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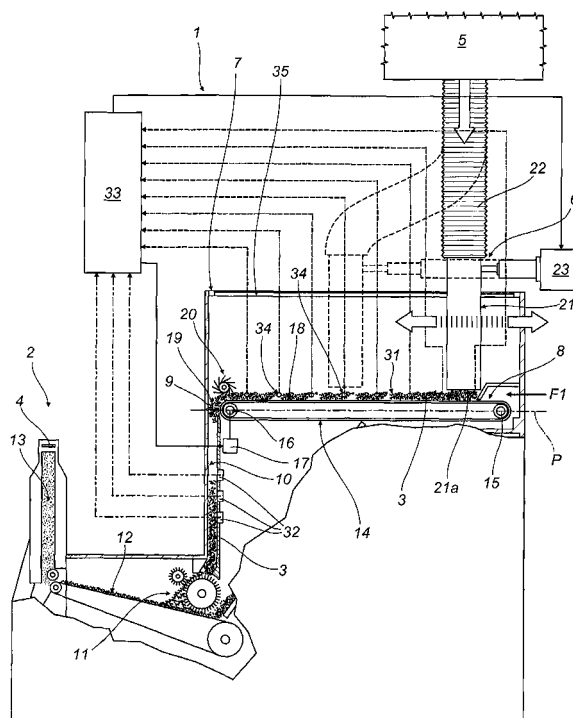
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(54) **A tobacco feeder unit in a cigarette maker**

(57) A tobacco feeder unit incorporates a descent channel (10) down which shredded tobacco (3) drops toward the rotary infeed unit (11) of a cigarette maker (2), and is equipped with a conveyor (8), positioned to transport and direct the tobacco (3) into the inlet end of

the descent channel (10), also with a duct (21) by which the tobacco (3) is released onto the conveyor (8); the duct (21) is capable of traversing horizontally in relation to the conveyor (8), at least between two operating limit positions, and set in motion by a respective actuator (23).

FIG. 1



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Description

[0001] The present invention relates to a tobacco feeder unit in a cigarette maker.

[0002] In cigarette making machines, shredded tobacco passes typically by way of an infeed hopper into an enclosure; internally of the enclosure, the tobacco is directed by a carding unit toward a downwardly directed duct affording a descent channel or chute.

[0003] A bottom end of the descent channel is connected normally to an upwardly directed duct affording an ascent channel or riser, enclosed at the top end by an air-permeable conveyor belt. An updraught in the ascent channel ensures that the tobacco particles are carried to the top and attracted to the surface of the permeable belt, on which they form a ribbon of tobacco filler used in making the cigarettes.

[0004] In conventional machines, the tobacco is released from the infeed hopper onto a belt conveyor and then carried by the belt toward the aforementioned carding unit, which comprises a proportioning-and-carding roller.

[0005] The tobacco will thus accumulate above the belt conveyor, in the space between the hopper outlet and the proportioning-and-carding roller, forming a reserve that is maintained by the hopper at a given level in order to ensure the roller can maintain a steady supply of tobacco to the chute.

[0006] One of the drawbacks encountered with this feed system is that the tobacco can dwell for relatively long periods inside the enclosure, with the result that it loses moisture and flavour.

[0007] The object of the present invention is to provide a tobacco feeder unit designed in such a way as to overcome the drawback mentioned above and ensure continuity of the flow of tobacco to the descent channel or chute, simply and economically.

[0008] The stated object is realized according to the present invention in a tobacco feeder unit for use with a cigarette maker, of which the characterizing features are as recited in claim 1 appended.

[0009] The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- figure 1 illustrates a first embodiment of a tobacco feeder unit in a cigarette maker, viewed schematically in a cutaway side elevation;
- figure 2 illustrates a variation on the unit of figure 1, viewed schematically in a cutaway side elevation.

[0010] With reference to the two accompanying drawings, 1 denotes a tobacco feeder unit, in its entirety, forming part of a cigarette maker 2. The unit 1 is designed to feed shredded tobacco 3 to a machine unit (not illustrated) of the cigarette maker 2 by way of an air-permeable conveyor belt 4 indicated schematically in the drawings.

[0011] The feeder unit 1 comprises an infeed hopper, indicated schematically by a block denoted 5, from which the shredded tobacco 3 is directed by way of feed means, denoted 6 in their entirety, into an enclosure 7, and more exactly onto a transporter unit 8 by which it is advanced toward the top inlet end 9 of a descent channel, or chute 10. The bottom end of the chute opens onto a rotary infeed unit 11 by which the descending tobacco 3 is taken up and passed to a conveyor 12 connecting with an ascent channel or riser 13 enclosed at the top end by the aforementioned air-permeable belt 4.

[0012] The transporter unit 8 comprises a substantially horizontal belt conveyor 14 looped around two end pulleys 15 and 16 including at least one pulley, denoted 16, coupled to a relative motor 17 by which the belt 14 is driven in a direction denoted F1 along a feed path denoted P, turning anticlockwise as seen in figures 1 and 2.

[0013] The belt conveyor 14 presents an active branch 18 uppermost, of which the downstream end is looped around the relative pulley 16 at a point coinciding with the top inlet end 9 of the chute 10, in such a way as to direct a flow 19 of shredded tobacco 3 into the selfsame chute 10 with the aid of a paddle roller 20.

[0014] In the first embodiment of the unit illustrated in figure 1, the feed means 6 comprise a delivery duct 21 in receipt of tobacco from the hopper 5 by way of a flexible portion consisting, for example, in a length of flexible and deformable duct 22. The duct 21 is positioned with its outlet end 21a above the active branch 18 of the belt conveyor 14 and rendered capable of movement back and forth along the feed path P, for reasons that will become clear in due course, through the agency of a respective actuator 23 to which it is connected.

[0015] In the case of the second embodiment of the unit illustrated in figure 2, the feed means 6 comprise a second belt conveyor 24 interposed between the outlet end 21a of the delivery duct 21, which in this instance is fixed, and the belt conveyor 14 of the transporter unit.

[0016] More exactly, the second belt conveyor 24, which likewise is substantially horizontal and disposed parallel with the belt conveyor 14 aforementioned, consists in a belt looped around pulleys 25 and 26 including at least one pulley, denoted 26, coupled to a relative motor 27 by which the selfsame second belt 24 is driven in a direction denoted F2 along a feed path denoted P1, turning clockwise as seen in figure 2.

[0017] The two end pulleys 25 and 26 of the second belt conveyor 24 are mounted to a frame 28 capable of movement, induced by a corresponding actuator 29, in a direction parallel to the direction followed by the belt conveyor 14 beneath, between two limit positions of which one is illustrated in phantom lines.

[0018] Accordingly, the position of the second belt conveyor 24 can be varied with respect to the outlet end 21a of the delivery duct 21, and the position occupied by the discharge end 30 of the selfsame belt conveyor 24 thus varied with respect to the belt conveyor 14 beneath.

[0019] In another embodiment (not illustrated) of the feeder unit 1, one end pulley 26 of the second belt conveyor 24 can be mounted to a shaft occupying a fixed position, whilst the other end pulley 25 can be mounted to a shaft traversable between two limit positions by a respective actuator 29 in such a way as to allow of positioning the discharge end 30 of the second belt conveyor 24 in relation to the belt conveyor 14 beneath.

[0020] In operation, referring to figure 1, the shredded tobacco 3 will drop from the outlet end 21a of the delivery duct 21 onto the belt conveyor 14 in such way as to form a substantially uniform layer 31, whereupon the tobacco 3 is advanced by the belt 14 toward and into the top inlet end 9 of the descent channel, or chute 10, along which sensors 32 are installed serving to detect the level of tobacco 3 internally of the selfsame chute.

[0021] The level sensors 32 generate signals indicating the amount of tobacco 3 occupying the chute 10, and these are relayed to a master control unit 33 that will pilot the motor 17 to regulate the peripheral speed of the belt conveyor 14 and thus maintain the tobacco in the chute 10 at a substantially constant level.

[0022] The feed means 6 further comprise a plurality of sensors 34, ordered along the feed path P followed by the belt conveyor 14 and positioned at a given height above the active branch 18, from which the control unit 33 receives signals indicating the presence or absence of the layer 31 of tobacco 3 and monitoring its depth.

[0023] The control unit 33 utilizes the signals from the sensors 34 to adjust the position of the delivery duct 21 along the feed path P, and therefore along the active branch 18 of the belt conveyor 14, by piloting the operation of the relative actuator 23. In this way, it becomes possible to restore the continuity of the layer 31 of tobacco 3 along the active branch 18 in the event of breaks occurring due to imbalances between the quantity of tobacco 3 released from the infeed hopper 5 and the quantity of tobacco 3 taken up by the cigarette maker 2. The movement of the delivery duct 21 relative to the enclosure 7 is made possible by incorporating a slot 35, and the permanent nature of the connection between the hopper 5 and the duct 21 is assured by the flexible duct 22.

[0024] In the example of figure 2, signals are relayed by the sensors 34 to the control unit 33 as in the manner already described, indicating the presence or absence of the layer 31 of tobacco 3, and used by the control unit 33 to adjust the position of the frame 28, or alternatively the position of the shaft carrying the movable pulley 25, by piloting the operation of the relative actuator 29 so as to vary the position occupied by the discharge end 30 of the second belt conveyor 24 in relation to the belt 14 beneath and thus restore the continuity of the layer 31 of tobacco 3 along the branch 18 in the event of breaks occurring, as mentioned above, due to imbalances between the quantity of tobacco 3 released from the infeed hopper 5 and the quantity of tobacco 3 taken up by the cigarette maker 2.

[0025] In both of the two embodiments illustrated, the position occupied by the delivery duct 21 or by the discharge end 30 of the second belt conveyor 24 is made adjustable in order to prevent the creation of voids or breaks in continuity of the layer 31 of shredded tobacco 3 advancing on the top branch 18 of the belt conveyor 14, and thus ensure that the selfsame layer 31 is maintained at a substantially constant and uniform depth.

[0026] Moreover, the active branch 18 of the transporter belt conveyor 14 constitutes a first-in first-out (FIFO) type temporary storage facility of variable capacity on which to hold a reserve of tobacco 3.

[0027] The tobacco 3 can be either released continuously or batched discontinuously from the hopper 5.

Claims

1. A tobacco feeder unit in a cigarette maker, comprising a descent channel (10), a transporter unit (8) by which tobacco (3) is directed into the descent channel (10), and feed means (6) by which tobacco is supplied to the transporter unit (8), **characterized in that** the feed means (6) supplying the tobacco (3) are capable of movement relative to the transporter unit (8) at least between two limit positions.
2. A unit as in claim 1, wherein the transporter unit (8) comprises a substantially horizontal belt conveyor (14) of which an outfeed end is positioned to coincide with the inlet end (9) of the descent channel (10), and the feed means (6) comprise a delivery duct (21) by which the tobacco (3) is directed from above onto the belt conveyor (14).
3. A unit as in claim 2, wherein the delivery duct (21) is capable of movement along a predetermined feed path (P) followed by the transporter belt conveyor (14).
4. A unit as in claim 2, wherein the feed means (6) supplying the tobacco (3) comprise a second belt conveyor (24) interposed between the outlet end (21a) of the delivery duct (21) and the transporter belt conveyor (14).
5. A unit as in claim 4, wherein at least a discharge end (30) of the second belt conveyor (24) is capable of movement relative to the transporter belt conveyor (14).
6. A unit as in claim 4, wherein the second belt conveyor (24) is capable of movement between two limit positions, relative to the transporter belt conveyor (14).
7. A unit as in claims 2 to 6, comprising means (34) by which to sense and monitor the presence of tobacco

(3) along the transporter belt conveyor (14).

8. A unit as in claims 1 to 7, wherein the feed means (6) supplying the tobacco (3) comprise actuator means (23, 29) interlocked to the sensing and monitoring means (34). 5
9. A unit as in claims 3 and 8, wherein the actuator means (23) are connected to the delivery duct (21). 10
10. A unit as in claims 5 and 8, wherein the actuator means (29) are connected to a return pulley (25) of the second belt conveyor (24) coinciding with the end (30) from which the tobacco (3) is discharged. 15
11. A unit as in claims 5 and 8, wherein the actuator means (29) are connected to a frame (28) carrying the second belt conveyor (24).
12. A unit as in claims 7 to 11, comprising a master control unit (33) connected on the one hand to the sensing and monitoring means (34) and to means (32) by which to sense the level of the tobacco (3) internally of the descent channel (10), and on the other to the actuator means (23, 29). 20 25
13. A unit as in claim 12, wherein the master control unit (33) is connected to means (17) driving the transporter belt conveyor (14). 30
14. A unit as in claim 12, wherein the master control unit (33) is connected to means (27) driving the second belt conveyor (24). 35

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FIG. 1

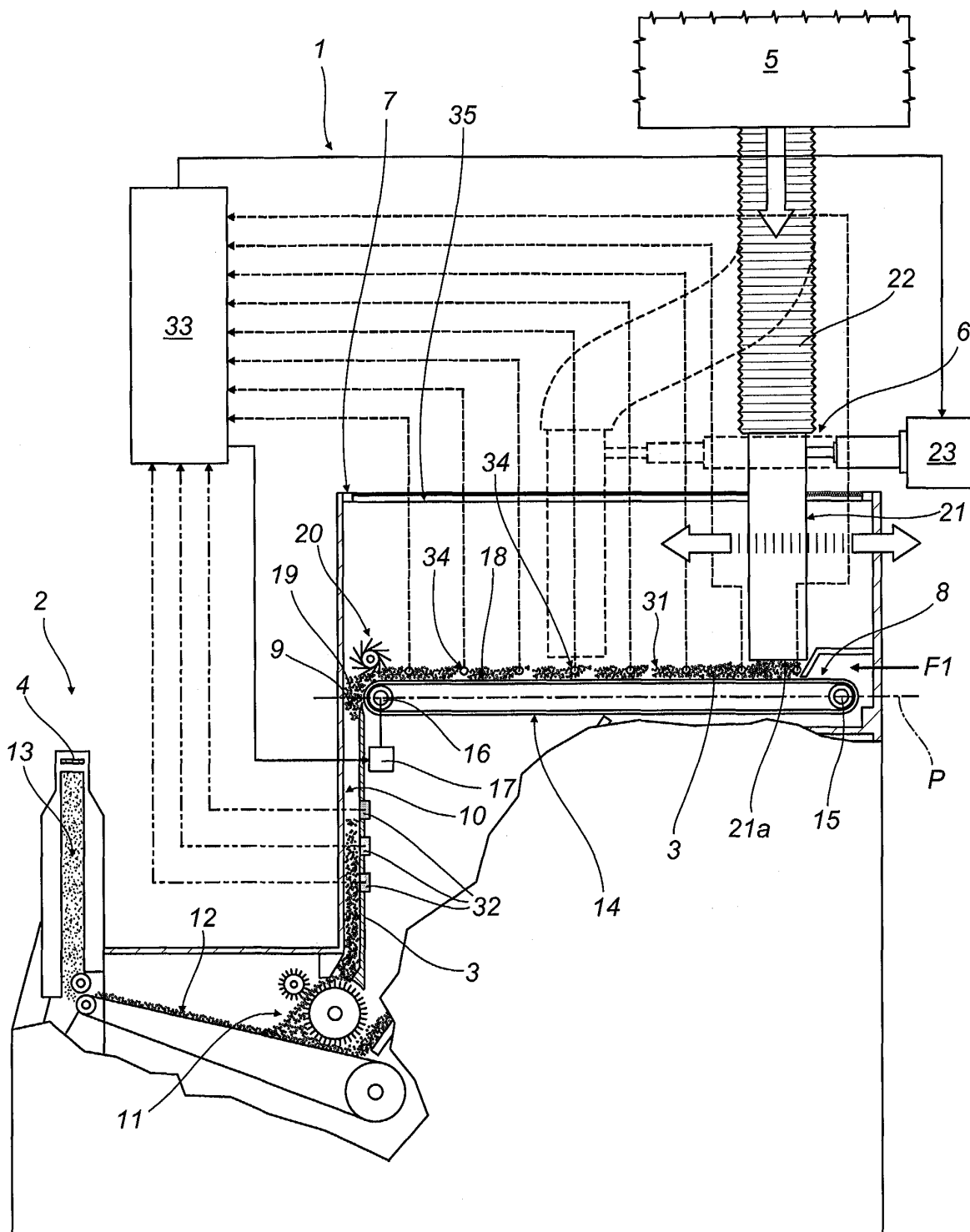
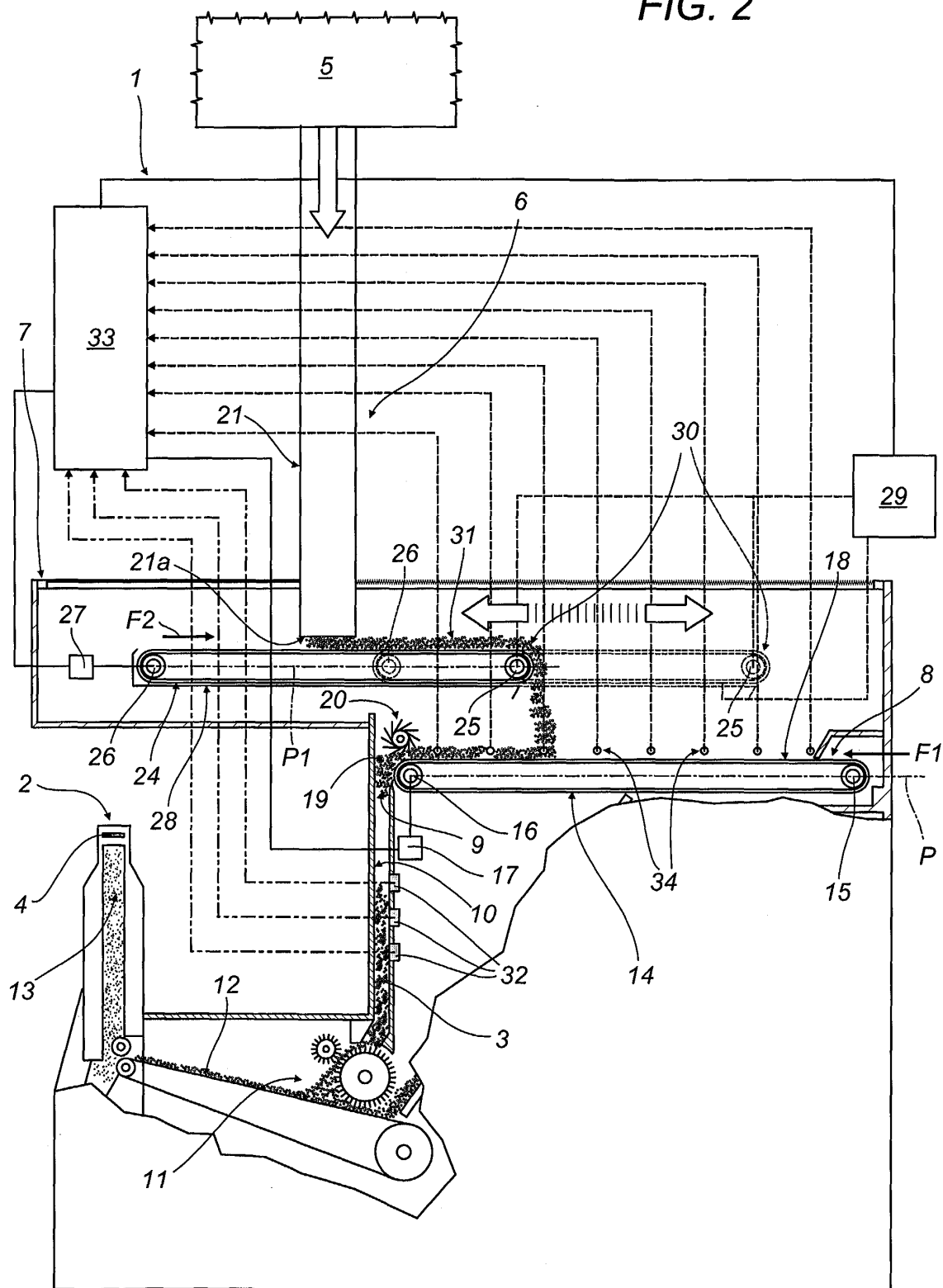


FIG. 2





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5147

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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A	DE 21 24 908 A (HAUNI-WERKE KÖRBER) 7 December 1972 (1972-12-07) * page 5, line 24 - page 7; figure 2 *	1	
A	US 4 474 511 A (LABBE) 2 October 1984 (1984-10-02) * the whole document *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 7 May 2004	Examiner MARZANO MONTERO..., M
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 04 42 5147

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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