

Feb. 28, 1967

W. RUDSZINAT

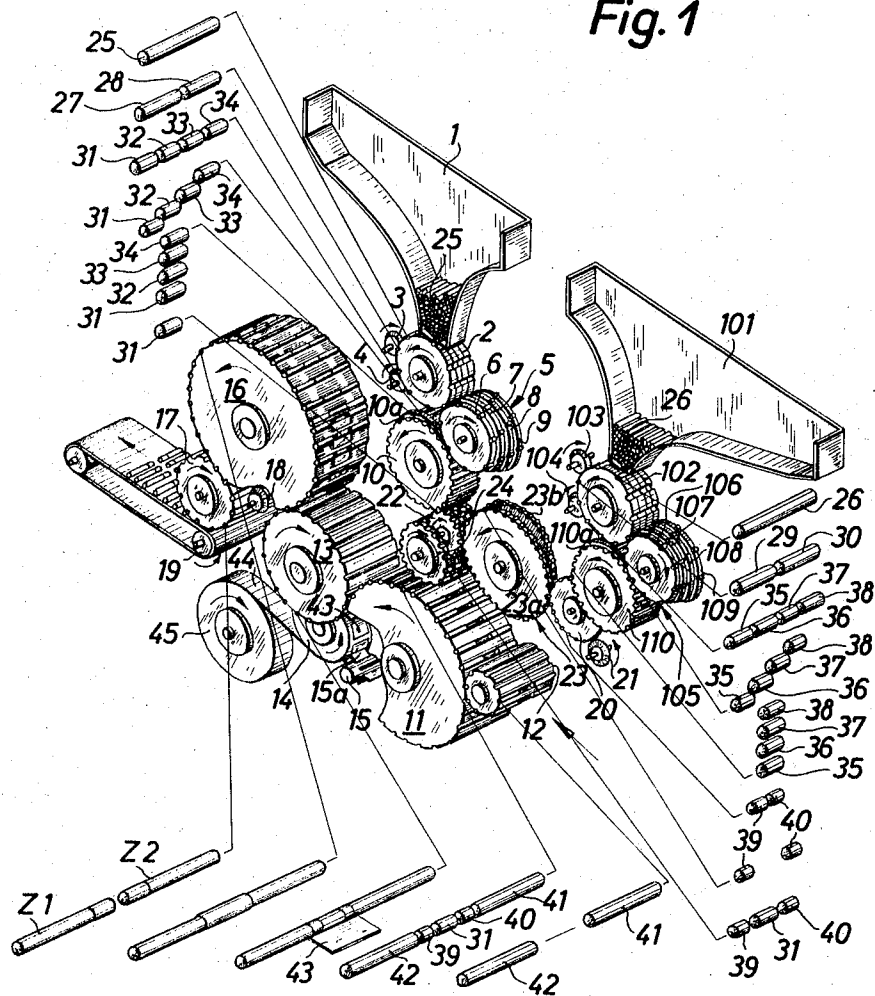
3,306,306

APPARATUS FOR THE PRODUCTION OF FILTER CIGARETTES AND THE LIKE

Original Filed Nov. 21, 1961

4 Sheets-Sheet 1

Fig. 1



INVENTOR
Willy Rudszinat
BY
Michael J. Striker
His ATTORNEY

Feb. 28, 1967

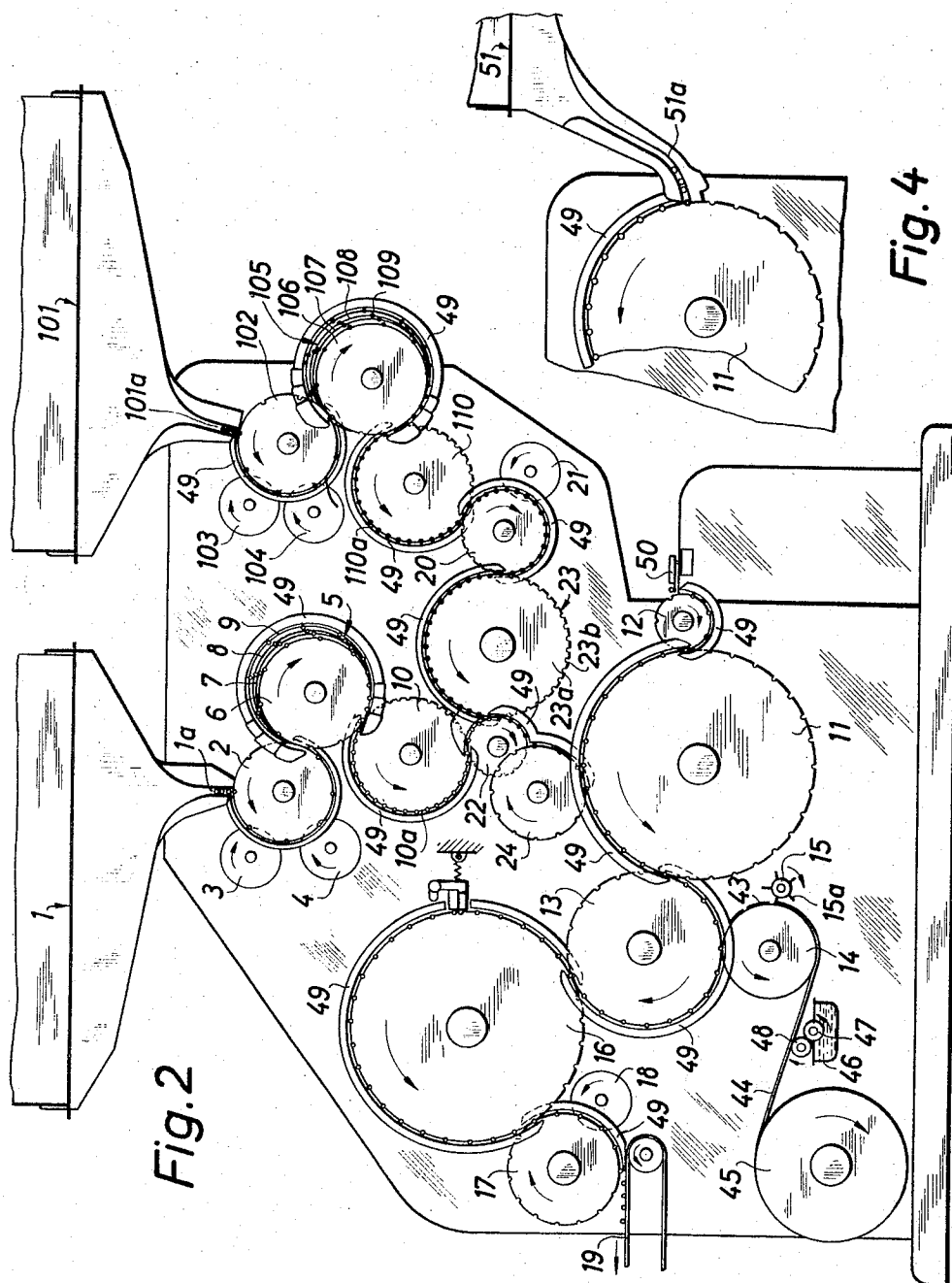
W. RUDSZINAT

3,306,306

APPARATUS FOR THE PRODUCTION OF FILTER CIGARETTES AND THE LIKE

Original Filed Nov. 21, 1961

4 Sheets-Sheet 2



INVENTOR
 Willy Rudzinat
 BY Michael J. Striker
 His ATTORNEY

Feb. 28, 1967

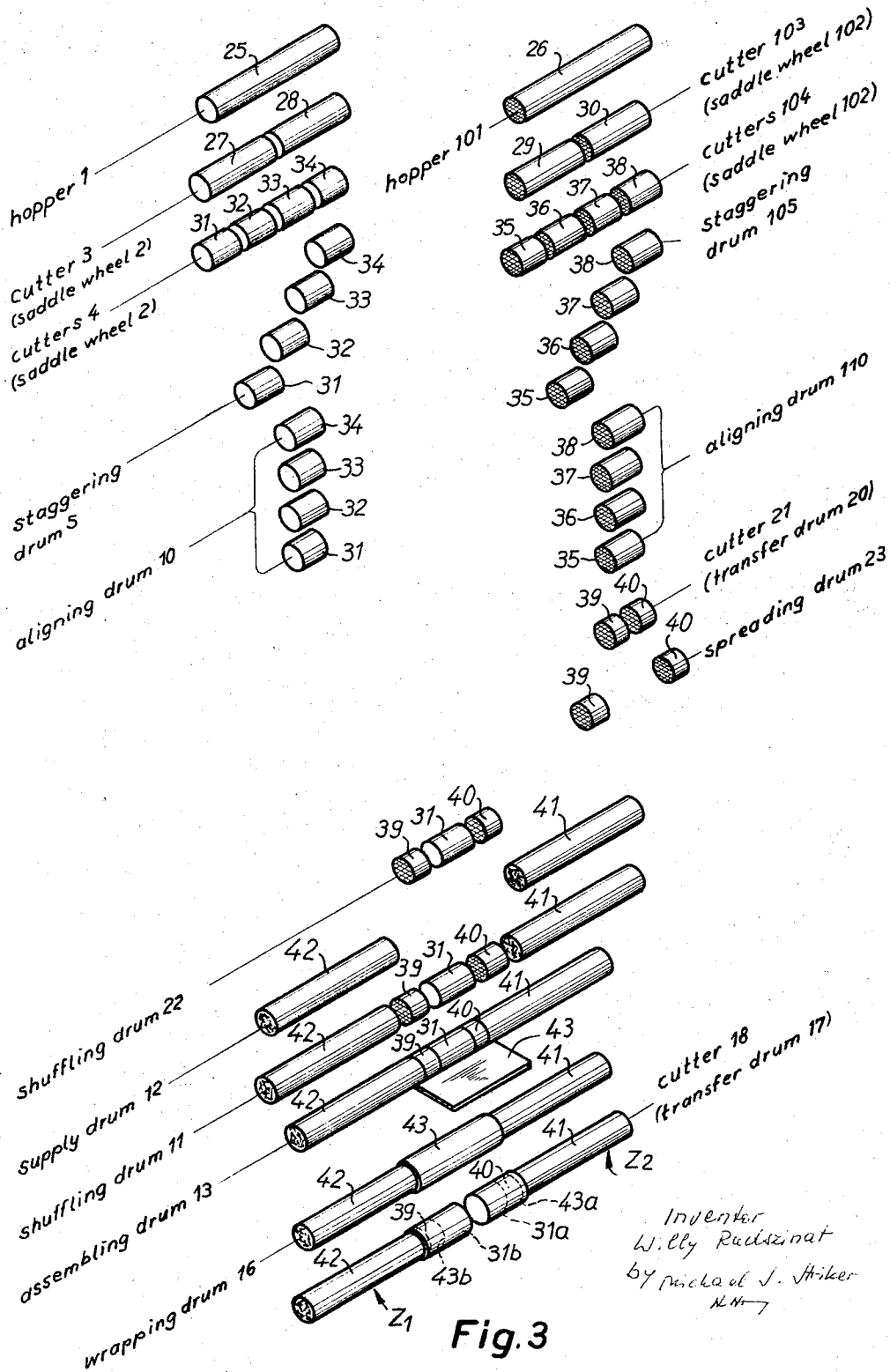
W. RUDSZINAT

3,306,306

APPARATUS FOR THE PRODUCTION OF FILTER CIGARETTES AND THE LIKE

Original Filed Nov. 21, 1961

4 Sheets-Sheet 3



Feb. 28, 1967

W. RUDSZINAT

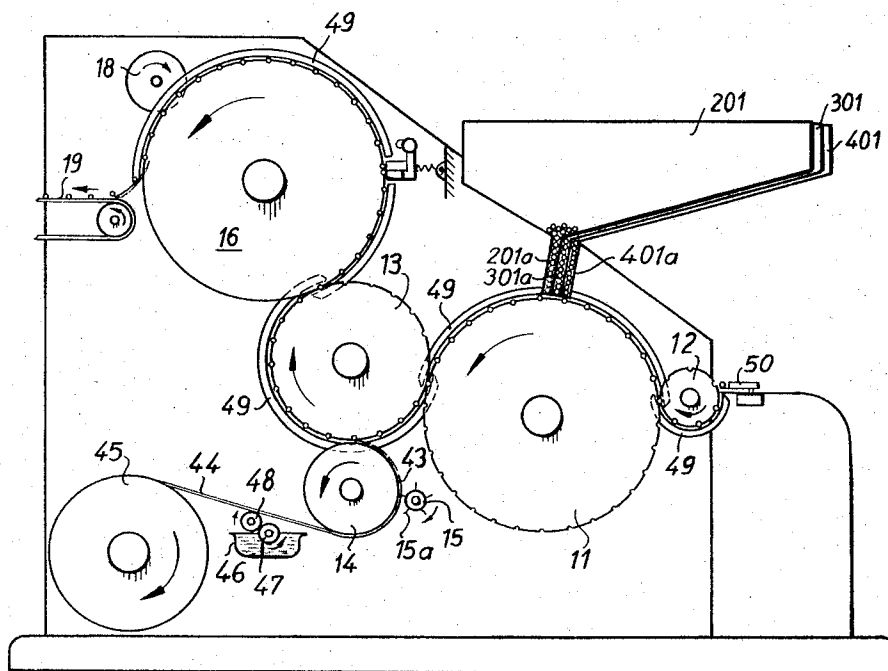
3,306,306

APPARATUS FOR THE PRODUCTION OF FILTER CIGARETTES AND THE LIKE

Original Filed Nov. 21, 1961

4 Sheets-Sheet 4

Fig.5



INVENTOR.

BY

Willy Rudzinski

Michael S. Striker

N 14-7

1

3,306,306

APPARATUS FOR THE PRODUCTION OF FILTER CIGARETTES AND THE LIKE

Willy Rudszinat, Hamburg-Lohbrugge, Germany, assignor to Hauni Werke Koerber & Co., Kg., Hamburg-Bergedorf, Germany

Original application Nov. 21, 1961, Ser. No. 153,926, now Patent No. 3,245,414, dated Apr. 12, 1966. Divided and this application Apr. 20, 1965, Ser. No. 449,455 14 Claims. (Cl. 131-94)

This is a division of my copending application Serial No. 153,926, filed November 21, 1961, now Patent No. 3,245,414.

The present invention relates to the manufacture of filter cigarettes and other types of rod-shaped or stick-shaped smokers' articles, and more particularly to the production of filter cigarettes or filter cigars whose mouthpieces consist of at least two distinct rod-shaped filter elements of unit length.

An important object of the invention is to provide an apparatus for the production of filter cigarettes or filter cigars in a continuous operation by starting with cigarette or cigar sticks of unit length and/or multiple unit length and with filter rods whose length is a multiple of the length of filter elements in the mouthpieces of the ultimate products.

Another object of the invention is to provide an apparatus of the just outlined characteristics wherein a cigarette or cigar stick can be assembled with two or more filter elements into a filter cigarette having a duplex triplex, quadruplex, etc. mouthpiece and a minimum of wrapping material.

A further object of the invention is to provide an apparatus for the production of filter cigarettes or filter cigars of the type wherein the filter elements which together constitute the mouthpiece need not be connected with each other prior to their connection with the cigarette or cigar stick.

An additional object of the invention is to provide an apparatus which is capable of producing filter cigarettes or filter cigars in such a way that a single wrapper of paper or other suitable wrapping material suffices to secure the filter elements to each other and to secure the filter elements to the tobacco-containing sticks.

Still another object of the invention is to provide an apparatus of the above outlined characteristics wherein a plurality of filter cigarettes or filter cigars may be produced in a simultaneous operation.

A further object of the invention is to provide a very simple, compact and rugged apparatus for the manufacture of cigarettes or cigars with duplex, triplex, quadruplex, etc. mouthpieces which utilizes a single wrapping station where the filter elements of the mouthpiece are connected to each other and with the tobacco-containing sticks.

A concomitant object of the invention is to provide an apparatus of the above outlined character wherein the production of filter elements of requisite length, the alignment of filter elements with each other and with the tobacco-containing sticks, as well as the connection of filter elements to each other and to the tobacco-containing sticks may take place in a continuous operation.

An additional object of the invention is to provide an apparatus for the production of filter cigarettes or filter cigars with composite mouthpieces wherein mouthpieces of double unit length can be simultaneously assembled with a pair of tobacco-containing sticks of unit length so that a single cut is necessary to transform filter cigars or filter cigarettes of double unit length into pairs of cigars or cigarettes of unit length but having duplex mouthpieces.

2

It is also an object of my invention to provide an improved rod-shaped smokers' article which is produced in an apparatus of the above outlined type.

Briefly stated, one feature of the present invention resides in the provision of an apparatus which includes means for forming a composite mouthpiece by shuffling or interdigitating a pair of filter elements of a first type with a filter of a second type so that the filter of the second type is located between the filter elements of the first type and forms therewith a duplex mouthpiece of double unit length, means for forming a filter cigar or filter cigarette of double unit length by shuffling the mouthpiece of double unit length with a pair of tobacco-containing sticks of unit length so that the mouthpiece is located between the tobacco-containing sticks, means for applying a single wrapper of paper or another suitable wrapping material about the mouthpiece and about the adjacent portions of the tobacco-containing sticks, and means for subdividing the resulting cigar or cigarette of double unit length into a pair of filter cigars or filter cigarettes of unit length each of which comprises a duplex mouthpiece of unit length.

In accordance with a preferred embodiment of the present invention, the improved apparatus may be used for the production of filter cigarettes and then comprises a first rotary shuffling or interdigitating drum which is provided with a plurality of axially parallel peripheral grooves or holders, means for consecutively delivering filters of double unit length and pairs of filter elements of unit length into the holders of the shuffling drum so that each filter is located between and forms a duplex mouthpiece of double unit length with a pair of such filter elements, a second rotary shuffling or interdigitating drum which is provided with a plurality of axially parallel peripheral pockets or holders adapted to receive duplex mouthpieces of double unit length as well as to receive pairs of coaxial but spaced cigarette sticks of unit length so that the mouthpieces are disposed between the respective pairs of cigarette sticks, and means for consecutively applying wrappers about the duplex mouthpieces of double unit length and about the adjacent portions of the cigarette sticks.

The means for producing and feeding filter elements of the first type may comprise a hopper arranged to consecutively discharge filter rods of multiple unit length into the grooves or holders of a transfer drum (also called saddle wheel). Cutter means are provided for halving and, if necessary, further subdividing the filter rods so that each thereof yields a plurality of axially aligned plugs of double unit length, and a staggering drum is used to arrange or array the thus obtained plugs in such a way that the plug are staggered in the direction in which the staggering drum rotates. An aligning drum is located between the staggering drum and the first shuffling drum for arranging such staggered plugs in a single file and this aligning drum cooperates with a cutter which subdivides each consecutive plug into a pair of coaxial filter elements of unit length. A spreading drum serves to move the filter elements of each pair axially and away from each other in such a way that the pairs of filter elements delivered to the first shuffling drum define between themselves gaps each adapted to accommodate a filter of the second type.

If the filters of the second type are of double unit length and are obtained by halving or by further subdividing elongated filter rods of multiple unit length into a plurality of shorter filters of double unit length, the means for delivering filters of the second type to the first shuffling drum preferably comprises all of the elements constituting the arrangement which delivers filter elements of the first type excepting that one of the cutters and the spread-

3

ing drum may be dispensed with because each filter of the second type and of double unit length is received between a pair of filter elements of unit length 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 improved apparatus itself, however, both as to its construction and its mode of operation, together with additional features and advantages thereof, will be best understood upon perusal of 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 is used for the production of filter cigarettes and embodies one form of the invention;

FIG. 2 is a front elevational view of the apparatus shown in FIG. 1;

FIG. 3 is a perspective view showing the sequence in which filter cigarettes having duplex mouthpieces are assembled in the apparatus of FIGS. 1 and 2;

FIG. 4 illustrates a modified source of pair-wise arranged tobacco-containing sticks which delivers such sticks directly into the pockets or holders of the second shuffling drum; and

FIG. 5 is a front elevational view of a further apparatus.

Referring first to FIGS. 1 and 2, there is shown an apparatus for assembling filter cigarettes with duplex mouthpieces. The apparatus 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 of eight times unit length are stacked and consecutively discharged by gravity feed by descending through a chute 1a to enter consecutive axially parallel peripheral grooves or holders of a transfer drum 2, also called saddle wheel, which is driven to rotate in a direction indicated by the arrow and to advance the rods 25 seriatim past a rotary halving cutter 3 which severs each rod 25 midway between its ends so that such rods yields pairs of white filter members 27 and 28 of quadruple unit length (see also FIG. 3). Such white filter members 27, 28 are then advanced by the transfer drum 2 past a pair of spaced coaxial rotary subdividing cutters 4 (only one shown in FIGS. 1 and 2) which respectively sever the white filter members 27, 28 so that such filter members respectively yield two white filters 31, 32 and 33, 34 of double unit length (see also FIG. 3), i.e., the length of each of the white filters 31-34 is twice the length of a white filter element as utilized in the duplex mouthpiece of a filter cigarette.

The white filters 31-34 of double unit length which are obtained by halving the white filter rods 25 of eight times unit length and by thereupon subdividing the thus obtained white filter members 27, 28 of quadruple unit length are then transferred into consecutive axially parallel peripheral grooves or holders formed in the four disks 6, 7, 8 and 9 of a revolving 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-larger disk 8, and that the filters 34 are transferred into the grooves of the largest disk 9.

The staggering drum 5 transfers white filters 31-34 to a shifting or aligning drum 10 which rotates in the direction indicated by the arrow and arrays the filters 31-34 in a single file so that the longitudinal ends of these filters are disposed in two parallel planes which are normal to the axis of the shifting drum 10. As shown in FIG. 1, the disks 6-9 of the drum 5 deliver the filters 31-34 into the space between a pair of fixed arcuate guide rails or cams 10a which are adjacent to the periphery of the drum 10 and converge in the direction in which the drum 10 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 or interdigitating drum 22. Thus, the cams 10a cooperate with the drum 10 to shift the filters 31-34 axially and to array

4

such filters in a single file. It is clear that the cams 10a may be arranged to shift only three filters of each group of four filters 31-34 so that such three filters of each group will move into registry with the fourth filter.

The staggering drum 5 is in linear contact with the transfer drum 2 and with the shifting drum 10, i.e., the axes of its disks 6-9 are parallel with each other and are located in a plane which is normal to the plane passing through the axes of the drums 2 and 10.

The apparatus of FIGS. 1 and 2 further comprises a source of filter rods 26 of a second type (hereinafter called black filter rods), and this source is shown in the form of a magazine or hopper 101. The rods 26 are of eight times unit length. The chute 101a in the bottom part of the hopper 101 delivers such black filter rods 26 seriatim into the axially parallel peripheral grooves or holders of a second transfer drum or saddle wheel 102 which cooperates with a first rotary cutter 103 to halve each black filter rod 26 in order to form pairs of black filter members 29, 30 of quadruple unit length (see also FIG. 3), and the transfer drum 102 also cooperates with a pair of spaced coaxial rotary cutters 104 (only one shown in FIGS. 1 and 2) which respectively subdivide the filter members 29, 30 so that each black filter rod 26 ultimately yields four black filters or plugs 35, 36, 37 and 38 of double unit length. Such black filters or plugs of double unit length are thereupon transferred into the axially parallel peripheral grooves or holders of four disks 106, 107, 108, 109 which together constitute a second staggering drum 105. The diameter of the disk 108 for the plugs 37 is smaller than the diameter of the disk 109 for the plugs 38, the diameter of the disk 107 for the plugs 36 is smaller than the diameter of the disk 108, and the diameter of the disk 106 for the plugs 35 is smaller than the diameter of the disk 107. The staggering drum 105 transfers black plugs 35-38 of double unit length obtained by severing consecutive black filter rods 26 onto the periphery of a second shifting or aligning drum 110 which cooperates with a pair of converging arcuate rails or cams 110a (only one shown in FIGS. 1 and 2) so as to perform a function analogous to that of the drum 10 and cams 10a by arraying the black plugs 35-38 of double unit length in a single file located between a pair of spaced parallel planes which are normal to the axis of the shifting drum 110.

The single file of black plugs 35-38 of double unit length is then conveyed into the peripheral grooves or holders of a transfer drum 20 which advances the plugs seriatim past a rotary cutter 21 so that each black plug is ultimately halved and yields a pair of black filter elements 39, 40 of unit length, i.e., of such length as is necessary in a duplex mouthpiece of unit length. 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 white filter 31, 32, 33 or 34 of double unit length, forms a duplex mouthpiece of unit length.

The transfer drum 20 cooperates with a spreading drum 23 which moves the black filter elements 39, 40 of each pair away from each other, i.e., this drum 23 spaces or separates the aligned black filter elements 39, 40 to such an extent that they define between themselves a space or gap having a length which suffices to accommodate one of the white filters 31, 32, 33 or 34 of double unit length. 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 which is adjacent to the transfer drum 20 but diverge while advancing toward the first shuffling or interdigitating drum 22.

The purpose of the first shuffling drum 22 is to assemble black-and-white mouthpieces of double unit length each consisting of two axially spaced black filter elements 39, 40 of unit length and a white filter 31, 32, 33 or 34 of double unit length. A duplex mouthpiece consisting, for example, of two black filter elements 39, 40 and a white filter 31 is a loose structure because its three rod-

5

shaped components are normally somewhat spaced from each other. This is due to the fact that the gaps between the filter elements 39, 40 in the holders of the shuffling drum 22 are preferably at least slightly longer than a filter 31, 32, 33 or 34 of double unit length in order to prevent jamming and pile-up of such rod-shaped components. The thus obtained duplex mouthpieces of double unit length are transported by the shuffling drum 22 toward and into consecutive pockets or holders of a transfer drum 24 which advances such duplex mouthpieces into the central portions of consecutive pockets or holders provided in the periphery of a second shuffling or interdigitating drum 11. The holders or pockets of the shuffling drum 11 are parallel with the axis about which the drum 11 rotates and each thereof receives a pair of coaxially aligned but spaced cigarette sticks 41, 42 of unit length from a suitable source including a supply drum 12. Thus, and since the shuffling drum 11 also receives duplex mouthpieces of double unit length (from the transfer drum 24) each of its holders will accommodate a pair of cigarette sticks 41, 42 of unit length and a mouthpiece 39, 31, 40 or 39, 32, 40 or 39, 33, 40 or 39, 34, 40 of double unit length.

The thus obtained composite but still loose assemblies each of which includes two black filter elements 39, 40 of unit length, a white filter 31 or 32 or 33 or 34 of double unit length and two cigarette sticks 41, 42 of unit length are thereupon transferred into the pockets or holders of an assembly drum 13 which also 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 to form a bobbin or reel 45 and is paid out in the form of a strip or tape which is severed at regular intervals by a revolving knife roll 15 cooperating with roller 14 and having axially parallel radially outwardly extending knives 15a. The assembly drum 13 delivers the assemblies, each of which now includes a band 43, into the peripheral grooves or holders of a wrapping drum 16 so that the assemblies consisting of two cigarette sticks 41, 42 of unit length, two black filter elements 39, 40 of unit length, one white filter 31, 32, 33 or 34 of double unit length and a band 43 are transformed into filter cigarettes of double unit length. Such wrapping operation is carried out by convoluting the bands 43 around the respective white filters, around the respective black filter elements, and around the adjoining inner end portions of the cigarette sticks. The resulting filter cigarettes of double unit length are delivered into the holders or pockets of a transfer drum 17 which cooperates with a revolving disk knife 18 to subdivide each such filter cigarette of double unit length into a pair of filter cigarettes Z_1 , Z_2 of unit length. The knife 18 severs the convoluted wrappers 43 and the white filters 31, 32, 33 or 34 so that each such white filter yields two white filter elements 31a, 31b of unit length. The length of white filter elements 31a, 31b may but need not equal the length of black filter elements 39, 40. The filter cigarettes Z_1 and Z_2 of unit length are delivered onto the upper run of an endless band conveyor 19 which serves as a collecting conveyor and advances the cigarettes to a storing station, a packing station, an inverting station wherein one of the cigarettes is turned through 180 degrees so that its mouthpiece faces in the same direction as the mouthpiece of the non-inverted cigarette, or to another destination.

The wrapping drum 16 may be constructed and assembled in a manner as disclosed in U.S. Patent No. 2,902,040 to Kurt Korber et al.

The underside of the tape 44 is coated with adhesive while advancing along a paster shown in FIG. 2 and including a tank 46, a transfer roll 47 which dips into adhesive contained in the tank 46, and a roll-shaped applicator 48 whose periphery is provided with a film of adhesive by contact with the transfer roll 47. The applicator 48 rolls along the underside of the tape 44.

6

The apparatus of my present invention further comprises suitable retainers in the form of arcuate shields 49 (see FIG. 2) which retain black and white filter rods, filters, plugs, filter elements, mouthpieces and cigarette sticks in the holders of the respective conveyors. The exact construction and mounting of such shields is well known and forms no part of the present invention. The drive means which rotates the rollers, rolls, wheels and drums in directions indicated by the arrows may include suitable gear trains, belt-and-pulley arrangements or the like. One form of drive means capable of being adapted for use in the apparatus of the present invention is disclosed in U.S. Patent No. 2,714,384 to Schubert.

Prior to reaching the holders of the assembly drum 13, the assemblies including the cigarette sticks 41, 42 of unit length, filter elements 39, 40 of unit length and filters 31, 32, 33 or 34 of double unit length are compressed or condensed in the axial direction thereof so that the ends of the filter elements 39, 40 respectively abut against the cigarette sticks 41, 42 and also against the respective ends of the filters 31, 32, 33 or 34. Thus, when an adhesive-coated band 43 is applied to and is wrapped around the respective duplex mouthpiece of double unit length to form a tube which connects the component parts of the duplex mouthpiece to each other and to the cigarette sticks, the total length of the assembly equals the combined length of the filter cigarettes Z_1 and Z_2 . Such axial compression or condensing of a composite assembly including two or more cigarette sticks and one or more filters and/or filter elements is well known in the art (see, for example, U.S. Patent No. 2,902,040 to Korber et al.) and, therefore, the means for carrying out such condensing operation are not shown in the drawings.

The operation of the improved apparatus will be best understood with reference to FIG. 3 which illustrates various stages in the production of filter cigarettes with duplex mouthpieces. Thus, and starting in the upper left-hand corner of FIG. 3, white filter rods 25 delivered by the chute 1a of the hopper 1 are halved by the cutter 3 to yield filter members 27, 28 which are then severed by the rotary cutters 4 to respectively yield white filters 31, 32 and 33, 34 of double unit length. While travelling with the disks 6-9 of the staggering drum 5, the filters 31-34 are staggered in the circumferential direction of the drum 5 so that the filters 34, 33, 32 respectively lag behind the filters 33, 32, 31. In the next step, the cams 10a compel the filters 31-34 to form a single file, with the filter 31 leading, so that the filter 31 is first to be transferred into the median portion of a peripheral holder in the first shuffling or interdigitating drum 22.

The black filter rods 26 are discharged through the chute 101a of the hopper 101 and are severed by the cutter 103 while advancing with the transfer drum 102 so that each such rod yields two filter members 29, 30 of quadruple unit length. Such filter members 29, 30 are then severed by the cutters 104 to respectively yield filters or plugs 35, 36 and 37, 38 of double unit length. The plugs 35-38 are axially aligned and enter the holders of the drum 105 which staggers them in the circumferential direction and in such a way that the plug 35 reaches the shifting or aligning drum 110 ahead of the plugs 36, 37, 38, that the plug 36 reaches the drum 110 ahead of the plugs 37, 38 and that the plug 37 reaches the drum 110 ahead of the plug 38. The cams 110a cooperate with the drum 110 to array the plugs 35-38 in a single file which is delivered to the transfer drum 20 and advances past the cutter 21 which severs each plug midway between the ends so that each such plug yields two filter elements 39, 40, of unit length. The spreading drum 23 causes the filter elements 39, 40 of each pair to move axially and away from each other and such spreading action is completed before the filter elements 39, 40 reach the holders of the first shuffling drum 22. The resulting gaps between the filter elements 39, 40 are long

enough to accommodate a filter 31, 32, 33 or 34. Such filters are delivered by the shifting or aligning drum 10. The resulting duplex mouthpieces of double unit length comprise three axially aligned but unconnected rod-shaped parts including two spaced-apart filter elements 39, 40 and a white filter 31, 32, 33 or 34 of double unit length which is located between the respective filter elements. Such mouthpieces of double unit length are transferred into the holders of the second shuffling drum 11 simultaneously with pairs of spaced-apart cigarette sticks 41, 42 of unit length, such cigarette sticks being delivered by the supply drum 12. Prior to leaving the second shuffling drum 11, the assemblies of cigarette sticks, black filter elements and white filters are condensed by moving the cigarette stick 41 in a direction toward the cigarette stick 42 and/or vice versa so that the inner ends of the cigarette sticks respectively abut against the outer ends of the black filter elements 40, 39 and that the inner ends of the black filter 39, 40 elements abut against the respective ends of the white filter 31, 32, 33 or 34. The thus condensed assemblies are delivered into the holders of the assembly drum 13 and each thereof receives a band 43 which is applied by the roller 14. The band 43 is wrapped around the respective condensed assembly while the assembly travels with the wrapping drum 16 in a direction toward the transfer drum 17 so that each such assembly forms a filter cigarette of double unit length. The drum 17 cooperates with the cutter 18 which severs each convoluted wrapper 43 so that the mouthpiece is halved whereby the holders of the drum 17 contain pairs of filter cigarettes Z_1 , Z_2 of unit length each of which comprises a duplex mouthpiece of unit length. As shown in FIG. 3, the mouthpiece of the cigarette Z_1 comprises a black filter element 39 of unit length and a white filter element 31b of unit length. The mouthpiece of the cigarette Z_2 comprises a black filter element 40 of unit length and a white filter element 31a of unit length. The convoluted wrapper 43 is transformed into a pair of tubes 43b, 43a which respectively connect the filter elements 31b, 39 and 31a, 40 to the cigarette sticks 42, 41. The cigarettes Z_1 , Z_2 are deposited on the upper run of the belt 19. It will be seen that the black filter elements 39, 40 respectively abut against the inner ends of the cigarette sticks 42, 41 and that one end of each of the white filter elements 31b, 31a is exposed. It will also be noted that the tubes 43b, 43a constitute the sole means for connecting the black filter elements 39, 40 with the white filter elements 31b, 31a and cigarette sticks 42, 41. In other words, the wrappers 43 constitute the sole means for connecting more than two coaxial rod-shaped members to each other, and such wrappers 43 are applied to and convoluted about all of the corresponding rod-shaped members in a single operation, namely while travelling about the axes of the drums 13 and 16. It is obvious that the assembly drum 13 may also serve as a wrapping drum, that the transfer drum 17 may be omitted if the cutter 18 is placed adjacent to the wrapping drum 16 (see FIG. 5), and that the shuffling drums 22, 11 may be replaced by a single shuffling or interdigitating drum which receives white filters of double unit length from the shifting drum 10, pairs of black filter elements from the spreading drum 23, and pairs of cigarette sticks 41, 42 from the supply drum 12.

It is further to be understood that each of the individual filter elements 31a, 31b, 39, 40 may consist of two or more different filter materials and which may be produced in a manner as disclosed in U.S. Patent No. 3,039,367 to Stelzer, and that it is equally possible to simultaneously produce four, six or more filter cigarettes of unit length merely by arranging the drums, rollers, rolls, wheels and other component parts in such a way that two or more duplex mouthpieces of double unit length are simultaneously shuffled with four, six, etc. cigarette sticks of unit length. In such modified apparatus, all but the two outermost cigarette sticks may be of double unit

length and such sticks of double unit length are halved prior to reaching the upper run of the belt 19.

If a supply of white filters 31, 32, 33 and/or 34 is already available, and if a supply of black filters or plugs 35, 36, 37 and/or 38 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, 32, 33 and/or 34 therein) in such a way that the chute 1a delivers directly into the holders of the first shuffling drum 22 and by mounting the hopper 101 (with a supply of filters or plugs 35, 36, 37 and/or 38 therein) in such a manner that the chute 101a delivers directly into the holders of the transfer drum 20. The plugs travelling with the transfer drum 20 are severed by the cutter 21 so that each thereof yields a pair of black filter elements 39, 40 which are then moved axially and away from each other (drum 23) prior to entering the holders of the first shuffling drum 22. In other words, the drums 2, 102 and the drums 5, 105 are necessary only in the event that the operation begins with white filter rods 25 whose length is a whole multiple of the length of the white filter elements 31a, 31b as used in a duplex mouthpiece of unit length, and with black filter rods 26 whose length is also a whole multiple of the length of black filter elements 39, 40 as used in such duplex mouthpieces of unit length. In fact, even the spreading drum 23 may be omitted if the apparatus comprises two hoppers as a substitute for the hopper 101 and if such hoppers deliver filter elements 39 and 40 directly into the holders of the first shuffling drum 22 where the duplex mouthpieces of double unit length are assembled. This modification is illustrated in FIG. 5 which shows a single shuffling drum 11, a composite magazine 201, 301, 401 having chutes 201a, 301a, 401a which respectively feed filters 31, filter elements 39 and filter elements 40 directly into the holders of the drum 11, a drum 12 which delivers pairs of cigarette sticks 41, 42 directly into the holders of the drum 11, an assembly drum 13 which receives assemblies from the drum 11, a suction drum 14 which supplies wrappers 43, a wrapping drum 16 which cooperates with the cutter 18, and a belt 19.

FIGS. 2 and 5 show a so-called kicker 50 (see the disclosure of U.S. Patent No. 2,917,156 to Pollmann) which is utilized to transfer pairs of cigarette sticks 41, 42 into the holders of the supply drum 12. This kicker 50 may be replaced by a source 51, shown in FIG. 4, which includes a magazine having a chute 51a arranged to deliver pairs of aligned cigarette sticks 41, 42 directly into the pockets of the second shuffling drum 11.

The exact composition of the filter rods 25 and 26 forms no part of my invention. For example, the filter rods 25 may be acetate filters and the rods 26 may be carbon filters. Also, the preceding detailed description of the invention refers to an apparatus for the production of filter cigarettes. It is obvious that this apparatus may be used with equal advantage in the production of other types of rod-shaped smokers' articles, such as filter tipped cigars, cigarillos, cheroots and the like.

In the apparatus of the present invention, all rod-shaped members are preferably moved sideways, i.e., in a direction which is normal or substantially normal to their axes. The sole exception constitute the cigarette sticks which move axially into the range of the kicker 50 shown in FIG. 2. However, once they enter the holders of the supply drum 12, all of the cigarettes 41, 42 advance sideways in the same way as the filter material.

In the appended claims, the term "conveyor" or "conveyor means" is intended to embrace rotary drums or any analogous or equivalent conveying structure which is capable of advancing tobacco-containing sticks and/or rod-shaped filter members sideways, i.e., in a direction substantially at right angles with reference to the axes of such rod-shaped bodies.

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 which fairly constitute essential characteristics of the generic and specific aspects of my contribution to the art and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

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

1. An apparatus for producing rod-shaped smokers' articles of double unit length having multiplex mouthpieces of double unit length and including a pair of axially spaced tobacco-containing sticks, a pair of rod-shaped filter elements of a first type and of unit length axially spaced from each other and located between the sticks, a rod-shaped filter of a second type and of double unit length located between the filter elements, and a single tubular wrapper constituting the sole means for connecting the filter elements to the filter and to the adjacent portions of the sticks, in combination, separate sources of filters, adhesive-coated wrappers and pairs of sticks; a separate source of filter element rods of multiple unit length; means for subdividing each multiple length rod into successive pairs of filter elements, each of said pairs of filter elements being axially aligned and spaced from each other; conveyor means comprising a plurality of equidistant parallel holding means and arranged to advance such holding means sideways; means for feeding said filters, said pairs of filter elements and said pairs of sticks into consecutive holding means of said conveyor means in such a way that the thus fed rod-shaped parts advance only sideways all the way from the respective sources, into, and also with the respective holding means to form in each holding means an unconnected assembly of a filter, a pair of filter elements and a pair of sticks; means for feeding said single wrapper each to consecutive holding means; and means for convoluting such wrappers around the filters, filter elements and sticks in the respective holding means.

2. An apparatus for producing rod-shaped smokers' articles of double unit length having multiplex mouthpieces of double unit length and including a pair of axially spaced tobacco-containing sticks, a pair of rod-shaped filter elements of a first type and of unit length axially spaced from each other and located between the sticks, a rod-shaped filter of a second type and of double unit length located between the filter elements, and a single tubular wrapper constituting the sole means for connecting the filter elements to the filter and to the adjacent portions of the sticks, said apparatus comprising separate sources of filters, pairs of filter elements and pairs of tobacco-containing sticks; conveyor means comprising a plurality of equidistant parallel holders and arranged to advance such holders sideways; means for feeding filters, pairs of filter elements and pairs of sticks from the respective sources and into consecutive holders of said conveyor means in such a way that all of the rod-shaped parts move only sideways all the way from the respective sources, into, and also with the respective holders whereby each of said holders accommodates an unconnected assembly of rod-shaped components including a pair of sticks, a pair of filter elements between the respective pair of sticks and a filter between the respective pair of filter elements; means for attaching a single adhesive-coated wrapper to each consecutive assembly; and wrapping means for convoluting the wrappers around the respective assemblies while the assemblies move sideways.

3. An apparatus for producing rod-shaped smokers' articles of double unit length having multiplex mouthpieces of double unit length and including a pair of axially spaced tobacco-containing sticks, a pair of axially spaced rod-shaped filter elements of a first type and of unit length disposed between the sticks, a rod-shaped filter of a second type and of double unit length disposed between the filter elements, and a single tubular wrapper

constituting the sole means for connecting the filter elements with the filter and with the sticks, said apparatus comprising a first rotary shuffling drum having axially parallel equidistant peripheral holders; means for feeding filters sideways into consecutive holders of said drum; means for feeding pairs of filter elements sideways into consecutive holders so that each filter is disposed between and forms with the respective pair of filter elements a multiplex mouthpiece of double unit length composed of unconnected rod-shaped components; a second rotary shuffling drum having a plurality of axially parallel equidistant peripheral holders; means for transferring the mouthpieces from the holders of said first drum into consecutive holders of said second drum; means for feeding pairs of sticks into consecutive holders of said second drum so that each mouthpiece is disposed between a pair of sticks and that each consecutive holder of said second drum accommodates an unconnected assembly of two sticks, two filter elements and a filter; and means for convoluting a single adhesive-coated wrapper around each consecutive mouthpiece and about the adjacent portions of the respective sticks.

4. An apparatus for producing rod-shaped smokers' articles of double unit length having multiplex mouthpieces of double unit length and including a pair of axially spaced tobacco-containing sticks, a pair of axially spaced rod-shaped filter elements of a first type and of unit length disposed between the sticks, a rod-shaped filter of a second type and of double unit length disposed between the filter elements, and a single tubular wrapper constituting the sole means for connecting the filter elements with the filter and with the sticks, said apparatus comprising a source of filters; a source of pairs of filter elements; a source of pairs of tobacco-containing sticks; a source of adhesive-coated wrappers; a first rotary shuffling drum having axially parallel equidistant peripheral holders; means for feeding filters from the respective source into consecutive holders of said drum; means for feeding pairs of axially spaced filter elements only sideways all the way from the respective source and into consecutive holders of said drum so that each filter is disposed between and forms with the respective pair of filter elements a multiplex mouthpiece of double unit length composed of unconnected rod-shaped components; a second rotary shuffling drum having a plurality of axially parallel equidistant peripheral holders; means for feeding mouthpieces from the holders of said first drum into consecutive holders of said second drum; means for feeding pairs of axially spaced tobacco-containing sticks from the respective source into consecutive holders of said second drum so that each mouthpiece is located between the respective pair of sticks and that each consecutive holder of said second drum accommodates an unconnected assembly of two sticks, two filter elements and a filter; and means for feeding adhesive-coated wrappers from the respective source and for convoluting such wrappers around consecutive mouthpieces and around the adjacent portions of the sticks so as to form smokers' articles of double unit length each of which comprises a single convoluted wrapper.

5. An apparatus as set forth in claim 5, wherein said first named source comprises means for consecutively discharging a series of filter rods of the second type and of multiple unit length, said means for feeding filters of the second type into the holders of said first drum comprising cutting means for subdividing consecutive filter rods into filters of the second type and of double unit length, a rotary staggering drum disposed intermediate said cutting means and said first shuffling drum for staggering the filters obtained by subdivision of consecutive filter rods in the direction in which said staggering drum rotates, and an aligning drum disposed between said staggering drum and said first shuffling drum for arraying the thus staggered filters in a single file.

6. An apparatus for producing rod-shaped smokers'

articles having multiplex mouthpieces of double unit length and including a pair of axially spaced wrapped tobacco-containing sticks, a pair of axially spaced rod-shaped filter elements of a first type and of unit length disposed between the sticks, a rod-shaped filter of a second type and of double unit length disposed between the filter elements, and a single tubular wrapper constituting the sole means for connecting the filter elements with the filter and with the sticks, said apparatus comprising first shuffling conveyor means having a plurality of elongated holder means and arranged to advance said holder means sideways; means for feeding filters into consecutive holder means of said first conveyor means; means for feeding pairs of axially spaced filter elements into consecutive holder means of said first conveyor means so that each filter is disposed between and forms with the respective pair of filter elements a multiplex mouthpiece of double unit length composed of unconnected rod-shaped components; second shuffling conveyor means having a plurality of elongated holder means and arranged to advance such holder means sideways; means for feeding mouthpieces from said first conveyor means into consecutive holder means of said second conveyor means; means for feeding pairs of axially spaced wrapped tobacco-containing sticks into consecutive holder means of said second conveyor means so that each mouthpiece is disposed between the respective pair of sticks and that each consecutive holder means of said second shuffling conveyor means accommodates an unconnected assembly of two sticks, two filter elements and a filter; and means for applying and convoluting adhesive-coated wrappers around consecutive mouthpieces and around the adjacent portions of the respective pairs of sticks to form smokers' articles of double unit length each of which contains a single convoluted wrapper.

7. An apparatus for producing rod-shaped smokers' articles having multiplex mouthpieces of double unit length and including a pair of axially spaced wrapped tobacco-containing sticks, a pair of axially spaced rod-shaped filter elements of a first type and of unit length disposed between the sticks, a rod-shaped filter of a second type and of double unit length disposed between the filter elements, and a single adhesive-coated tubular wrapper constituting the sole means for connecting the filter elements with the filter and with the sticks, said apparatus comprising a source of filters; a source of pairs of filter elements; a source of pairs of wrapped tobacco-containing sticks; a source of adhesive-coated wrappers; first shuffling conveyor means having elongated holder means and arranged to advance said holder means sideways; means for feeding filters from the respective source into consecutive holder means of said first conveyor means; means for feeding pairs of axially spaced filter elements only sideways from the respective source and into consecutive holder means of said first conveyor means so that each filter is disposed between the respective pair of filter elements and forms therewith a multiplex mouthpiece of double unit length composed of unconnected rod-shaped components; second shuffling conveyor means having a plurality of elongated holder means and arranged to move such holder means sideways; means for feeding mouthpieces from said first conveyor means into consecutive holder means of said second conveyor means; means for feeding pairs of axially spaced tobacco-containing sticks from the respective source into consecutive holder means of said second conveyor means so that each mouthpiece is located between the respective pair of sticks and that each consecutive holder means of said second conveyor means accommodates an unconnected assembly including a pair of sticks, a pair of filter elements and a filter; and means for feeding wrappers from the respective source and for applying and convoluting such wrappers around consecutive mouthpieces and around the adjacent portions of the respective pairs of sticks so as to form rod-

shaped articles of double unit length each of which comprises a single convoluted wrapper.

8. An apparatus as set forth in claim 7, wherein said first named source comprises means for discharging a series of filter rods of the second type and of multiple unit length sideways, said means for feeding filters of the second type to consecutive holder means of said first conveyor means comprising cutting means for subdividing consecutive filter rods into filters of the second type and of double unit length, staggering means disposed intermediate said cutting means and said first conveyor means for staggering the filters obtained by subdivision of consecutive filter rods in the direction in which said staggering means proceeds, and aligning means disposed between said staggering means and said first conveyor means for arraying the thus staggered filters in a single file.

9. In an apparatus for producing rod-shaped smokers' articles having multiplex mouthpieces and including a tobacco-containing stick, a plurality of different types of rod-shaped filter members, and a single adhesive-coated tubular wrapper constituting the sole means for connecting the filter members to each other and to a portion of the stick, in combination, a source of sticks; separate sources of each type of filter member, the filter members in each of said separate sources being parallel to each other and to the sticks in said first named source; conveyor means comprising a plurality of holder means parallel to the sticks and to the filter members in the respective sources, said conveyor means being arranged to advance said holder means sideways; separate feeding means for supplying the sticks and the filter members only sideways all the way from the respective sources and into consecutive holder means so that each of the thus supplied holder means contains an assembly composed of a plurality of unconnected rod-shaped components and including a stick and a plurality of different filter members adjacent to one end of the respective stick; a source of adhesive-coated wrappers; and means for convoluting wrappers coming from said source singly around consecutive assemblies so that each such wrapper forms a tube around the filter members and the adjacent portion of the stick in the respective assembly and that each such wrapper constitutes the sole connector between the respective stick and filter members.

10. A structure as set forth in claim 9, further comprising an additional source containing a supply of one type of filter rod having a length which is a multiple of the length of the corresponding filter members, said filter rods being parallel to said sticks and said filter members, additional conveyor means for advancing the filter rods sideways from said additional source to the source of the corresponding filter members, cutting means cooperating with said additional conveyor means for subdividing consecutive filter rods into filter members, and means for arraying the thus obtained filter members in at least one file while such filter members move sideways in a direction toward the second-named source.

11. A structure as set forth in claim 9, further comprising collecting conveyor means for receiving wrapped assemblies from consecutive holder means of said first named conveyor means and for advancing such assemblies sideways.

12. A structure as set forth in claim 9, wherein said conveyor means comprises a plurality of parallel rotary drums and wherein said holder means are constituted by axially parallel equidistant pockets provided in the peripheries of said drums.

13. An apparatus for producing rod-shaped smokers' articles of double unit length having multiplex mouthpieces of double unit length and including a pair of axially spaced tobacco-containing sticks, a pair of axially spaced rod-shaped filter elements of a first type and of unit length disposed between the sticks, a rod-shaped filter of a second type and of double unit length disposed between the filter elements, and a tubular wrapper consti-

tuting the sole means for connecting the filter elements with the filter and with the sticks, said apparatus comprising a source of filters; a source of pairs of filter elements including means for discharging a series of filter rods of the first type and of multiple unit length; a source of pairs of tobacco-containing sticks; a source of adhesive-coated wrappers; a first rotary shuffling drum having axially parallel equidistant peripheral holders; means for feeding filters from the respective source into consecutive holders of said first shuffling drum; means for feeding pairs of axially spaced filter elements from the respective source into consecutive holders of said first shuffling drum so that each filter is disposed between and forms with the respective pair of filter elements a multiplex mouthpiece of double unit length, including cutting means for subdividing consecutive filter rods into plugs of double unit length, a rotary staggering drum disposed between said cutting means and said first shuffling drum for staggering the plugs obtained by subdivision of consecutive filter rods in the direction in which said staggering drum rotates, an aligning drum disposed between said staggering drum and said first shuffling drum for arraying the thus staggered plugs in a single file, cutter means for subdividing consecutive plugs of said single file into pairs of filter elements of unit length, and a spreading drum disposed between said cutter means and said first shuffling drum for axially shifting the filter elements of consecutive pairs to provide between such pairs of filter elements gaps wide enough to receive a filter of the second type and of double unit length; a second rotary shuffling drum having a plurality of axially parallel equidistant peripheral holders; means for feeding mouthpieces from the holders of said first shuffling drum into consecutive holders of said second shuffling drum; means for feeding pairs of axially spaced tobacco-containing sticks from the respective source into consecutive holders of said second shuffling drum so that each mouthpiece is located between the respective pair of sticks; and means for feeding adhesive-coated wrappers from the respective source and for convoluting such wrappers around consecutive mouthpieces and around the adjacent portions of the sticks so as to form smokers' articles of double unit length.

14. An apparatus for producing rod-shaped smokers' articles having multiplex mouthpieces of double unit length and including a pair of axially spaced wrapped tobacco-containing sticks, a pair of axially spaced rod-shaped filter elements of a first type and of unit length disposed between the sticks, a rod-shaped filter of a second type and of double unit length disposed between the filter elements, and an adhesive-coated wrapper constituting the sole means for connecting the filter elements with the filter and with the sticks, said apparatus comprising a source of filters; a source of pairs of filter elements including means for discharging a series of filter rods of the first type and of multiple unit length sideways; a source of pairs of wrapped tobacco-containing sticks; a source of adhesive-coated wrappers; first shuffling con-

veyor means having elongated holder means and arranged to advance said holder means sideways; means for feeding filters from the respective source into consecutive holder means of said first shuffling conveyor means; means for feeding pairs of axially spaced filter elements from the respective source into consecutive holder means of said first shuffling conveyor means so that each filter is disposed between the respective pair of filter elements and forms therewith a multiplex mouthpiece of double unit length, including cutting means for subdividing consecutively discharged filter rods into plugs of the first type and of double unit length, staggering means disposed between said cutting means and said first shuffling conveyor means for staggering the plugs obtained by subdivision of consecutive filter rods in the direction in which said staggering means proceeds, aligning means disposed between said staggering means and said first shuffling conveyor means for arraying the thus staggered plugs in a single file, cutter means for subdividing the thus arrayed plugs into pairs of filter elements of unit length, and spreading means disposed between said cutter means and said first shuffling conveyor means for axially shifting consecutive pairs of filter elements to provide between such pairs of filter elements gaps wide enough to receive filters of the second type; second shuffling conveyor means having a plurality of elongated holder means and arranged to move such holder means sideways; means for feeding mouthpieces from said first shuffling conveyor means into consecutive holder means of said second shuffling conveyor means; means for feeding pairs of axially spaced tobacco-containing sticks from the respective source into consecutive holder means of said second conveyor means so that each mouthpiece is located between the respective pair of sticks; and means for feeding wrappers from the respective source and for applying and convoluting such wrappers around consecutive mouthpieces and around the adjacent portions of the respective pairs of sticks so as to form rod-shaped articles of double unit length.

References Cited by the Examiner

UNITED STATES PATENTS

2,156,600	5/1939	Molins	131—94
2,649,761	8/1953	Edwards	131—94
2,821,200	1/1958	Korber	131—94
2,867,219	1/1959	Hug	131—10
2,886,043	5/1959	Korber	131—94
2,994,251	8/1961	Pollmann	131—94 X
3,036,581	5/1962	Dearsley	131—94
3,039,367	6/1962	Stelzer	131—94 X
3,052,164	9/1962	Rowlands	131—94 X
3,079,926	3/1963	Litchfield et al.	131—10
3,088,359	5/1963	Schur	131—94 X
3,164,243	1/1965	Rudszinat et al.	131—94 X

55 SAMUEL KOREN, *Primary Examiner*.

H. P. DEELEY, JR., *Assistant Examiner*.