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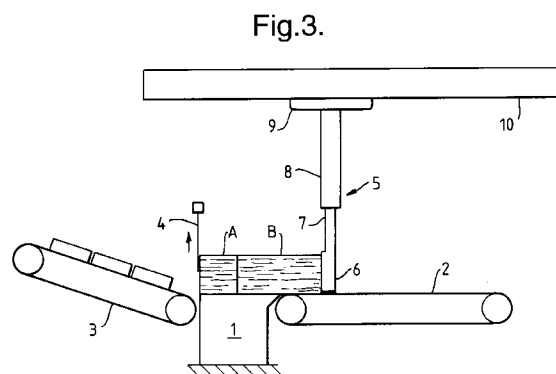
(71) Applicant : **BRITISH-AMERICAN TOBACCO
COMPANY LIMITED**
Millbank,
Knowle Green
Staines, Middlesex TW18 1DY (GB)

(72) Inventor : **Klammer, Barbara Carol**
37 Osborne Road
Totton, Southampton (GB)
Inventor : **Tatham, Ian Ernest**
108 Downscourt Road
Purley, Surrey (GB)

(74) Representative : **MacLean, Kenneth John**
Hamson et al
Patents Section
British-American Tobacco Company Ltd.
Technology Centre
Regents Park Road
Southampton, S015 8TL (GB)

(54) **Cutting tobacco bales.**

(57) An improved method of, and apparatus for, cutting tobacco bales. Bales of tobacco (A) are fed stepwise by feed means (5) through a cutting device (4), which device severs the bale in intervals between feed steps. The next bale (8) is brought into abutment with the rear face of the previous bale before the final severing cycle, the remaining portion of the first bale and the second bale being fed together in the next feed step such that the second bale is positioned for the first of the severing cycles in respect thereof. The subject invention provides a practical and simple mode of cutting tobacco bales, such that the cutting apparatus performs fully effectively a continuous cutting operation which maintains a uniform output of cut tobacco.



The subject invention relates to a method of, and apparatus suitable for, cutting bales of tobacco.

It is a conventional practice for tobacco leaf material to be packed as a compressed bale for transport to the cigarette manufacturing facility, the bales being protected by outer packaging material such, for example, as carton board. As a first stage in the tobacco leaf treatment process in the cigarette manufacturing facility it is a common practice, after removal of the packaging material, to cut a bale into slices.

Proposed modes of cutting tobacco bales are disclosed in DE 1 068 599, DE 1 139 419, EP 095 866, EP 159 836, WO 87/02868 and WO 91/00029. These proposals suffer from the fact that they are overly complex and/or lack the desired degree of practicability.

It is an objective of the subject invention to provide an improved method of, and an improved apparatus suitable for, cutting tobacco bales.

The subject invention provides a method of cutting bales of tobacco, wherein a first bale is fed stepwise by feed means through a cutting plane of a cutting device, which device transversely severs the first bale during intervals between feed steps, a second bale being, during the time elapsed for one or more severing cycles in respect of the first bale, disposed at a location remote the first bale, whereafter the second bale is brought into abutment with the rear face of the remaining portion of the first bale, and then said portion and said second bale are fed stepwise together by said feed means.

The subject invention also provides bale cutting apparatus comprising bale feed means and a bale cutting device, said bale feed means being operable to feed bales stepwise through a cutting plane of said cutting device and said cutting device being operable to sever a bale in intervals between feed steps, said feed means being further operable, during severing cycles in respect of a first bale, to move a second bale from a location remote said first bale in a direction towards said first bale and to bring said second bale into abutment with the rear face of the remaining portion of said first bale and thereafter to feed said portion and said second bale stepwise together.

Preferably, the feed means is operable to move the second bale into abutment with the rear face of the first bale prior to commencement of the final severing cycle in respect to the first bale and to maintain the abutment until the occurrence of the aforesaid feed step in which the said portion and the further bale are fed together. It is advantageous for the abutment to commence while the length of the part of the bale yet to be acted upon by the cutting device is such that the said part of the bale is fully orientationally stable.

It is preferable too that the feed means comprises pusher means, the feed means effecting movement of a bale by exertion of the necessary tractive force

on the bale via the pusher means while the pusher means is in contact with the rearward face or portion of the bale. In order to effect the movement of a second bale from a location remote said first bale in a direction towards said first bale, which first bale is in the process of being cut by the cutting device, the pusher means moves from a location to the fore of the second bale, past the second bale, to a location behind the second bale and into contact with the second bale. Advantageously, in its passage past the second bale the pusher means passes above the second bale.

The cutting plane of the cutting device is suitably an upwardly extending plane, a vertical plane being especially suitable. By preference the cutting stroke of the cutting means is a downward stroke.

With an upwardly extending cutting plane, it is preferable that the feed path of the second bale to the cutting device is substantially horizontal. It is further preferable that such feed path is, in plan view, a substantially straight path.

In order that the subject invention may be clearly understood and readily carried into effect, reference will now be made, by way of example, to the drawings hereof, which drawings (designated Figures 1-3) show, diagrammatically, elevational views of a tobacco bale cutting apparatus, the three figures depicting respective operational conditions of the apparatus.

The tobacco bale cutting apparatus shown diagrammatically in Figures 1-3 comprises a cutting table 1, a delivery conveyor 2, a take-off conveyor 3 and a cutting device comprising a cutting blade 4. The apparatus also comprises pusher means, which means is generally designated by reference numeral 5.

The cutting device comprises frame means (not shown) providing guiding means whereby the cutting blade 4 is guided for vertical upward and downward movement under the action of a pneumatic piston and cylinder unit (also not shown) of the cutting device.

The pusher means 5 comprises a pusher plate 6, an extension 7 of which is slidably mounted in a framework 8. The framework 8 is rigidly mounted from a trolley 9, which trolley 9 is mounted to run along horizontal beam means 10 under the action of an electric motor (not shown) and an endless drive chain (also not shown) which are mounted on the beam means 10. Beam means 10 is supported by uprights (not shown).

Mounted in the framework 8, and connected to the extension 7 of the pusher plate 6, is a pneumatic piston and cylinder unit (not shown) which is operable to move the pusher plate 6 from a lowermost position, as shown in Figure 1, to an uppermost position, in which the lower end of the pusher plate 6 is at a level which is above that of the upper surface of a bale of tobacco which is supported on the conveyor 2, and to return the pusher plate 6 to the lowermost position.

The cutting apparatus further comprises programmable control means (not shown), functions of

which are elucidated below.

In the operational condition of the cutting apparatus which is depicted in Figure 1 the cutting of a first tobacco bale A has been commenced. The cutting blade 4 has descended so as to transversely sever the bale A, there thereby having been produced a slice 11, which slice 11 has fallen onto the take off conveyor 3. After the blade 4 has been lifted from the lowermost position thereof, as is indicated in Figure 1, to the uppermost position, the pusher means 5 indexes forwards (to the left as viewing Figure 1) for a distance equal to a slice width, thus effecting a feed step of the bale A so that a forward portion of bale A is fed through the cutting plane of blade 4 and becomes positioned for the next cutting stroke.

The just described sequence of events is repeated until a stage is reached at which the length (forward to rearward) of the portion of the bale A yet to be cut is, say, about half the original length of the (uncut) bale A. That such stage has been reached is signalled to the aforesaid programmable control means, the signal being generated at a photoelectric cell (not shown) which detects the rear extremity of the pusher plate 6. Under direction of the control means, the pusher means 5 next effects one more feed step, whereupon the pusher plate 6 is moved to the uppermost position thereof. The pusher means 5 then moves rearwardly under the action of the aforesaid motor mounted on the beam means 10. When the pusher plate 6 has reached a position just rearward of a second bale, bale B, which is stationarily disposed on the conveyor 2, the rearward movement of the pusher means 5 is terminated and the pusher plate 6 is moved again to the lowermost position thereof. The pusher means 5 then moves forwardly thus to bring the pusher plate 6 into contact with the rear face of the bale B. In Figure 2 the broken line indicates the path of movement of the mid point of the rear face of the pusher plate 6 up until this stage. The pusher means 5 continues in forward movement until the bale B has been brought into abutment with the remaining portion of the bale A, this condition being that depicted in Figure 3. (During this forward movement of the bale B the conveyor 2 is stationary, the bale B being slid along the conveyor surface. The conveyor 2 is driven only when a bale is being fed thereonto.) During the forward movement of the bale B the aforementioned photoelectric cell detects the arrival at the location of the cell of the forward extremity of the bale B. Forward movement is then continued until the bale B has been moved by an additional distance equivalent to a width of a bale slice plus the thickness of the pusher plate 6, whereupon the bale B is in abutment, or extremely near thereto, with the remaining portion of the bale A.

The just described sequence of events, involving the rearward and the forward movement of the pusher means 5, with upward and then downward move-

ment of the pusher plate 6, which is effected in order to bring the bale B into abutment with the remaining portion of the bale A, takes place swiftly enough to ensure that when the time has been reached at which the next bale feeding step is due, the pusher means 5 is positioned such that upon the pusher means 5 indexing forward, both the remaining portion of bale A and the bale B are fed forward as a unit and the remaining portion of bale A is brought to the position thereof requisite for the next cutting action thereon.

Because the sequence of events which effects the bringing of the bale B into abutment with the remaining portion of bale A is initiated at a time when the length of that portion still represents a significant proportion of the original length of bale A, it is ensured that the said portion of bale A is fully orientationally stable. If by contrast the remaining portion of bale A was of only a short length when the said sequence of events was initiated, there would be a possibility or likelihood that the said portion would fall over once the support of pusher plate 6 was removed.

Because of its simple construction and mode of operation, as above described, the cutting apparatus performs fully effectively a continuous cutting operation such that a uniform flow of tobacco is maintained on the take off conveyor 3 notwithstanding the fact that bales yet to be cut are fed only intermittently onto the delivery conveyor 2, from, for example, a decasing unit. By running the conveyor 3 at the correct constant speed it can be ensured that the tobacco slices thereon are in abutment or near abutment. As will be appreciated by those skilled in the art, a continuous uniform flow of tobacco on the conveyor 3 is operationally advantageous in that this makes possible the attainment of uniform conditions in a conditioning unit to which the tobacco may next be fed.

When in the cutting of a first bale the stage is arrived at where the length of the remaining portion of the bale is equivalent to two slice widths and then a further, and last, severing cycle is completed, the control means operates to ensure that the cutting blade 4 remains at the uppermost position thereof for a period of time equivalent to that of a severing cycle. Upon the expiry of this period, the pusher means 5 indexes forwards to effect a feed step over a distance two times that of a normal feed step. This double distance feed step causes the last slice of the first bale to fall onto the off take conveyor 3 and also positions the next, formally abutting, bale for the first severing cycle in respect thereto.

Claims

1. A method of cutting bales of tobacco, wherein a first bale is fed stepwise by feed means through a cutting plane of a cutting device, which device transversely severs the first bale during intervals

between feed steps, a second bale being, during the time elapsed for one or more severing cycles in respect of the first bale, disposed at a location remote from the first bale, whereafter the second bale is brought into abutment with the rear face of the remaining portion of the first bale, and then said portion and said second bale are fed stepwise by said feed means.

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2. A method according to Claim 1, wherein the said abutment of the second bale with the rear face of the said remaining portion of the first bale is brought about by said feed means acting upon the second bale.

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3. A method according to Claim 1 or 2, wherein after completion of the last severing cycle in respect of the first bale and before the first severing cycle in respect of the second bale, the cutting device remains inactive for a period of time equivalent to that of a severing cycle, whereupon said second bale is fed forwards over a distance two times that of a normal feed step.

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4. Bale cutting apparatus comprising bale feed means and a bale cutting device, said bale feed means being operable to feed bales stepwise through a cutting plane of said cutting device and said cutting device being operable to sever a bale in intervals between feed steps, said feed means being further operable, during severing cycles in respect of a first bale, to move a second bale from a location remote said first bale in a direction towards said first bale and to bring said second bale into abutment with the rear face of the remaining portion of said first bale and thereafter to feed said portion and said second bale stepwise together.

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5. Apparatus according to Claim 4, wherein said bale feed means comprises pusher means.

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6. Apparatus according to Claim 4 or 5, wherein said cutting plane of said cutting device is an upwardly extending plane.

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7. Apparatus according to Claim 4, 5 or 6, wherein the feed path of the bales to said cutting device is substantially horizontal.

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Fig.1.

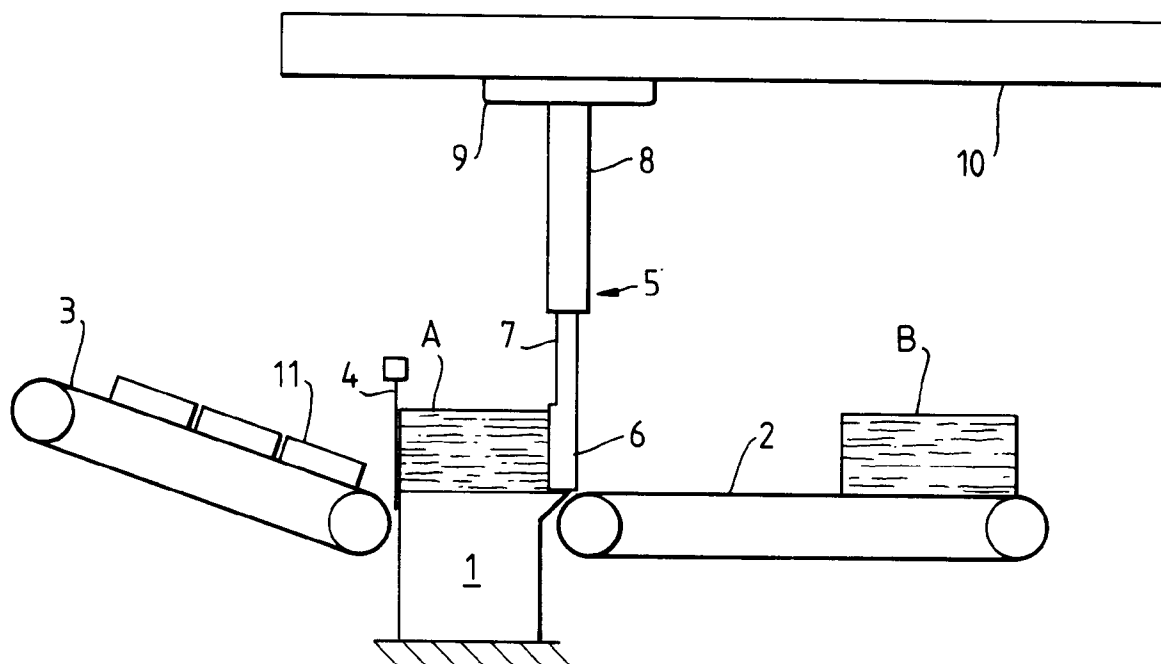


Fig.2.

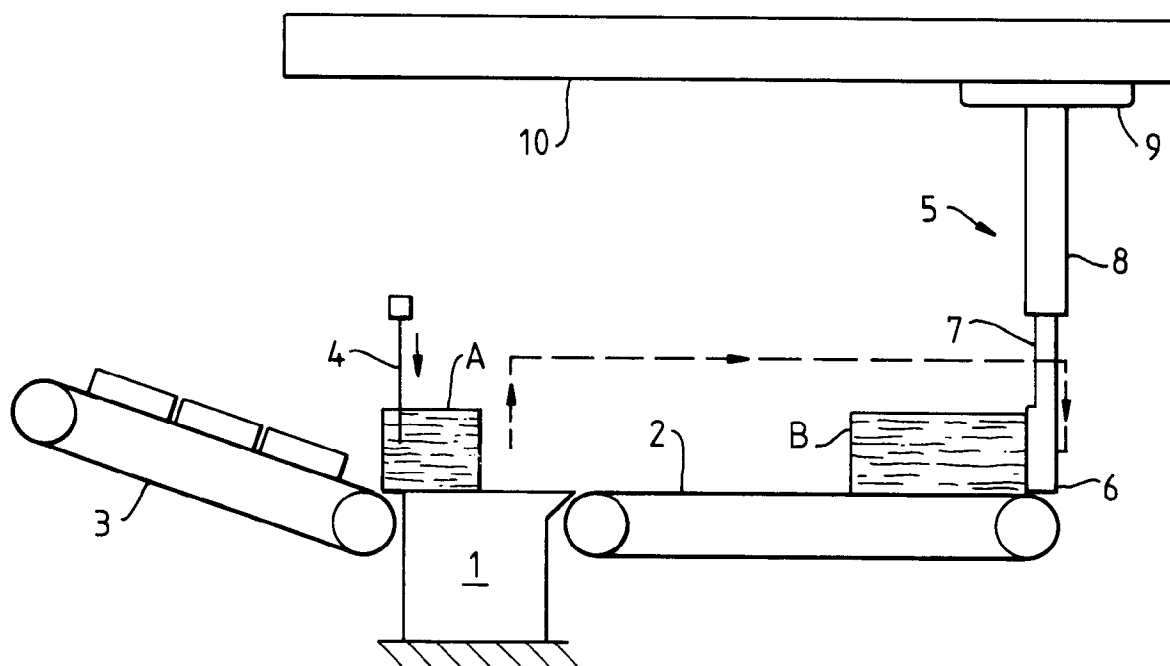
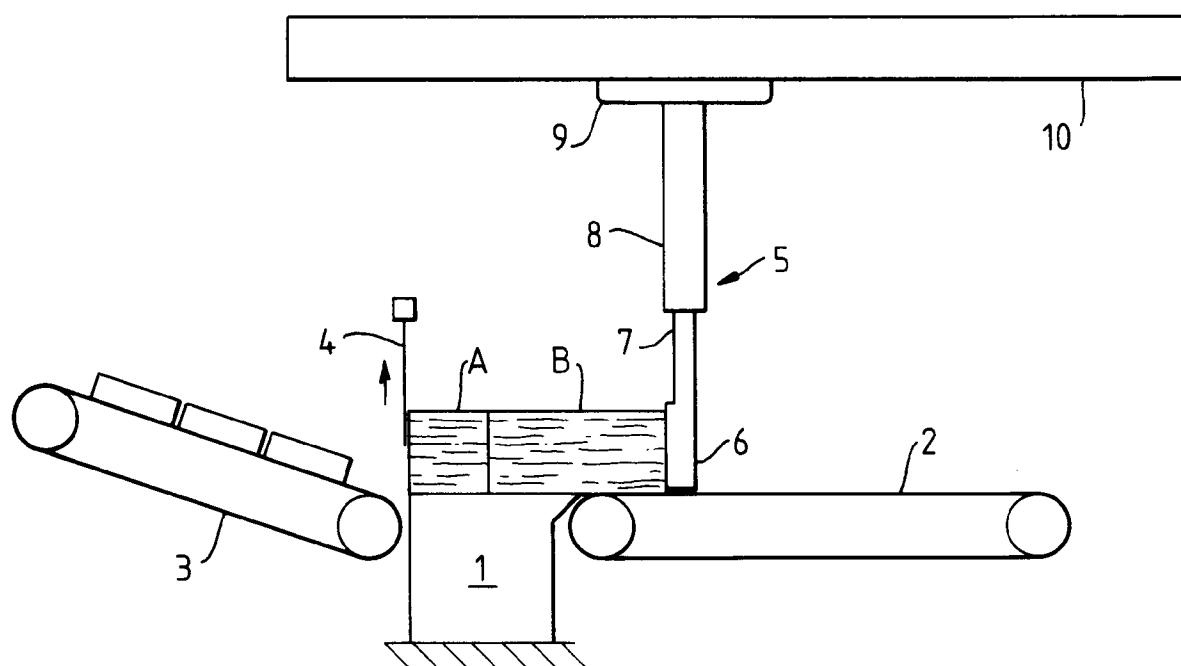


Fig.3.





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 94 30 6448

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	GB-A-2 246 279 (KORBER AG) * page 6, line 1 - page 7, line 13; figure 1 *	1,4	A24B3/06
A,D	DE-B-10 68 599 (HAUNI-WERKE KORBER) * the whole document *	1,4	
A,D	WO-A-87 02868 (GBE INTERNATIONAL PLC) * abstract; figures 1-3 *	1,4	
A	EP-A-0 511 196 (SCHIFF & STERN KG) * the whole document *	1,4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A24B B26D A01K A01D A01F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 1 December 1994	Examiner Riegel, R
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