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(54) **A method and a unit for the formation of tapered cigarettes into groups**

Verfahren und Einheit zum Bilden von Gruppen von frustokonischen Zigaretten

Procédé et unité pour la formation de groupes de cigarettes frustoconiques

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Description

[0001] The present invention relates to a method of forming tapered cigarettes into groups.

[0002] The term "tapered cigarette" used here and in the course of the following specification is intended to signify a cigarette of substantially frustoconical appearance with substantially circular greater and lesser bases interconnected perpendicularly by a longitudinal axis.

[0003] It is customary in the manufacture of tobacco products for tapered cigarettes to be bunched together by hand in an entirely random fashion and formed into groups each providing the contents of one packet, whereupon each group is inserted into the relative packet. Indeed, it known for example from document EP0677441, a device for forming and feeding ordered groups of fragile rod-shaped objects, particularly cigarettes, which comprises a plurality of forming and transfer stations for rows of cigarettes. Tubular housings are: made to pass next to the said stations and the individual rows of cigarettes are introduced into these housings in such a way that they are automatically superimposed over each other until the tubular housings are completely filled. The invention provides stationary retaining means extending along the path of the tubular housings from one station to the next, and holding in the correct position the rows of cigarettes introduced into and partially filling the housings during the advance. Given the conical geometry of the single cigarettes, and therefore the overall shape that the group can subsequently assume, it happens that the surfaces of the packet will almost invariably exhibit unsightly undulations, even after attempts have been made to rearrange the contents by manipulation once inserted.

[0004] In addition to its notable cost, reflected not least in the need to employ operatives in relatively large number, the method of forming groups outlined above involves somewhat lengthy operating times that are effectively incompatible with the levels of output encountered in present day manufacture; moreover, the group formed in this manner presents a markedly unstable structure and is unsuitable for any of the mechanized handling operations normally utilized.

[0005] The object of the present invention is to provide a method of forming tapered cigarettes into groups such as will allow of mechanizing the procedures involved and afford a simple and economic solution to the drawbacks mentioned above.

[0006] The stated object is realized in a method of forming tapered cigarettes into groups, comprising the steps of advancing at least one forming pocket in a predetermined direction and along a feed path extending through at least two loading stations arranged in series along the path; and causing the cigarettes to be distributed into the pocket at each loading station and positioned therein adjacent one to another, in such a way that a layer of mutually parallel tapered cigarettes is formed at each loading station.

[0007] Each group comprises at least two layers of tapered cigarettes disposed mutually adjacent, each layer in its turn composed of a first half-layer and a second half-layer occupying the same plane, of which the respective single cigarettes are similarly oriented and disposed parallel one with another.

[0008] Preferably the tapered cigarettes of the first half-layer and the tapered cigarettes of the second half-layer will be oriented oppositely and disposed in interlocking alternation.

[0009] The present invention relates also to a unit for the formation of tapered cigarettes into groups.

[0010] A unit according to the invention for the formation of tapered cigarettes into groups comprises conveying means extending along a predetermined feed path, designed to advance at least one forming pocket along the selfsame path in a predetermined feed direction and through at least two loading stations arranged in series along the path, also distribution means disposed in alignment with each loading station, of which the function is to direct the tapered cigarettes into the pocket in mutually adjacent positions and thus to bring about the formation of a layer of cigarettes, disposed parallel one with another, at each station.

[0011] The unit according to the invention further comprises feed means associated with each loading station, such as will supply two successions of half-layers of the tapered cigarettes to respective feed stations positioned in alignment with the loading station and on opposite sides of the feed path, each half-layer consisting in a given number of cigarettes oriented identically one with another and oppositely to the cigarettes of the remaining half-layer; also sliding means associated with the feed means, of which the function is to direct. the two half-layers into the pocket and thus bring about the formation of one relative layer of the tapered cigarettes.

[0012] The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- fig 1 illustrates a unit for implementation of the method according to the present invention, seen schematically in perspective and with certain parts omitted for clarity;
- fig 2 shows an enlarged detail of the unit as in fig 1, illustrated in perspective with certain parts in section and others omitted for clarity.

[0013] With reference to fig 1 of the drawings, 1 denotes a machine, in its entirety, for fashioning packets to accommodate cigarettes 2 of tapered geometry, each presenting a greater base 3 and a lesser base 4 substantially of circular shape, and a longitudinal axis 2a perpendicular to the bases 3 and 4.

[0014] The machine 1 comprises a forming unit 5 by which the cigarettes 2 are ordered into groups 6 each providing the contents of one packet (not indicated) and, in the example illustrated, consisting in at least two ad-

jacent layers 7 of cigarettes; more exactly, the single cigarettes 2 of each layer 7 are disposed with the relative axes 2a mutually parallel and with their respective tapered profiles oriented alternately in opposing directions, the cigarettes 2 of the one layer 7 also being oriented oppositely to the corresponding contiguous cigarettes 2 of the other layer 7. In the example of the drawings, each layer 7 is composed of six cigarettes 2 arranged with the tapered profiles oriented in alternately opposing directions and divisible, according to the orientation, into two half-layers 8 occupying the same plane and making up the single layer 7, each of which comprises three similarly oriented tapered cigarettes 2 disposed in alternation with the three similarly and oppositely oriented cigarettes 2 of the other half-layer 8.

[0015] The unit 5 comprises a pocket conveyor 9 affording a plurality of single pockets 10 each proportioned to accommodate a relative group 6 of cigarettes. The pockets 10 are caused to advance transversely to the axis 2a of the cigarettes 2 in a predetermined feed direction D1 and along a predetermined feed path P extending through at least two loading stations 11, arranged in series along the path P, at which each pocket 10 in turn is brought to a halt in readiness to receive a layer 7 of cigarettes 2, as will become clear in due course. In particular, each pocket 10 presents what is substantially a U shaped sectional profile, and comprises a horizontal bottom 12 with two side walls 13 disposed perpendicular to the bottom 12; the side walls 13 extend transversely to the feed direction D1 and combine with the bottom 12 to afford two lateral openings 14 into the pocket 10 which lie parallel to the feed direction D1.

[0016] The unit 5 further comprises a feed device 15, coinciding with an infeed station of the machine 1, by which the tapered cigarettes 2 are supplied to the conveyor 9. The feed device 15 in its turn comprises two outlet ducts 16 serving each loading station 11, disposed on opposite sides of the path P and designed to supply respective successions 17 of half-layers 8 of the cigarettes 2 to respective feed stations 18 located on opposite sides of the path P and in alignment with each loading station 11. More exactly, the two outlet ducts 16 associated with each loading station 11 exhibit respective bottom openings 19 disposed one facing toward the other on either side of the feed path P and establishing the relative feed stations 18; each outlet duct 16 also incorporates a set of channels 20 disposed side by side, equal in number to the number of cigarettes 2 making up each half-layer 8, along which respective columns 21 of cigarettes 2 are fed by gravity to the relative opening 19.

[0017] The outlet ducts 16 further comprise respective horizontal bottom plates 22 positioned at increasing heights along the feed direction D1, relative to the bottoms 12 of the pockets 10, of which the function is to arrest the fall of the cigarettes 2 within the channels 20 and thus cause a respective half-layer 8 to form at the relative opening 19.

[0018] The channels 20 of each outlet duct 16 are shown in the perspective of fig 1 as being separated one from the next along the feed direction D1 by a distance substantially equal to a maximum thickness of the cigarettes 2, and are offset along the selfsame feed direction D1 in relation to the channels 20 of the outlet duct 16 positioned opposite at the respective loading station 11. Moreover, the channels 20 of each duct 16 coincide with a first substantially rectilinear and vertical path P1 on the side facing the conveyor 9 and with a second curvilinear path P2 on the side remote from that facing the conveyor 9, and are embodied in such a way that the relative columns 21 of cigarettes 2 will descend freely with the greater bases 3 of the cigarettes 2 distributed along the second path P2 and the lesser bases 4 distributed along the first path P1.

[0019] In particular, the second path P2 of each outlet duct 16 comprises at least one substantially chevron profiled portion T located immediately above the relative bottom plate 22 and serving to ensure, in operation, that the cigarettes 2 distributed along the part of each channel 20 compassed by this same portion T will remain horizontally disposed. During operation, accordingly, the cigarettes 2 occupying an initial stage and a terminal stage of the chevron portion T afforded by each single channel 20 will be disposed mutually parallel and oriented transversely to the feed direction D1, whilst the cigarettes 2 occupying the part of the chevron portion T between the initial and terminal stages will be oriented in respective positions angled first increasingly away from a plane transverse to the feed direction D1, when between the initial stage and a middle stage of the chevron portion T, then in respective positions angled increasingly toward a plane transverse to the selfsame feed direction D1 when between the middle stage and the terminal stage.

[0020] The unit 5 also comprises a distribution unit 23 by which the half-layers 8 of cigarettes 2 are ejected from the outlet ducts 16 through the openings 19 and transferred into a relative pocket 10 positioned at the respective loading station 11, by way of the two lateral openings 14. The distribution unit 23 is also designed to operate in conjunction with a guide device 24 (see fig 2) favouring the insertion of the cigarettes 2 of each half-layer 8 into the relative pocket 10, and comprises a set of slide devices 25, one associated with each outlet duct 16, each in its turn comprising a fingered push rod 26 operated by an actuator (not illustrated) and capable thus of reciprocating movement through the bottom opening 19 and above the bottom plate 22 of the relative outlet duct 16 along a diverting direction D2 transverse to the feed direction D1, parallel with the axes 2a of the cigarettes 2 occupying the opening 19, in such a way as to transfer each successive half-layer 8 of cigarettes into a relative pocket 10.

[0021] Observing fig 2 the guide device 24 will be seen to comprise a horizontal plate 27, and more exactly

one such plate to each loading station 11, associated with an actuator (not illustrated) and capable thus of movement between a raised position (indicated in fig 2) in which the plate 27 is disposed directly above a pocket 10 occupying the relative station 11, and a lowered position (not indicated) in which the open top 28 of the pocket 10 is enclosed by the plate 27. The underside of the plate 27, facing the conveyor 9, presents a plurality of vertical fins 29 set skew in relation to the diverting direction D2; the adjacent fins 29 are angled oppositely relative one to another and designed to assist, when the plate 27 occupies the lowered position, in wedging the cigarettes 2 of one half-layer 8 between the cigarettes 2 of the other half-layer 8.

[0022] Finally, the unit 5 comprises a compactor device 30 designed to pack the cigarettes 2 of each layer 7 securely into the relative pocket 10; the device 30 illustrated comprises a pair of plate-like pusher elements 31 associated with each loading station 11, disposed on opposite sides of the feed path P beyond the station 11 in the feed direction D1, and capable thus of movement through the agency of respective actuators (not illustrated) toward and away from one another and toward and away from the two relative lateral openings 14 of the single pocket 10 in such a way as to impinge axially on and thus compact the cigarettes 2 occupying the pocket 10.

[0023] In operation, the single pockets 10 are advanced along the feed path P by the conveyor 9 and brought to a standstill at each loading station 11 with the respective lateral openings 14 offered to the bottom openings 19 of the corresponding outlet ducts 16; at the same time, the successions 17 of half-layers 8 are directed down through the outlet ducts 16 to the feed stations 18.

[0024] When an empty pocket 10 draws to a halt at the first of the two loading stations 11 encountered along the feed path P, the plate 27 lying above the station, denoted 11a, descends to the lowered position and the push rods 26 are directed toward one another in such a manner as to engage the cigarettes 2 by the ends affording the greater bases 3 and traverse the two half-layers 8 likewise one toward another into the pocket 10; as discernible from fig 2, the two half-layers 8 meet with the lesser bases 4 of the respective cigarettes 2 directed one toward another. The cigarettes 2 of the two half-layers 8 interlock when inserted into the pocket 10, assisted also by the guiding action of the fins 29 which prevent the cigarettes 2 from snagging against one another.

[0025] Once the half-layers 8 have been removed completely from the relative outlet ducts 16 and transferred into the waiting pocket 10 by the push rods 26, the push rods 26 are returned to their former position outside the dimensional compass of the ducts 16 to allow the formation of two further half-layers 8 on the relative bottom plates 22, whilst the conveyor 9 indexes a further step, advancing the pocket 10 to a point between the pusher elements 31 and bringing an empty pocket 10 into the first loading station 11a. The pusher elements 31 are now directed inwards and toward the respective lateral openings 14 of the part-filled pocket 10, impinging axially on the cigarettes 2 of the newly formed layer 7 so as to produce the compacting action aforementioned.

[0026] At this juncture the pocket 10 is advanced another step by the conveyor 9 and brought to the second of the two loading stations 11 (denoted IIb) whereupon the relative plate 27 (not indicated, but identical to that above the first station IIa), descends to the lowered position and the push rods 26 of the second station IIb are directed toward one another in such a manner as to engage the cigarettes 2 by the ends affording the greater bases 3 and traverse the half-layers 8 one toward another and into the pocket 10, although not in this instance directly onto the bottom 12 of the pocket 10, rather onto and in direct contact with the layer 7 of cigarettes 2 formed at the first station 11a. The cigarettes 2 of the two half-layers 8 interlock when inserted into the pocket 10, assisted also by the guiding action of the fins 29 (not illustrated in the case of the second station 11b), and are brought to rest on top of the half-layers 8 assembled previously in such a way that each cigarette 2 of the new layer 7 will be disposed with the relative taper oriented oppositely to the contiguous cigarette 2 of the already formed layer 7.

[0027] Once the half-layers 8 have been removed completely from the relative outlet ducts 16 and transferred into the waiting pocket 10 by the push rods 26, the push rods 26 are returned to their former position outside the dimensional compass of the ducts 16 to allow the formation of two further half-layers 8 on the relative bottom plates 22, whilst the conveyor 9 indexes a further step, advancing the pocket 10 to a point between the pusher elements 31 and bringing a successive pocket 10 into the second station 11b. The pusher elements 31 are now directed inwards and toward the respective lateral openings 14 of the pocket 10, impinging axially on the cigarettes 2 of the newly formed layer 7 in the pocket 10 so as to produce the compacting action.

[0028] At this stage, the pocket 10 contains a group 6 of cigarettes 2 exhibiting a notably stable structure that can undergo any further mechanized operation, and in particular a wrapping operation performed by packaging machines of the type used conventionally in the tobacco industry.

Claims

1. A method of forming tapered cigarettes (2) into groups (6),
   comprising the steps of:

   - advancing at least one forming pocket (10) in a predetermined direction (D1) and along a feed path (P) extending through at least two loading

stations (11) arranged in series along the path (P);

- causing the cigarettes (2) to be distributed into the pocket (10) at each loading station (11) and positioned therein adjacent one to another, in such a way that a layer (7) of mutually parallel tapered cigarettes (2) is formed at each station (11);

characterized in that it comprises the further steps, implemented at each loading station (11), of:

- supplying two successions (17) of half-layers (8) of the tapered cigarettes (2) to respective feed stations (18) positioned in alignment with the loading station (11) and on opposite sides of the feed path (P), each half-layer (8) consisting in a plurality of cigarettes (2) oriented identically one with another and oppositely to the cigarettes (2) of the remaining half-layer (8);
- bringing the pocket (10) to a standstill at each loading station (11); and
- inserting each half-layer (8) into the pocket (10) in such a way as to bring about the formation of a relative layer (7) of the tapered cigarettes (2).

2. A method as in claim 1, wherein the step of inserting each half-layer (8) into the pocket (10) consists in displacing the tapered cigarettes (2) of the half-layer (8) along a diverting direction (D2) extending transversely to the feed direction (D1), in such a way that the cigarettes (2) of each two half-layers (8) making up a relative layer (7) are caused to advance axially and convergently from the respective feed stations (18) toward the relative loading station (11).

3. A method as in claim 2, wherein the step of inserting each half-layer (8) into the relative pocket (10) is implemented in such a way that the cigarettes (2) of one of the two half-layers (8) are caused to interlock with and wedge between the cigarettes (2) of the other half-layer (8).

4. A method as in claim 2 or 3, comprising the further step of compacting the tapered cigarettes (2) of each layer (7) occupying the pocket (10) through the agency of compactor means (30) positioned on either side of the feed path (P), located beyond each of the loading stations (11) in the feed direction (D1) and capable of movement toward and away from the path (P).

5. A method as in preceding claims, wherein each group (6) of tapered cigarettes (2) comprises at least two layers (7) of cigarettes disposed mutually adjacent, each layer in turn comprising respective first and second half-layers (8) of cigarettes (2) occupying the same plane, of which the respective single cigarettes (2) are oriented identically and disposed parallel one with another.

6. A method as in claim 5, wherein each layer (7) comprises a f irst and a second half-layer (8) of which the respective tapered cigarettes (2) are disposed in interlocking alternation.

7. A method as in claim 5 or 6, wherein the tapered cigarettes (2) of one layer (7), in a group (6) of at least two layers, are oriented oppositely to the corresponding contiguous tapered cigarettes (2) of the remaining layer (7).

8. A unit for the formation of tapered cigarettes (2) into groups (6), comprising conveying means (9) extending along a predetermined feed path (P), designed to advance at least one forming pocket (10) along the selfsame path (P) in a predetermined feed direction (D1) and through at least two loading stations (11) arranged in series along the path (P), also distribution means (23) disposed in alignment with each loading station (11) of which the function is to direct the tapered cigarettes (2) into the pocket (10) in mutually adjacent positions and thus to bring about the formation of a layer (7) of cigarettes (2), disposed parallel one with another, at each station (11);
characterized in that it further comprises feed stations and feed means (16) associated with each loading station (11), of which the function is to supply two successions (17) of half-layers (8) of the tapered cigarettes (2) to the respective feed stations (18) disposed in alignment with the loading station (11) and on opposite sides of the feed path (P), wherein each half-layer (8) consists in a plurality of cigarettes (2) oriented identically one with another and oppositely to the cigarettes (2) of the remaining half-layer (8), and distribution means (23) consist in sliding means (25) associated with the relative feed means (16), of which the function is to insert each of the two half-layers (8) into the pocket (10) and thus to bring about the formation of one relative layer (7) of the tapered cigarettes (2).

9. A unit as in claim 8, comprising feed means (16) embodied as a plurality of substantially vertical channels (20) associated with each feed station (18) along which respective columns (21) of cigarettes (2) are directed toward a bottom opening (19) common to all the channels (20) and positioned in alignment with the feed station (18), wherein sliding means (25) comprise pushing elements (26) positioned one on the side of each bottom opening (19) remote from the feed path (P) and capable of movement through the bottom opening (19) in a diverting

direction (D2) transverse to the feed direction (D1).

10. A unit as in claim 9, wherein the pocket (10) presents two lateral openings (14) and is brought to a standstill at each of the loading stations (11) with the lateral openings (14) disposed facing the respective bottom openings (19) of the relative feed stations (18), and the pushing elements (26) of each station (11) are capable of movement parallel with the diverting direction (D2) toward one another and through the relative lateral openings (14) of a pocket (10) occupying the relative station (11), to the end of inserting the cigarettes (2) of the two half-layers (8) into the waiting pocket (10).

11. A unit as in claim 10, wherein the channels (20) of each feed station (18) are separated one from the next along the feed direction (D1) by a distance substantially equal to a maximum thickness of the tapered cigarettes (2), and offset along the feed direction (D1) in relation to the channels (20) of the feed station (18) positioned opposite at the relative loading station (11).

12. A unit as in claim 11, comprising guide means (24) associated with each loading station (11), capable of movement toward and away from an open top (28) of each pocket (10) and operating in conjunction with the pushing elements (26) to the end of guiding the cigarettes (2) of the half-layers (8) along the diverting direction (D2).

13. A unit as in claim 12, wherein the guide means (24) comprise a plurality of fins (29) disposed skew in relation to the diverting direction (D2), of which adjacent fins (29) are angled oppositely relative one to another in such a way as to assist in wedging the cigarettes (2) of one half-layer (8) between the cigarettes (2) of the other half-layer (8).

14. A unit as in claims 11 to 13, wherein the pushing elements (26) consist in fingered push rods (26) by which the the two half-layers (8) of each layer (7) are inserted into the pocket (10) in such a way that the tapered cigarettes (2) of one half-layer (8) will engage in interlocking alternation with the tapered cigarettes (2) of the other half-layer (8).

15. A unit as in claims 9 to 14, wherein the channels (20) of each feed station (18) describe a first substantially rectilinear path (P1) on one side of the station (18) and a second curvilinear path (P2) on the opposite side of the station, in such a way that tapered cigarettes (2) presenting a greater base (3) and a lesser base (4) can be accommodated, when in the relative column (21), with the lesser bases (4) distributed along the first path (P1) and the greater bases (3) distributed along the second path (P2).

16. A unit as in claim 13, wherein the first path (P1) of each channel (20) is directed toward the feed path (P).

17. A unit as in claims 8 to 14, comprising means (30) disposed on each side of the feed path (P) and beyond each of the loading stations (11), considered in the feed direction (D1), of which the function is to compact the tapered cigarettes (2) of each layer (7) occupying the pocket (10).

Patentansprüche

1. Verfahren zum Bilden von Gruppen (6) von frustokonischen Zigaretten (2), enthaltend die folgenden Phasen:

- Vorlauf von wenigstens einer Formtasche (10) in einer bestimmten Richtung (D1) und entlang einer Zuführbahn (P), die sich über wenigstens zwei Ladestationen (11) erstreckt, welche in Reihe entlang der Bahn (P) angeordnet sind;
- Verteilen der Zigaretten (2) in jeder Ladestation (11) in der Tasche (10) und das Anordnen derselben in dieser eine neben der anderen auf solche Weise, dass an jeder Station (11) eine Lage (7) von parallel zueinander liegenden konischen Zigaretten (2) gebildet wird;

dadurch gekennzeichnet, dass es die weiteren, an jeder Ladestation (11) ausgeführten Phasen enthält:

- Zuführen von zwei Folgen (17) von halben Lagen (8) von konischen Zigaretten (2) an jeweilige Zuführstationen (18), die zu der Ladestation (11) ausgerichtet und an entgegengesetzten Seiten der Zuführbahn (P) angeordnet sind, wobei jede halbe Lage (8) aus einer Anzahl von Zigaretten (2) besteht, die gleich zueinander und entgegengesetzt zu den Zigaretten (2) der verbleibenden halben Lage (8) ausgerichtet sind;
- Anhalten der Tasche (10) an einer jeden Station (11); und
- Einlegen einer jeden halben Lage (8) in die Tasche (10) auf solche Weise, dass sie in die Form einer entsprechenden Lage (7) von konischen Zigaretten (2) gebracht werden.

2. Verfahren nach Patentanspruch 1, bei welchem die Phase des Einlegens einer jeden halben Lage (8) in die Tasche (10) darin besteht, dass die konischen Zigaretten (2) der halben Lage (8) entlang einer Einschubrichtung (D2) verschoben werden, die sich quer zu der Zuführrichtung (D1) erstreckt, und zwar auf solche Weise, dass die Zigaretten (2) von je-

weils zwei halben Lagen (8), die eine entsprechende Lage (7) ergeben, axial und zusammenlaufend von den jeweiligen Zuführstationen (18) zu der entsprechenden Ladestation (11) geleitet werden.

3. Verfahren nach Patentanspruch 2, bei welchem die Phase des Einschiebens einer jeden halben Lage (8) in die entsprechende Tasche (10) auf solche Weise ausgeführt wird, dass die Zigaretten (2) einer jeden der beiden halben Lagen (8) keilartig zwischen die Zigaretten (2) der anderen halben Lage (8) geschoben werden und mit diesen verkeilt sind.

4. Verfahren nach Patentanspruch 2 oder 3, enthaltend die weitere Phase des Kompaktierens der konischen Zigaretten (2) einer jeden Lage (7), welche die Tasche (10) belegt, und zwar mit Hilfe von Kompaktiermitteln (30), die an jeder Seite der Zuführbahn (P) positioniert sind, angeordnet stromabwärts einer jeden der Ladestationen (11) in der Zuführrichtung (D1) und in der Lage, eine Bewegung zu der Bahn (P) hin und von dieser fort auszuführen.

5. Verfahren nach den vorstehenden Patentansprüchen, bei welchem jede Gruppe (6) von konischen Zigaretten (2) wenigstens zwei Lagen (7) von aneinander angrenzenden Zigaretten enthält, wobei jede Lage wiederum jeweilige erste und zweite halbe Lagen (8) von Zigaretten (2) enthält, welche die gleiche Ebene belegen, und von welchen die jeweiligen einzelnen Zigaretten (2) identisch ausgerichtet und parallel zueinander angeordnet sind.

6. Verfahren nach Patentanspruch 5, bei welchem eine Lage (7) eine erste und eine zweite halbe Lage (8) enthält, von welchen die jeweiligen konischen Zigaretten (2) abwechselnd formschlüssig zueinander ausgerichtet angeordnet sind.

7. Verfahren nach Patentanspruch 5 oder 6, bei welchem die konischen Zigaretten (2) einer Lage (7), in einer Gruppe (6) von wenigstens zwei Lagen, entgegen der entsprechenden angrenzenden konischen Zigaretten (2) der verbleibenden Lage (7) ausgerichtet angeordnet sind.

8. Einheit zum Bilden von Gruppen (6) von frustokonischen Zigaretten (2), enthaltend Fördermittel (9), die sich entlang einer bestimmten Zuführbahn (P) erstrecken und dazu bestimmt sind, wenigstens eine Formtasche (10) entlang der Bahn (P) selbst in einer bestimmten Zuführrichtung (D1) und durch wenigstens zwei Ladestationen (11) vorzuschieben, die in Reihe entlang der Bahn (P) angeordnet sind, sowie Verteilermittel (23), angeordnet in Ausrichtung zu einer jeden Ladestation (11), und deren Aufgabe es ist, die konischen Zigaretten (2) in gegenseitig aneinandergrenzenden Positionen in die Tasche (10) zu leiten und somit an jeder Station (11) das Bilden einer Lage (7) von Zigaretten (2) zu bewirken, die parallel zueinander angeordnet sind; **dadurch gekennzeichnet, dass** sie weiter einer jeden Ladestation (11) zugeordnete Zuführstationen (18) und Zuführmittel (16) enthält, deren Aufgabe es ist, zwei Folgen (17) von halben Lagen (8) von konischen Zigaretten (2) an jeweilige Zuführstationen (18) zu bringen, angeordnet in Ausrichtung zu der Ladestation (11) und auf entgegengesetzten Seiten der Zuführbahn (P), wobei eine halbe Lage (8) aus einer Anzahl von Zigaretten (2) besteht, die identisch zueinander und entgegengesetzt zu den Zigaretten (2) der verbleibenden Halblage (8) ausgerichtet sind, und dass die Verteilermittel (23) aus entsprechenden Zuführmitteln (16) zugeordneten Gleitelementen (25) bestehen, deren Aufgabe es ist, jede der beiden halben Lagen (8) in die Tasche (10) einzuschieben und somit eine entsprechende Lage (7) von konischen Zigaretten (2) zu bilden.

9. Einheit nach Patentanspruch 8, enthaltend Zuführmittel (16), die als eine Anzahl von im wesentlichen vertikalen Kanälen (20) ausgebildet und einer jeden Zuführstation (18) zugeordnet sind, und entlang welchen jeweilige Stapel (21) von Zigaretten (2) in Richtung einer unteren, allen Kanälen (20) gemeinsamen Öffnung (19) geleitet und zu der Zuführvorrichtung (18) ausgerichtet angeordnet werden, wobei die Gleitelemente (25) Schubelemente (26) enthalten, angeordnet eins an jeder Seite von jeder unteren Öffnung (19) und entfernt von der Zuführbahn (P) und in der Lage, eine Bewegung durch die untere Öffnung (19) in einer Einschubrichtung (D2) quer zu der Zuführrichtung (D1) auszuführen.

10. Einheit nach Patentanspruch 9, bei welcher die Tasche (10) zwei seitliche Öffnungen (14) aufweist und an jeder Ladestation (11) zum Anhalten gebracht wird, und zwar mit den seitlichen Öffnungen (14) den jeweiligen unteren Öffnungen (19) der entsprechenden Zuführstation (18) zugewandt, wobei die Schubelemente (26) einer jeden Station (11) in der Lage sind, eine Bewegung parallel zu der Einschubrichtung (D2) zueinander hin und durch die entsprechenden seitlichen Öffnungen (14) einer die entsprechende Station (11) belegenden Tasche (10) auszuführen, mit dem Zweck, die Zigaretten (2) der beiden halben Lagen (8) in die wartende Tasche (10) einzuschieben.

11. Einheit nach Patentanspruch 10, bei welcher die Kanäle (20) einer jeden Zuführstation (18) entlang der Zuführrichtung (D1) durch einen Abstand voneinander getrennt sind, der im wesentlichen dem der maximalen Stärke der konischen Zigaretten (2) entspricht, und sie versetzt sind entlang der Zuführrichtung (D1) im Verhältnis zu den Kanälen (20) der

Zuführstation (18), die gegenüberliegend der entsprechenden Ladestation (11) angeordnet ist.

12. Einheit nach Patentanspruch 11, enthaltend Führungsmittel (24), die einer jeden Ladestation (11) zugeordnet und in der Lage sind, eine Bewegung zu einer oberen Öffnung (28) einer jeden Tasche (10) hin und von dieser fort auszuführen, und die mit den Schubelementen (26) zu dem Zweck zusammenarbeiten, die Zigaretten (2) der halben Lagen (8) entlang der Einschubrichtung (D2) zu führen.

13. Einheit nach Patentanspruch 12, bei welcher die Führungsmittel (24) eine Anzahl von Rippen (29) enthalten, die schräg im Verhältnis zu der Einschubrichtung (D2) angeordnet sind, deren angrenzende Rippen (29) im Verhältnis zueinander auf solche Weise entgegengesetzt angewinkelt sind, dass sie das Verkeilen der Zigaretten (2) von einer halben Lage (8) zwischen die Zigaretten (2) der anderen halben Lage (8) begünstigen.

14. Einheit nach den Patentansprüchen von 11 bis 13, bei welcher die Schubelemente (26) aus fingerförmigen Schubstangen (26) bestehen, durch welche die beiden halben Lagen (8) einer jeden Lage (7) in die Tasche (10) auf solche Weise eingeschoben werden, dass die konischen Zigaretten (2) von einer halben Lage (8) sich in formschlüssigem Wechsel mit den konischen Zigaretten (2) der anderen halben Lage (8) verbinden.

15. Einheit nach den Patentansprüchen von 9 bis 14, bei welcher die Kanäle (20) einer jeden Zuführstation (18) eine erste, im wesentlichen geradlinige Bahn (P1) auf der einen Seite der Station (18) beschreiben, sowie eine zweite gekrümmte Bahn (P2) auf der entgegengesetzten Seite der Station, und zwar auf solche Weise, dass die eine grössere Basis (3) und eine kleinere Basis (4) aufwesenden konischen Zigaretten (2), wenn sie sich in dem entsprechenden Stapel (21) befinden, mit der kleineren Basis (4) entlang der ersten Bahn (P1) verteilt und mit der grösseren Basis (3) entlang der zweiten Bahn (P2) verteilt angeordnet werden können.

16. Einheit nach Patentanspruch 13, bei welcher die erste Bahn (P1) eines jeden Kanals (20) zu der Zuführbahn (P) hin gerichtet ist.

17. Einheit nach den Patentansprüchen von 8 bis 14, enthaltend Mittel (30), die an jeder Seite der Zuführbahn (P) und stromabwärts der Ladestationen (11) angeordnet sind, betrachtet in Zuführrichtung (D1), deren Aufgabe es ist, die konischen Zigaretten (2) einer jeden Lage (7), welche die Tasche (10) belegt, zu kompaktieren.

Revendications

1. Un procédé pour la formation de groupes (6) de cigarettes frustoconiques (2), comprenant les phases consistant à :

- faire avancer au moins une poche (10) de mise en forme dans une direction (D1) prédéterminée et le long d'un parcours d'avancement (P) s'étendant à travers au moins deux stations de chargement (11) disposées en série le long de ce même parcours (P) ;
- distribuer et positionner les cigarettes (2) dans la poche (10) au niveau de chaque station de chargement (11) de manière à ce qu'elles soient adjacentes entre elles pour former, au niveau de chaque station (11), une couche (7) de cigarettes frustoconiques (2) mutuellement parallèles ;

ledit procédé étant **caractérisé en ce qu'**il comprend les autres phases, effectuées au niveau de chaque station (11), consistant à :

- alimenter deux successions (17) de demi-couches (8) de cigarettes frustoconiques (2) à des stations d'alimentation (18) respectives alignées avec la station de chargement (11) respective et situées sur des côtés opposés du parcours d'avancement (P), chaque demi-couche (8) consistant en une pluralité de cigarettes (2) orientées de la même façon entre elles et de façon opposée aux cigarettes (2) de l'autre demi-couche (8) ;
- arrêter la poche (10) au niveau de chaque station de chargement (11) ; et
- introduire chaque demi-couche (8) dans la poche (10) de manière à former une couche (7) correspondante de cigarettes frustoconiques (2).

2. Le procédé selon la revendication 1, **caractérisé en ce que** ladite phase d'introduction de chaque demi-couche (8) dans la poche (10) consiste à déplacer les cigarettes frustoconiques (2) de la demi-couche (8) dans une direction (D2) de déviation s'étendant transversalement à la direction d'avancement (D1) de manière à ce que les cigarettes (2) de chacune des deux demi-couches (8) définissant une couche (7) correspondante soient déplacées axialement et de manière convergente depuis les stations d'alimentation (18) respectives vers la station de chargement (11) correspondante.

3. Le procédé selon la revendication 2, **caractérisé en ce que** ladite phase d'introduction de chaque demi-couche (8) dans la poche (10) correspondante est effectuée de manière à ce que les cigarettes (2)

d'une des deux demi-couches (8) soient emboîtées et calées entre les cigarettes (2) de l'autre demi-couche (8).

4. Le procédé selon la revendication 2 ou 3, **caractérisé en ce qu'**il comprend l'autre phase consistant à compacter les cigarettes frustoconiques (2) de chaque couche (7) occupant la poche (10) par l'intermédiaire de moyens compacteurs (30) situés de chaque côté du parcours d'avancement (P), au-delà de chacune des stations de chargement (11) dans la direction d'avancement (D1), et pouvant se déplacer pour s'approcher et s'éloigner de ce même parcours (P).

5. Le procédé selon les revendications précédentes, **caractérisé en ce que** chaque groupe (6) de cigarettes frustoconiques (2) comprend au moins deux couches (7) de cigarettes mutuellement adjacentes, chaque couche comprenant à son tour une première et une seconde demi-couches (8) respectives de cigarettes (2) occupant le même plan, dont les cigarettes (2) respectives sont orientées de la même façon et parallèles entre elles.

6. Le procédé selon la revendication 5, **caractérisé en ce que** chaque couche (7) comprend une première et une seconde demi-couche (8) dont les cigarettes frustoconiques (2) respectives sont emboîtées entre elles en alternance.

7. Le procédé selon la revendication 5 ou 6, **caractérisé en ce que** lesdites cigarettes frustoconiques (2) d'une couche (7), dans un groupe (6) d'au moins deux couches, sont orientées de façon opposée aux cigarettes frustoconiques (2) contiguës correspondantes de l'autre couche (7).

8. Une unité pour la formation de groupes (6) de cigarettes frustoconiques (2), comprenant des moyens de transport (9) s'étendant le long d'un parcours d'avancement (P) prédéterminé et destinés à faire avancer au moins une poche (10) de mise en forme le long du parcours (P) lui-même dans une direction d'avancement (D1 prédéterminée et à travers au moins deux stations de chargement (11) disposées en série le long de ce même parcours (P), également des moyens de distribution (23) alignés avec chaque station de chargement (11) et destinés à diriger les cigarettes frustoconiques (2) dans la poche (10) dans des positions mutuellement adjacentes pour former ainsi, au niveau de chaque station (11), une couche (7) de cigarettes (2) parallèles entre elles ; ladite unité étant **caractérisée en ce qu'**elle comprend également des stations d'alimentation (18) et des moyens d'alimentation (16), lesquels moyens d'alimentation (16) sont associés à chaque station de chargement (11) et sont destinés à alimenter deux successions (17) de demi-couches (8) de cigarettes frustoconiques (2) aux stations d'alimentation (18) respectives qui sont alignées avec la station de chargement (11) respective et situées sur des côtés opposés du parcours d'avancement (P), chaque demi-couche (8) consistant en une pluralité de cigarettes (2) orientées de la même façon entre elles et de façon opposée aux cigarettes (2) de l'autre demi-couche (8), et **en ce que** lesdits moyens de distribution (23) consistent en des moyens-tiroir (25) associés aux moyens d'alimentation (16) respectifs et destinés à introduire chacune des deux demi-couches (8) dans la poche (10) pour former ainsi une couche (7) correspondante de cigarettes frustoconiques (2).

9. L'unité selon la revendication 8, comprenant des moyens d'alimentation (16) réalisés sous forme d'une pluralité de canaux (20) essentiellement verticaux associés à chaque station d'alimentation (18) et le long desquels des colonnes (21) respectives de cigarettes (2) sont dirigées vers une ouverture inférieure (19) commune à tous les canaux (20) et située au niveau de la station d'alimentation (18), **caractérisée en ce que** lesdits moyens-tiroir (25) comprennent des éléments pousseurs (26), un de chaque côté de l'ouverture inférieure (19) à l'opposé du parcours d'avancement (P), pouvant se déplacer à travers cette même ouverture inférieure (19) dans une direction de déviation (D2) transversale à la direction d'avancement (D1).

10. L'unité selon la revendication 9, **caractérisée en ce que** ladite poche (10) présente deux ouvertures latérales (14) et est arrêtée au niveau de chacune des stations de chargement (11) avec les ouvertures latérales (14) en question disposées face aux ouvertures inférieures (19) respectives des stations d'alimentation (18) correspondantes, et **en ce que** lesdits éléments pousseurs (26) de chaque station (11) peuvent se déplacer parallèlement à la direction de déviation (D2), l'un vers l'autre et à travers les ouvertures latérales (14) correspondantes d'une poche (10) occupant la station (11) correspondante, pour introduire les cigarettes (2) des deux demi-couches (8) dans la poche (10) qui attend.

11. L'unité selon la revendication 10, **caractérisée en ce que** lesdits canaux (20) de chaque station d'alimentation (18) sont séparés l'un de l'autre dans la direction d'avancement (D1) d'une distance essentiellement égale à une épaisseur maximum des cigarettes frustoconiques (2), et sont décalés dans cette même direction (D1) par rapport aux canaux (20) de la station d'alimentation (18) située à l'opposé au niveau de la station de chargement (11) correspondante.

12. L'unité selon la revendication 11, **caractérisée en ce qu'**elle comprend des moyens de guidage (24) associés à chaque station de chargement (11), pouvant s'approcher et s'éloigner d'une extrémité supérieure ouverte (28) de chaque poche (10) et fonctionnant en association avec les éléments pousseurs (26) pour guider les cigarettes (2) des demi-couches (8) dans la direction de déviation (D2).

13. L'unité selon la revendication 12, **caractérisée en ce que** lesdits moyens de guidage (24) comprennent une pluralité d'ailettes (29) disposées de biais par rapport à la direction de déviation (D2), des ailettes (29) adjacentes étant inclinées de façon réciproquement opposée de manière à concourir à l'emboîtement des cigarettes (2) d'une demi-couche (8) entre les cigarettes (2) de l'autre demi-couche (8).

14. L'unité selon les revendications de 11 à 13, **caractérisée en ce que** lesdits éléments pousseurs (26) consistent en des poussoirs à peigne (26) par l'intermédiaire desquels les deux demi-couches (8) de chaque couche (7) sont introduites dans la poche (10) de manière à ce que les cigarettes frustoconiques (2) d'une demi-couche (8) soient emboîtées en alternance avec les cigarettes frustoconiques (2) de l'autre demi-couche (8).

15. L'unité selon les revendications de 9 à 14, **caractérisée en ce que** lesdits canaux (20) de chaque station d'alimentation (18) décrivent, d'un côté de cette même station (18), un premier parcours (P1) essentiellement rectiligne et, du côté opposé de la station, un second parcours curviligne (P2) de manière à ce que les cigarettes frustoconiques (2), qui présentent une grande base (3) et une petite base (4), soient positionnées, une fois dans la colonne (21) correspondante, avec les petites bases (4) situées le long du premier parcours (P1) et les grandes bases (3) situées le long du second parcours (P2).

16. L'unité selon la revendication 13, **caractérisée en ce que** ledit premier parcours (P1) de chaque canal (20) est orienté vers le parcours d'avancement (P).

17. L'unité selon les revendications de 8 à 14, **caractérisée en ce qu'**elle comprend des moyens (30) disposés de chaque côté du parcours d'avancement (P), au-delà de chacune des stations de chargement (11) si l'on considère la direction d'avancement (D1), et destinés à compacter les cigarettes frustoconiques (2) de chaque couche (7) occupant la poche (10).

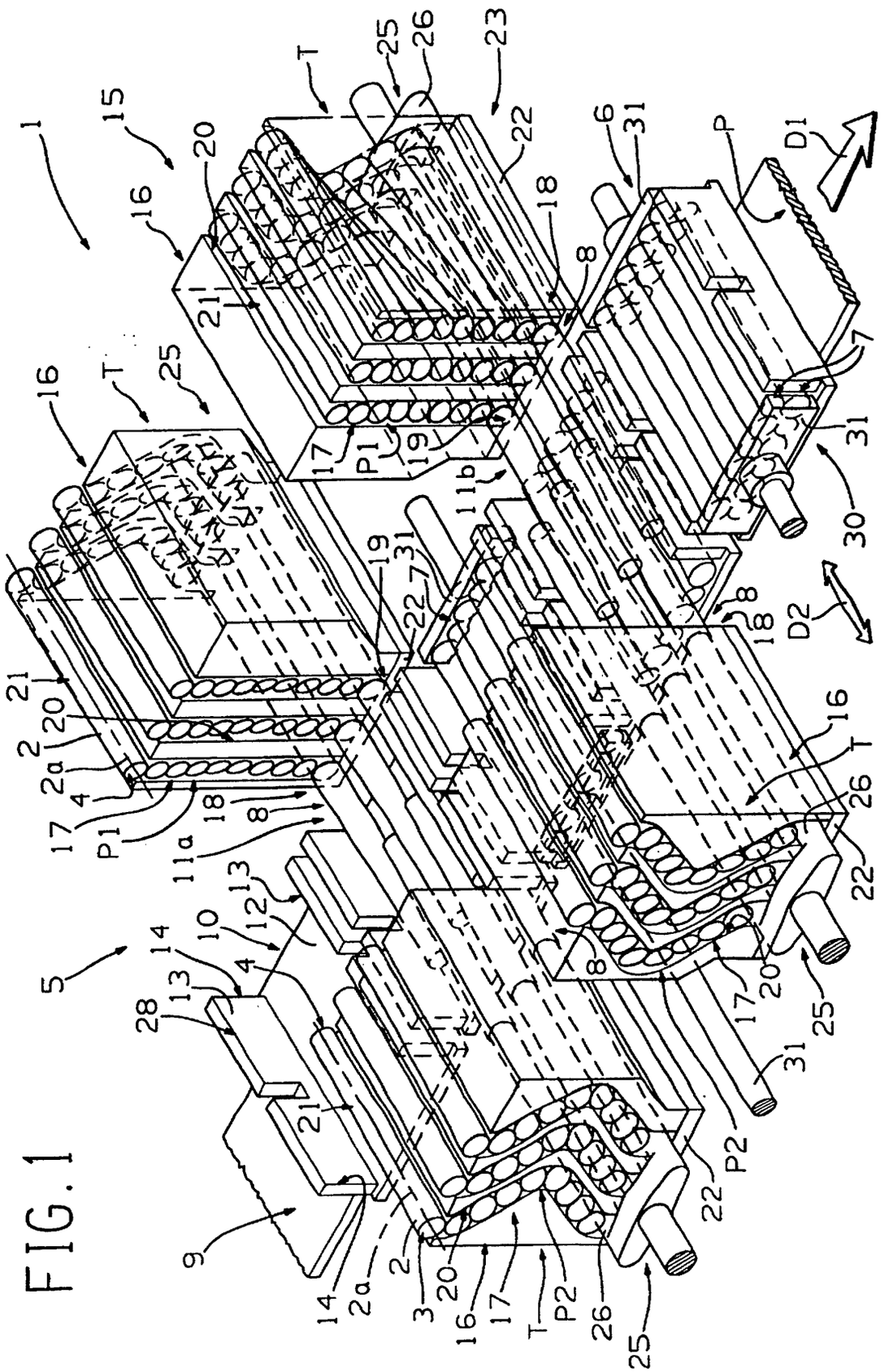

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FIG. 1

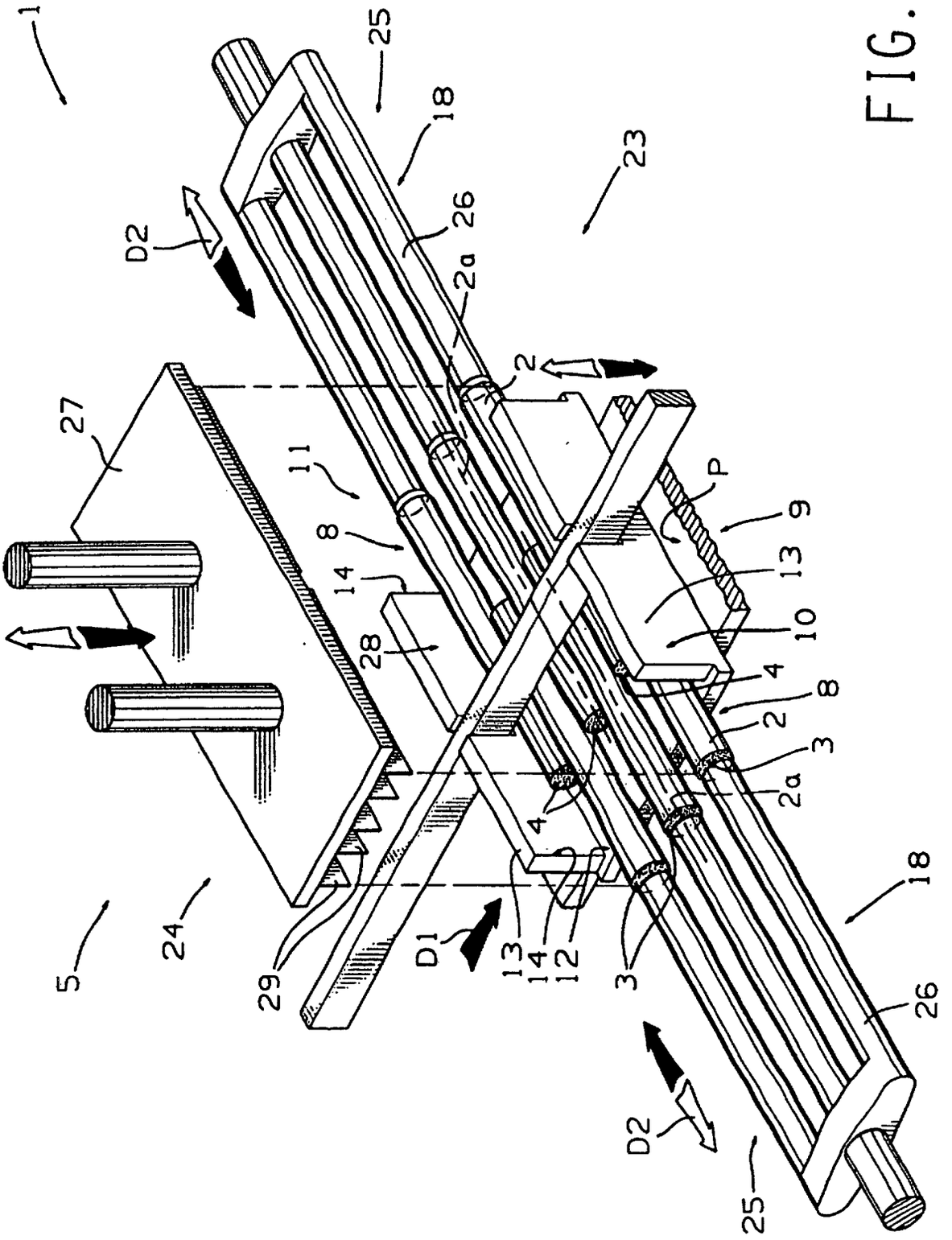

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FIG.2