

Dec. 20, 1960

A. FAVA

2,964,855

MATERIAL DRIER WITH TROUGHING BELTS

Filed April 3, 1957

5 Sheets-Sheet 2

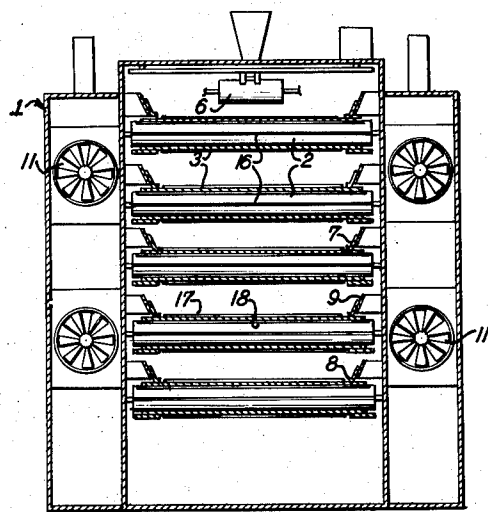


Fig. 2

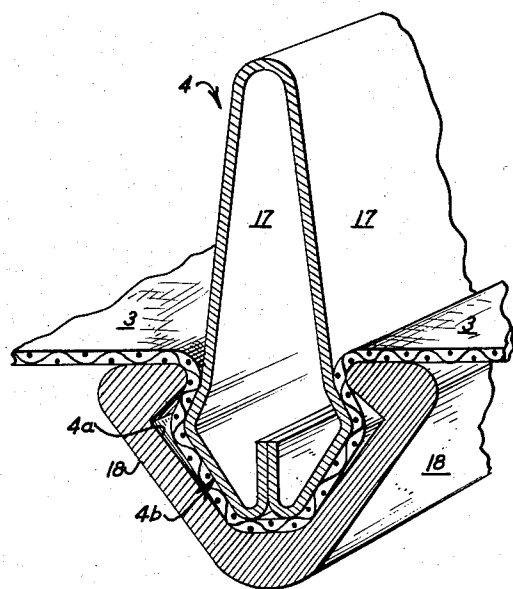


Fig. 3

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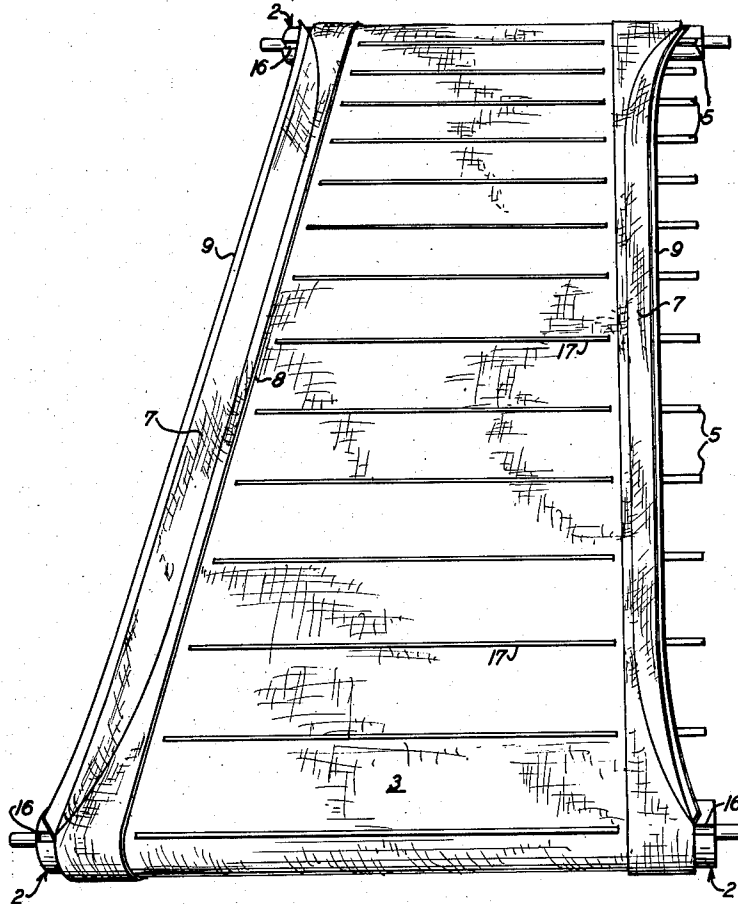


Fig. 4

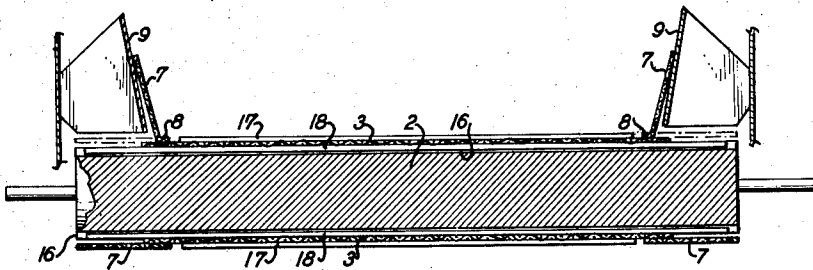


Fig. 5

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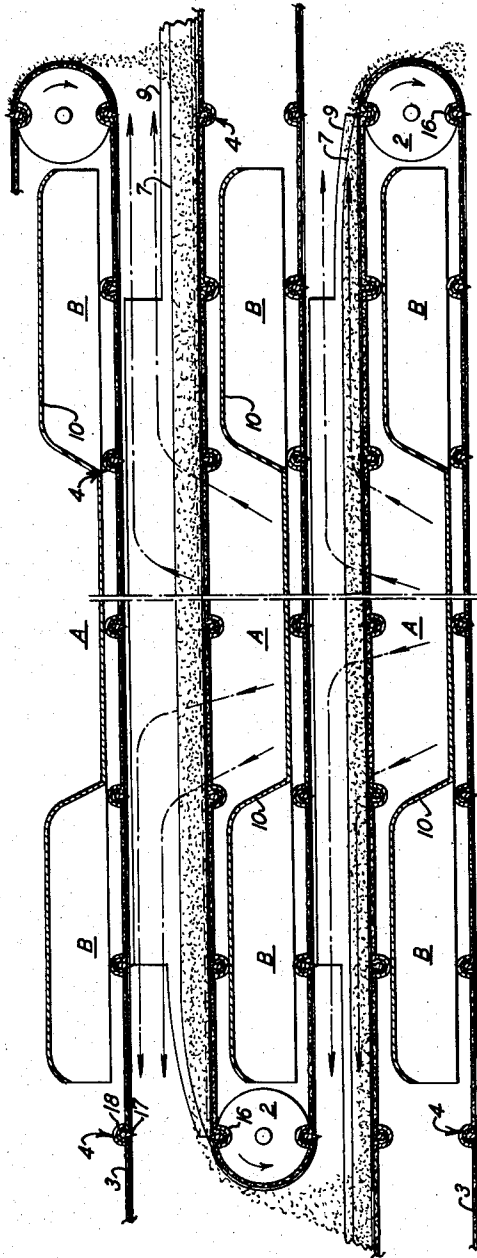


Fig. 7

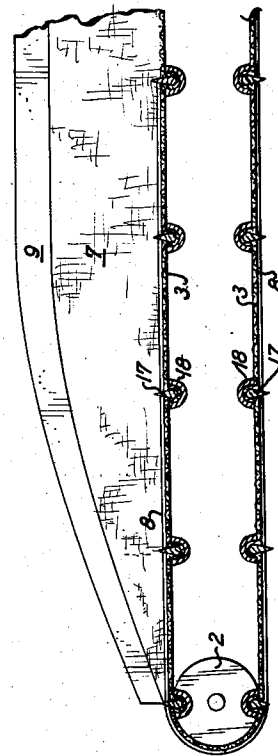


Fig. 6

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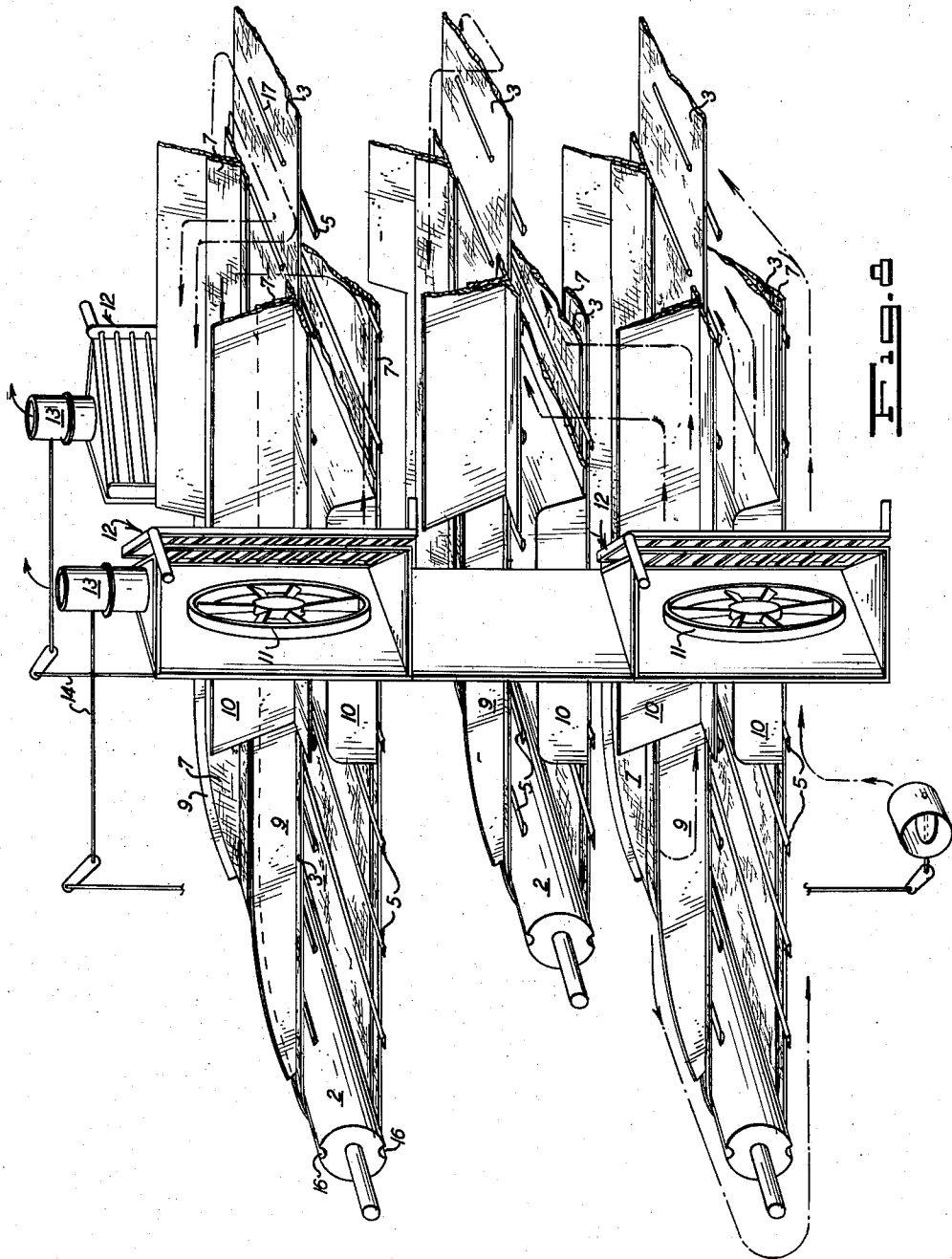
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2,964,855

MATERIAL DRIER WITH TROUGHING BELTS

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6 Claims. (Cl. 34—203)

This invention relates to conveyor systems and more particularly to conveyors adapted for use in drying equipment.

The invention is particularly concerned with provisions which have to be made with respect to drying materials such as alimentary paste. Further, the invention is concerned with permitting a drying process to be effected as rapidly as possible with apparatus requiring a minimum of space.

It is, accordingly, an object of the invention to provide an improved conveying system.

It is, moreover, an object of the invention to provide an improved drying device.

A further object of the invention is to provide an improved drying device especially suitable for effecting the drying of alimentary paste.

In achieving the above and other of its objects, the invention contemplates the provision of a system of conveying belts housed in a unit in which the temperature and moisture conditions are susceptible of being maintained at substantially constant and optimum values.

A feature of the invention is the provision of means whereby a flexible foraminous belt which is especially suitable for the curing of alimentary paste is maintained rigid by transverse supports.

A further feature of the invention relates to the use of these transverse supports for positive engagement by driving rollers which are adapted for engaging the transverse supports.

Another feature of the invention relates to the provision of hingedly displaceable side flaps which are mounted on the belts of the invention and which normally lie flatly thereagainst but which are displaceable to substantially perpendicular positions so as to provide sides for the belt for maintaining the materials to be treated on the belt and for the further purpose of guiding the flow of a drying medium.

Still another feature of the invention is the provision of particular guiding means for guiding the flow of a drying medium in a predetermined path which is most suited for the type of material to be treated.

Another feature of the invention is the combined utilization of the aforementioned guides and transverse members to coact for the purpose of confining the paths provided for the flow of the drying medium.

Still a further feature of the invention which is contemplated, is the provision of a readily applied type of transverse support which support performs the functions noted above.

The above objects and features of the invention will be discussed in the following detailed description along with other objects and features of the invention as well as advantages thereof.

In the drawings:

Fig. 1 is a diagrammatic side elevation with the side wall removed.

Fig. 2 is a section taken on line 2—2 of Fig. 3 but

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with the end rollers turned 90° in order to show the grooves 16 in the rollers 2.

Fig. 3 is a top plan view, partially broken away, of the invention.

Fig. 4 is a perspective view of one of the conveyors.

Fig. 5 is a section taken through one of the end rollers 2.

Fig. 6 is a section taken through the end portion of one of the conveyors and the end roller 2.

Fig. 7 is a sectional view showing diagrammatically the passage of air through the conveyors.

Fig. 8 is a perspective view of part of the conveying and drying means of the invention, and

Fig. 9 is a sectional detail of one of the sheaths 4 in use.

In the drawing, casing 1 serves to provide a hermetically sealed chamber for maintaining temperature and moisture conditions whereby the material to be dried may favorably undergo the drying process. Moreover, casing 1 serves to support all of the members and mechanisms required for the operation of the drier.

Said mechanisms include drive rolls 2 which support and drive conveyor belts 3 which are made of a flexible and foraminous material and are made substantially rigid by a system of transverse sheaths or reinforcing members 4, said sheaths having tubular rods 5 for rendering them slidable in associated guides.

For charging the upper belt of the drier, there is provided an oscillating distributor 6 having the function of distributing the product to be dried uniformly over the width of the belt.

The movement of the material to be treated, from the point of entrance to the point of exit from the drier, is effected by allowing the material to fall from one belt onto the next lower belt, these belts having opposite movements with respect to one another.

With reference to a first feature of the apparatus, there are applied to the conveyor belts the sheaths 4 gripping said belts over their entire widths and equally spaced from one another.

With specific reference to Fig. 9, sheaths 4 each including mating elements 17 and 18, element 18 defining a socket 4a for engaging the knob-like extremity 4b of elements 17. It will be appreciated that element 17 urges a portion of belt 3 into socket 4a for purposes of a positive engagement.

A second feature of the invention is that, at the lateral edges or sides of the conveyor belts, there are hingedly connected flaps or strips 7 along the lines 8 as shown in Fig. 4. These strips normally remain adjacent the belts but eventually are engaged by the lateral guides 9 which displace the flaps towards a perpendicular position in such a way as to form two side-walls for the belt. The guides 9 are intermediate the rollers so that the strips 7 resume their normal positions at the rollers and do not interfere with the drive of the belts.

Distinguished from known systems wherein the side-walls of the conveyors are independent segments vertically or angularly fixed to the belts, the invention affords the advantage of simplicity and avoids excessive space requirements because the strips 7 assume vertical positions only along the sections at which the belts are charged. Hence, space saving and, consequently, complete utilization of the capacity of the drier is achieved, since a greater number of belts can be accommodated as compared with conventional driers of equal height.

The flaps further avoid contact with fixed walls and thus avoids the possibility of friction and of the falling of the conveyed materials, as well as the mechanical annoyances that might derive therefrom.

For the drying of alimentary paste, there are provided flexible belts of net material and a system of

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ventilation designed to effect a rapid distribution of a drying medium such as hot air while taking into account the delicacy of the material to be treated.

With reference to Fig. 7, in the interior spaces confined by the conveyor belts, there are provided guides 10 including a depressed central portion and attached elevated portions.

The air stream caused by blowers 11 is introduced by conduits into the interior zones at A and at both sides of the drier and the two opposite currents create a pressure in said zones.

Since this pressure must find an exit, the medium passes through the net of the belts and the material lying thereon. This, however, occurs only at the zones A because of elevations of the guides at zones B.

It would not be possible to maintain a sharp distinction of conditions between the zones A and B if there were not provided projections 4 on each belt. Projections or reinforcements 4 constitute by themselves a feature of the invention since they serve to stiffen the belts and constitute positive means for engaging grooves 16 in the rollers 2.

As illustrated in Fig. 7, a certain number of members 4 slidably engage the elevations of the guides which determine the zones B and thus prevent the air introduced into the zones A from following paths other than as desired. Thus, the invention provides the product to be dried with the possibility of rendering uniform its own moisture conditions in the static zones B.

The paths marked by arrows in Fig. 8 indicate the movement of the air in the drier, said air being moved by the blowers 11 and heated by the heat exchangers 12.

There are also provided pipes 13 for exhaust of saturated air from the drier and controlled from the outside by a system of levers 14.

There will now be obvious to those skilled in the art many modifications and variations of the invention which do not depart essentially from the spirit thereof as defined in the following claims.

What is claimed is:

1. A conveyor comprising at least one flexible conveyor belt including opposite faces, and at least one transverse reinforcing member engaged with said belt for reinforcing the same; said member comprising mating elements, one of said elements defining a socket opening and being positioned at one face of the belt and the other element being positioned at the other face of said belt, said other element including a knob-like extremity for urging a portion of the belt into the socket opening and being itself locked therein for engaging the reinforcing member with the belt; said belt including lateral edges, and said conveyor further comprising flaps connected to

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said belt adjacent said edges and guide means operatively associated with said belt for selectively lifting said flaps to provide sides for the belt at predetermined regions.

2. A conveyor comprising at least one flexible conveyor belt including opposite faces, and at least one transverse reinforcing member engaged with said belt for reinforcing the same; said member comprising mating elements, one of said elements defining a socket opening and being positioned at one face of the belt and the other element being positioned at the other face of said belt, said other element including a knob-like extremity for urging a portion of the belt into the socket opening and being itself locked therein for engaging the reinforcing member with the belt; said belt being of a foraminous material and including lateral edges, the conveyor further comprising flaps of said material hingedly connected to said belt along lines spaced from said edges, said flaps being adapted for hinged displacement towards positions normal to said belt for providing sides for the same.

3. A conveyor as claimed in claim 2 comprising a roller for driving said belt, said roller defining an axially disposed groove for engaging said reinforcing member for the positive driving of the belt.

4. A conveyor as claimed in claim 2 wherein said belt is in the form of an elongated loop comprising a blower for directing a drying medium laterally at said belt within said loop, and a guide adjacent said belt within said loop for directing the flow of the medium, said guide being spaced from said belt at different positions thereof by a distance substantially equal to the height of one of the elements of the reinforcing member for cooperating with said one element in restricting the flow of the medium.

5. A conveyor as claimed in claim 2, wherein said belt is an elongated loop of foraminous material, comprising a blower for directing a drying medium at the central opening of the loop and guide means in the central opening for guiding the medium outwardly through the belt.

6. A conveyor as claimed in claim 2, wherein said one element has a substantially V-shaped cross-section with inwardly directed abutments at the extremities of the V.

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