

[54] **METHOD AND DEVICE FOR FORMING
A STREAM OF MATERIAL
CONSISTING OF TANGLED SHREDS
SUCH AS TOBACCO**

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198/69; 222/55, 56, 64; 302/30, 42, 59, 62;
214/17 CA

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[57] **ABSTRACT**

In a method for forming a stream of material consisting of tangled shreds such as tobacco and having a substantially constant density, wherein a reserve supply of material having a substantially constant volume is formed by bringing the material in the direction of the stream and discharging the said material in the same direction, further comprising the step of exerting the pressure of a compressed gaseous fluid on the said reserve supply of material in the direction of the stream.

4 Claims, 6 Drawing Figures

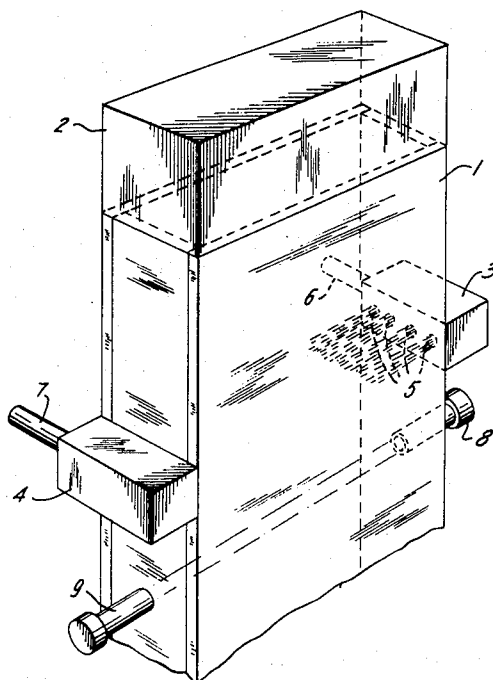


FIG. 1

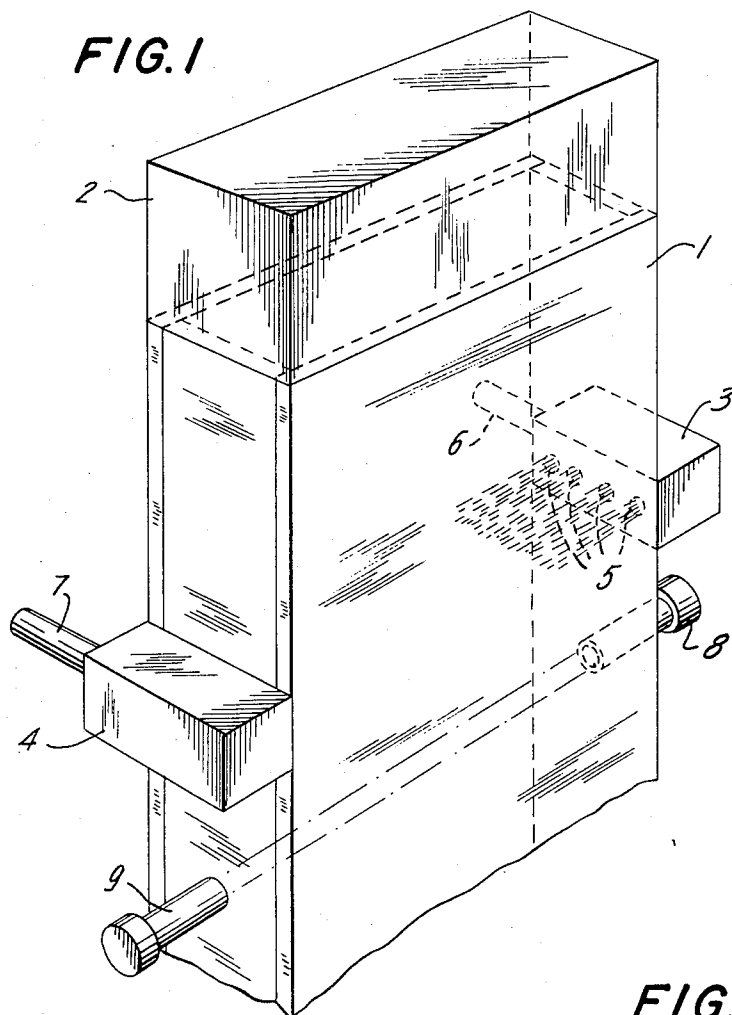


FIG. 2

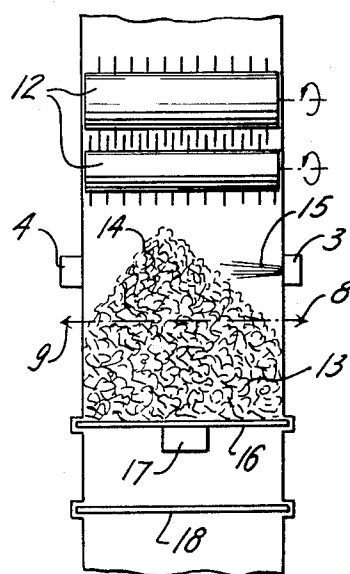


FIG. 3

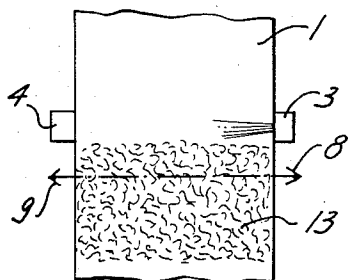


FIG. 4

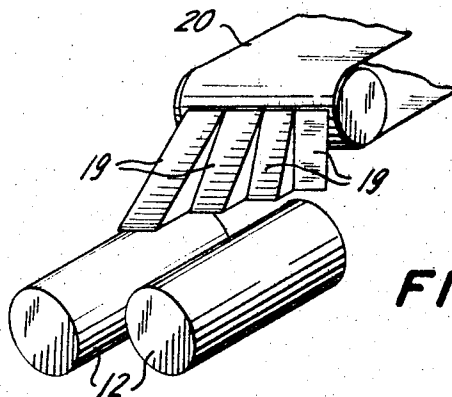
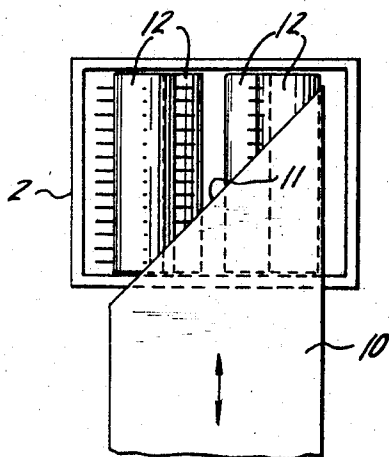


FIG. 5

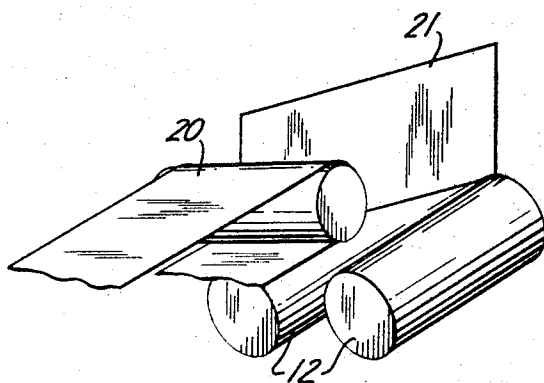


FIG. 6

METHOD AND DEVICE FOR FORMING A STREAM OF MATERIAL CONSISTING OF TANGLED SHREDS SUCH AS TOBACCO

This invention relates to a method and device for forming a stream of material consisting of tangled shreds such as tobacco.

In order to constitute equal doses of interlaced material of this type by dividing the downstream end of a product stream into separate portions, it is usually endeavored to maintain above the separating devices a column of material which has a substantially constant height in order that the pressure exerted on the downstream portion which is to constitute the dose should be substantially constant. In order to reduce inequalities in metered supply which arise from the inherent nature of the material, a pressure can be applied on the top of the column. The means which consist in applying a weight such as a piston head are subject to disadvantages which arise from the need for a non-continuous supply process.

The present invention relates to a method which permits continuous supply of material, that is to say in which the supply proceeds without interruption while the dose is made-up and discharged.

To this end, the invention provides a method for forming a stream of material consisting of tangled shreds such as tobacco and having a substantially constant density of the type in which a reserve supply of material having a substantially constant volume is formed by bringing the material in the direction of the stream and discharging said material in the same direction. The method essentially consists in applying the continuous or non-continuous pressure of a compressed gaseous fluid to said reserve supply of material in the direction of the stream.

Advantageously, the fluid under pressure is applied in accordance with the method on each side of the stream, thereby providing a completely free passageway for said stream. Moreover, by applying the fluid under pressure alternately on each side of the stream, a distribution of the material over the entire cross-section of the column is obtained by means of the method. In particular, the material is distributed during downward motion and this serves to eliminate the formation of banks which are detrimental to the homogeneity of the stream and consequently to the uniformity of doses.

This result is obtained in particular by making use of compressed-air jets which are delivered in a direction which makes an angle with the direction of motion of the stream, the angle being at the maximum a right-angle in order that the air pressure and the means for displacing the stream which can be gravity forces may both produce action in the same direction.

Moreover, in the case of a downwardly moving stream under consideration, the method has the further advantage of causing the fall of tangled shreds which would otherwise be retained by the supply means located at the upstream end.

It should be added that, if said air jets produce action in alternate sequence, the effect thereby achieved is to subject the mass of tobacco to transverse vibration within the passageway and this further enhances the homogeneity of said mass.

This invention is also concerned with a device having a vertical passageway which is fitted with a level-detection device, supply means placed upstream of the passageway for ensuring leak-tightness of the top opening of said passageway and at least two air-blowing nozzles which are disposed symmetrically on the walls of the passageway and are controlled so as to operate in alternate sequence.

As an advantageous feature, the air-blowing nozzles can be placed upstream of the level-detection device and as close as possible to said device. This arrangement makes it possible to equalize the level of the column of material at the level of the photoelectric device. Thus, the admission of material is initiated as soon as the cell is unmasked; and, by preventing time-lags, a substantially constant height is maintained within the column.

Moreover, in order to assist the action of the blowing nozzle, the supply means are preceded by at least one conveyor whose downstream extremity is positioned above said means, the vertical plane which contains said extremity being oblique with respect to the vertical plane of displacement of the material. This form of construction permits uniform distribution of the material between supply means such as rollers which thus distribute the material over the entire width of the column. Moreover, the shreds or short pieces of tobacco which form part of the same transverse section of the initial stream are released successively, thereby assisting the distribution of shreds within the column.

The following description relates to one exemplified embodiment of the invention which is given without any intended limitation, reference being made to the accompanying drawings, in which:

FIG. 1 is a view in perspective showing a device in accordance with the invention;

FIGS. 2 and 3 illustrate diagrammatically the operation of the device;

FIG. 4 is a top view of the device showing the supply means;

FIGS. 5 and 6 illustrate different forms of construction of the upstream portion of said supply means.

In the example of FIGS. 1 to 4, a vertical passageway 1 having a rectangular cross-section is surmounted by a supply device which is mounted within a casing 2 and ensures by means of the mass of material and by means of the pairs of rollers 12 which rotate in the direction of the arrows both relative leak-tightness at the top portion of the passageway 1 and at the same time a compression of air as a result of rotation of the sets of paired rollers of both the studded and vane type which constitute the supply means.

Two blowing devices 3 and 4 constituted by nozzles 5 are mounted symmetrically on the side walls of the passageway 1. Said nozzles are supplied by means of two pipes 6 and 7 connected to a common compressed-air source which is provided with a reversing system for supplying the nozzle 3 or nozzle 4 in alternate sequence.

Beneath said devices, a photoelectric cell 8 and a lamp 9 are adapted to control the admission of material into the passageway when the cell is not masked. The blowing devices are located at a short distance from the photoelectric device in order to unmask the cell by causing the air jets to produce action as rapidly as

possible on the "bank" of material and on hanging shreds, thereby permitting of practically uninterrupted supply.

The material 13 which is supplied by the rollers 12 forms within the passageway 1 a "bank" 14 (as shown in FIG. 2). The air jets 15 which are delivered alternately from the nozzle 3 and the nozzle 4 have the effect of breaking-up the bank of material and restoring this latter to a uniform level as shown in FIG. 3.

The proportioning blade 16 which is mounted on a piston 17 is adapted to move beneath the bottom opening of the column.

A vibrating plate 10 (shown in FIG. 4) has a bevelled terminal edge 11 and is placed above the studded rollers 12 which serve to supply the passageway 1.

In the example of FIG. 5, the vibrating plate 10 is replaced by a set of plates 19 contained in concurrent planes, the intersection of which corresponds to the extremity of the conveyor belt 20, the downstream extremities of said plates being located in relatively displaced relation above the rollers 12.

In the example of FIG. 6, the vibrating plate is replaced by a vertical plate 21 which forms a deflector and is disposed slantwise with respect to the rollers 12.

The means of FIGS. 5 and 6 permit uniform packing of the rollers 12.

The operation of the device according to the invention is as follows:

The material 13 which is made up of tangled shreds and fed into the passageway 1 by the rollers 12 masks the photoelectric device 9.

The bank of material which is formed at the top level of the column is equalized by the nozzles 3 and 4 which operate alternately but produce a continuous admission of air above the column. This admission of compressed air has the effect on the one hand of equalizing the level so that this latter reaches a plane which is very close to the axis or center-line of the light beam and on the other hand of detaching the shreds which hang from the rollers 12 and are liable to mask the cell after the level of the column has fallen below the plane of said cell.

The action of the compressed-air jets and of the additional air pressure which is produced by the rotating system of pairs of rollers 12 exerts on a mass of shreds of given height a pressure which has the effect of compressing the tobacco on the table 18 under conditions such that the weight of the dose which will be formed between the blade 16 and the table 18 will be rendered uniform irrespective of the particle size and elasticity of the material.

Furthermore, the compressed air generates above the column a pressure which results in uniformity both in density and distribution of the material.

When the top level of the column is equalized and the shreds which are suspended from the rollers 12 have been detached by the air jets 15, the photoelectric device 8 - 9 initiates the admission of material into the

passageway as soon as the cell has been unmasked, thus maintaining a substantially constant height. The result thereby achieved is to remove the undesirable phenomena which result in lack of constancy in the height of the mass and consequently impair the effect of the compression on the uniformity of the dose.

What we claim is:

1. In a method for forming a stream of material consisting of tangled shreds such as tobacco and having a substantially constant density, wherein a reserve supply of material having a substantially constant volume is formed by bringing the material in the direction of the stream and discharging the said material in the same direction, further comprising the step of exerting the pressure of a compressed gaseous fluid on the said reserve supply of material in the direction of the stream, at least part of the compressed fluid is applied on each side of the stream in alternate sequence and in a direction which makes an angle equal at a maximum to a right-angle with the direction of the stream.

2. In a device for forming a stream of material consisting of tangled shreds such as tobacco and having a substantially constant density, comprising means defining a vertical passageway for receiving a downflowing stream of material, a supporting element mounted transversely to the said passageway and capable of shutting-off the said passageway at the bottom portion thereof and retaining the said material, level-detecting means located above the said supporting element, means for supplying material and means for ensuring leak-tightness at the top portion of the passageway, means supplying gaseous fluid under pressure alternately to at least two nozzles mounted opposite each other on the walls of said passageway and directing the fluid in opposite directions towards the central portion of the said passageway.

3. In a device according to claim 2, wherein said nozzles are placed upstream of said level-detecting means and in the immediate vicinity of said means.

4. In a device for forming a stream of material consisting of tangled shreds such as tobacco and having a substantially constant density, comprising a vertical passageway for receiving a downflowing stream of material, a supporting element mounted transversely to the said passageway and capable of shutting off the said passageway at the bottom portion thereof and retaining the said material, level-detecting means located above the said supporting element, means for supplying material and means for ensuring leak-tightness at the top portion of the passageway, means supplying gaseous fluid under pressure to at least two nozzles for blowing compressed gaseous fluid mounted on the walls of said passageway whereby directing the fluid in opposite directions towards the central portion of the said passageway, and means for controlling said nozzles and having said nozzles produce action in alternate sequence.

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