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S. BOGATY

2,820,307

CONVEYING AND TREATING SYSTEM FOR LOOSE MATERIALS

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FIG. 1.

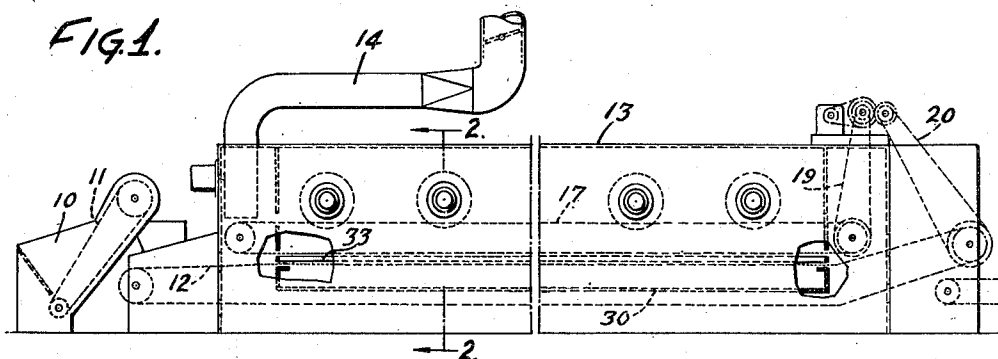


FIG. 2.

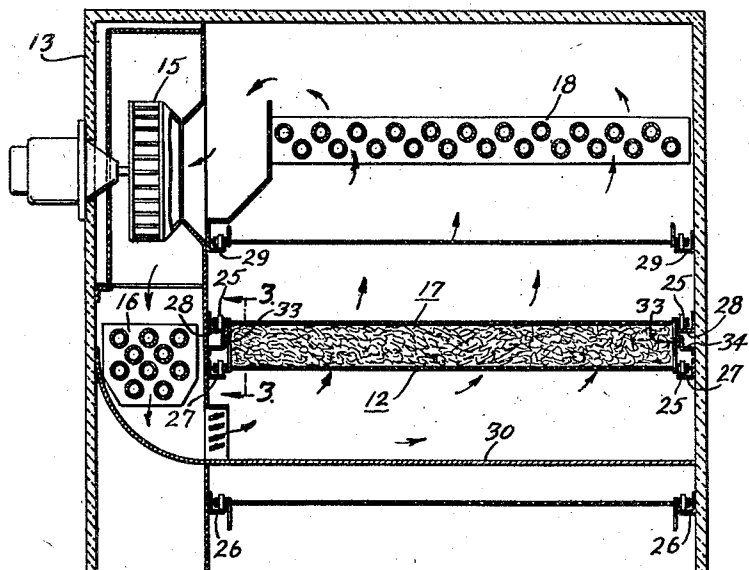
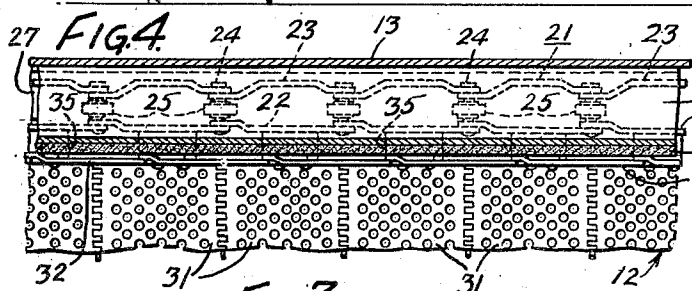


FIG. 3.

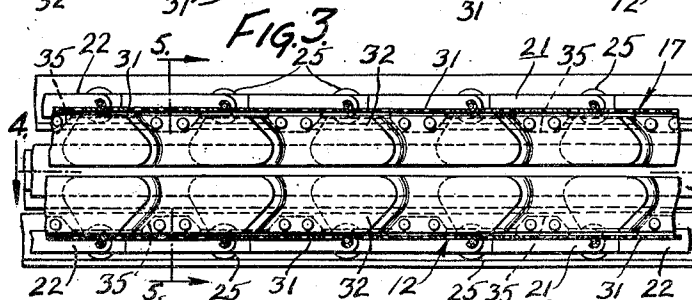
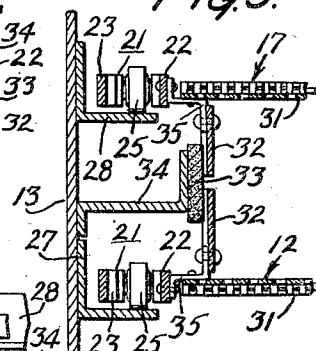


FIG. 5.



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CONVEYING AND TREATING SYSTEM FOR LOOSE MATERIALS

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10 Claims. (Cl. 34—223)

This invention relates to the art of conveying and treating loose materials. It is concerned especially with problems encountered when fibrous materials, such as tobacco, are subjected to treatment with gases or vapors while being conveyed through the treating apparatus in a continuous process.

In the drying or ordering of tobacco, for example, this treatment has been accomplished by conveying the tobacco continuously on a foraminous conveyor comprising successive hinged sections while passing the treating fluid, such as air or steam, through the bed of tobacco on the conveyor. In such treatments, metal side guards may be provided at the edges of the conveyor sections to provide confining side walls for the material under treatment, and the conveying systems may embody aligned runs of vertically spaced conveyors in which both conveyors are equipped with such side guards and in which these guards extend vertically toward each other in the confining and material treating runs.

An object of this invention has been to improve upon systems of this kind by greater cleanliness, reduction of material losses and enhancement of the general performance by better control of the flow of the treating fluids.

A more specific object has been to avoid or minimize escape of treating fluids and material under treatment from the space between the aligned confining runs.

A further object has been to provide a seal which is effective to prevent undesired loss of material or passage of gases or vapors through the spaces between the adjacent edges of the side guards attached to the opposed aligned conveyor sections.

Still further objects and advantages, and the manner in which they have been attained, will be apparent from reading of the following detailed description in the light of the attached drawing, in which:

Figure 1 is a side elevation of treating apparatus embodying the invention, with parts shown in section;

Figure 2 is a cross-section on the line 2—2 of Figure 1;

Figure 3 is a cross-section on the line 3—3 of Figure 2;

Figure 4 is a cross-section on the line 4—4 of Figure 3; and

Figure 5 is a cross-section on the line 5—5 of Figure 3.

While the apparatus of the invention may be applied in treatment of quite a variety of materials, it will be convenient if we discuss it in reference to the continuous application of treating fluids, in the form of gases or vapors, to tobacco. For example, strip tobacco may be fed at a uniform rate from hopper 10 by an automatic feed mechanism including a continuously advancing spike apron 11, and received by a pervious endless conveyor 12. In treatment of tobacco, this is preferably a wire screen but it may be any kind of surface best adapted to the processing of the particular material, such as the perforated plate conveyor illustrated in the drawing. The tobacco or other material is passed on this conveyor through a chamber or housing 13 while being subjected continuously to the drying treatment with air admitted through the housing and discharged through conduit 14

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after it has performed its drying function. As illustrated by the arrows in Figure 2, the air is circulated by blowers 15 repeatedly through the bed of tobacco lying on conveyor 12, this circulation being directed by a system of plates and baffles downwardly through heater 16 and then upwardly through the bed of tobacco on the upper run of conveyor 12, through an overlying and confining foraminous conveyor 17 and through a heater 18 before being recirculated.

In a system of this kind, it is desirable that the material under treatment be confined to minimize loss of tobacco from conveyor 12, and the aligned overlying conveyor 17 is therefore provided, with its lower run serving to form the travelling upper surface of a continuously moving treating chamber whose under surface is the upper run of conveyor 12. The upper and lower conveyors are driven through suitable variable speed mechanism by belts or chains 19 and 20 which drive sprockets which in turn receive the carrying chains 21 for the conveyors 12 and 17. These carrying chains may comprise successive sections each consisting of an inner link 22 and an outer link 23, pivotally connected together by pintles 24 which carry rollers 25 designed to travel around the sprockets and to support the chains in their longitudinal runs by bearing upon horizontal supporting flanges or tracks 26, 27, 28 and 29. By reference to Figure 2 it will be seen the conveying runs of conveyors 12 and 17 are carried by chain links supported upon the intermediate tracks 27 and 28, while the return runs are supported respectively by the lowermost track 26 below the plate or baffle 30, and by the uppermost track 29.

The conveyors 12 and 17 may be of the well known type embodying successive hinged screen or plate sections 31 secured to the individual links of the chains 21, and each individual section carries a side guard 32 extending vertically toward the correspondingly opposed guard of the coacting confining conveyor, as illustrated in Figures 2 and 5. Each side guard is laterally offset at one end to clear the adjacent end of the side guard of the next hinged section and provide a continuous side guard structure in which the offset end of each guard overlaps and rubs against the adjacent end of the corresponding guard of the next foraminous conveyor section.

Conveying and treating systems as discussed above are well known in the art, and they are subject to serious limitations, particularly with respect to cleanliness, material losses and control of fluid flow. These result directly from the fact that there is a free space between adjacent ends of opposed guards 32, through which gases or material may escape. In order to minimize these drawbacks, the apparatus is often run at a lower capacity than could be achieved if they could be eliminated.

In practice of this invention, the free space between opposed side guards is sealed by longitudinally extending strip 33 mounted in position to rub against the adjacent spaced edges of opposed side guards on each side of the material confining and treating runs of conveyors 12 and 17, and thus convert the space between these runs into a sealed treating chamber extending throughout the length of the chamber or housing 13 wherein the treatment takes place. These sealing strips may be made of any material capable of closing off the space between the side guards sufficiently to prevent or minimize loss of tobacco, but they should preferably have sufficient flexibility and resilience to maintain a fair rubbing contact against the opposed side guards. They may, for example, be of woven or molded brake lining material, micarta or felt.

The sealing strips 33 are secured by brackets 34 to opposite sides of the interior of the housing 13, and there is thus provided a self-contained sealing unit which

prevents escape of treating fluids or solids except as established by the system of conveyors, baffles and conduits.

As illustrated in Figure 3 of the drawing, the driving of the conveyor sections, and also the securement of the side guards 32 in relation to those sections, may be established through Z-shaped lugs 35, having their terminal arms secured by rivetting respectively to links 22 and side guards 32, and their central portions to the conveyor sections 31.

While the invention has been described in reference to a single illustrative embodiment, persons skilled in the art will recognize that it may be modified and refined in various ways. I therefore wish it to be understood that it is not to be limited in interpretation except by the scope of the following claims.

I claim:

1. In an apparatus for conveying loose material between opposed conveyor sections, the combination comprising a pair of conveyors having aligned vertically spaced runs between which material is adapted to be confined and conveyed, side guard plates secured to said conveyors and extending vertically toward each other with a narrow vertical space between their adjacent edges in said aligned runs, a flexible and resilient sealing strip, and means for mounting said strip for rubbing contact with said adjacent edges of the side guard plates of both of said conveyors along the longitudinal extent of said runs, whereby to provide a confining and sealed travelling chamber between said aligned conveyor runs.

2. In an apparatus for conveying loose material between opposed conveyor sections, the combination comprising a pair of foraminous conveyors having aligned vertically spaced runs between which material is adapted to be confined and conveyed, side guard plates secured to said conveyors and extending vertically toward each other with a narrow vertical space between their adjacent edges in said aligned runs, a flexible and resilient sealing strip, and means for mounting said strip for rubbing contact with said adjacent edges of the side guard plates of both of said conveyors along the longitudinal extent of said runs, whereby to provide a confining and sealed travelling chamber between said aligned conveyor runs.

3. In an apparatus for subjecting loose material to fluid treatment while being advanced between opposed conveyor sections, the combination comprising a housing within which said fluid treatment takes place, a pair of conveyors having aligned vertically spaced runs within said housing between which material is adapted to be confined, conveyed and treated, means for passing a fluid treating agent through said material between said spaced runs while so confined, side guard plates secured to said conveyors and extending vertically toward each other with a narrow vertical space between their adjacent edges in said aligned runs, a flexible and resilient sealing strip, and means within said housing for mounting said strip for rubbing contact with said adjacent edges of the side guard plates of both of said conveyors along the longitudinal extent of said runs, whereby to provide a confining and sealed travelling chamber between said aligned conveyor runs.

4. In an apparatus for subjecting loose material to fluid treatment while being advanced between opposed conveyor sections, the combination comprising a housing within which said fluid treatment takes place, a pair of endless conveyors having aligned vertically spaced runs within said housing between which material is adapted to be confined, conveyed and treated, means for passing a fluid treating agent through said material between said spaced runs while so confined, side guard plates secured to said conveyors and extending vertically toward each other with a narrow vertical space between their adjacent edges in said aligned runs, a flexible and resilient sealing strip, and means within said housing for mounting said strip for rubbing contact with said adjacent edges

of the side guard plates of both of said conveyors along the longitudinal extent of said runs, whereby to provide a confining and sealed travelling chamber between said aligned conveyor runs.

5. In an apparatus for conveying loose material between opposed conveyor sections, the combination comprising a pair of conveyors in the form of hinged foraminous sections having aligned vertically spaced runs between which material is adapted to be confined and conveyed, side guard plates secured to said conveyor sections and extending vertically toward each other with a narrow vertical space between their adjacent edges in said aligned runs, a flexible and resilient sealing strip, and means for mounting said strip for rubbing contact with said adjacent edges of the side guard plates of both of said conveyors along the longitudinal extent of said runs, whereby to provide a confining and sealed travelling chamber between said aligned conveyor runs.

6. In an apparatus for conveying loose material between opposed conveyor sections, the combination comprising a pair of conveyors in the form of hinged foraminous sections having aligned vertically spaced runs between which material is adapted to be confined and conveyed, longitudinally overlapping side guard plates secured to said conveyor sections and extending vertically toward each other with a narrow vertical space between their adjacent edges in said aligned runs, a flexible and resilient sealing strip, and means for mounting said strip for rubbing contact with said adjacent edges of the side guard plates of both of said conveyors along the longitudinal extent of said runs, whereby to provide a confining and sealed travelling chamber between said aligned conveyor runs.

7. In an apparatus for conveying loose material between opposed conveyor sections, the combination comprising a pair of conveyors having aligned vertically spaced runs between which material is adapted to be confined and conveyed, side guard plates secured to said conveyors and extending vertically toward each other with a narrow vertical space between their adjacent edges in said aligned runs, a sealing strip, and means for mounting said strip in sealing relationship to said adjacent edges of the side guard plates of both of said conveyors along the longitudinal extent of said runs, whereby to provide a confining and sealed travelling chamber between said aligned conveyor runs.

8. In an apparatus for conveying loose material between opposed conveyor sections, the combination comprising a pair of conveyors having aligned vertically spaced runs between which material is adapted to be confined and conveyed, side guard plates secured to said conveyors and extending vertically toward each other with a narrow vertical space between their adjacent edges in said aligned runs, a sealing strip of brake lining material, and means for mounting said strip in sealing relationship to said adjacent edges of the side guard plates of both of said conveyors along the longitudinal extent of said runs, whereby to provide a confining and sealed travelling chamber between said aligned conveyor runs.

9. In an apparatus for subjecting loose material to fluid treatment while being advanced between opposed conveyor sections, the combination comprising a housing within which said fluid treatment takes place, a pair of endless conveyors having aligned vertically spaced runs within said housing between which material is adapted to be confined, conveyed and treated, means for passing a fluid treating agent through said material between said spaced runs while so confined, side guard plates secured to said conveyors and extending vertically toward each other with a narrow vertical space between their adjacent edges in said aligned runs, a sealing strip, and means within said housing for mounting said strip in sealing relationship to said adjacent edges of the side guard plates of both of said conveyors along the longitudinal extent of said runs, whereby to provide a confining and

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sealed travelling chamber between said aligned conveyor runs.

10. In an apparatus for advancing loose material in a continuous bulk stream while subjecting said material to fluid treatment, the combination comprising a pair of conveyors in the form of hinged foraminous sections having aligned vertically spaced runs between which material is adapted to be confined and conveyed, longitudinally overlapping side guard plates secured to said conveyor sections and extending vertically toward each other with a narrow vertical space between their adjacent edges in their said aligned runs, a stationary, longitudinally extending flexible and resilient sealing strip, and means

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for mounting said strip in rubbing relationship to adjacent outside edges of the longitudinally overlapping series of side guard plates of both of said conveyors along the longitudinal extent of said runs whereby to provide a confining and sealed traveling chamber between said aligned conveyor runs.

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