

IMPROVEMENTS RELATING TO THE EXPANSION OF
PARTICULATE TOBACCO MATERIAL

The invention the subject of the present application relates to the expansion of particulate tobacco material.

In the specification of our United Kingdom Patent No. 2,176,385 (Application No. 86.05376), to which attention is directed, there is described a tobacco expansion apparatus comprising gaseous-medium supply means operable to supply hot gaseous-medium, a transport duct, an upstream end of which duct is in gas flow communication with the supply means, feed means operable to feed particulate tobacco material to the transport duct, and a separator of a type similar to that disclosed in United Kingdom Patent Specification No. 1,575,175 and United States Patent Specification No. 3,580,644 comprising a casing, a gaseous-medium inlet to the casing, a gaseous-medium outlet from the casing, which outlet is disposed generally opposite the gaseous-medium inlet, a gas pervious separation screen extending across the interior of the casing such that the gaseous-medium inlet and gaseous-medium outlet are at opposite sides of the separation screen, and a tobacco material outlet at the same side of the separation screen as is the gaseous-medium inlet, the gaseous-medium inlet being in gas flow communication with the downstream end of the transport duct.

In tobacco expansion apparatus as set forth in the preceding paragraph, the separator screen was mounted, for the purposes of cleaning or repair, so as to be slidably movable to and from the operative position of the screen. The mounting of the screen for

this purpose was by way of elongate mounting brackets secured at the interior surfaces of the separator casing. With the screen disposed in the operative position thereof, the mounting brackets extended along and over the margins of the screen, one set of the brackets being located above and one set below the screen.

In use of the expansion apparatus, with the temperature of moist air at entry to the transport duct being at or above 350°C, an operational defect was, however, observed. The defect was manifested by the inclusion in the tobacco passing out of the separator of lumps of highly toasted material. Not infrequently the material was even burning. Such a defect detracts from the commercial acceptability of the apparatus as set forth.

The invention the subject of the present application provides particulate tobacco expansion apparatus comprising a separator for separating expanded particulate tobacco material from a hot gaseous-medium, the separator comprising a casing, a gas-pervious separation screen disposed within the interior of the casing, an inlet for hot gaseous-medium on one side of the screen, an outlet for the gaseous-medium on the opposite side of the screen and disposed generally opposite the inlet for hot gaseous medium, an outlet for particulate tobacco material also on said one side of the screen, a transport duct having a downstream end and an upstream end, the downstream end of the duct being connected to the hot gaseous-medium inlet of the separator, means for supplying hot gaseous-medium to the upstream end of the transport duct and feed means operable to feed particulate tobacco material to an upstream region of the duct, that side of the separation screen facing the inlet for hot gaseous-

medium ~~and~~ extending over the full cross-section of gas-flow through the casing, the screen being perforated over said full cross-section and fully up to the walls of the casing, said screen being without unperforated obstructions.

5 By use of the apparatus in accordance with the subject invention the above mentioned operational defect may be completely eliminated.

In order that the subject invention may be clearly understood and readily carried into effect reference will now be made, by way
10 of example, to the diagrammatic drawings hereof, in which:-

Figure 1 shows parts of particulate tobacco expansion apparatus; and

Figure 2 shows, to a larger scale, a separator of the apparatus of Figure 1.

15 With reference to Figure 1, the apparatus there shown comprises a tobacco feeder 1, an upwardly inclined transport duct 2 and a separator 3. The tobacco feeder 1 comprises a rotary airlock 4 fitted with an inlet hopper 5 and a downwardly extending outlet pipe 6. At its lower end the pipe 6 opens into a short inclined length
20 of piping 7 and inlet end of which is in communication with a supply pipe 8. The supply pipe 8 forms part of gaseous medium supply means, otherwise not shown, operable to supply moist air at a temperature at or above 350°C.

The outlet end of the piping 7 communicates with the
25

transport duct 2. The transport duct 2 is of rectangular cross-section, the lesser dimension thereof being that viewable in Figure 1. At its upper, outlet end the duct 2 opens into a casing, generally designated by reference numeral 9, of the separator 3.

A tobacco outlet pipe 10 extends downwardly from the lowermost location of the separator 3 to a rotary airlock 11. From the airlock 11 there downwardly extends a discharge pipe 12. At an intermediate height location of the separator 3 there extends from the separator 3 an air outlet duct 13 of rectangular cross-section.

Extending across the interior of the casing 9 of the separator 3 is a downwardly inclined separation screen 14, which screen takes the form of a thin rectangular sheet of stainless steel which has been rendered gas pervious by the provision therein of micro perforations, typically in the form of 0.8 mm diameter holes. For the purpose of removably mounting the screen 14 in the casing 9, the casing 9 is divided at the plane of the screen 14 into upper and lower casing sections 15 and 16. Extending continuously about the mouth of the each of the sections 15 and 16 is an exterior securement flange. Portions of the flanges extending at the upper wall of the casing 9 are designated in Figure 2 by reference numerals 17 and 18 and portions thereof extending at an end wall of the casing 9 are designated by reference numerals 19 and 20. The remaining portions

(not shown) of the flanges of the casing sections 15 and 16 extend at the front and rear side walls of the casing 9.

As is shown in Figure 2, at its margins the screen 14 extends between the exterior securement flanges of the casing sections 15 and 16. Securement means hold the upper and lower flanges in firm contact with the interposed margins of the screen 14. The securement means comprises bolts, indicated at 21 and 22 in Figure 2, which extend through registered holes in the flanges and the screen margins. If required, gas tightness may be enhanced by the provision of sealing gaskets disposed between the flanges, one above and one below the screen.

Reference numerals 23-25 in Figure 2 designate screen rigidifying bars which extend across and are secured to the rear face of the screen 14.

The micro perforations in the separation screen 14 are distributed over the full gas-flow cross-section of the casing 9 of the separator 3, that is to say, the perforated area of the screen 14 extends fully up to the walls of the casing 9. Moreover, owing to the exterior sandwich form of mounting of the screen 14 in the casing 9, the upstream face of the screen (with reference to the direction of gas flow) 14 is unobstructed right up to the walls of the casing 9. By 'unobstructed' it is meant that there are no obstructions on the upstream face of the screen by or at which tobacco might be trapped and

therefore become over-heated or burnt.

In use of the just described tobacco expansion apparatus no toasted or burning material whatsoever was observed to exit the discharge pipe 12 even when moist
5 air at a temperature of or in excess of 350°C was supplied from the supply pipe 8.

Whereas it is preferred to use for the separation screen of the tobacco/air separator a micro perforated metal sheet, it is also conceivable to employ a wire
10 mesh screen.. If a wire mesh screen is employed, the margins of the screen sandwiched between the flanges of the separator casing are suitably of plain sheet form. This may be achieved by supporting the wire mesh in a flat metal frame, the arrangement being such that the
15 wire mesh at the upstream side thereof extends right up to the walls of the separator casing.

A further alternative is for the separator screen to be of slotted form. A suitable slotted screen is marketed by Greening Limited, Warrington, England under
20 the trade name Wedge Wire. Wedge Wire screens comprise a multiplicity of spaced apart parallel rods interconnected by laterally extending securement wires. When used for the purpose of the present invention a Wedge Wire screen would be positioned in the separator such that the
25 securement wires were at the downstream side of the screen.

Although the screen 14 of Figures 1 and 2 is flat,

it is conceivable that the screen, and correspondingly the line of separation of the casing sections 15, 16 could be convexly curved as viewed from the upstream side thereof.

5 It will be clear to a man skilled in the art that the screen may be held in position not only between exterior securement flanges of the upper and lower casing sections but also between the flange of one section and the wall of the other section of the casing,
10 or alternatively between the walls of both sections of the casing without the need for exterior flanges. It is also possible that a screen fulfilling the objectives of the invention may be suitably fixed to the interior of a separator casing which is not divided into two
15 parts.

CLAIMS

1. Particulate tobacco expansion apparatus comprising a separator for separating expanded particulate tobacco material from a hot gaseous-medium, the separator comprising a casing, a gas-pervious separation screen disposed within the interior of the casing, an inlet for hot gaseous-medium on one side of the screen, an outlet for the gaseous-medium on the opposite side of the screen and disposed generally opposite the inlet for hot gaseous medium, an outlet for particulate tobacco material also on said one side of the screen, a transport duct having a downstream end and an upstream end, the downstream end of the duct being connected to the hot gaseous-medium inlet of the separator, means for supplying hot gaseous-medium to the upstream end of the transport duct and feed means operable to feed particulate tobacco material to an upstream region of the duct, that side of the separation screen facing the inlet for hot gaseous-medium ~~and~~ extending over the full cross-section of gas-flow through the casing, the screen being perforated over said full cross-section and fully up to the walls of the casing, said screen being without unperforated obstructions.
2. Apparatus according to Claim 1, wherein said casing is divided at the plane of said screen into first and second sections.
3. Apparatus according to Claim 2, wherein said screen is releasably held by securement means between said first and second sections.
4. Apparatus according to Claim 2 or 3, wherein at the mouth of each of said sections there extends an exterior securement flange.
5. Apparatus according to Claim 4, wherein securement means are provided for releasably securing said screen between the flanges of said first and second sections of said casing.
6. Expansion apparatus substantially as hereinabove described with reference to Figures 1 and 2 of the drawings hereof.



* C L M S *