This invention relates to tobacco conveying and feeding, more particularly to a process and apparatus; and the invention may be used for conveying and evenly spreading tobacco or other disintegrated material in cigarette machine feeds, scrap cigar machines, or other fields.

The main object of the invention is to improve the operation of cigarette tobacco feeds by replacing the apron wherein the sheet of shredded tobacco is advanced to the picker roll to be delivered through the chute on to the cigarette wrapper web with a vibrating tray. The latter may be inclined at any angle suitable for the nature of the material being handled, or it may be arranged horizontally if desired. The rapid vibration of the tray obliquely will cause the sheet of tobacco to flow uphill or down depending on the direction of inclination of the tray, in the present embodiment of the invention the tobacco flowing uphill by a sort of hopping action. This rapid agitation of the tobacco tends to spread the tobacco evenly and fill holes or low places in the sheet, and the same is one of the main advantages derived from the invention.

According to another concept of the invention, the apron of the cigarette machine feed may be suitably vibrated to assure uniformity of the tobacco sheet thereon, and the same forms still another object of the invention. Accordingly, a further object of the invention is to provide mechanism for vibrating the operating run of said apron, and to this end the said operating run may be vibrated transversely by the vibrator head of a vibrator unit of well known type; and the said head may be provided with cross-bars, if desired, engaging the under face of said run at intervals therealong; or the apron may be vibrated by a rotating polygonal cross-bar, or a series of such cross-bars, engaging the under face of the said operating run. With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a side elevation of a cigarette machine feed wherein the apron has been replaced by a vibrating tray equipped with a vibrator unit;

Fig. 2 is a sectional view of one form of vibrator unit suitable for the present invention;

Fig. 3 is a detail side elevation of another embodiment of the invention showing the vibrator head of a vibrator unit arranged to vibrate the apron of the cigarette machine feed;

Fig. 4 is a cross-section of the same on line 4-4 of Fig. 3;

Fig. 5 is a side elevation of a modified form of vibrator head for actuating the apron; and

Fig. 6 is a detail view of a rotary polygonal bar for vibrating the apron in accordance with still another embodiment of the invention.

Generally stated, in the particular embodiments herein illustrated, a layer of the material to be handled is deposited on a planar surface which is vibrated at a frequency sufficient to assure uniformity of the layer. The apparatus for carrying the process of this invention into effect may include, as herein illustrated, a vibrating surface on which shredded tobacco or other disintegrated material is deposited, the tobacco being thus spread evenly thereon and advanced to mechanism for showering the tobacco on to a traveling wrapper web. In the best constructions contemplated the vibrating surface may constitute the upper run of the apron of a cigarette machine tobacco feed, or an obliquely vibrating tray replacing said apron.

The process and apparatus of this invention may be widely varied for the specific methods and structures selected to illustrate the invention herein are but a few of the many possible concrete embodiments of the same. The invention, therefore, is not to be restricted to the details of the apparatus described herein, nor to the particular embodiments chosen as illustrative of the invention.

Referring to Fig. 1 of the drawings, the mass of tobacco in the hopper 10 is advanced toward the rotary carded feed drum 12 which picks up a sheet of tobacco therefrom. A rotary carded refuser drum 13 removes the surplus tobacco from the sheet thus formed on the feed drum and returns the same to the tobacco supply. The tobacco in the corrected sheet is removed from the feed drum by the winnower 14 and falls on to an imperforate (upwardly inclined) tray 15, which is shown upwardly inclined at a suitable acute angle, whereon the tobacco collects to form a sheet.

The tray is supported on a bracket 16 connected to a vibrator unit of the well known Jeffrey-Traylor type shown in the Traylor Patent 1,772,586, granted August 12, 1930. This unit may consist of a center clamp 17 which extends obliquely to and carries the bracket 16 and is fastened about the mid-section of a group of
2 vibrator bars 21. The bars 21 are securely clamped at their ends in the vibrator frame 22 set on bed 23 but are free to flex at their centers. The vibrator unit also includes a vibrating motor consisting of an electromagnet or stator 18 provided with coils 19, and a reciprocating armature 20 fastened to the center clamp or otherwise connected to the mid-section of the vibrator bars.

When an alternating current, or a direct current, superimposed on the alternating current, is impressed on the coils of the stator the vibrator bars will be periodically flexed due to the successive attraction of the armature toward the stator and release of the armature with each interruption or change of the current. In this manner the tray is vibrated obliquely at a frequency such that the sheet of tobacco will be spread evenly and the inertia of the disintegrated particles will cause the material to flow uphills with a sort of hopping action, as indicated by the dotted arrows in Fig. 1. The particular frequency required will of course depend on the nature of the material being handled, but with shredded tobacco a 60-cycle alternating current will be ample.

As stated above, the oblique vibration of the tray feeds the tobacco up on to the carded pin roll 25 which carries the tobacco under the pressure roll 24 which helps to guide the tobacco on to and over the concave 39 to the picker roll 25 which is enclosed by the concave 34. The picker roll removes the tobacco from the pin roll and showers it through the chute 27 on to the wrapper web P traveling through the trough 28 of well known construction provided with side bars 29.

While the apron of the cigarette machine feed may be replaced by a vibrating tray as shown in Fig. 1, according to other embodiments of the invention the apron may be retained and provided with a vibrator as illustrated in Figs. 3, 4, 5 and 6. The construction of the vibrator unit required for this purpose may be similar to that shown in Figs. 1 and 2, and the center clamp 17 thereof may carry a vibrator head 34 provided with longitudinal strips 33 engaging the under surface of the upper run of the apron 32 to vibrate the same by periodically lifting the same slightly. The tobacco deposited on the upper run of the apron 32 by a feed drum (not shown) collects thereon to form a sheet which is spread evenly by the operation of the vibrator head to fill holes and low places therein. The vibrator head may be hollowed out, as in Fig. 5, to receive the lower run of the apron or may have any other desirable or suitable configuration. As shown in Fig. 3, the apron carries the tobacco sheet on to the pin roll 25 from which it is removed by a picker roll 26 and showered through the chute 27 on to the wrapper web (not shown).

According to a modified form of the invention shown in Fig. 5, the longitudinal strips on the upper face of the vibrator head may be provided with cross-bars 35 engaging the apron at the under face of its upper run at intervals thereon. With this construction the apron may be vibrated to a greater extent and a greater uniformity of the tobacco sheet may be attained.

In the embodiment of the invention fragmentarily illustrated in Fig. 6, a cross-bar 40 of polygonal cross-section is mounted on a cross-shaft 41 carrying a sprocket 42 which is rapidly driven from the cigarette machine drive through a chain 43, each face of the cross-bar successively engaging the under face of the operating run of apron 76. 32. Preferably a set of bars 40 will be employed, and by reason of their polygonal configuration the belt will be vibrated very rapidly to assure uniformity of the tobacco sheet.

What is claimed is:

1. In a cigarette machine tobacco feed, the combination with an inclined tray, of means for depositing shredded tobacco upon said tray, a device for feeding said tray obliquely relative to the plane of the tray, whereby the tobacco deposited thereon will form a uniform sheet and be conveyed therealong, and means arranged to receive the tobacco from said tray and shower the same on to a traveling web for formation into a cigarette filler.

2. The process of forming a uniform mat of shredded tobacco and conveying the same, comprising continuously depositing shredded tobacco upon a planar surface, continuously vibrating said surface obliquely relative to the plane of said surface at a frequency such that the inertia of the disintegrated particles deposited thereon will cause them to form a uniform mat on said surface and the mat so formed will be advanced along said surface toward one end thereof with a hopping action, and continuously advancing and showering said mat on to a traveling wrapper web.

3. In a cigarette machine tobacco feed, the combination with a revolving roll, of an inclined imperforate surface arranged adjacent said roll to support a mass of shredded tobacco, a carded feed drum rotating in a source of supply of shredded tobacco to pick up a carpet of tobacco therefrom, a member for removing the tobacco from said drum and delivering it to said surface and mechanism for continuously vibrating said surface to form a uniform sheet of tobacco and feed the same on to said roll, a concave surrounding a portion of said roll adjacent the point of delivery of tobacco thereto, and a picker for removing the tobacco from the sheet on said roll as it emerges from the concave.

4. The combination with a vibratory vertically inclined tray adapted to support a mass of disintegrated tobacco, of an electromagnetically driven device for vibrating said tray obliquely relative to the plane of the tray at a frequency such that a uniform layer of tobacco will be formed thereon and fed off one end of said tray, members arranged to receive tobacco from said vibratory tray and confine the same, and mechanism arranged to receive tobacco from said members and enclose the same in a wrapper and form tobacco articles of the desired kind and a device for separating portions from the mass of tobacco confined by said members and delivering them to said mechanism.

5. In a machine for making smoking articles, the combination with a hopper holding a bulk source of supply of disintegrated tobacco, of a vibrating table arranged to receive tobacco from said supply, of means for imparting a diagonal vibrating movement to said table in a direction oblique to the plane of the table and toward one edge thereof to spread tobacco delivered thereon into a layer of uniform thickness and deliver the same in substantially uniform stream over said edge, means for forming a filler of said tobacco for making said smoking article, a device for deflecting the tobacco fed over said edge to said filler forming means, and means coacting with said hopper to feed tobacco therefrom to said table at a portion thereof remote from said edge.

6. In a tobacco feed for cigarette machines, the combination with an elongated feed chute,
of a tobacco feed roll overlying said chute, a picker roll for picking tobacco from said feed roll into said chute, a relatively wide plate providing a tobacco supporting and conveying surface having its forward edge arranged to deliver tobacco against said feed roll, said edge extending longitudinally along the axis of said feed roll, a main tobacco feed roll for feeding tobacco from a source of supply onto the rear end of said plate, a picker roll for picking tobacco from said feed roll and showering it onto the rear portion of said plate, and means for vibrating said plate at an oblique forward inclined angle with respect to the surface of the plate to produce a positive forward hopping action of the tobacco showered on said plate, whereby the tobacco is positively fed by said plate against said roll and is uniformly distributed on said plate by the vibrating action thereof, said means for vibrating the plate comprising a weighty member, an armature and alternating current magnet constituting vibrator elements and producing relative vibration between said armature and the alternating current magnet, means connecting one of said elements to the weighty member, and mechanism connecting the other to said plate.

7. In a tobacco feed for cigarette machines, the combination with an elongated feed chute, of a tobacco feed roll overlying said chute, a picker roll for picking tobacco from said feed roll into said chute, a relatively wide plate providing a tobacco conveying surface having its forward edge arranged to deliver tobacco against said feed roll, said edge extending longitudinally along the axis of said feed roll, a main tobacco feed roll for feeding tobacco from a source of supply onto the rear end of said plate, a picker roll for picking tobacco from said feed roll and showering it onto the rear portion of said plate, and means for vibrating said plate at an oblique forward inclined angle with respect to the surface of the plate to produce a positive forward hopping action of the tobacco showered on said plate, whereby the tobacco is positively fed by said plate against said roll and is uniformly distributed on said plate by the vibrating action thereof, said means for vibrating the plate comprising a weighty member, an armature and alternating current magnet constituting vibrator elements and producing relative vibration between said armature and the alternating current magnet, means connecting one of said elements to the weighty member, and mechanism connecting the other to said plate.

8. In a cigarette machine tobacco feed, the combination with a revolving carded roll, of a vertically inclined perforate tray arranged adjacent said roll to support a mass of shredded tobacco, a carded feed drum rotating in a source of supply of shredded tobacco to pick up a carpet of tobacco therefrom, a member for removing the tobacco from said drum, and delivering it to said tray, and mechanism for continuously vibrating said tray obliquely relative to the plane of the tray toward and away from said roll to form a sheet of uniform thickness and feed the same onto said roll and thereby uniformly fill the carding thereof.

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