

### [54] CIGARETTE RIPPING DEVICE

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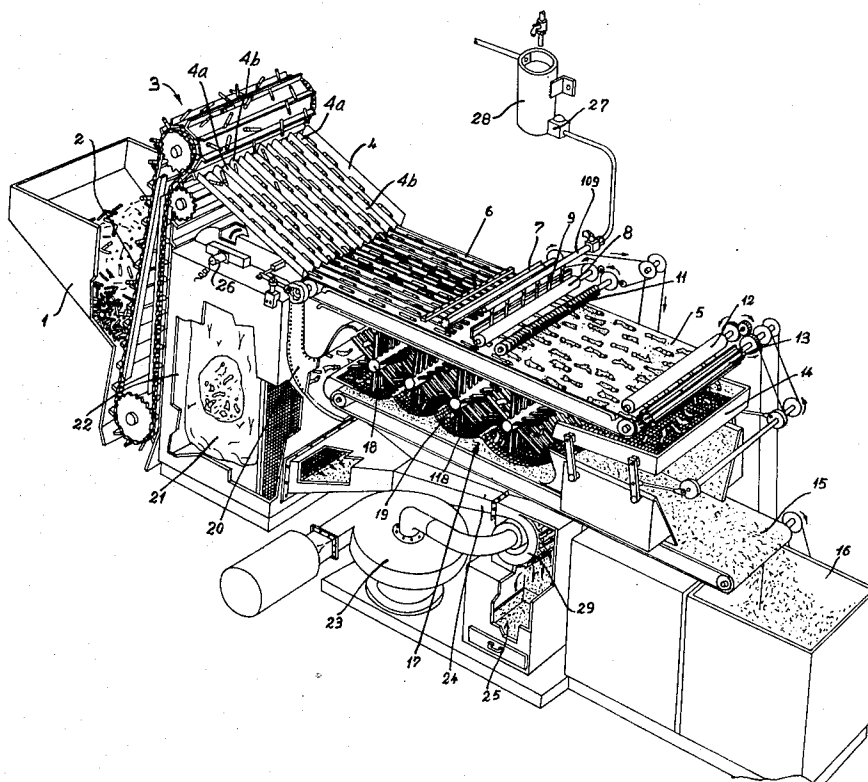
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### [57]

### ABSTRACT

In this invention, cigarettes are processed to separate the tobacco from the other parts of the cigarette. The cigarettes are stored in a random manner in a bin. An endless belt having paddle-like projections scoops cigarettes from the bin and deposits them onto a feed track having a plurality of channels. The cigarettes travel along each of the channels in end-to-end relationship. As the cigarettes travel along the channels, the cigarette paper is wet along a line that is parallel to the axis of the cigarette, the paper is opened along the wet line, the cigarette is further opened and filter plugs, if present, are broken away, and the tobacco is then separated from the other parts of the cigarette.

10 Claims, 3 Drawing Figures



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2 Sheets-Sheet 1

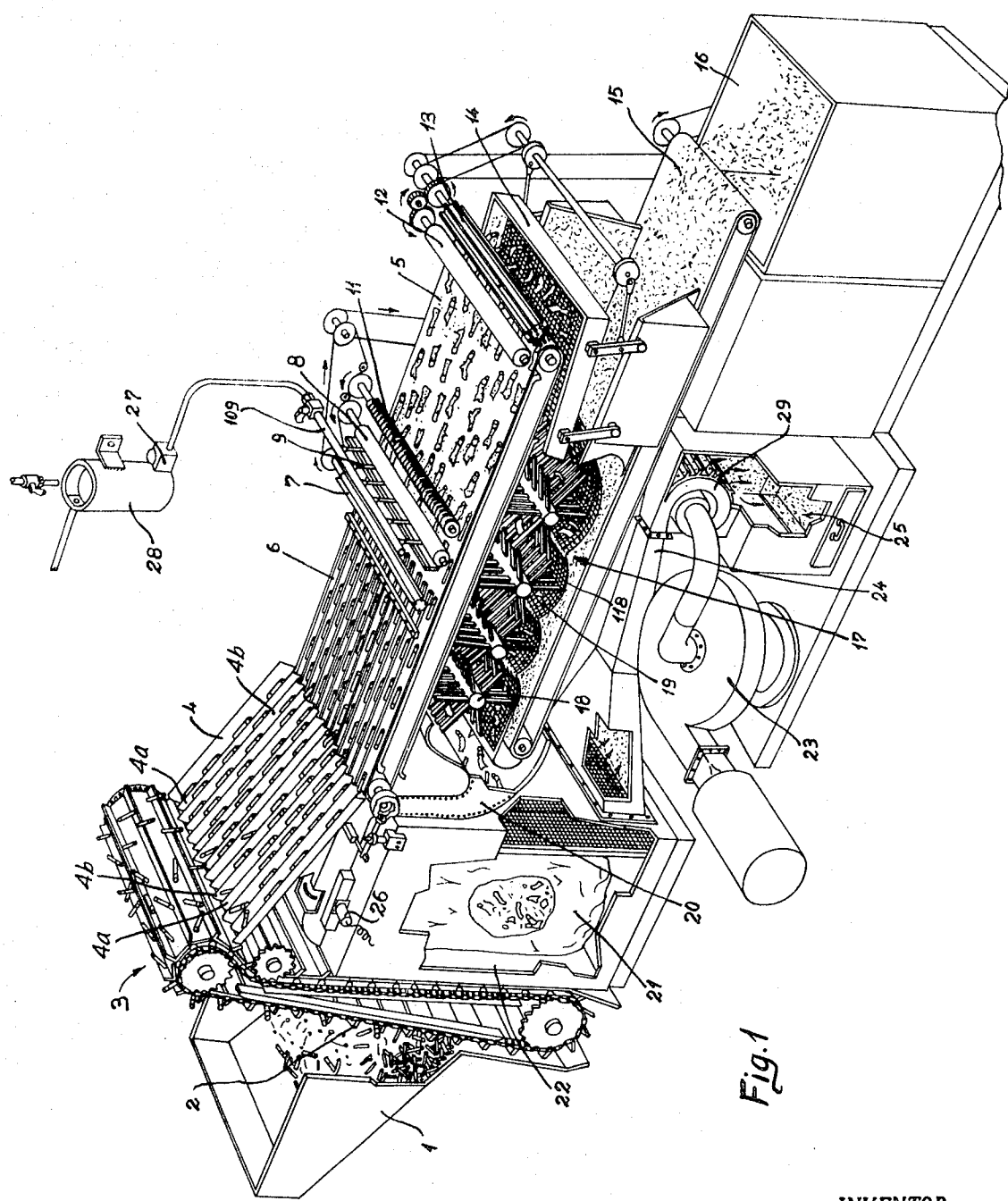
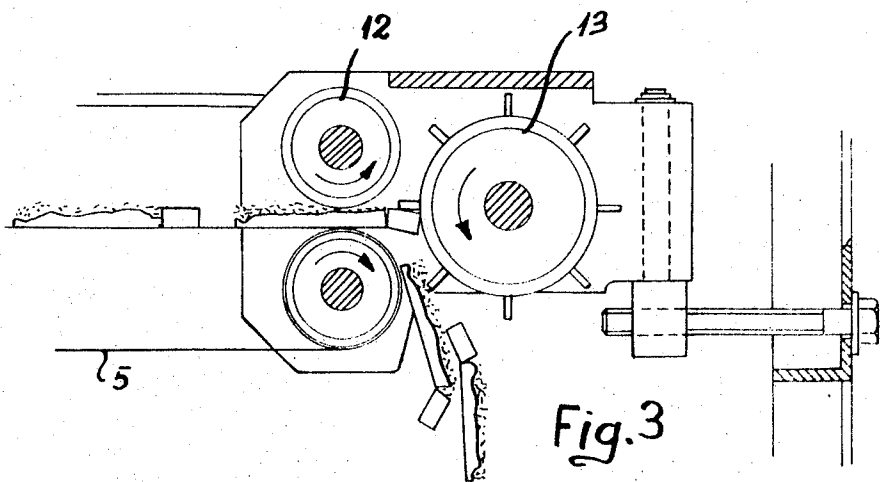
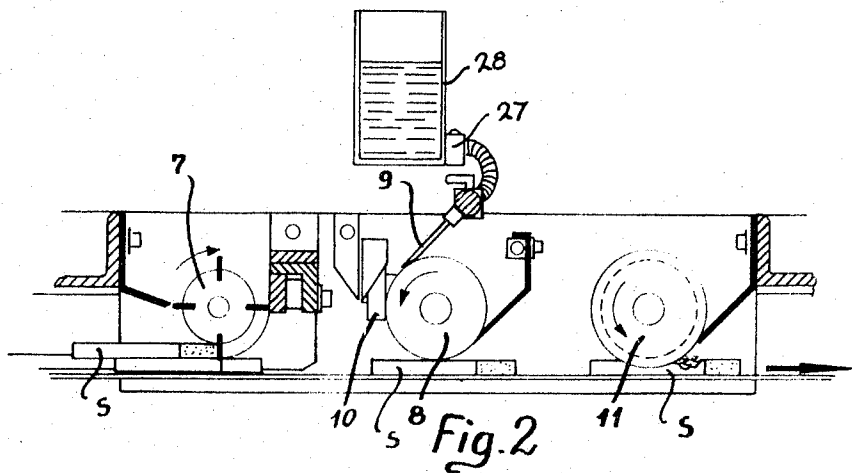


Fig. 1

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## CIGARETTE RIPPING DEVICE

This invention relates to a high output cigarette ripping device.

Cigarette ripping devices of two main types are currently in use. One is a long rod ripping device and the other is a single cigarette (with or without filter plug) ripping device.

In the past, cigarette making machinery incorporated a ripping device which was generally used to rip not only the long rod but also single cigarettes which were rejected as being defective or the like.

In modern cigarette making techniques, it is preferable to separate the ripping device from the cigarette maker. The ripping operation can then be centralized and a high output ripping device can be utilized.

In currently available cigarette ripping devices, the cutting blade, which should incise the paper only, actually penetrates into the cigarettes, thus partially degrading some of the tobacco by cutting part of the tobacco shreds. In other instances, the defective cigarettes are stored for a substantial interval of time before being fed to a ripping device, thus allowing the cut tobacco to dry below the normal moisture values and cause degradation of the tobacco. Furthermore, when ripping defective cigarettes having filter tips, the blade, in some instances, also cuts the filter paper to cause cellulose acetate threads from the filter to mix with the cut tobacco. It is to be noted that cellulose acetate adversely affects the taste. Additionally, in many instances, a vibrating sieve is utilized to separate the tobacco from the paper after the cigarette is ripped. It has been found that a substantial quantity of tobacco shreds remain attached to the paper along the sealing line of the cigarette rod wrapping paper. For example, it has been found that in about 200,000 cigarettes so separated, a quantity of tobacco corresponding to about 3 Kg. and frequently much more is lost.

Furthermore, the output of cigarette ripping machines currently in use require that the cigarettes be aligned by centrifugal force, one after the other, along a same row.

In this invention, which relates to a high output cigarette ripping device, cigarettes that are to be ripped are picked up from a hopper where they are stored in bulk, and then longitudinally aligned in an orderly manner along a plurality of parallel and adjoining feed tracks. Thereafter, they are moved under a wetting roller positioned transversely to the tracks which wets a portion of the paper of each of the cigarettes longitudinally from one end to the other. The cigarettes are then engaged by a ripping roller which tears open the cigarettes along the transversely positioned wet area. The cigarettes so opened are then moved to a finned striking roller which further opens the cigarettes and partially separates the filter plug from the cigarette. The opened and broken cigarette then drops onto a vibrating sieve through which most of the cut tobacco falls. The paper and the filter plugs are then conveyed to a tumbler when they are subjected to a centrifugal force which separates the remaining tobacco shreds by whipping. The shreds of paper and filter tips are then pneumatically discharged, completely clean of tobacco into a receptacle and a bag.

The novel features that are considered characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, as well as additional objects and advantages thereof, will best be understood from the following description when read in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a cigarette ripping device in accordance with the principles of this invention; and

FIGS. 2 and 3 illustrate in greater detail structural portions of FIG. 1.

With reference to the drawings, the cigarettes to be ripped are positioned randomly in a hopper 1 from where they are picked up by the lugs or pockets 2 of an elevating conveyor 3. The cigarettes are discharged by the pockets 2 at the top of a chute 4. The chute has a group of parallel depressions which

form a plurality of grooves or channels which extend in the direction of the chute slope. The channels of chute 4 have alternate crests of two different heights, the lower crests being designated 4a and the higher crests 4b, the distance between a low crest and the two adjacently positioned higher crests being less than the length of a cigarette. Thus, when the cigarettes are delivered by the conveyor to the chute, the cigarettes do not roll transversely down the chute 4, but practically immediately assume a position within the depressions between the crests and slide longitudinally downward within said depression.

Chute 4 discharges the cigarettes onto a conveyor 5 which, starting from the outlet end of chute 4, is subdivided into a plurality of parallel tracks by means of a group of fixed spaced apart guides 6.

To avoid or prevent some cigarettes from assuming a position that is crosswise relative to the motion of the conveyor 5, a vibratory or shaking motion is impressed upon the assembly guide 6 in a direction that is transverse to the motion of the conveyor 5, which motion induces the cigarettes to enter the tracks between the spaced apart guides 6 wherein the longitudinal axis of the cigarettes are aligned in the direction of movement of the conveyor 5. The cigarettes so transported by the conveyor 5 pass under a rotary cylinder 7 having appropriate radial fins which push back those cigarettes which surmount those presently positioned within the tracks. The cigarettes so pushed back eventually find and enter a free space in the tracks.

Downstream of the finned rotary cylinder 7 relative to the forward direction of motion of the cigarettes on conveyor 5, there is mounted a rubber surfaced roller 8. The roller 8 is mounted to rotate freely and its peripheral surface is kept wet with water by means of a wetting felt 10 which touches the surface of the roller. Water is fed to the felt from a row of capillary pipes 9 which, in turn, receive water from a manifold 109. The manifold 109 receives water from a tank when an automatically operated tap 27 is opened. Thus, cigarettes which pass under the roller 8 contact the wet surface of the roller 8 and are slightly wet by the latter along a line which extends from one end of the cigarette to the other.

Subsequently, the cigarettes that have been wet pass beneath and are contacted by low-speed rotating roller 11 having a plurality of spaced sharp-edged peripheral annular projections or discs. The discs contact and compress the cigarettes along the previously wet surface and tear the paper of the cigarette along its entire length.

The cigarettes which are now only partially open are then fed under a roller 12 which holds them while the fins of a roller 13 contact and break the cigarettes at the filter connecting collar (see FIG. 3). The breaking of the filter tip from the end of the cigarette permits tobacco to more easily be removed from the cigarette.

The cigarettes that are broken are fed from the discharge end of conveyor 5 to a vibrating sieve 14, where most of the cut tobacco is separated from the paper and falls onto an underlying conveyor 15 which discharges the tobacco into a container 16 if desired onto another conveyor. Finally, the cigarette paper and the filter plugs pass from the vibrating sieve 14 to a tumbler 17 consisting of four rollers 18, each provided with flexible radially extending stripes composed of, for instance, polyvinyl chloride cloth or other suitable material. A net positioned below the rollers 18 is to follow partially the curved section of the peripheral route of rollers 18.

Rollers 18 are rotatably driven at a high speed such that the radially extending stripes 118 violently and repeatedly strike the cigarettes to further separate the cut tobacco from the paper.

While the cut tobacco falls through the net 19 onto the underlying conveyor 15, the papers and filters of the cigarettes are sucked by duct 20 to a collecting bag 21 composed of air permeable cloth. The bag is positioned within chamber 22 and is connected to the inlet of fan 23 by means of a duct 24. A centrifugal device interposed in duct 24 removes tobacco dust

from the air in duct 24 and feeds the tobacco collected to box 25.

A photocell 26 is coupled to a circuit which stops the ripping device when bag 21 is full and, at the same time, actuates the solenoid valve 27 to interrupt the flow of water from container 28 to the capillary ducts 9.

When the bag 21 is full, it can be very quickly removed and replaced with an empty one. The ripping device can then be re-started and, at the same time, the water feed to the capillary ducts 9 will be resumed.

In the cigarette ripping system wherein the paper is wet as above described, numerous beneficial advantages are achieved. The bladed edge of roller 11 which opens the cigarette along the wet surface has a minimum speed and, therefore, does not cut the tobacco of the cigarette being ripped. Furthermore, the slight wetting of the cigarettes helps maintain the cut tobacco soft and therefore it is less subjected to degradation. Additionally, the wetting of the cigarette paper does not cause deterioration of the filter plug and, therefore, the filter plug does not shed pieces of cellulose acetate. The tumbler violently agitates the cut cigarette papers to practically fully separate the tobacco shreds from the paper even if the shreds are partially attached to the paper.

In this invention, the output of the system is determined by the number of cigarette conveying channels and therefore is quite high.

Obviously, many modifications and variations of the present invention are possible in the light of the above teaching. It is, therefore, to be understood that the invention may be practiced otherwise than as specifically described herein.

What is claimed is:

1. Apparatus for removing tobacco from cigarettes comprising:

a hopper to receive and store cigarettes in a random manner,  
conveyor means for receiving cigarettes from the hopper and transporting them to a transfer area,  
channel means mounted at the transfer area and adapted to receive cigarettes from the conveyor means, said channel means comprises at least three grooves where each groove includes first and second side walls, said first side wall having a height that is less than the second side wall, the first and second grooves of said three grooves being a first pair of grooves and the second and third grooves of said three grooves being a second pair of grooves, the two first side walls of said first pair of grooves being coupled and forming sides of the first pair and the two second side

walls of said second pair of grooves being coupled and forming sides of the second pair, and the distance from a pair of second side walls to a next occurring pair of second side walls is less than the length of a cigarette,

means for wetting the paper of each cigarette along a line parallel to the longitudinal axis thereof,

means for opening the paper of the cigarette along the wet line, and

separating means for receiving the opened cigarette and separating the tobacco from the other parts thereof.

2. The structure of claim 1 comprising a conveyor having channels coupled to receive cigarettes from said grooves and feed them to said opening means.

3. The structure of claim 2 including refuser means coupled to permit only a single layer of cigarettes in each channel of said conveyor.

4. The structure of claim 3 including vibrator means coupled to vibrate said conveyor in a direction transverse to its direction of motion.

5. The structure of claim 4 wherein said means coupled to wet the paper of each cigarette comprises a roller coupled to rotate about an axis transverse to the direction of motion of the cigarettes, and means coupled to wet said roller with water.

6. The structure of claim 5 wherein said roller has a rubber surface.

7. The structure of claim 6 wherein said opening means comprises an annular knife coupled to rotate about an axis transverse to the direction of motion of the cigarette to engage and open the cigarettes along the wet line.

8. The structure of claim 7 wherein said separating means comprises a rotatable member, projections coupled to said rotatable member to strike said opened cigarettes to break the filter plug from the cigarette and to further open the opened cigarette, and a sieve means to receive the opened cigarette and separate the tobacco from the other parts of the cigarette.

9. The structure of claim 8 wherein said sieve means comprises a vibrating screen member which passes tobacco and rejects the other parts of the cigarette, feeding the parts of the cigarette rejected by the screen to a rotary paddle tumbler which separates the tobacco still adhering to the paper and pneumatic means to feed the tobacco free paper to an air permeable container.

10. The structure of claim 9 including means to stop the removal of tobacco from cigarettes when said air permeable container is full of cigarette paper.

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