1 shows a willow drier according to the invention with a single row of perforated drums;

Fig. 2 shows a similar drier with two rows of perforated drums superimposed upon each other;

Fig. 3 shows a detail view of a portion of two adjacent drums with the intermediate perforated roller, illustrating its action upon the bat of fibers; and

Fig. 4 is a cross-sectional view through Fig. 2 and showing the suction through the bat and drums.

Referring to the drawings, and first particularly to Figs. 1 and 3, the new drier consists of a housing **10** in which a plurality of perforated drums **11**, **12**, **13**, and **14** are rotatably mounted. A pair of conveyor belts **15** and **16** conduct the bat **20** of loose fibrous material toward and away from the drums and the drier. Hollow perforated rollers **17**, **18**, and **19** are interposed between the adjacent drums **11**, **12**, **13**, and **14**, respectively, and rest with their own weight on the bat **20** and the respective adjacent drums. Cover plates **21**, **22**, **23**, and **24** are provided in the customary manner at the inside of the drums so as to cover up those parts of the drums from the inside thereof which are not covered on the outside by the fiber bat **20**. Thus, as shown in Fig. 3, the bat **20** runs over that part of drum **11** which is not covered on the inside by the cover plate **21**, and it is attached thereto due to the suction of the suction fans. The upper end of cover plate **21** is disposed relative to the perforated roller **17** so that there will be no suction upon bat **20** intermediate the two drums **11** and **12** so that the bat will then be released from drum **11** and be picked up by or follow the perforated roller **17** because of the fan suction which then again can exert its action. The same procedure is repeated at the perforated rollers **18** and **19** until the fiber bat **20** is finally taken off the surface of drum **14** by the conveyor belt **16**.

In this movement of fiber bat **20** along the surface of drums **11**, **12**, **13**, and **14**, the perforated rollers **17**, **18**, and **19** also rotate, being driven merely by the friction on drums **11** to **14** or the fiber bat **20**, respectively. These rollers also pull the fiber bat slightly apart without, however, changing the thickness or width thereof on the drums. Since rollers **17**, **18**, and **19** are perforated, they do not obstruct the free passage of air to the fiber bat.

Although the frictional engagement of rollers **17**, **18**, and **19** on the bat is usually sufficient to rotate the same, they may, if desired, also be positively driven by any suitable driving mechanism.

Since a willow drier of a type according to the invention may be enclosed within a very low housing **10**, it is also possible to provide two rows of such perforated drums underneath each other and to pass the fiber bat first over one row of drums, for example, the lower row, and thereafter over the other.

Such embodiment of the invention is diagrammatically illustrated in Fig. 2, in which two rows of drums **11** to **14** and **25** to **28** are mounted underneath each other, and a perforated roller is mounted between each pair of adjacent drums. The fiber bat **20** is inserted into the drier on the lower conveyor belt **15** and runs over the upper sides of drums **11**, **12**, **13**, and **14**, whereupon it is passed from drum **14** over drum **25** of the upper row and then successively over the other upper drums **26**, **27**, and **28**, and finally out of the drier on the upper conveyor belt **16**. The air then flows through the drums in a downward direction, as directed by baffles **29**, **30**, **31** and **32**, and is drawn off the lower drums in the axial

direction thereof. Motors M rotate the drums, and, if desired, the rollers by means of the gearing and shafting shown in Figs. 1, 2 and 4, and at the same time drive the suction fans **35** which communicate with the interiors of the drums for drawing an air current through the rollers, bat and drums for drying the bat.

Fig. 3 finally shows on an enlarged scale the gap intermediate two adjacent drums which is filled out by the perforated roller **17**. Such arrangement of the drums saves considerable space permitting even a larger number of drums to be mounted within the smallest possible space, thus increasing the drying efficiency of the drier and keeping the cost of production and operation thereof at the lowest possible level.

While the invention has been described in detail and with reference to certain now preferred examples and embodiments thereof, it will be understood by those skilled in the art that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new is:

1. A willow drier for drying a bat of loose fibrous material comprising a plurality of perforated drums mounted adjacent each other in the same plane, means for rotating said drums in the same direction and for passing said bat along the upper sides of said drums, a perforated roller rotatably mounted above and intermediate each pair of adjacent drums and adapted to act upon the upper surface of said bat, baffles arranged on the lower sides and inside of the said perforated drums and ending adjacent to the lines of contact between said rollers and said bat, and suction means communicating with the interiors of said drums for drawing an air current through said rollers, said bat, and said drums for drying said bat.

2. A willow drier for drying a bat of loose fibrous material comprising a plurality of perforated drums mounted in a row closely adjacent each other in the same plane, means for rotating said drums in the same direction and for passing said bat along the upper sides of said drums, a perforated roller rotatably mounted above and in the V-shaped gap intermediate each pair of adjacent drums and adapted to rest under its own weight on the upper surface of said bat, baffles arranged on the lower sides and inside of the said perforated drums and ending adjacent to the lines of contact between said rollers and said bat, and suction means communicating with the interiors of said drums for drawing an air current through said rollers, said bat, and said drums for drying said bat.

3. A willow drier for drying a bat of loose fibrous material comprising a plurality of perforated drums mounted in a row closely adjacent each other in the same plane, means for rotating said drums in the same direction and for passing said bat along the upper sides of said drums, a perforated roller rotatably mounted above and in the V-shaped gap intermediate each pair of adjacent drums and adapted to rest under its own weight on the upper surface of said bat, baffles arranged on the lower sides and inside of the said perforated drums and ending in the drums in advance of said rollers above the lines of contact between the said rollers and said bat and rearwardly of said rollers under the lines of contact between the said rollers and said bat, and suction means communicating with the interiors of said drums for drawing an air current through said rollers, said bat, and said drums for drying said bat.

4. A willow drier for drying a bat of loose fibrous material comprising a plurality of perforated drums mounted in at least two superimposed rows and closely adjacent each other in the same plane in each respective row, means for rotating said drums in one row in one direction and those in the superimposed row in the opposite direction, a perforated roller mounted above and in the V-shaped gap intermediate each pair of adjacent drums in each row and adapted to act upon the upper surface of said bat, baffles arranged on the lower sides and inside of the said perforated drums and ending adjacent to the lines of contact between the said rollers and said bat, and suction means communicating with the interiors of said drums for drawing an air current through said rollers, said bat, and said drums for drying said bat.

5. A willow drier as defined in claim 1, further comprising means for positively driving said perforated rollers at a peripheral speed substantially in accordance with the peripheral speed of said drums.

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