

April 12, 1966

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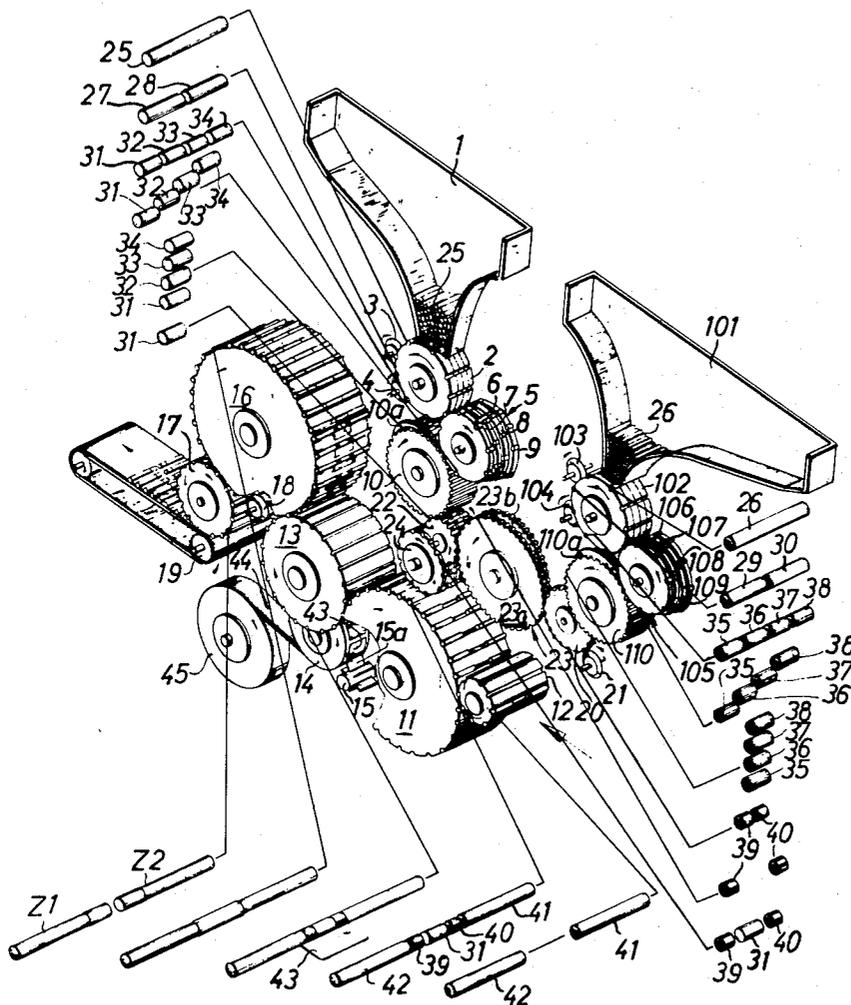
3,245,414

METHOD OF MANUFACTURING FILTER TIP CIGARETTES AND THE LIKE

Filed Nov. 21, 1961

3 Sheets-Sheet 1

Fig.1



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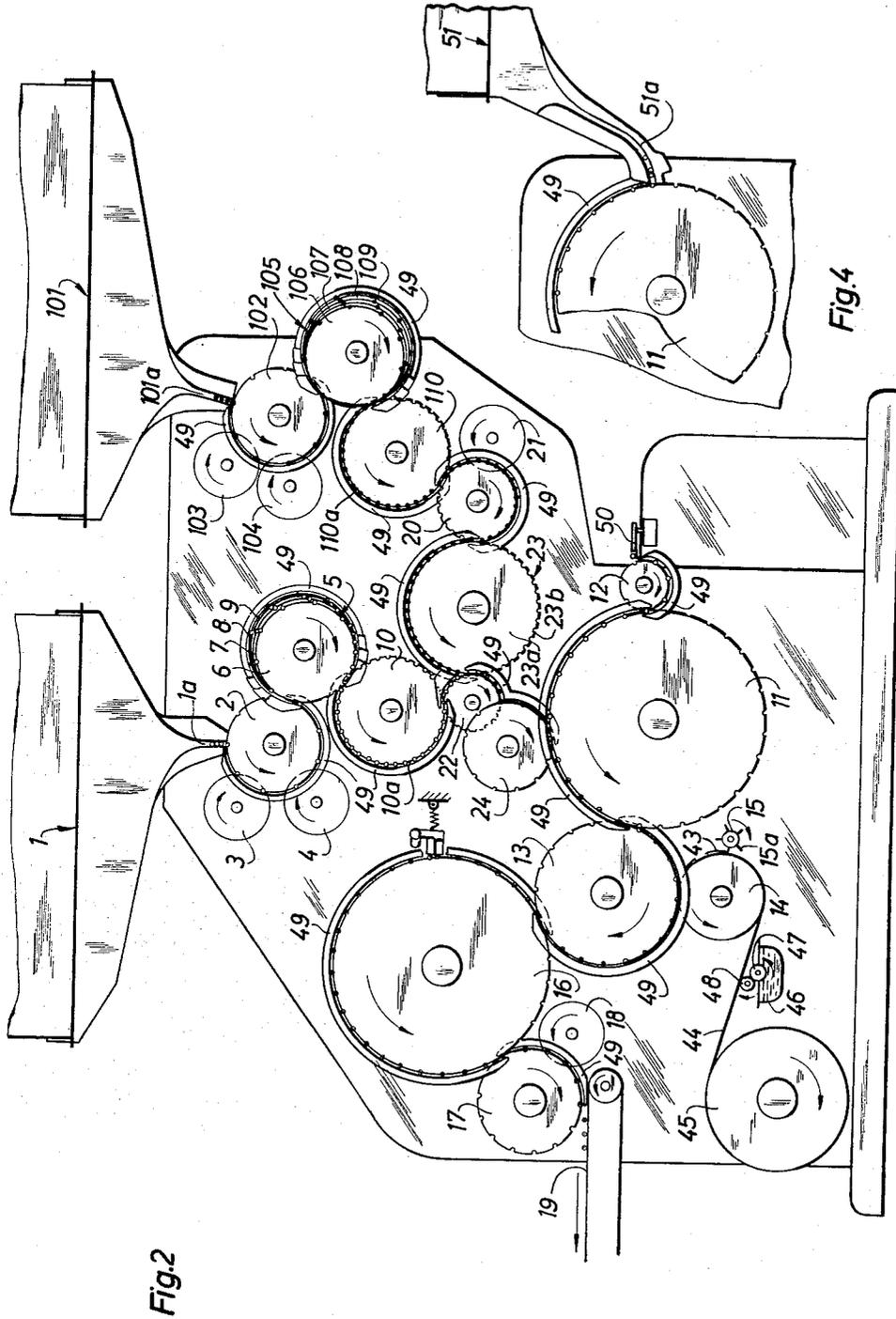


Fig.2

Fig.4

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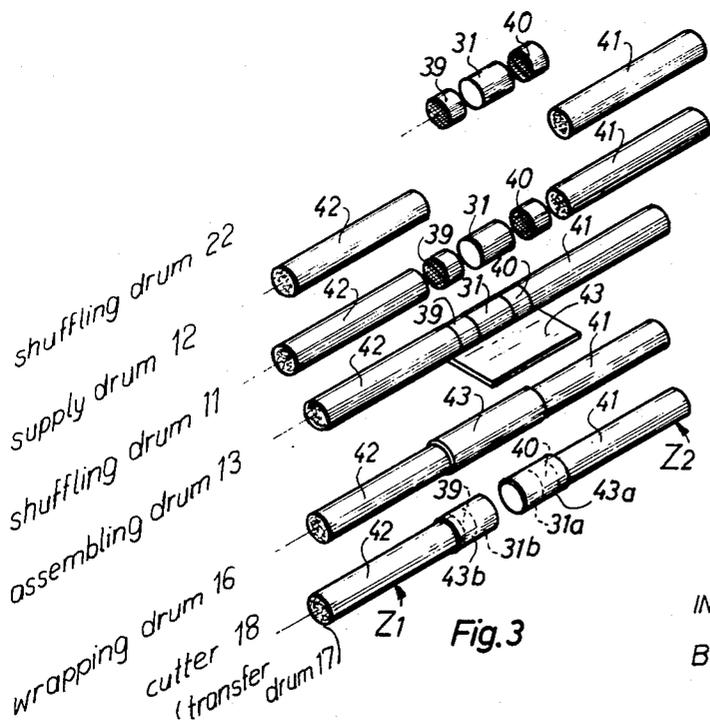
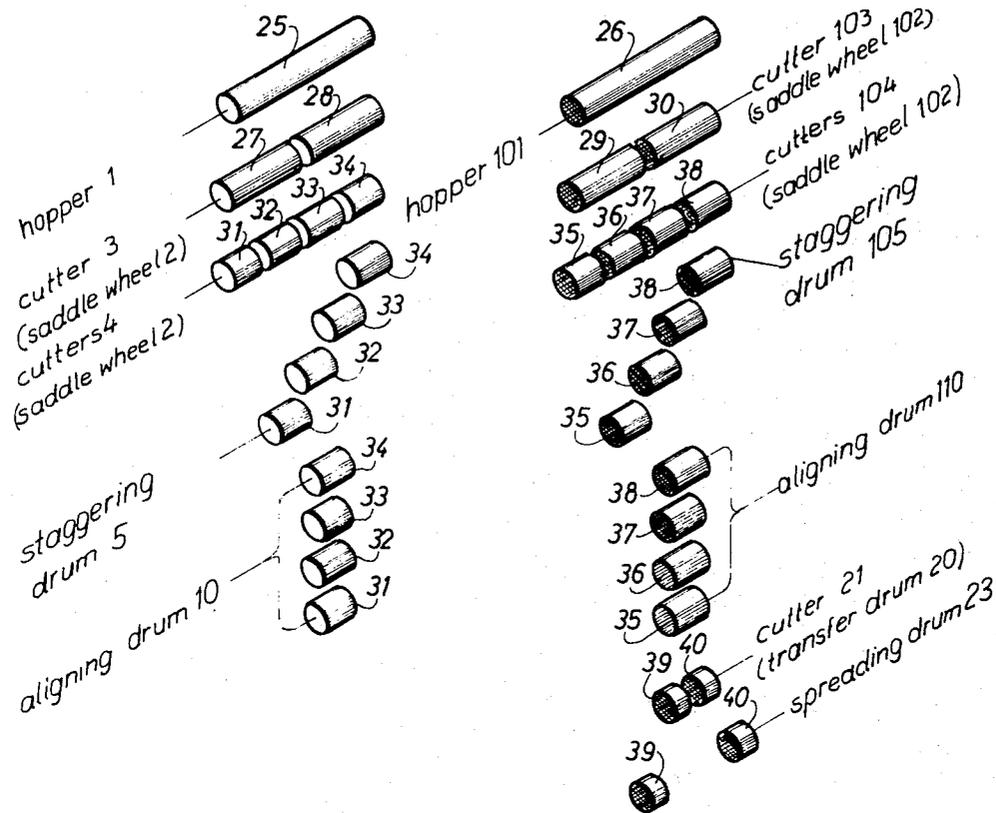


Fig. 3

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3,245,414

METHOD OF MANUFACTURING FILTER TIP CIGARETTES AND THE LIKE

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3 Claims. (Cl. 131-94)

The present invention relates to the manufacture of filter tip cigarettes, and more particularly to the production of filter tip cigarettes whose filter tips consist of at least two distinct filter elements.

An important object of the invention is to provide a method of manufacturing filter tip cigarettes in a continuous operation by starting with cigarette sticks and with filter rods whose length is equal to or a multiple of the length of filter elements in the ultimate products.

Another object of the invention is to provide a method of the just outlined characteristics according to which a cigarette stick may be assembled with two or more filter elements into a dual-, triple-, etc. filter tip cigarette with a minimum amount of wrapping material.

A further object of the instant invention is to provide a method of the above outlined character according to which the filter elements of the ultimate product need not be connected with each other prior to their connection with the cigarette stick.

An additional object of my invention is to provide a method of manufacturing filter tip cigarettes according to which a single wrapper of paper like material is sufficient to secure the filter elements to each other and to secure the filter elements to the cigarette sticks.

Still another object of my invention is to provide a method of the above outlined characteristics according to which two or more filter tip cigarettes may be manufactured in simultaneous operation.

A further object of the invention is to provide a method for the manufacture of dual filter tip cigarettes which may be practiced in a very simple apparatus embodying a single wrapping station where the filter elements are connected to each other and to the cigarette sticks.

A concomitant object of the present invention is to provide a method according to which the formation of filter elements of requisite length, the alignment of filter elements with each other and with the cigarette sticks, as well as the connection of filter elements with each other and with the cigarette sticks may take place in a continuous operation.

An additional object of the invention is to provide a method for the production of composite filter tip cigarettes according to which composite filter tips of a length equal to that of two filter tips as used in the ultimate products may be simultaneously assembled with a pair of cigarette sticks so that a single cut is necessary to transform the composite cigarette into a pair of dual filter tip cigarettes.

With the above objects in view, one feature of the invention resides in the provision of a method which comprises the steps of forming a composite filter by shuffling a pair of filter elements of a first type with a filter of a second type so that the filter is located between the filter elements and forms a composite filter therewith, forming a composite filter tip cigarette by shuffling the composite filter with a pair of cigarette sticks so that the composite filter is located between the cigarette sticks and by thereupon applying a single wrapper of paper like material about the composite filter and about the adjacent portions of the cigarette sticks, and dividing the composite cigarette into a pair of dual filter tip cigarettes by halving the filter of the second type.

The apparatus for the practice of my method comprises a first rotary shuffling drum which is provided with a plurality of axially parallel peripheral grooves, means for consecutively delivering filters and pairwise arranged filter elements into the grooves of the shuffling drum so that each filter is disposed between and forms a composite filter with a pair of filter elements, a second rotary shuffling drum which is provided with a plurality of axially parallel peripheral pockets adapted to receive the composite filters as well as pairwise arranged aligned cigarette sticks so that the composite filters are disposed between the respective pairs of cigarette sticks, and means for consecutively applying wrappers about the composite filters and about the adjacent portions of the respective cigarette sticks.

In accordance with a preferred embodiment of the apparatus, the means for delivering filter elements of the first type comprises a hopper for consecutively discharging filter rods of a length at least twice the length of a single filter element into the grooves of a transfer drum (also called saddle wheel), cutter means for halving and, if necessary, for further subdividing the filter rods into a plurality of axially aligned filter elements, a staggering drum which arranges the filter elements obtained by the subdivision of consecutive filter rods in such a way that the filter elements are staggered in the direction in which the staggering drum rotates, an aligning drum located between the staggering drum and the first shuffling drum for arranging the staggered filter elements in a single file or row, and a spreading drum which spaces the filter elements in such a way that the filter elements are delivered to the first shuffling drum in spaced pairs adapted to receive a filter of the second type therebetween.

If the filters of the second type are obtained by halving or by further subdividing elongated filter rods into a plurality of shorter filters, the means for delivering filters of the second type to the first shuffling drum preferably comprises all the elements constituting the arrangement with delivers filter elements of the first type, excepting that no spreading drum is necessary since each filter of the second type is received between a pair of filter elements of the first type.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following detailed description of certain specific embodiments with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of an apparatus which may be utilized for practicing the method of my invention;

FIG. 2 is a side elevational view of the apparatus; FIG. 3 is a perspective view showing the sequence in which dual filter tip cigarettes are assembled in the apparatus of FIGS. 1 and 2; and

FIG. 4 illustrates a modified source of pairwise arranged cigarette sticks which delivers directly into the pockets of the second shuffling drum.

Referring now in greater detail to the illustrated embodiment and first to FIGS. 1 and 2 there is shown an apparatus for assembling dual filter tip cigarettes which comprises a source of a first type of filters (hereinafter called white filters) shown in the form of a magazine or hopper 1 wherein white filter rods 25 are stacked in such a way as to be consecutively discharged by gravity through a chute 1a and into the axially parallel peripheral grooves of a transfer drum 2, also called saddle wheel, which is driven in the direction indicated by the arrow and consecu-

tively advances the white filter rods 25 against a rotary halving cutter 3 which divides each filter rod into a pair of halved white filter members 27, 28 (see FIG. 3) of equal length. These halved white filter members 27, 28 are subsequently advanced by the saddle wheel 2 against a pair of spaced coaxial rotary subdividing cutters 4 (only one shown in FIGS. 1 and 2) which respectively sever the halved white filter members 27, 28 into subdivided white filters 31, 32 and 33, 34 (see also FIG. 3) of equal length. The length of each of the subdivided white filters 31-34 is twice the length of a white filter element as utilized in the filter tip of the ultimate product.

The subdivided white filters 31-34 which are consecutively obtained by halving the white filter rods 25 and by thereupon subdividing the halved white filter members 27, 28 are subsequently transferred into the axially parallel peripheral grooves formed in the four disks 6, 7, 8, 9 of a staggering drum 5 so that the filters 31 are transferred into the grooves of the smallest disk 6, that the filters 32 are transferred into the grooves of the larger disk 7, that the filters 33 are transferred into the grooves of the next-layer disk 8, and that the filters 34 are transferred into the grooves of the largest disk 9.

The revolving drum 5 transfers the staggered white filters 31-34 onto an aligning drum 10 which revolves in the direction of the arrow and arranges the filters 31-34 in a single row so that the longitudinal ends of these filters are disposed in two parallel planes which are perpendicular to the axis of the drum 10. As illustrated in FIG. 1, the filters 31-34 are transferred by the drum 5 into the spaces formed between a pair of arcuate guide rails 10a which are adjacent to the periphery of the drum 10 and which converge in the direction in which the drum rotates so as to compel the filters 31-34 to move toward the central portion of the periphery of the drum 10 while simultaneously advancing toward a first shuffling drum 22.

The staggering drum 5 is in linear contact with the saddle wheel 2 and with the aligning drum 10, i.e. the axes of its disks 6-9 are parallel with each other and are located in a plane which is perpendicular to the plane passing through the axes of the members 2 and 10.

The apparatus of FIGS. 1 and 2 further comprises a source of a second type of filter rods 26 (hereinafter called black filter rods) in the form of a magazine or hopper 101. The chute 101a in the bottom part of this hopper consecutively delivers black filter rods 26 into the axially parallel peripheral grooves of a second transfer drum or saddle wheel 102 which cooperates with a first rotary cutter 103 to halve each filter rod 26 into a pair of halved black filter members 29, 30 (see FIG. 3) of equal length, and with a pair of coaxial rotary cutters 104 (only one shown in FIGS. 1 and 2) which respectively subdivide the halved filter members 29, 30 so that each black filter rod 26 is ultimately transformed into four subdivided black filters 35, 36, 37, 38. These subdivided black filters are subsequently transferred into the axially parallel peripheral grooves of four disks 106-109 which together constitute a second staggering drum 105. The diameter of the disk 108 for the filters 37 is smaller than the diameter of the disk 109 for the filters 38, the diameter of the disk 107 for the filters 36 is smaller than the diameter of the disk 108, and the diameter of the disk 106 for the filters 35 is smaller than the diameter of the disk 107. The staggering drum 105 transfers the subdivided black filters 35-38 obtained by the cutting of consecutive black filter rods 26 onto the periphery of a second aligning drum 110 which cooperates with a pair of converging arcuate rails 110a (only one shown in FIGS. 1 and 2) so as to perform a function analogous to that of the drum 10 and rails 10a by arranging the black filters 35-38 in a single row between a pair of spaced parallel planes which are perpendicular to the axis of the drum 110.

The single file or row of black filters 35-38 is thereupon conveyed into the peripheral grooves of a transfer

drum 20 which consecutively advances the black filters against a rotary cutter 21 so that each subdivided black filter is ultimately halved into a pair of black filter elements 39, 40 of such length as is necessary in the ultimate product. The length of each black filter element 39 or 40 is selected in such a way that one such filter element, together with one-half of a subdivided white filter 31, 32, 33 or 34, may form a composite filter element or dual filter tip in the ultimate product, i.e. in a dual filter tip cigarette.

The transfer drum 20 cooperates with a spreading drum 23 which moves the black filter elements 39, 40 obtained by halving the subdivided black filters 35-38 away from each other, i.e. this drum spaces or separates the aligned black filter elements 39, 40 to such an extent that they provide between themselves a space of a length sufficient to accommodate one of the subdivided white filters 31, 32, 33 or 34. The spreading drum 23 comprises a pair of disks 23a, 23b which rotate about mutually inclined axes so that these disks converge at a point adjacent to the transfer drum 20 but diverge while advancing toward the shuffling drum 22.

The purpose of the shuffling drum 22 is to form composite black-and-white filters consisting of two spaced black filter elements 39, 40 and of a white filter 31, 32, 33, or 34. The composite black-and-white filter consisting, for example, of two black filter elements 39, 40 and of a subdivided white filter 31 is a loose structure in that its three components are still somewhat spaced from each other, and the composite filters consecutively assembled in the peripheral grooves of the shuffling drum 22 are thereupon delivered by a transfer drum 24 into the central portions of the axially parallel peripheral pockets provided in a second shuffling drum 11. The pockets of the drum 11 may simultaneously receive a pair of aligned but spaced cigarette sticks 41, 42 and a composite filter 39, 31, 40 therebetween. The cigarette sticks 41, 42 are delivered from a source 50 including a supply drum 12, and their lengths correspond to that of the tobacco-filled portions in the ultimate products.

The composite but still loose assemblies each of which includes two cigarette sticks 41, 42 and say a composite black-and-white filter 39, 31, 40 are thereupon transferred onto an assembling drum 13 which receives suitably spaced bands 43 of adhesive-coated paper-like wrapping material 44 from a band-applying roller 14. The wrapping material 44 is convoluted on a source in the form of a bobbin or reel 45 and is paid out in the form of a strip which is cut into bands 43 by a revolving knife roll 15 cooperating with the roller 14 and provided with axially parallel radially outwardly extending knives 15a. The assembling drum 13 delivers the composite assemblies into the peripheral grooves of a wrapping drum 16 so that the composite assemblies consisting of two cigarette sticks 41, 42, of two black filter elements 39, 40 and of a subdivided white filter (e.g. 31) are wrapped on the drum 16 into bands 43 in order to form a series of twin-length composite cigarettes which are subsequently received by a third transfer drum 17, the latter cooperating with a revolving disk knife 18. The purpose of the knife 18 is to divide the twin-length cigarettes into a pair of ultimate products by halving the white filter 31 into a pair of white filter elements 31a, 31b (see FIG. 3) whose length may but need not equal or approximate that of a black filter element 39 or 40. The pairs of ultimate products, i.e. dual filter tip cigarettes, are indicated by the reference numerals Z₁, Z₂. These dual filter tip cigarettes are delivered by the transfer drum 17 onto the upper run of an endless band conveyor 19 which advances the filter tip cigarettes to the storing or packaging station.

One form of the wrapping drum which may be utilized in the apparatus for practicing the method of my invention is disclosed in U.S. Patent No. 2,902,040.

The underside of the wrapping material 44 advancing toward the roller 14 is coated with an adhesive substance,

e.g. a paste contained in a tank 46. The paste is withdrawn by a paste roll 47 which coats the periphery of a paste transfer roll 48, and the latter applies the adhesive to the underside of the strip while the strip advances toward the roller 14.

Of course, the apparatus comprises a series of suitable shields 49 (shown in FIG. 2) which retain the black filters, the white filters and the cigarette sticks in the grooves and pockets of the various wheels and drums. The construction of such shields is well known. The drive means which rotates the various rollers, rolls, wheels and drums in directions indicated by the arrows may assume the form of gear trains, of belt-and-pulley arrangements or the like. Such drive means are also known in the art of making filter tip cigarettes (see, for example, U.S. Patent 2,714,384) and, therefore, were not shown in the drawings.

Before reaching the grooves of the assembling drum 13, the composite assemblies including cigarette sticks 41, 42, filter elements 39, 40 and say a filter 31 are compressed in the axial direction thereof so that the ends of the filter elements 39, 40 respectively abut against the cigarette sticks 41, 42 and against the opposite ends of the filter 31. Thus, when the adhesive-coated band 43 is wrapped onto and forms a tube about the composite filter 39, 31, 40 and about the adjacent portions of the cigarette sticks 41, 42, the length of the composite assembly equals twice the length of a dual filter tip cigarette Z_1 or Z_2 . Such axial compression of a composite assembly including two or more cigarette sticks and one or more filters is well known (see, for example, U.S. Patent 2,902,040) and, therefore, the means for performing this compressing action are not shown in the drawings.

The method of making filter tip cigarettes with the help of the apparatus shown in FIGS. 1 and 2 will be best understood with reference to FIG. 3 which illustrates various stages of the assembling operation. Thus, and beginning in the upper left-hand part of FIG. 3, white filter rods 25 delivered by the chute 1a of the hopper 1 are halved by the cutter 3 into filter members 27, 28 which latter are subsequently subjected to the action of pairwise arranged rotary cutters 4 to form a series of aligned subdivided white filters 31-34. While passing about the periphery of the drum 5, the filters 31-34 are staggered in the direction in which the drum 5 rotates so that the filters 34, 33, 32 respectively lag behind the filters 33, 32, 31. In the next step, the guide rails 10a compel the filters 31-34 to form a single row, with the filter 31 leading, so that this filter 31 is first to be transferred onto the median portion of a peripheral groove in the first shuffling drum 22.

The black filter rods 26 discharged through the chute 101a of the hopper 101 are subjected to the action of the cutter 103 while advancing with the saddle wheel 102 and the resulting halved filter members 29, 30 are thereupon subdivided by cutters 104 into filters 35-38. The axially aligned filters 35-38 are transferred onto the drum 105 which staggers these filters in such a way that the filter 35 reaches the aligning drum 110 ahead of the filter 36 and so forth, so that the filters 35-38 are caused by the guide rails 110a to form a single file or row which is thereupon delivered to the drum 20 and is subjected to the action of the cutter 21 which halves each of these filters into a pair of black filter elements 39, 40. Owing to the action of the spreading drum 23, the filter elements 39, 40 are caused to move away from each other before they reach the shuffling drum 22 in order to provide room for the foremost white filter 31 which is delivered by the aligning drum 10. The composite filter consisting of three axially aligned but unconnected parts including two spaced-apart filter elements 39, 40 and the white filter 31 therebetween is transferred onto the second shuffling drum 11 simultaneously with a pair of spaced-apart cigarette sticks 42, 41 which are delivered by the supply drum 12. Before leaving the respective pocket of the

second shuffling drum 11, the assembly of two cigarette sticks 42, 41, of two black filter elements 39, 40 and of a white filter 31 is compressed in axial direction so that the elements 39, 40 respectively abut the sticks 42, 41 and the opposite longitudinal ends of the filter 31, whereupon the assembly is delivered into a groove of the assembling drum 13 to be joined by a band 43 which is delivered by the drum 14. The band 43 is wrapped around the composite filter 39, 31, 40 and about the adjacent portions of the cigarette sticks 42, 41 on the drum 16 and while the assembly advances toward the transfer drum 17 so that the assembly is transformed into a composite, twin-length cigarette before reaching the cutter 18. The latter cuts through the white filter 31 to transform this filter into a pair of white filter elements 31a, 31b and to simultaneously transform the composite cigarette into a pair of dual filter tip cigarettes Z_1 , Z_2 which are deposited on the conveyor 19. Each dual filter tip cigarette thus comprises a cigarette stick 42 or 41, a black filter element 39 or 40 which is adjacent to and abuts against one end of the stick 42 or 41, a white filter element 31b or 31a which is adjacent to and abuts against the black filter element 39 or 40, and a wrapper 43b or 43a which surrounds the filter elements 31b, 39 or 31a, 40 and the adjacent portion of the cigarette stick 42 or 41. In other words, the wrapper 43b or 43a constitutes the sole means for connecting the filter elements 31b, 39 or 31a, 40 with the cigarette stick 42 or 41, respectively, and this wrapper is applied to the cigarette sticks and to the filter elements in a single operation, namely, while passing about the axis of the wrapping drum 16.

It is to be understood that, if desired, the individual filter elements 31a, 31b, 39 or 40 may consist of two or more different filter materials, and that it is equally possible to simultaneously form four, six or more filter tip cigarettes merely by arranging the drums, rollers, wheels and rolls in such a way that two or more composite filters are simultaneously shuffled with four, six, etc. cigarette sticks. In such apparatus, all but the two outermost cigarette sticks may be of twin length and such twin-length sticks are halved before reaching the conveyor 19.

If a supply of white filters 31 is already available, and if a supply of black filters 35 is also available, the apparatus of FIGS. 1 and 2 may be further simplified by arranging the hopper 1 (with a supply of filters 31 therein) in such a way that its chute 1a delivers directly into the pockets of the first shuffling drum 22 and by mounting the hopper 101 (with a supply of say filters 35 therein) in such a manner that its chute 101a delivers filters 35 directly into the grooves of the transfer drum 20 where they are transformed into pairwise arranged black filter elements 39, 40 which are spaced apart by the spreading drum 23 before being delivered into the pockets of the second shuffling drum 22. In other words, the saddle wheels 2, 102 and the staggering drums 5, 105 are necessary in the event that the operation is started with white filter rods 25 whose length is a multiple of the length of white filter elements as used in the filter tip cigarette, and with black filter rods 26 whose length is also a multiple of the length of black filter elements utilized in the filter tip cigarette. In fact, even the spreading drum 23 may be dispensed with if the apparatus comprises two hoppers 101 whose chutes respectively deliver filter elements 39 and 40 into the pockets of the second shuffling drum 22 where the composite filters 39, 31, 40 are formed.

FIG. 2 illustrates a so-called kicker 50 (see U.S. Patent 2,917,156) which is utilized for delivering pairwise arranged cigarette sticks 41, 42 into the grooves of the supply drum 12. This arrangement may be replaced by a source 51, e.g. a magazine having a chute 51a, which is shown in FIG. 4 and which delivers aligned pairs of cigarette sticks 41, 42 directly into the pockets of the second shuffling drum 11.

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The exact composition of filter rods 25 and 26 forms no part of my invention. For example, the rods 25 may be acetate filters and the rods 26 may be carbon filters.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that fairly constitute essential characteristics of the generic and specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

The previous description refers to the method and apparatus for making filter tip cigarettes. It is obvious that this method and apparatus may be used also for making other composite smoker's articles such as filter tipped cigarrillos, cigars or the like.

What is claimed as new and desired to be protected by Letters Patent is:

1. A method of making filter tipped smokers' articles which comprises the steps of subdividing an elongated filter rod of a first type into a plurality of coaxially aligned filters; staggering the filters in a direction at right angles to their axes and thereupon moving the filters in the axial direction thereof to form a first row of consecutively arranged parallel filters of the first type; subdividing an elongated filter rod of a second type into a plurality of coaxially arranged filters parallel to the filters of the first type; staggering the thus obtained filters of the second type in a direction at right angles to their axes and thereupon moving such filters in the axial direction thereof to form a second row of consecutively arranged parallel filters of the second type; halving each consecutive filter of the second type into a pair of coaxial filter elements and increasing the distance between the thus obtained filter elements sufficiently to provide room for a filter of the first type; introducing consecutive filters of the first type between consecutive pairs of filter elements to form consecutively arranged composite filters consisting of coaxial filters and filter elements each comprising a filter of the first type disposed in axial alignment between but not connected with the filter elements of the respective pair; introducing consecutive composite filters between spaced pairs of coaxial tobacco-containing sticks which are parallel to such composite filters; moving the filters, the filter elements and the tobacco-containing sticks at right angles

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to their axes during introduction of filters between the respective filter elements and during introduction of composite filters between the tobacco-containing sticks; applying a wrapper around each consecutive composite filter and around the adjacent portions of the respective sticks so that the wrappers constitute the sole connectors between the pairs of filter elements, the respective filters of the first type, and the respective tobacco-containing sticks; and halving the composite filters to obtain filter tipped smokers' articles each of which comprises a tobacco-containing stick, a filter element of the second type and a portion of a filter of the first type.

2. A method as set forth in claim 1, wherein the axial length of each filter element is less than the axial length of a filter of the first type.

3. A method as set forth in claim 1, wherein each of said filter rods is subdivided into more than two filters.

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