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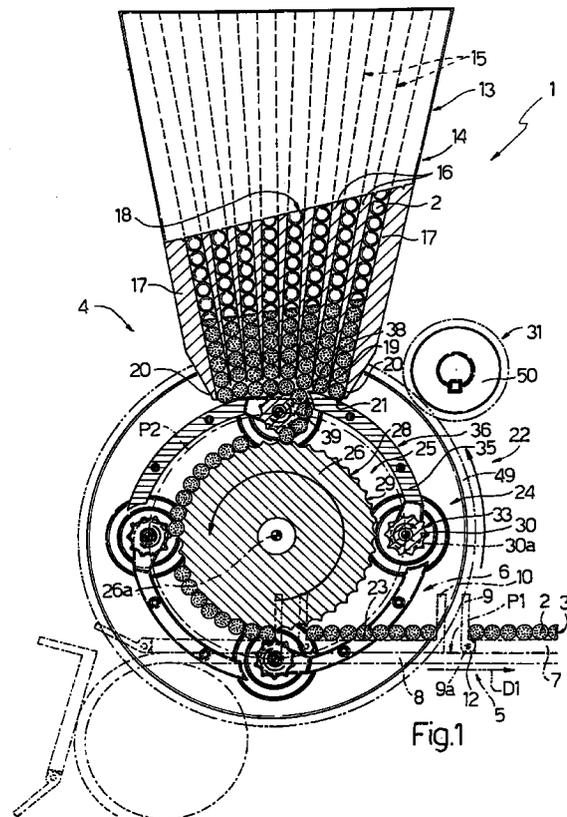
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(54) Cigarette transfer unit

(57) A unit (22) for transferring cigarettes (2), and for transferring at least one layer (3) of cigarettes (2) from a fixed pickup position (21) to an unloading position (23), the unit having a supply roller (26) substantially tangent to the unloading position (23), and a number of pickup rollers (30) movable along an annular path (P2) extending substantially about a periphery (29) of the supply roller (26) and through the pickup and unloading positions (21, 23); the pickup rollers (30) being arranged singly along the path (P2), and cooperating with an end portion (34) of the cigarettes (2) to pick up the cigarettes (2) at the pickup position (21) and feed the cigarettes to the supply roller (26).



EP 0 839 718 A1

Description

The present invention relates to a cigarette transfer unit.

International Patent Application WO 9521771 5
relates to a transfer unit for transferring at least one layer of cigarettes from a fixed pickup position defined by the bottom opening of a hopper outlet, to an unloading position inside a conveyor pocket traveling continuously along a given path. The unit comprises a supply device for feeding the layer of cigarettes to the unloading position, and in turn comprising a first and a second transfer roller tangent to each other at a transfer station, and of which the first roller is also tangent to the unloading position; and a pickup device, in turn comprising a number of pickup rollers, which are arranged on either side of the second roller, travel along a path extending about the second roller and through the pickup position and transfer station, are equally spaced in pairs along said path, and provide for picking up the cigarettes from the pickup position and feeding them to the second roller. 10 15 20

More specifically, the pickup rollers in each pair pick up the cigarettes from the pickup position by engaging respective opposite free ends of the cigarettes, and roll to the side of the first transfer roller at the transfer station, where the cigarettes are fed from the second to the first transfer roller through a gap between two adjacent pairs of pickup rollers. 25

The above transfer unit involves several drawbacks. Firstly, the wear and complex adjustments of the mechanical components operating each pair of pickup rollers may result in such slack between the mechanical components that the pickup rollers in each pair rotate at different speeds about the respective axes of rotation, thus resulting in damage and even tearing of the cigarettes. Secondly, the structure of the transfer unit is made extremely complex, expensive and vertically bulky by the pair arrangement and the location of the pickup rollers about the periphery of the second roller. 30 35 40

It is an object of the present invention to provide a straightforward, low-cost transfer unit designed to eliminate the aforementioned drawbacks.

According to the present invention, there is provided a unit for transferring cigarettes, and for transferring at least one layer of cigarettes from a fixed pickup position to an unloading position; the unit comprising a supply device for feeding the cigarettes to the unloading position; and a pickup device associated with the supply device, and in turn comprising a number of pickup rollers traveling along an annular path extending along said fixed pickup position; the unit being characterized in that said pickup rollers are arranged singly along said path, and cooperate with an end portion of said cigarettes to pick up the cigarettes from said pickup position and feed the cigarettes to said supply device. 45 50 55

A non-limiting embodiment of the present invention will be described by way of example with reference to

the accompanying drawings, in which:

Figure 1 shows a front view, with parts in section and parts removed for clarity, of a preferred embodiment of the unit according to the present invention; Figure 2 shows a side view, with parts in section and parts removed for clarity, of the Figure 1 unit.

Number 1 in Figure 1 indicates a machine for continuously packing cigarettes 2 in groups (not shown), each comprising at least one layer 3 comprising a given number of cigarettes 2.

Machine 1 comprises an input portion 4, in turn comprising a pocket conveyor 5 traveling continuously in a given direction D1 and along a given straight conveying path P1, and in turn comprising a succession of substantially U-shaped pockets 6, each for containing and feeding at least one layer 3 along path P1 crosswise to the axes of cigarettes 2, and each comprising a bottom wall 7 connected integrally to a conveyor belt 8 of conveyor 5, and two lateral walls 9 and 10 crosswise to direction D1 and each having a rectangular recess 11 (Figure 2). More specifically, whereas wall 10 is integral with and crosswise to wall 7, wall 9 rotates with respect to wall 7 about an axis 9a of rotation defined by a hinge 12 connecting walls 7 and 9, and is rotated by an actuating device (not shown) between an open parted position in which it is inclined with respect to wall 7, and a closed position in which it is crosswise to wall 7.

Portion 4 also comprises a cigarette hopper 13 located over conveyor 5 and having at least one outlet 14 comprising a number of substantially vertical, side by side channels 15 defined laterally by respective pairs of substantially vertical partitions 16 between two lateral walls 17 of outlet 14, and each of which provides for gravity feeding a respective continuous column 18 of cigarettes 2. Partitions 16 and walls 17 are defined at the bottom by respective tapered ends 19 and 20, which define a bottom output opening 21 through which cigarettes 2 are fed out of outlet 14, and which are arranged at different heights along an arc, the lowest points of which are defined by ends 20.

Finally, portion 4 comprises a transfer unit 22 associated with outlet 14 and interposed between a cigarette pickup position defined by bottom opening 21 of outlet 14, and an unloading position 23 where layer 3 is unloaded into a pocket 6, and which is defined in the Figure 1 embodiment by the bottom surface of pocket 6. As shown more clearly in Figure 2, unit 22 comprises a pickup device 24 for picking up cigarettes 2 from outlet 14 in such a manner as to detach a layer 3 of cigarettes 2 from the cigarettes 2 inside outlet 14; and a supply device 25 for receiving layers 3 successively from device 24, and feeding layers 3 to unloading position 23.

Supply device 25 comprises a roller 26 fitted to a drive shaft 27 so as to rotate (anticlockwise in Figure 1) continuously in a circle about a horizontal axis 26a, and having a number of suction seats 28 parallel to the axes

of cigarettes 2 and to axis 26a, and equally spaced about the periphery 29 of roller 26. More specifically roller 26 is located between opening 21 and unloading position 23, is of a width smaller than the length of cigarettes 2 so as to retain cigarettes 2 by suction inside seats 28 by cooperating with a central portion of each cigarette 2, and rotates through recesses 11 in walls 9 and 10 of each pocket 6 to gradually release cigarettes 2 inside pocket 6 by rolling over said bottom surface.

Pickup device 24 comprises a number of rollers 30 smaller in diameter than roller 26 and of a width substantially equal to half the length of cigarettes 2. Rollers 30 are arranged substantially along the periphery 29 of roller 26, and are movable and equally spaced singly along an annular path P2 (Figure 2), which lies in a plane inclined with respect to axis 26a, and extends between open 21 and unloading position 23 so that an upper portion is substantially tangent to opening 21, and a lower portion extends laterally with respect to unloading position 23 to enable roller 26 to feed cigarettes 2 directly to position 23.

Device 24 also comprises an actuating device 31 for continuously rotating rollers 30 (clockwise in Figure 1) about respective axes 30a, and for revolving rollers 30 continuously (anticlockwise in Figure 1) about axis 26a; and a release device 32 for moving rollers 30 axially along axis 26a between a first work position in which rollers 30 partially face periphery 29 of roller 26 and engage opening 21, and a second rest position in which rollers 30 are located to the side of periphery 29 and travel to the side of conveyor 5.

Each roller 30 comprises a number of peripheral suction seats 33, each for retaining a cigarette 2 by suction by cooperating with a respective end portion 34 of cigarette 2; and, in the first work position, each roller 30 rolls along opening 21 of outlet 14 to successively pick up cigarettes 2 fed along opening 21 by channels 15, and, still in the first work position, rolls along the periphery 29 of roller 26 to feed the picked up cigarettes 2 into seats 28 of roller 26 and so form a layer 3 of cigarettes 2 on periphery 29.

For each roller 30, device 24 also comprises a stop plate 35, which is defined externally by a curved surface 36 extending substantially between two successive rollers 30 and of substantially the same curvature as said arc along which ends 19 and 20 of partitions 16 and walls 17 are located, and which is connected in rotary and axially-fixed manner to a tubular shaft 37 supporting roller 30, so as to rotate about axis 26a and move axially with respect to axis 26a together with respective roller 30. Each plate 35 comprises a tapered front end portion 38 defining, with the roller 30 downstream from plate 35 in the revolving direction of rollers 30, a channel 39 for the passage of cigarettes 2; and, as cigarettes 2 are picked up, in use, by the downstream roller 30, plate 35 gradually closes opening 21 of outlet 14 to prevent any further cigarettes 2 from issuing from channels 15.

Device 31 for activating rollers 30 comprises a fixed

tubular shaft 40 coaxial with axis 26a and fitted through with shaft 27; and a drum 41, in turn comprising a rear wall 42 crosswise to axis 26a and fitted in rotary manner to shaft 40, a front wall 43 facing roller 26, crosswise to axis 26a, and fitted in rotary manner to a portion of shaft 27 projecting outwards of shaft 40 and supporting roller 26, and a cylindrical lateral wall 44 connected to walls 42 and 43, and defining, with walls 42 and 43, an inner chamber 45 of drum 41. For each roller 30, walls 42 and 43 comprise respective through holes 46 and 47; hole 46 is engaged in rotary manner by the free end of shaft 37 opposite the end supporting roller 30; and hole 47 houses in rotary manner a gear 48 fitted in axially-sliding, angularly-fixed manner to shaft 37.

Device 31 also comprises a gear 49 formed on the outside of wall 44; a drive pinion 50 meshing with gear 49 to rotate drum 41, and so revolve rollers 30, about axis 26a; and a gear 51 fitted to shaft 27 and meshing with all of gears 48 to rotate rollers 30 about respective axes 30a. Actuating device 31 therefore defines a differential epicyclic transmission comprising gears 48, 49 and 51, and of which gears 48 represent the planet gears, gear 51 the sun gear, and drum 41 the carrier.

Finally, release device 32 is housed inside chamber 45, and comprises a cylindrical wall 52 fitted coaxially with axis 26a to a free end of fixed tubular shaft 40; an annular cam 53 formed on the outside of wall 52 and extending parallel to path P2 about axis 26a; and, for each roller 30, a bush 54 fitted in rotary and axially-fixed manner to respective shaft 37, and a tappet roller 55 fitted in rotary manner to respective bush 54 and engaged inside cam 53. Device 32 provides for moving each roller 30 and respective plate 35 between the first work position and the second rest position, so as to move rollers 30 and plates 35 away from roller 26 and clear of conveyor 5.

In actual use, pocket conveyor 5 feeds pockets 6 continuously along path P1 at a given speed V1, and roller 26 is rotated about axis 26a by drive shaft 27 at a tangential surface speed substantially equal to speed V1. The rotation of shaft 27 rotates gear 51 to rotate rollers 30 about respective axes 30a; the rotation of drum 41 about axis 26a causes rollers 30 and respective stop plates 35 to revolve about axis 26a; and the angular speed of drum 41 and gear 51 is controlled by a known transmission (not shown) connected to pinion 50 and shaft 27, so that the tangential surface speed of rollers 30 equals that of roller 26.

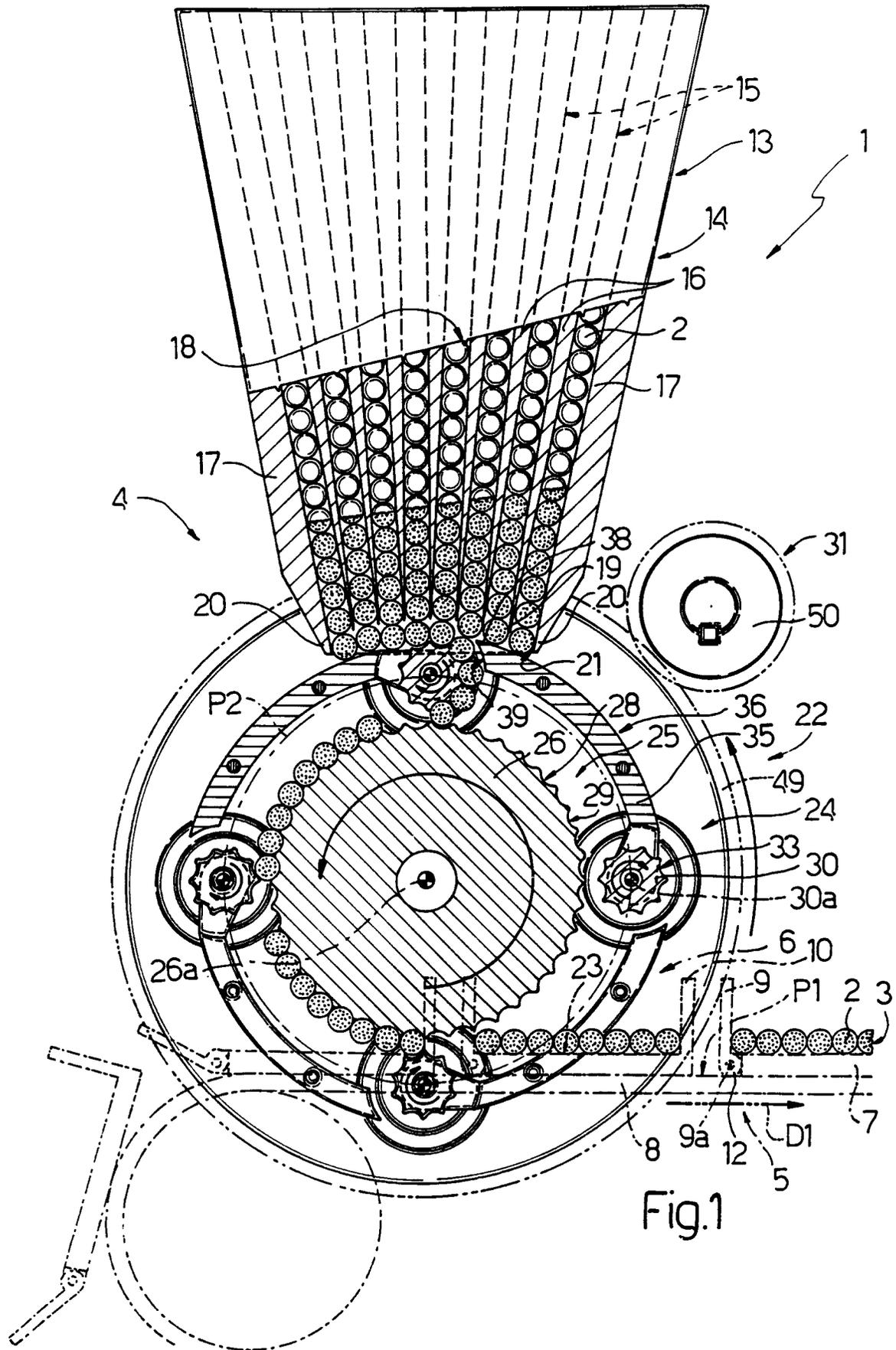
Each time a roller 30 is fed along path P2 to opening 21, roller 30 is set to the first work position by release device 32, and is rolled along opening 21 by device 31 to pick up cigarettes 2 from respective channels 15. As soon as each cigarette 2 is withdrawn from respective channel 15, the stop plate 35 integral with the following roller 30 is positioned with surface 36 along opening 21 to prevent any further cigarettes 2 from issuing from channels 15.

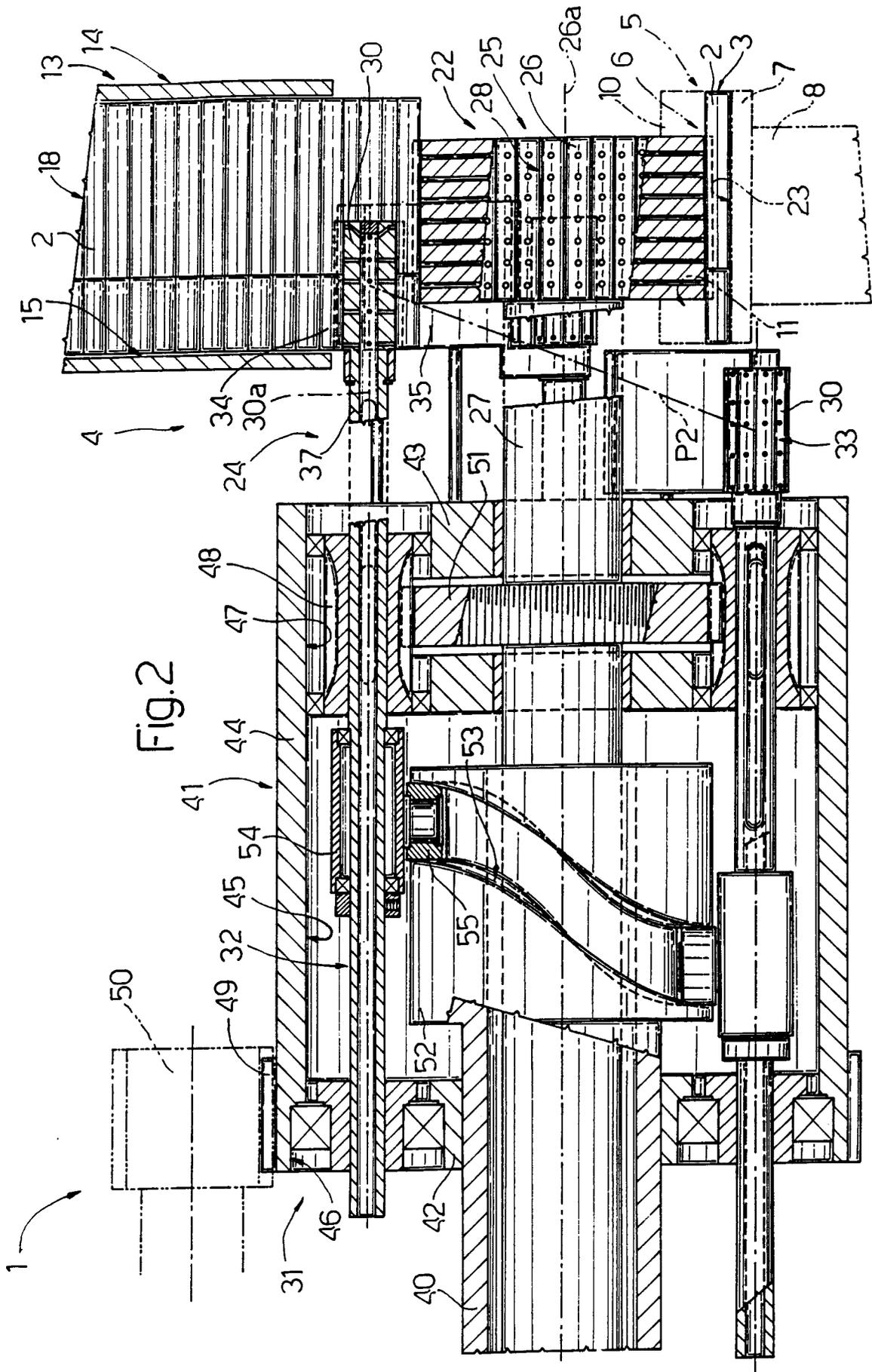
The cigarettes 2 picked up by each roller 30 are fed

about respective axis 30a and along respective channel 39, and are deposited successively into respective suction seats 28 on roller 26 to define a layer 3 of cigarettes 2 along the periphery 29 of roller 26. At which point, release device 32 sets roller 30 and respective plate 35 to the second rest position, so as to clear the periphery 29 of roller 26 and enable roller 26 to deposit layer 3 of cigarettes 2 inside a respective pocket 6 with respective wall 9 in the parted open position.

Claims

1. A unit (22) for transferring cigarettes (2), and for transferring at least one layer (3) of cigarettes (2) from a fixed pickup position (21) to an unloading position (23); the unit (22) comprising a supply device (25) for feeding the cigarettes (2) to the unloading position (23); and a pickup device (24) associated with the supply device (25), and in turn comprising a number of pickup rollers (30) traveling along an annular path (P2) extending along said fixed pickup position (21); the unit (22) being characterized in that said pickup rollers (30) are arranged singly along said path (P2), and cooperate with an end portion (34) of said cigarettes (2) to pick up the cigarettes (2) from said pickup position (21) and feed the cigarettes (2) to said supply device (25).
2. A unit as claimed in Claim 1, characterized in that said path (P2) extends to the side of said unloading position (23).
3. A unit as claimed in Claim 2, characterized in that said supply device (25) comprises a transfer roller (26) rotating about a respective axis of rotation (26a) and substantially tangent to said unloading position (23); said pickup rollers (30) being arranged substantially along a periphery (29) of the transfer roller (26).
4. A unit as claimed in Claim 3, characterized in that said path (P2) of said pickup rollers (30) is oblique with respect to said axis of rotation (26a).
5. A unit as claimed in Claim 3 or 4, characterized in that said pickup device (24) comprises a release device (32) associated with said pickup rollers (30) and for moving the pickup rollers (30) between a first and a second operating position; the second operating position being a rest position in which the pickup rollers (30) are located to the side of said transfer roller (26) to clear the periphery (29) of the transfer roller (26).
6. A unit as claimed in Claim 5, characterized in that said release device (32) comprises cam means (53) substantially parallel to said path (P2); and tap-
pet means (55) integral with said pickup rollers (30) and engaged in said cam means (53) to move the pickup rollers (30) parallel to said axis of rotation (26a).
7. A unit as claimed in Claim 5 or 6, characterized in that said pickup device (24) comprises, for each said pickup roller (30), a stop element (35) movable together with the respective pickup roller (30) along said path (P2); each stop element arresting the cigarettes (2) at said pickup position (21).
8. A unit as claimed in any one of the foregoing Claims from 3 to 7, characterized by comprising at least one outlet (14) of a hopper (13) for cigarettes (2), a bottom opening (21) of the outlet defining said fixed pickup position (21); and a number of conveying pockets (6) movable along a conveying path (P1); said unloading position (23) being inside said pocket (6); and said transfer roller (26) directly facing said conveying path (P1).
9. A unit as claimed in Claim 8, characterized by comprising conveying means (5) movable along said conveying path (P1); said path (P2) of said pickup rollers (30) being located to one side of said conveying path (P1) at least at said unloading position (23).







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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 8296

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 4 614 263 A (JAPAN TOBACCO) * column 3, line 39 - column 4, line 28; figures 1,2 *	1	B65B19/10
A,D	WO 95 21771 A (MOLINS) * abstract; figures 2,4 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		27 January 1998	Claeys, H
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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