Dec. 7, 1971 F. GIATTI 3,625,103

CIGARETTE TURN AROUND

Filed April 6, 1970 3 Sheets-Sheet 1

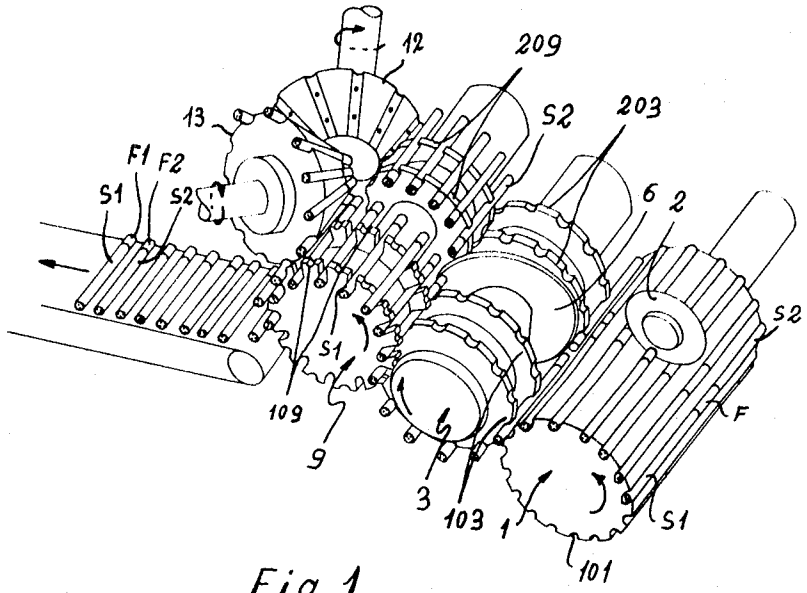


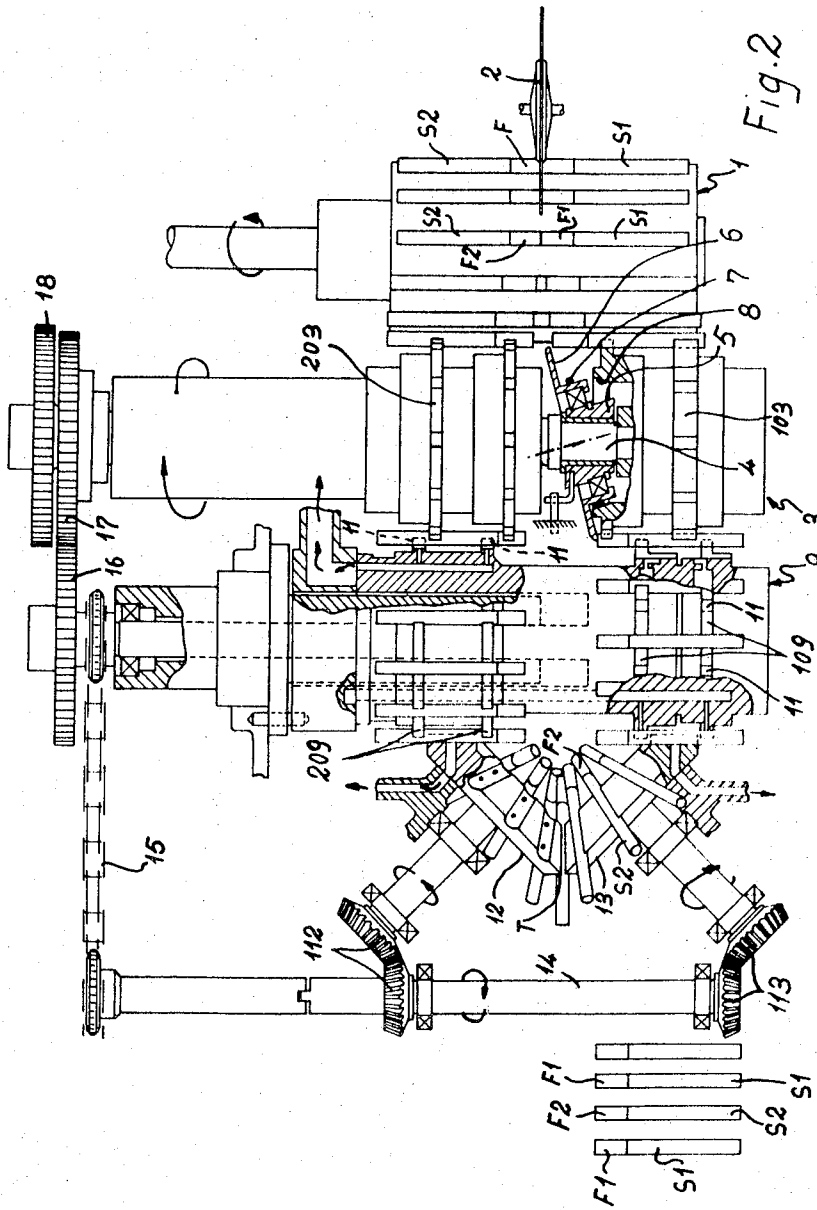
Fig. 1

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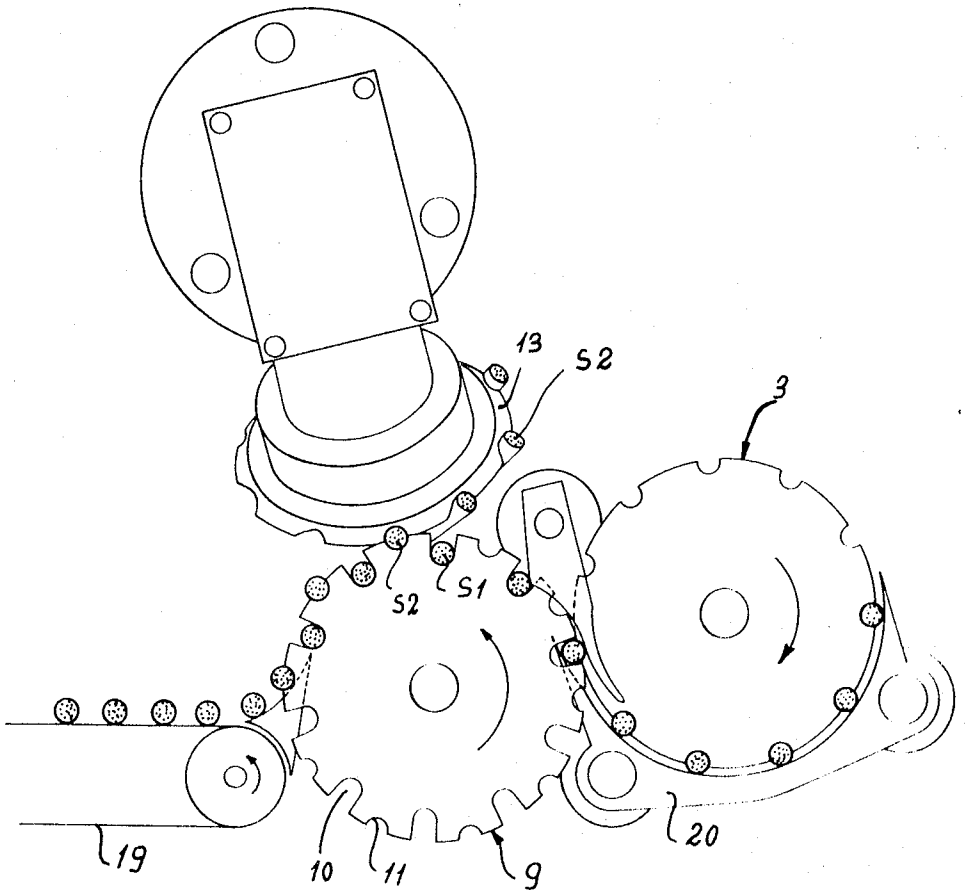


Fig. 3

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CIGARETTE TURN AROUND

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Int. Cl. B26d 1/14
U.S. Cl. 83—102 13 Claims

ABSTRACT OF THE DISCLOSURE

This disclosure relates to a device for cutting a single row of two axially aligned cigarettes having an interposed double length filter plug in half to form two rows, each row being fed to a grooved drum, two grooved drums being used to space and offset the severed cigarettes. The drums are mounted to rotate freely at different speeds about a common axis and are spaced longitudinally from each other, the drums having a different number of grooves. A turn around device is coupled to pick up the cigarettes of one row, turn them around, and thereafter position them between the cigarettes of the other row.

This invention relates to cigarette makers in general and, more particularly, to devices connected with filter tip cigarettes.

In the filter tip cigarette production, it has been found convenient to couple cigarettes delivered, one by one, in sequence, by a cigarette maker to form a group of pairs of cigarettes having an interposed filter plug of twice the length desired for a single cigarette. By so doing, each pair of cigarettes can have a single connector sheet which wraps the double length filter plug as well as a short section of the two cigarettes abutting the ends of the filter plug.

After this operation, the group of pairs or assemblage of cigarettes so arranged must be cut in the middle of the double length filter plug which results in the formation of two opposite rows of cigarettes. The cigarettes of one of the rows must then be turned around and, subsequently, grouped with those of the other row, for delivery, for instance, to a cigarette hopper packer or the like.

This invention relates to a device for arranging two rows of opposite pairs of cigarettes axially aligned and having a double length filter plug interposed between them into a single row by means of a unit which separates and offsets the rows of cigarettes. The unit consists of two grooved drums mounted to rotate at differential speeds, around a common axis of rotation. The drums are longitudinally interspaced some distance between each other and have a different number of grooves. One of the drums is associated with rotating means for spacing the cigarettes of one of the rows from those of the other row, said unit being operatively interposed between a unit which transfers and separates the pairs of cigarettes and a turn around unit which picks up the cigarettes of one row and turns them around to obtain a single row of filter tip cigarettes.

According to another feature of the invention, the cigarette spacing means associated with one of the drums can be a disc mounted to freely rotate around an axis of rotation, oblique with respect to that of the associated drum, on a corresponding fixed oblique hub fitted to the shaft of said drum, the disc being rotatably driven rotatingly by the same drum, for instance, through a friction coupling between a friction ring, integral with the disc and a corresponding annular and flared surface of the drum, the diameter of the drum being such as to engage peripherally the cigarettes of the row to be spaced on

the head of the filter plug such that the cigarettes are moved axially outward in the drum grooves without causing any sliding between the disc and the cigarettes engaged by it.

There has been thus outlined, rather broadly, the more important features of the invention in order that the detailed description hereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which this disclosure is based may readily be utilized as the basis for the design of other structures for carrying out the several purposes of the invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of the invention.

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 structure for cutting, turning around and aligning the cigarettes to form a single row in accordance with the principles of the invention;

FIG. 2 is a top view of the structure illustrated in FIG. 1;

FIG. 3 is a partial view of the front of the structure illustrated in FIG. 1.

With reference to the drawings, pairs or assemblies of cigarettes having a double length filter plug interposed between them and held together by means of connector sheets, are laid in any suitable manner, one by one, in the successive flutes **101** of a fluted drum **1**, and operatively associated with a rotating drum **2** which separates the two cigarettes of each pair with a cross cut in the middle of the double length filter plug F. After cutting, the cigarettes of each pair are slightly interspaced relative to each other in the area of the cut, by pneumatic means such as jets of air or the like directed through holes drilled in the flutes **101**.

The cigarettes so spaced from each other or separated are transferred from drum **1** to a spacing and offsetting unit **3** consisting of two fluted drums **103**, **203** having the same geometrical axis of rotation, parallel to that of drum **1**, but interspaced between each other to permit drum **103** to protrude outwardly with respect to drum **101**, while drum **103** remains aligned with cigarettes S2 of the second row on drum **1**.

Drum **103** which has an axis of rotation **4** is positioned to rotate about a fixed shaft or hub **5** which rotatably supports a disc **6**, positioned to rotate around a geometrical axis of rotation that is oblique with respect to that of drum **103**. The diameter of the disc **6** is sized to engage endwise the cigarettes S1 attached to filter plug F1, when said cigarettes are transferred to the offsetting unit **3** from drum **1**. The disc **6** is rotatably driven by the drum **1** by means of a friction coupling such as a friction ring **7** which is integral with the disc **6** and positioned to engage a surface **8** of the drum. With this arrangement, disc **6**, during its rotation around the oblique axis, determines the axial outward displacement of cigarettes S1 of the first row, as illustrated in FIG. 2 of the drawings. This displacement is greater than that which is obtainable with any fixed guide and the displacement is effected without causing cigarettes to rub against the filter plug head and to suffer possible foldings.

The coaxial drums **103** and **203** have a different number of grooves and, more precisely, drum **203**, associated with the row of cigarettes S2 which are to be turned, has

one groove less than drum **103**. Furthermore, the two drums **103** and **203** are rotatably driven in the same direction but at different speeds to cause half of a pitch offset between the two drums in a 180° rotation, drum **203** being rotated at a faster speed than drum **103**.

From drums **103** and **203**, cigarettes S2 and cigarettes S1, separated in the previously described manner, are transferred to a drum **9** on which are arranged two pairs of grooved discs **109**, **209**, the discs of each pair being spaced from each other. Discs **109** support deep grooves **10** equispaced around the periphery of the disc and receive cigarettes S1, F1 of the first row. Interposed between the grooves **10** are grooves **11**, said grooves being shallow relative to grooves **10**. Discs **209** support grooves which are positioned around the periphery and spaced to cooperate with the grooves **11** of the pair of discs **109**.

Cigarettes S2, F2 of the second row must be turned around and grouped with the cigarettes S1, F1 to form a single and well arranged row of filter tip cigarettes. The turn around and grouping can be accomplished by means of two fluted frusto-conical drums operatively associated with each other. The drums are maintained in synchronized rotation by means of pairs of frusto-conical gears **112**, **113** which are coupled to and driven by a shaft **14**, which is coupled to drum **9** through chain drive **15** and to offsetting unit **3** through a pair of gears **16**, **17**, one of the drums **103**, **203** being driven by separate means to provide the above mentioned differentiated speed between the drums **102**, **203**.

Drum **12** is positioned to receive cigarettes S2, F2 and retain them pneumatically in its flutes for substantially one-half of a revolution of the drum and up to matching point T with drum **13**. At matching point T, the cigarettes S2, F2 are pneumatically picked up by drum **13** from drum **12**. The cigarettes pneumatically held, by drum **13** are then fed to the shallow flutes **11** of the pair of discs **109** of drum **9** to which drum **13** is operatively coupled. The transfer of a cigarette S2, F2 from a flute of discs **209** to a flute **11** of discs **109** through the frusto-conical drums **12** and **13** causes a complete turning around of the cigarettes transferred. Thus, a cigarette delivered to a flute **11** will be positioned to the filter plug F2 on the same side as the filter plug F1 of cigarette S1. Cigarettes S2, F2 are thus grouped with cigarettes S1, F1 and inserted between the latter so as to form a single row of filter tip cigarettes which can then be transferred to a transfer unit **19** for further processing. The difference of one flute between drums **103** and **203** and the differentiated speed between the drums cooperate to provide the necessary offset required to insert the cigarettes of the second row between those of the first row. The cigarettes can be retained within the grooves or flutes of the various drums of the device by pneumatic and/or mechanical means. Thus, for instance, on the drums of unit **3** the cigarettes can be retained mechanically by means of curved guide elements **20** arranged around the bottom portion of the drums and when the cigarettes are positioned within the grooves or cut-outs **10** and **11**, they can be retained pneumatically by suction through holes conveniently arranged in the bottom portions of said grooves.

It is understood that the invention is not limited to the embodiment which has been described and illustrated, but many changes could be incorporated, mainly, from a constructive viewpoint. Thus, for instance, although the description and the drawings relate to a device for turning around the cigarette of the second row, it is clear that in an analogous manner, also the cigarettes of the first row could be turned around. All this without departing from the spirit of the invention as defined in the appended claims.

I claim:

1. A device for arranging in a single row two opposite rows of pairs of axially aligned cigarettes having an interposed double length filter plug comprising first means to support said pairs of axially aligned cigarettes having an interposed double length filter plug, knife means coupled to said first means to separate the two cigarettes of each pair with a cut across the middle of the double length filter plug, second means coupled to receive one of the cigarettes of the severed pair of cigarettes, third means coupled to receive the other of the cigarettes of the severed pair of cigarettes, means to rotatably drive said second means and said third means at different speeds, turn around means coupled to said second means and said third means to receive and turn around one of the cigarettes of the severed pair of cigarettes and thereafter insert said cigarette in alignment with the other cigarette to form a row.

2. The structure of claim **1** wherein said second means and said third means are coupled to rotate about the same geometrical axis.

3. The structure of claim **2** wherein said second means supports cut-outs to accommodate cigarettes and said third means supports cut-outs to accommodate cigarettes.

4. The structure of claim **3** comprising spacing means coupled to said third means to axially separate the severed cigarette of a pair of cigarettes.

5. The structure of claim **4** wherein said spacing means comprises a disc coupled to rotate about an axis oblique to the axis of rotation of said third means to axially urge cigarettes supported by the cutouts of said third means outward and away from the cigarettes supported by the cutouts of said second means.

6. The structure of claim **5** comprising means to rotatably drive said disc.

7. The structure of claim **6** wherein said first means comprises a drum having longitudinally positioned equispaced flutes to receive the pairs of axially aligned cigarettes having an interposed double length filter plug, orifices coupled to the flutes to direct air against the severed pair of cigarettes to urge the cigarettes axially away from each other.

8. The structure of claim **7** wherein said second means has a different number of cutouts than said third means.

9. The structure of claim **8** wherein said second means has one cutout less than said third means.

10. The structure of claim **9** wherein said second means is rotatably driven at a speed that is faster than the speed of said third means.

11. The structure of claim **10** wherein said second means is rotatably driven at a speed that is one-half of a cutout faster than the speed of said third means for 180° of rotation.

12. The structure of claim **11** wherein said turn around means comprises first fluted discs coupled to receive from said second means cigarettes that are to be turned around, second fluted discs coupled to receive cigarettes from said third means, a first frusto-conical turn around member coupled to receive cigarettes from said first fluted disc and a second frusto-conical turn around member coupled to receive cigarettes from said first frusto-conical turn around, and feed said cigarettes to said second fluted discs interposed between cigarettes received from said third means.

13. The structure of claim **12** wherein said second means, said third means, said first fluted discs, said second fluted discs, said first frusto-conical turn around and said second frusto-conical turn around are coupled to be driven in synchronism with each other by a common drive means.

References Cited

UNITED STATES PATENTS

2,988,198 6/1961 Pinkham ..... 198—32

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