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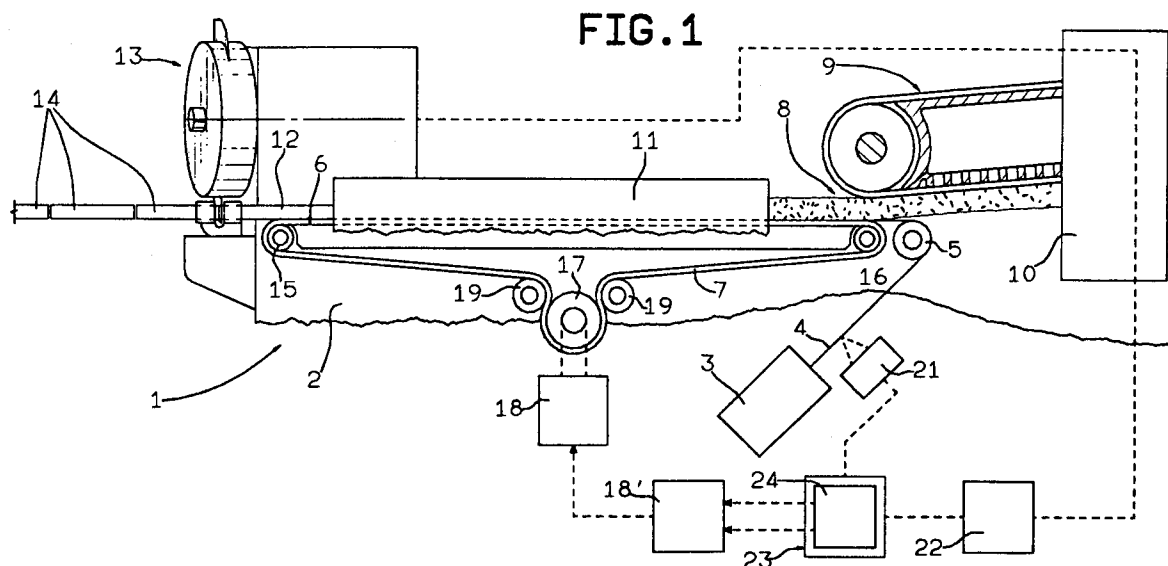
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I-10121 Torino(IT)(54) **Method of producing at least one continuous stream of cigarettes.**

(57) A method of producing a continuous stream of cigarettes (14), according to which a continuous strip (4) of paper, bearing a succession of equally-spaced reference marks (20 or 25), is fed to a loading station (8) where a stream of shredded tobacco is fed on to the strip (4); the strip (4) being advanced, at a predetermined speed, past a first detector (21) for emitting a first signal upon the passage of each

reference mark (20 or 25), and to a transverse cutter (13) associated with a second detector (22) for emitting a second signal at each cutting operation; the timing of each second signal being compared with the timing of the corresponding first signal to obtain a succession of third signals, via which the advancement speed of the paper strip (4) is controlled.


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The present invention relates to a method of producing at least one continuous stream of cigarettes.

On known cigarette manufacturing machines, a continuous strip of paper is fed on a motor-driven conveyor belt along a bed for forming a continuous cigarette rod, and through a loading station where a stream of shredded tobacco is fed on to the paper strip.

Along the path of the paper strip, upstream from the loading station, a printing device is provided for printing the brand name or trade mark on the strip, at equally-spaced intervals equal to the length of the cigarettes.

On machines of the aforementioned type, especially when operated for a certain length of time, the location of the print varies in relation to the cutter, due, for example, to variations in the speed of the conveyor belt.

To prevent this, control means are provided for detecting a shift in the print and, via transmission means, restoring the paper strip to the correct position in relation to the cutter.

While solving the above drawback, however, such a solution also affects the length of the cigarettes, the variation of which can obviously only be permitted within predetermined limits.

It is an object of the present invention to provide a method of producing at least one continuous stream of cigarettes, designed to overcome the aforementioned drawback associated with the known prior art.

According to the present invention, there is provided a method of producing at least one continuous stream of cigarettes, comprising the stages of feeding a continuous paper strip, at a predetermined advancement speed, to a transverse cutter through a loading station where a stream of shredded tobacco is fed on to the paper strip, the paper strip bearing a succession of reference marks at equally-spaced intervals equal to the length of the cigarettes being produced; folding the paper strip about the stream of shredded tobacco to form a continuous cigarette rod upstream from the cutter; and cutting the cigarette rod by means of said cutter; and being characterized in that the paper strip is advanced past a first detector emitting a first signal upon the passage of at least part of said reference marks; and the cutter is associated with a second detector emitting a second signal at each cutting operation; said first and second signals having respective timings; the timing of each second signal being compared with the timing of the corresponding first signal to obtain a third signal proportional to a difference between such timings; and said advancement speed being controlled via a succession of said third signals.

Preferably, in the method set forth above, the

reference marks are formed on the paper strip prior to use on a cigarette manufacturing machine.

The invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic front view and partial block diagram of a cigarette manufacturing machine implementing the method according to the present invention;

Figures 2 and 3 show two types of cigarette paper strips employable on the machine shown in Figure 1.

Numerals 1 in Figure 1 indicates a cigarette manufacturing machine comprising a base 2 supporting a device 3 for feeding a continuous strip 4 of cigarette paper.

At the output of device 3, strip 4 winds about a transmission roller 5 by which it is fed on to a substantially horizontal bed 6 supported in a fixed position on base 2 and in turn supporting the top branch of a conveyor belt 7.

As it travels along bed 6, strip 4 is fed through a loading station 8 where a continuous stream of shredded tobacco is fed on to it by a suction conveyor belt 9 at the output of a known feed unit 10.

Downstream from loading station 8, strip 4 engages a device for forming a continuous cigarette rod, and consisting of a known beam 11 (not shown in detail) having a curved inner section decreasing gradually so that the final portion is substantially cylindrical. Strip 4 is thus folded transversely in known manner about the shredded tobacco, to form a continuous cigarette rod 12.

At the end of bed 6, rod 12 is fed through a known cutter 13 by which it is cut into a continuous stream of cigarettes 14.

As shown in Figure 1, belt 7 is looped about two transmission rollers 15 and 16 at each end of bed 6, and about drive means comprising a drive roller 17 powered by a drive 18 connected to a known control circuit 18' described later on.

Between drive roller 17 and each of rollers 15 and 16, provision is made for two tensioning rollers 19 parallel to rollers 15 and 16.

As shown in Figure 2, prior to use on machine 1, strip 4 is marked with graphic reference marks 20 at equally-spaced intervals equal to the length of cigarette 14.

As shown in Figure 1, close to the path of strip 4, a detector 21 is provided for emitting a signal consisting of an electric pulse at the passage of each mark 20.

Similarly, cutter 13 comprises a known detector 22 for emitting an electric pulse, hereinafter referred to as a "machine pulse or signal", at each cutting operation.

The pulses emitted by detectors 21 and 22

constitute the inputs of a control circuit 23 comprising a block 24 for quantifying variations in the timing of the two signals in relation to a predetermined value, and emitting a first and second signal respectively indicating the absolute value and plus or minus sign of said variation.

Prior to startup of machine 1, the operator so positions preprinted strip 4 as to ensure cigarette rod 12 is cut by cutter 13 a predetermined distance from reference marks 20.

Under normal operating conditions, i.e. when the above conditions are met, zero signals are emitted by quantifying block 24, so that drive 18, via pulley 17 and conveyor 7, maintains a constant traveling speed of strip 4.

Conversely, in the event of a variation in the timing of the cutting operation in relation to detection of marks 20 by detector 21, due to wear or slackening of conveyor 7 or variations in the spacing of marks 20, quantifying block 24 supplies two output signals of other than zero, respectively indicating the absolute value and plus or minus sign of said variation.

On the basis of said signals, drive 18 regulates the speed of roller 17 and, consequently, the traveling speed of strip 4, so as to restore correct timing of the cutting operation in relation to detection of marks 20 by detector 21.

Following said adjustment, the output signals from quantifying block 24 eventually return to zero.

As shown in Figure 3, marks 20 may be replaced by rows of holes 25 formed in strip 4 for producing so-called "ventilated cigarettes".

Instead of varying the speed of pulley 17, the speed of conveyor 7 may, of course, be varied using, in place of pulley 17, a drive means comprising a variable-diameter pulley (not shown), as described for example in U.S. Patent No. 3,630,092, in which case, drive means 18 must be capable of so varying the diameter of the pulley as to vary the speed of conveyor 7 in the required direction.

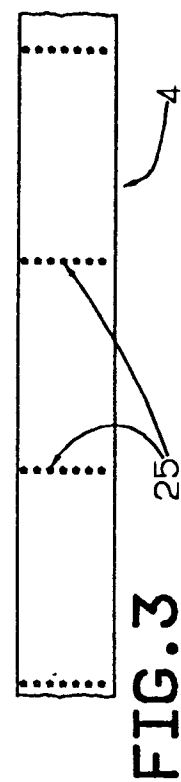
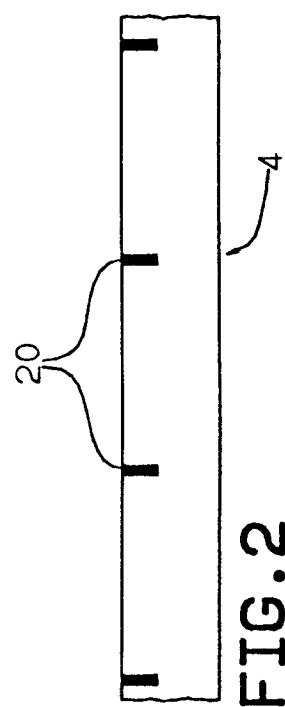
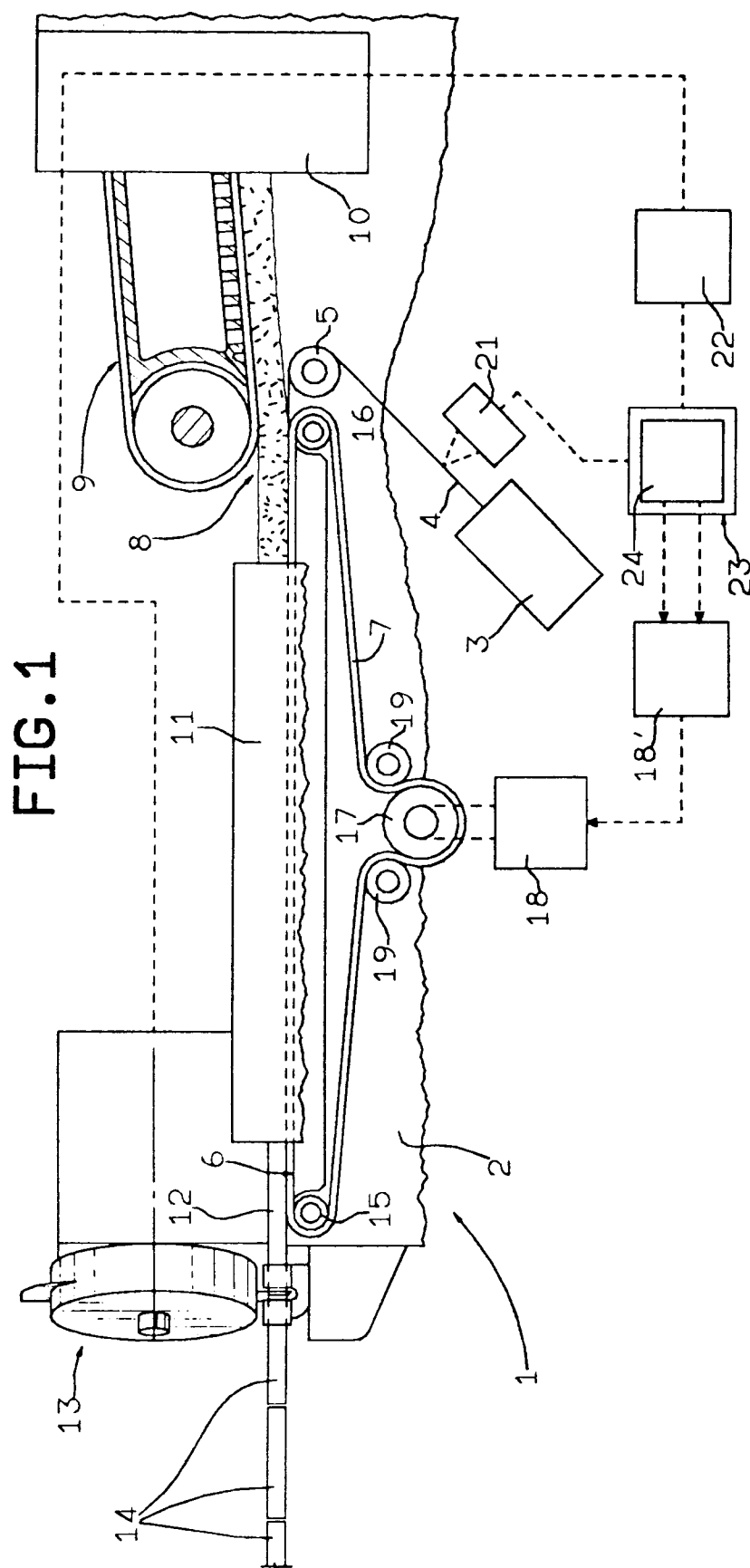
The method according to the present invention may, of course, also be applied to machines designed to simultaneously manufacture more than one cigarette rod, as described for example in U.S. Patent No. 4,336,812.

Claims

1. A method of producing at least one continuous stream of cigarettes, comprising the stages of feeding a continuous paper strip (4), at a predetermined advancement speed, to a transverse cutter (13) through a loading station (8) where a stream of shredded tobacco is fed on to the paper strip (4), the paper strip (4) bearing a succession of reference marks (20)(25) at

equally-spaced intervals equal to the length of the cigarettes (14) being produced; folding the paper strip (4) about the stream of shreadded tobacco to form a continuous cigarette rod (12) upstream from the cutter (13); and cutting the cigarette rod (12) by means of said cutter (13); and being characterized in that the paper strip is advanced past a first detector (21) emitting a first signal upon the passage of at least part of said reference marks (20)(25); and the cutter (13) is associated with a second detector (22) emitting a second signal at each cutting operation; said first and second signals having respective timings; the timing of each second signal being compared with the timing of the corresponding first signal to obtain a third signal proportional to a difference between such timings; and said advancement speed being controlled via a succession of said third signals.

2. A method as claimed in Claim 1, characterized in that the reference marks (20)(25) are formed on the paper strip (4) prior to use on a cigarette manufacturing machine (1).
3. A method as claimed in Claim 1 or 2, characterized in that said third signals are used to control a rotation speed of a driving roller (17) of a conveyor belt (7) advancing the paper strip (4) at said advancement speed.
4. A method as claimed in Claim 3, characterized by the fact that said third signals are used to vary a diameter of said driving roller (17).
5. A method as claimed in any one of the foregoing Claims, characterized by the fact that said reference marks consist of graphic marks (20).
6. A method as claimed in any one of the foregoing Claims 1 to 4, characterized by the fact that said reference marks consists of perforations (25) in said paper strip (4).





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EUROPEAN SEARCH REPORT

Application Number

EP 92 10 7650

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.5)
X	RESEARCH DISCLOSURE. no. 311, March 1990, EMSWORTH GB pages 208 - 209; ANONYMOUSLY: 'adjustment of the positions of imprints on preimprinted wrapping strips' * the whole document *	1-3, 5	A24C5/18 A24C5/28
A	GB-A-2 140 268 (GD SOCIETA PER AZIONI) * the whole document *	1, 4	
A	GB-A-2 167 938 (GD SOCIETA PER AZIONI) * the whole document *	1	
A	DE-A-3 638 751 (KORBER) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A24C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31 AUGUST 1992	Examiner RIEGEL R. E.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	