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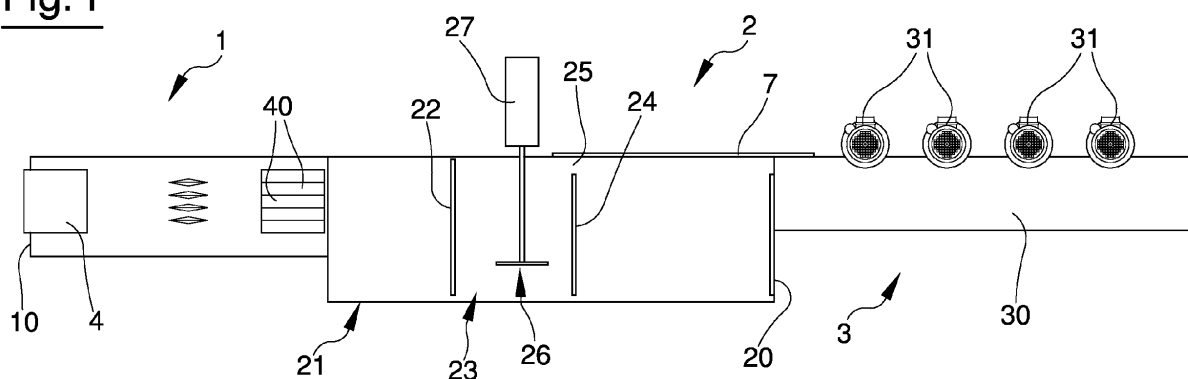
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(54) **Compact line for cutting and profiling of strips or listels.**

(57) A compact line for cutting and profiling lists or strips of ceramic, stone and similar materials comprising, in the following order, a first cutting unit (1) wherein flat elements in the form of tiles or slabs (4) are cut into lists or strips (40), a second handling unit (2) wherein the lists or strips (40) are set in order and individually prepared to be conveyed to a subsequent machining; and a third profiling or shaping unit (3) wherein the lists or strips (40) undergo at least one profiling or shaping operation. The

flat elements in the form of tiles or slabs (4) and the lists or strips (40) obtained from them, are supported in the said first cutting unit (1), in the said second handling unit (2) and in the third profiling or shaping unit (3), respectively on at least a first, a second and a third conveyor (10), (20), (30) which are arranged contiguously and consecutively to one another. At least the second conveyor (20) and the third conveyor (30) operate, running regularly, at different conveying or transporting speeds.

Fig. 1



Description

[0001] La present invention relates to compact line for cutting and profiling lists or strips of ceramic, stone and similar materials.

[0002] It is known to prepare lists from tiles or slabs to produce pieces, obviously of dimensions different from those of the tiles or slabs, which are habitually used as accessory finishing elements for floors and/or wall claddings. This, for example, is the situation that occurs with pieces like skirtings, which are made in the same color as the floor. In this specific case, one does not limit oneself to cutting the lists, but rather goes on to a further operation of profiling or shaping at least one edge of the list. It is common, for example to carry out what is called "bullnose" profiling.

[0003] The technique for producing such shapes or profiles is well known and relies on veritable profiling machines equipped with shaped multi-cutting tools (grinding wheels) which act upon the edges of the lists, to which feed motion is normally given during machining.

[0004] The essential cutting and profiling operations are normally carried out in a mutually independent manner with specialized machines, each of which is equipped with its own system for loading and unloading the pieces to be machined. To transfer the lists from one work surface to another or from one conveyor system to another, such known machines use pneumatic suction cup gripping apparatus which enable individual pieces or sets of pieces side by side to be lifted and positioned without producing damage and always maintaining considerable positioning precision.

[0005] Naturally, this requires suitable pneumatic gripping equipment which lends itself to being used for substantial volumes of production. Since the use thereof is cost-effective for production batches of a certain size and must necessarily take place in a production context that is well equipped and industrially organized, on the whole it is difficult to adapt to the requirements of a more flexible production involving batches of small entity and such as to enable the machining to take place in proximity to the place of use (building site).

[0006] The principal object of the present invention is to obviate the limits of the prior art by providing a compact line for cutting and profiling lists or strips of ceramic, stone and similar materials as claimed and described in the present application.

[0007] Additional features and advantages of the present invention will be more apparent from the description of a preferred, but not exclusive, embodiment of the present invention, relating to a compact line for cutting and profiling lists or strips of ceramic, stone and similar materials, illustrated by way of non-restrictive example in the appended drawings, in which:

- figure 1 shows a schematic plan view from above;
- figures 2, 3 and 4 show the view of figure 1 in different successive processing steps.

[0008] With reference to the above-mentioned figures, 1 indicates overall a first cutting unit in which flat elements in the form of tiles or slabs 4 are cut into lists or strips 40.

[0009] Immediately downstream of the first cutting unit 1, with reference to the general feed motion indicated by the arrows 5, there is provided a second unit, definable as a handling unit 2, in which the lists or strips 40 are transferred and individually prepared to be conveyed, arranged in a queue consecutively to one another, to a subsequent machining step. Immediately downstream of the second handling unit 2, again with reference to the general feed motion indicated by the arrow 5, there is provided a third profiling or shaping unit 3, in which the lists or strips 40 undergo at least one profiling or shaping operation.

[0010] The three units mentioned, though being arranged consecutively to one another, are equipped with their own conveyor surfaces for carrying out the conveyance of the products.

[0011] In fact, following the cutting operation, the flat elements in the form of tiles or slabs 4 and the lists or strips 40 obtained from them are supported in the first cutting unit 1, on at least one first conveyor 10.

[0012] In the second handling unit 2 the lists or strips 40 are supported on a second conveyor 20.

[0013] In the third profiling or shaping unit 3 the lists or strips 40 are supported on at least one third conveyor 30.

[0014] These three conveyors are arranged contiguously and consecutively to one another. They also have the advantage of being actuated independently or at any rate in a manner such as to give rise for at least one of them a different forward travel speed along the travel direction indicated by the arrow 5.

[0015] In particular, at least the second conveyor 20 operates, when running regularly, at a higher conveying or transporting speed than the third conveyor 30.

[0016] By virtue of this operating situation, the lists or strips 40 which pass through the third profiling or shaping unit 3, where they undergo shaping in machining stations 31 arranged in alignment consecutively to one another, are always placed in contact consecutively to one another so as to form a sort of continuous, uninterrupted queue.

[0017] After the longitudinal cut (performed parallel to the direction indicated by the arrow 5 in the first cutting unit 1), the set of lists or strips 40 advances into the second handling unit 2, in which the lists or strips 40 are set in order and individually prepared to be conveyed to a subsequent machining. The second handling unit 2 comprises, for this purpose, an entry portion 21, located immediately downstream of the first conveyor 20, which receives the already cut lists or strips 40 that are conveyed to it by the first conveyor 10, and is provided with a first stop barrier 22. The latter is mobile upon command from a lower active position, where it is located, relative to the support surface of the second conveyor 20, at a distance sufficient to interfere with the edges of the incoming lists or strips 40 and thus act as a stop for them, to an upper inactive position, where it does not interfere

with the lists or strips 40, permitting them to pass along freely as a result of the friction drag effected on them by the second conveyor 20.

[0018] Located downstream of the entry portion 21 delimited by the first stop barrier 22, with reference to the general direction of motion along the line, there is a deviation zone 23, which is suitable for accommodating the whole set of lists or strips 40 conveyed from the entry portion 21 and is in turn delimited downstream by a second stop barrier 24. The specific function of the second stop barrier 24 is to interfere with the edges of said lists or strips 40 so as to stop the feed motion independently of the motion of the second conveyor 20.

[0019] The second stop barrier 24, however, is structured and positioned to provide a gap or opening 25 having a pre-established width sufficient to permit the free passage of only one list or strip 40 at a time. In other words, the width of the gap is greater than the width or transverse dimension of the individual list or strip 40 and less than double said width or transverse dimension.

[0020] Suitable means are activated on command to act on the set of lists or strips 40 stopped against the second barrier 24, with the aim of creating transverse shifts of the entire "pack" of lists which are of an entity such as to bring an individual list or strip 40 - the one located at the end of the pack itself - into a position facing said gap or opening 25.

[0021] An upwardly projecting longitudinal edge 7, which delimits the gap 25, serves to retain the individual lists or strips 40 laterally, enabling them to be aligned one after the other in a continuous queue in the orientation required for passing into third profiling or shaping unit 3.

[0022] The list or strip 40, in contact with the edge 7 and no longer held back by the second stop barrier 24 is made to advance alone, dragged by the second conveyor 20, so as to pass the second stop barrier 24 and continue along the line toward the third profiling unit 3.

[0023] In particular, the gap or opening 25 is located at one flank of the second conveyor 20.

[0024] More specifically, the means suitable for acting upon the set of lists or strips 40 stopped against the second barrier 24 comprise a pusher member 26, which operates transversely to the direction of feed motion indicated by the arrow 5 and is dimensioned and prearranged above the conveying surface defined by the second conveyor 20 in such a manner as to be able to interfere with one flank of a list or strip 40. This action is normally exerted on the free flank of the list or strip 40 located at the side of the entire "pack" of lists.

[0025] The pusher member 26 is activated on command by an actuator 27 to create shifts, upon every activation, which are no smaller than the transverse dimensions or widths of the lists or strips 40.

[0026] This serves to sort the lists or strips 40, which are made to continue beyond the stop barrier 24 one at a time through the gap 25 and conveyed in continuous "Indian file" - i.e. in contact consecutively to one another

- to the next profiling or shaping unit 3 on the corresponding third conveyor 30. The third profiling or shaping unit 3 comprises, arranged in succession one after the other, a number of work stations or machining heads 31 which operate on the lateral edges of the lists or strips 40. The latter are arranged at the flank of the third conveyor 30, which is located on the same side of the second conveyor 20 where the gap or opening 25 is present.

[0027] To keep the lists or strips 40 aligned, lateral guides, not shown in the figure, can be provided.

[0028] In order to keep the lists or strips 40 aligned and in contact consecutively to one another during the entire profiling process the second conveyor 20 has a greater speed than the third conveyor 30 so as to exert a constant push on the queue of lists or strips 40, which in this manner comes to present a sort of continuous body to the shaping tools, consisting of suitably shaped multi-cutting tools or grinding wheels, which equip the various stations or heads.

Claims

1. A compact line for cutting and profiling lists or strips of ceramic, stone and similar materials comprising, in the following order, a first cutting unit (1) wherein flat elements in the form of tiles or slabs (4) are cut into lists or strips (40), a second handling unit (2) wherein the lists or strips (40) are set in order and individually prepared to be conveyed to a subsequent machining; a third profiling or shaping unit (3) wherein the lists or strips (40) undergo at least one profiling or shaping operation; **characterized in that** said flat elements in the form of tiles or slabs (4) and the lists () or strips (40) obtained from them, are supported in the said first cutting unit (1), in the said second handling unit (2) and in the third profiling or shaping unit (3), respectively on at least a first, a second and a third conveyor (10), (20), (30) which are arranged contiguously and consecutively to one another; it being foreseen that at least said second conveyor (20) and said third conveyor (30) operate, running regularly, at different conveying or transporting speeds.
2. The line according to claim 1, **characterized in that** the said second handling unit (2) wherein the lists or strips are set in order and individually prepared to be conveyed to a subsequent machining comprises an entry portion (21), located immediately downstream of the said first conveyor (1), this portion being suitable for receiving the previously cut lists or strips (40) conveyed to it by the same first conveyor (10) and provided with a first stop barrier (22) which is mobile upon command from a lower active position, whereat it is located with respect to the support surface of the second conveyor (20) at a distance sufficient to interfere with the edges of the incoming

lists or strips (40), to an upper inactive position, whereat it does not interfere with the said lists or strips (40) permitting them to be freely dragged by the said second conveyor (20).

3. The line according to claim 2, **characterized in that** the said second handling unit (2) comprises, downstream of the said entry portion (21) and of the said first stop barrier (22), with reference to the direction of motion relative to the feed of the lists () along the entire line, a deviation zone (23) which is suitable for integrally housing the set of lists or strips (40) conveyed from the said entry portion (21) and it is delimited, downstream, by a second stop barrier (24), suitable for interfering with the edges of the said lists or strips (40); said second stop barrier (24) being suitable for providing a gap or opening (25) having a width sufficient to permit the free transit of only one list or strip (40) at a time; suitable means being provided to act upon the set of lists or strips (40) stopped against the second barrier itself (24) causing them to shift transversely to a degree permitting an individual list or strip (25) to move to the said gap or opening (40).
4. The line according to claim 3, **characterized in that** the said gap or opening (25) is located at one flank of the said second conveyor (20).
5. The line according to claim 4, **characterized in that** the means suitable for acting upon the set of lists or strips (40) stopped against the same second barrier (24) comprises a pusher member (26), operating transversely to the direction of the feed motion, which is dimensioned and prearranged above the conveying surface defined by the second conveyor (20) in such a manner as to be able to interfere with one flank of a said list or strip (40).
6. The line according to claim 5, **characterized in that** the said pusher member (26) is activated on command by an actuator (27) to create shifts no smaller than the transverse dimensions or widths of the said lists or strips (40).
7. The line according to claim 6, **characterized in that** in the third profiling or shaping unit (3) wherein the lists or strips (40) undergo at least one profiling or shaping operation, there are work stations (31) that intervene on the lateral edges of the said lists or strips (40), which are arranged at the flank of the said third conveyor (30) which is located on the same side of the said second conveyor (20) whereat the said gap or opening (25) is present.
8. The line according to claim 7, **characterized in that** the speed of the said second conveyor (20) is greater than that of the said third conveyor (30).

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Fig. 1

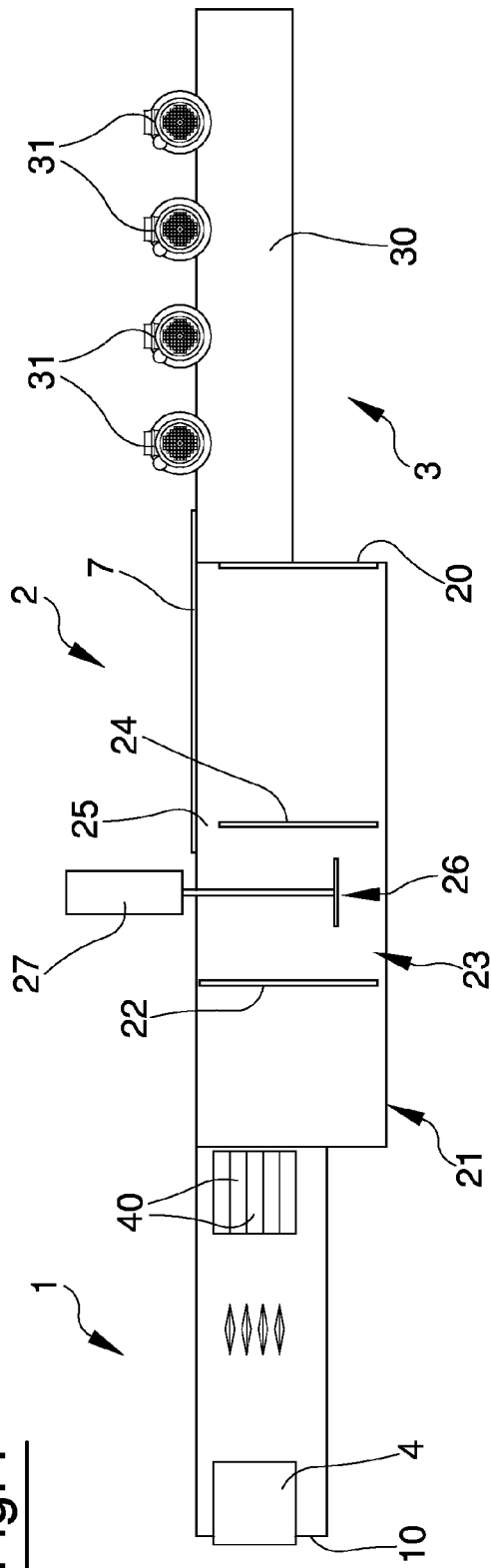


Fig. 2

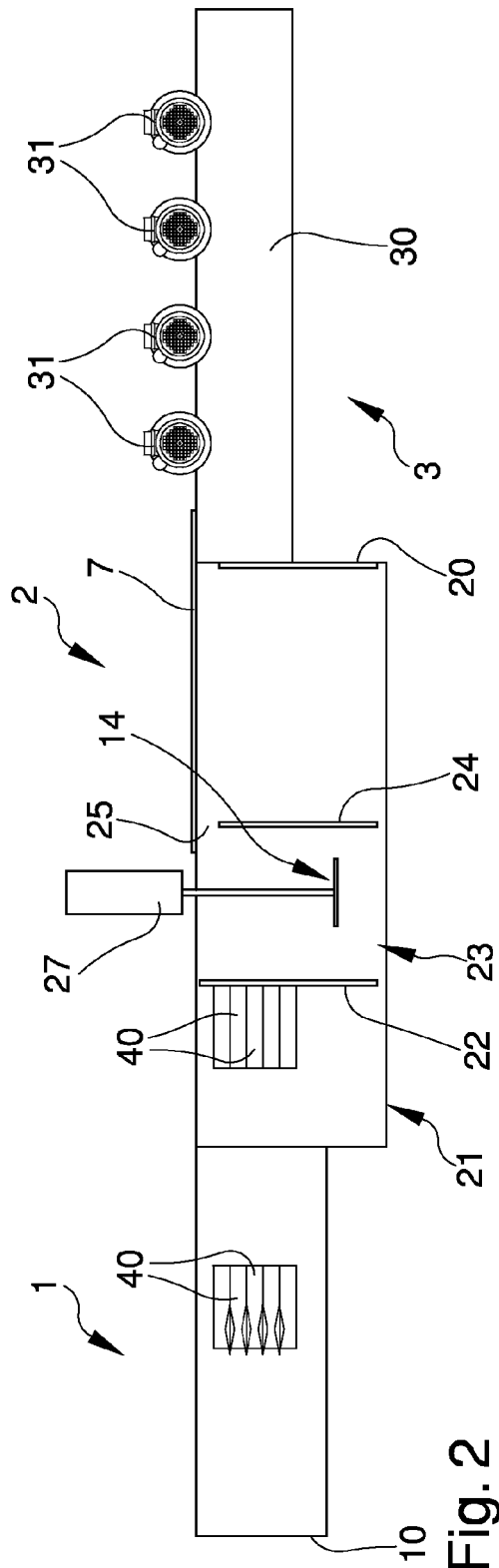


Fig. 3

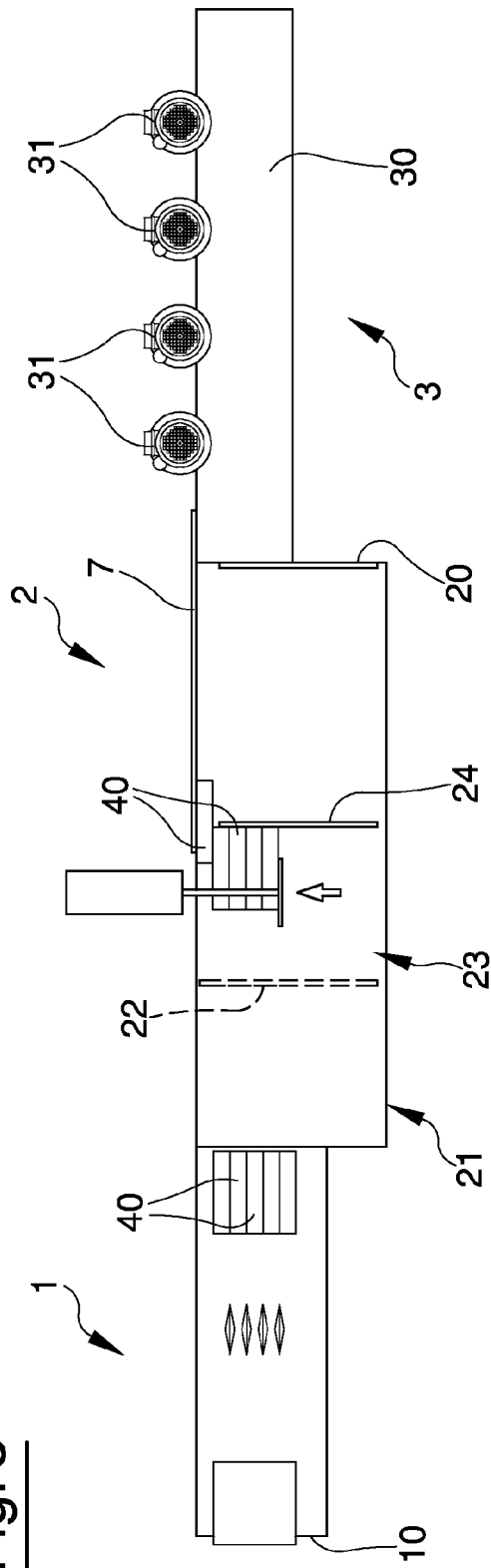
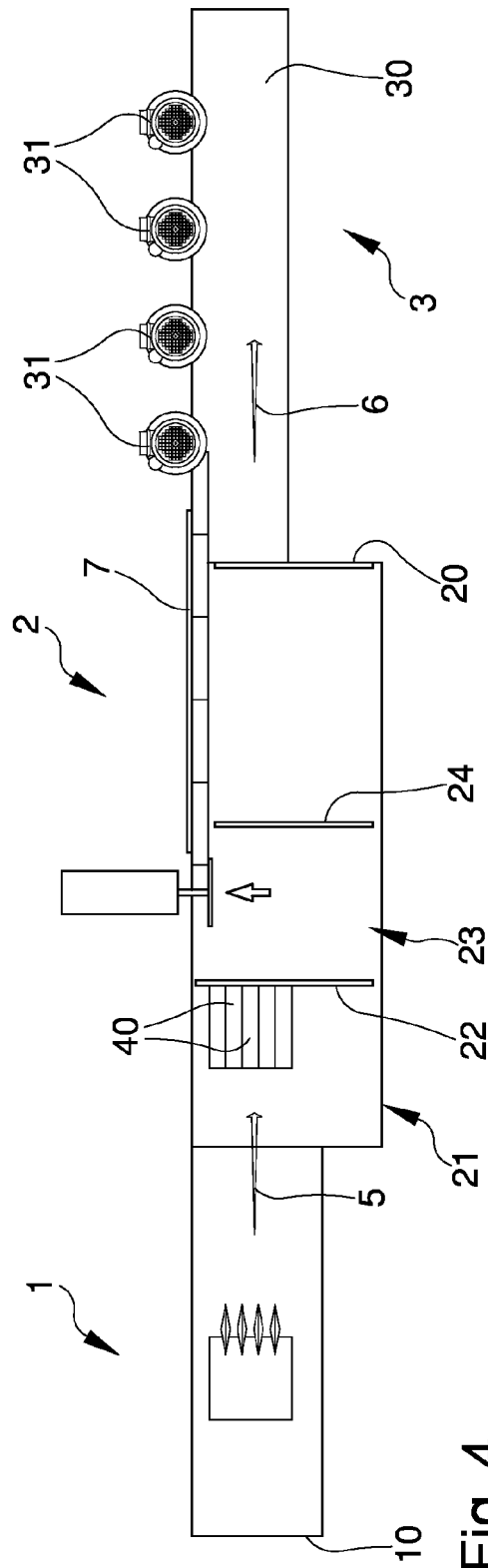


Fig. 4





EUROPEAN SEARCH REPORT

Application Number
EP 12 17 1252

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2004/244788 A1 (REGISTER SEAN [US]) 9 December 2004 (2004-12-09) * paragraph [0042]; figure 5 * -----	1	INV. B28D1/00 B28D7/00
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 October 2012	Examiner Garella, Mario
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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 12 17 1252

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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