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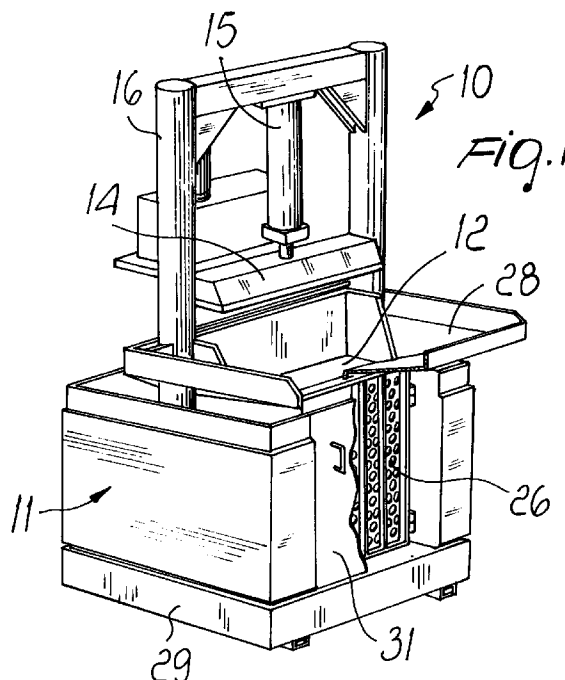
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(54) **Machine for reducing the amount of waste produced by machining**

(57) A machine for reducing the amount of waste produced by machining, comprising a press provided with a compaction chamber (13) with perforated walls (19), one (26) of which can be opened in order to discharge the compacted material.



EP 0 916 479 A1

Description

[0001] The present invention relates to a machine for reducing the amount of waste produced by machining.

[0002] A very important problem for anyone performing machining is currently constituted by the disposal of the sludge produced by said machining.

[0003] Nowadays it is in fact necessary to be equipped with an apparatus which is specifically meant to contain the costs of waste disposal.

[0004] This type of apparatus filters out the oily emulsions and mineral oils from the actual waste chips by means of a screen which is mounted on a conveyor belt above which the machining fluids are filtered.

[0005] Said screen is usually constituted by a paper roll or, in other cases, by a film made of non-woven fabric or other material having adapted characteristics, so that the cutting fluids can filter out from said waste by gravity.

[0006] Said cutting fluids, i.e., the oily emulsions and the whole mineral oils, are thus collected and conveyed into a tank which lies below said screen to be subsequently reused for subsequent machining.

[0007] The actual waste is instead retained by the mesh of the screen, which accordingly becomes clogged.

[0008] The conveyor belt, actuated appropriately, must therefore replace the clogged part of the screen with a new one, conveying the part that is clogged with residues into a collection container for subsequent disposal.

[0009] However, these residues are still highly impregnated with mineral oils and oily emulsions, to the point that disposal must comprise the treatments prescribed for special waste.

[0010] The disposal of said machining residues as special waste entails high costs, the burden of which affects the products obtained by machining.

[0011] The aim of the present invention is to solve the above drawbacks by providing a machine for reducing the amount of waste produced by machining.

[0012] In relation to this aim, a particular object of the present invention is to provide a machine which reduces the amount of waste and is simultaneously capable of recovering as completely as possible the fluids that can be reused for subsequent machinings.

[0013] Another important object of the present invention is to provide a machine for reducing the amount of waste produced by machining which allows to downgrade the waste to be disposed, so as to reduce its impact on the environment.

[0014] Another important object of the present invention is to provide a machine which by reducing the amount of waste ensures a considerable saving on the costs to be sustained for the disposal of said waste, reducing unit disposal costs.

[0015] Another important object of the present invention is to provide a machine which separates the liquid

part of the waste from the solid part, so as to reduce the weight and volume thereof.

[0016] Another object is to provide a machine for reducing the amount of waste produced by machining which allows to recover the oily emulsion to dispose it separately from the remaining waste.

[0017] Another object of the present invention is to provide a machine for reducing the amount of waste produced by machining which can be equipped in practice with per se known equipment and technologies and has a simple structure.

[0018] This aim, these objects and others which will become apparent hereinafter are achieved by a machine for reducing the amount of waste produced by machining, characterized in that it comprises a press with a compaction chamber provided with perforated walls, one of which can be opened in order to discharge the compacted material.

[0019] Further characteristics and advantages of the present invention will become apparent from the description of an embodiment thereof, illustrated by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a machine for reducing the amount of waste produced by machining, according to the invention;

Figure 2 is a sectional view, taken along a longitudinal plane, of the machine of Figure 1 during the introduction of the waste;

Figure 3 is a sectional view, taken along a longitudinal plane, of the machine of Figure 1 during waste compression;

Figure 4 is a sectional view, taken along a longitudinal plane, of the machine of Figure 1 during the extraction of the compacted material;

Figure 5 is a front view of a detail of the machine of Figure 1;

Figure 6 is a sectional view, taken along a longitudinal plane, of the detail shown in Figure 5.

[0020] With reference to the above figures, a machine for reducing the amount of waste produced by machining is generally designated by 10 and comprises a body 11 (housing) which is substantially box-like and is provided, in an upward region, with an opening 12 for accessing a compaction chamber 13 formed inside said body 11.

[0021] Said machine 10 further comprises a flat presser 14 which can slide alternatively in a longitudinal direction inside said compaction chamber 13 and is arranged, when inactive, above the body 11.

[0022] Said flat presser 14 is conveniently actuated by a piston 15, which is supported by a frame 16 is provided above the body 11 and is connected to an oleodynamic control unit actuated by a motor drive 17.

[0023] In this constructive configuration, said compaction chamber 13 has a trapezoidal plan shape, with a

bottom 18 and side walls 19 formed by the coupling of a first internal layer, a second intermediate layer and a third outer layer, designated by the reference numerals 20, 21 and 22 respectively, all of which are made of metal plate.

[0024] First uniformly distributed holes 23 are provided in said first layer 20, while said second layer 21, which is thicker than the first layer 20, is provided with second holes 24 which are conveniently larger than the first holes 23 and are also uniformly distributed.

[0025] Said third layer 22 also is thicker than said second layer 21 and has third holes 25 which are conveniently larger than the second holes 24.

[0026] Said body 11 is also provided with a door 26 which is arranged at the side wall 19 formed by the larger parallel side of the trapezoidal plan of said compaction chamber 13.

[0027] Said door 26 is hinged, at one end, to the body 11 so that it can be opened; a pin 30 prevents accidental opening of the door 26, while the housing body 11 of the machine has a detachable part 31 at said door 26.

[0028] On the bottom 18 of the compaction chamber 13 there is a removable footing 27 which also is constituted by the coupling of said first, second and third layers 20, 21 and 22 made of metal plate.

[0029] Above said body 11 there is a hopper with an inclined plane 28 for conveying the waste produced by machining toward the opening 12 of the compaction chamber 13.

[0030] In the region below the body 11 there is a tray 29 for collecting the liquid part and there is a pump, not shown in the above figures for the sake of simplicity, for emptying said tray 29.

[0031] In practice, the operation of the machine 10 for reducing the amount of waste is very simple.

[0032] It is in fact sufficient to load the hopper 28 with said waste, which is conveyed by said hopper into the compaction chamber 13.

[0033] Once the piston 15 has been actuated, the flat presser 14 enters the compaction chamber 13, compressing the waste introduced therein, causing the consequent migration of the fluid part through said first, second and third holes, designated by the reference numerals 23, 24 and 25 respectively, and its conveyance into the collecting tray 29, while the solid part is compacted at the bottom of the chamber 13.

[0034] It is then sufficient to open the part 31 of the housing 11, remove the pin 30, open the door 26 and remove the footing 27 from the compaction chamber 13 to cause the extraction of the block of compacted waste.

[0035] Such extraction is facilitated by the trapezoidal plan structure of the compaction chamber 13, and by the presence of the door 26 and of the removable footing 27.

[0036] When the flat presser 14 descends, mechanical resistance to the pressure is effectively ensured by the coupling between said first, second and third layers 20, 21 and 22 of metal plate of different thicknesses that

constitutes the side walls 19 and the door 26.

[0037] In the same manner, the passage for the cutting fluids subjected to the compression of the flat presser 14 is determined by the first, second and third holes 23, 24 and 25, which lead into the collection tray 29.

[0038] In practice it has been observed that the present invention fully achieves the intended aim and all the objects.

[0039] In particular, by using the machine 10 for reducing the amount of waste produced by machining described with the present invention it is possible to separate the liquid fraction and the solid fraction of said waste, so as to reduce the weight and volume of the waste to be disposed.

[0040] This operation correspondingly substantially reduces the noxiousness of the waste to be disposed, which can thus be sent directly to a landfill.

[0041] An important advantage achieved with the present invention is the provision of a machine by virtue of which there is a reduced waste of raw material, in view of the considerable amount of whole oil that can be recovered and returned to subsequent machining operations.

[0042] Another advantage is achieved with the machine according to the present invention in that a machine has been provided which allows, by reducing the amount of waste, to correspondingly also reduce the transportation related thereto, leading to positive effects on traffic, noise pollution and atmospheric pollution.

[0043] The present invention is susceptible of numerous modifications and variations, all of which are within the scope of the same inventive concept.

[0044] All the details may furthermore be replaced with other technically equivalent elements.

[0045] The materials used, so long as they are compatible with the contingent use, as well as the dimensions, may be any according to the requirements.

[0046] The disclosures in Italian Utility Model No. PD97U000080 from which this application claims priority are incorporated herein by reference.

[0047] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A machine for reducing the amount of waste produced by machining, characterized in that it comprises a press (10) with a compaction chamber (13) provided with perforated walls (19), one (26) of which can be opened in order to discharge the compacted material.

2. A machine according to claim 1, characterized in that said walls (19) are constituted by a plurality of layers (21, 22) of metal plate with different perforation diameters.
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3. A machine according to claim 2, characterized in that said walls (19) have different thicknesses.
4. A machine according to one or more of the preceding claims, characterized in that said compaction chamber (13) has a trapezoidal cross-section in which the wall (26) that corresponds to the longer parallel side can be opened.
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5. A machine according to one or more of the preceding claims, characterized in that it comprises a hopper with an inclined plane (28) for conveying the mass to be compacted into said compaction chamber (13).
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6. A machine according to one or more of the preceding claims, characterized in that it comprises a tray (29) that lies below said compaction chamber (13) in order to collect the liquid fraction.
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7. A machine according to claim 6, characterized in that it comprises a pump for emptying said tray (29).
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8. A machine according to one or more of the preceding claims, characterized in that said compaction chamber (13) comprises a removable lower base (27).
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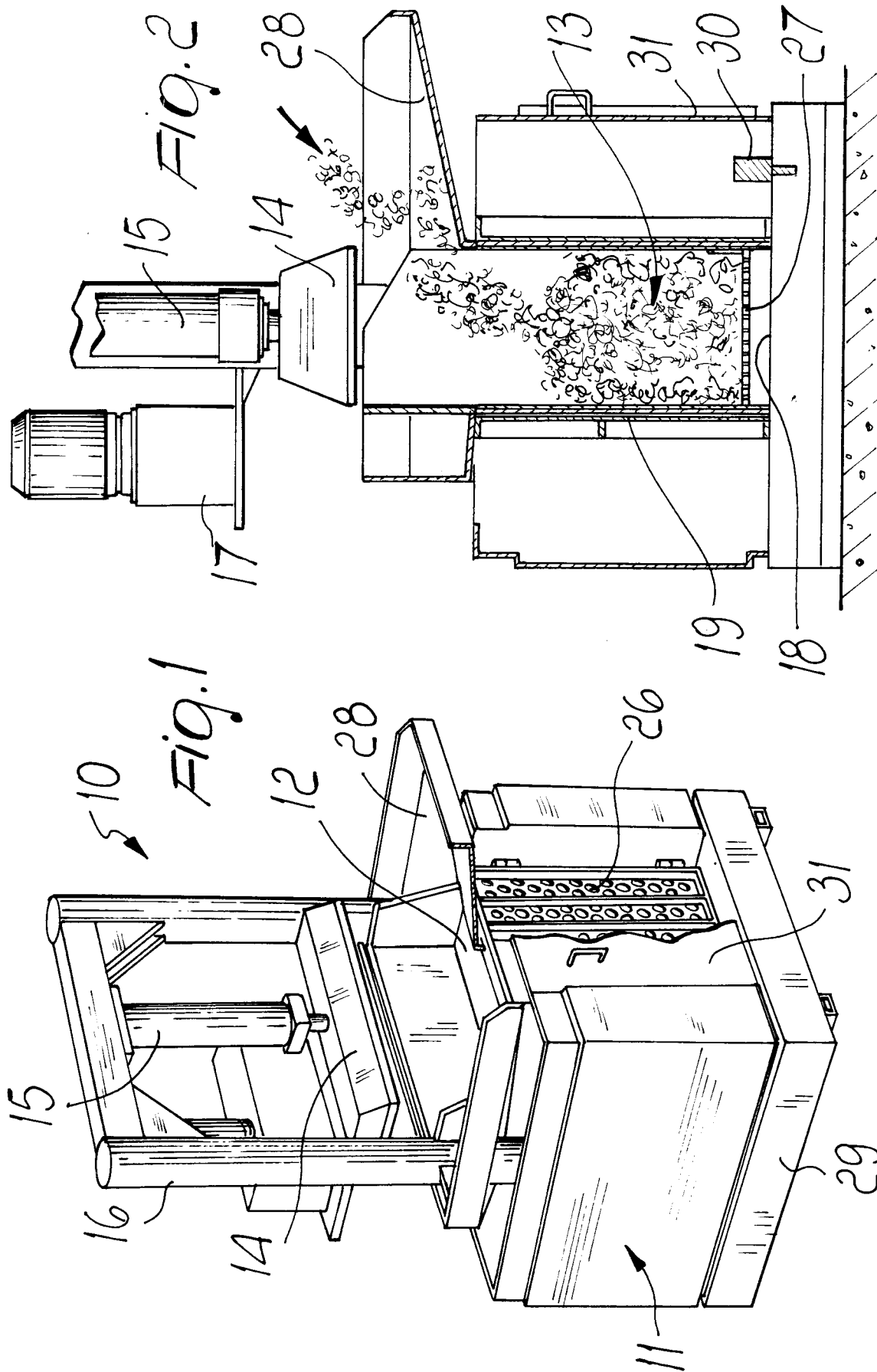
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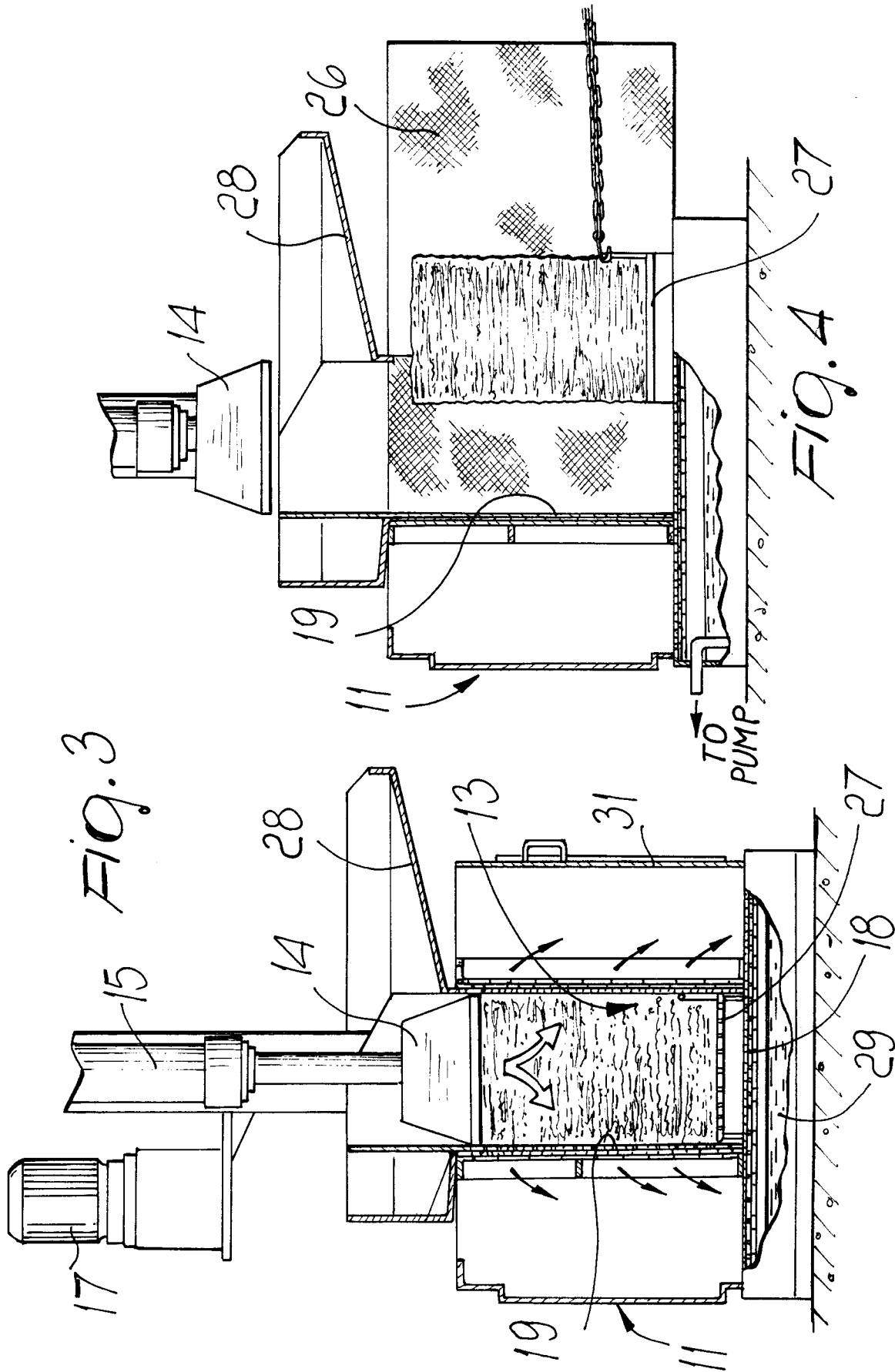
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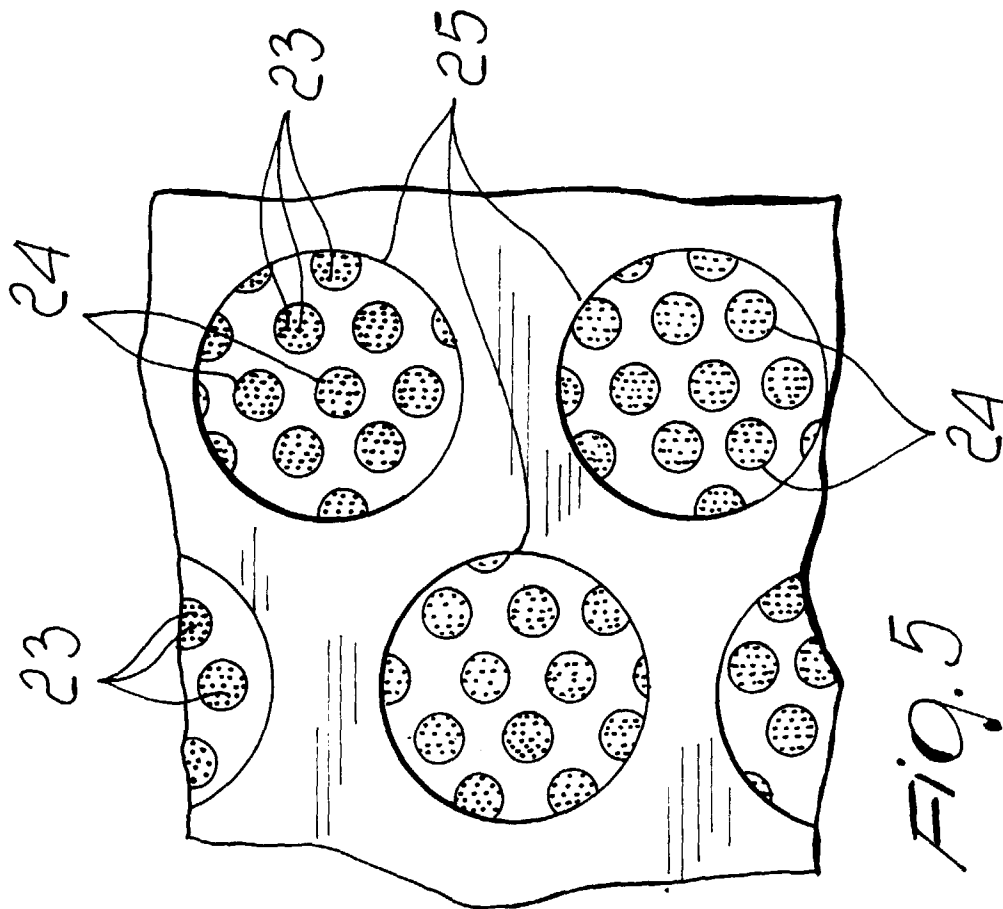
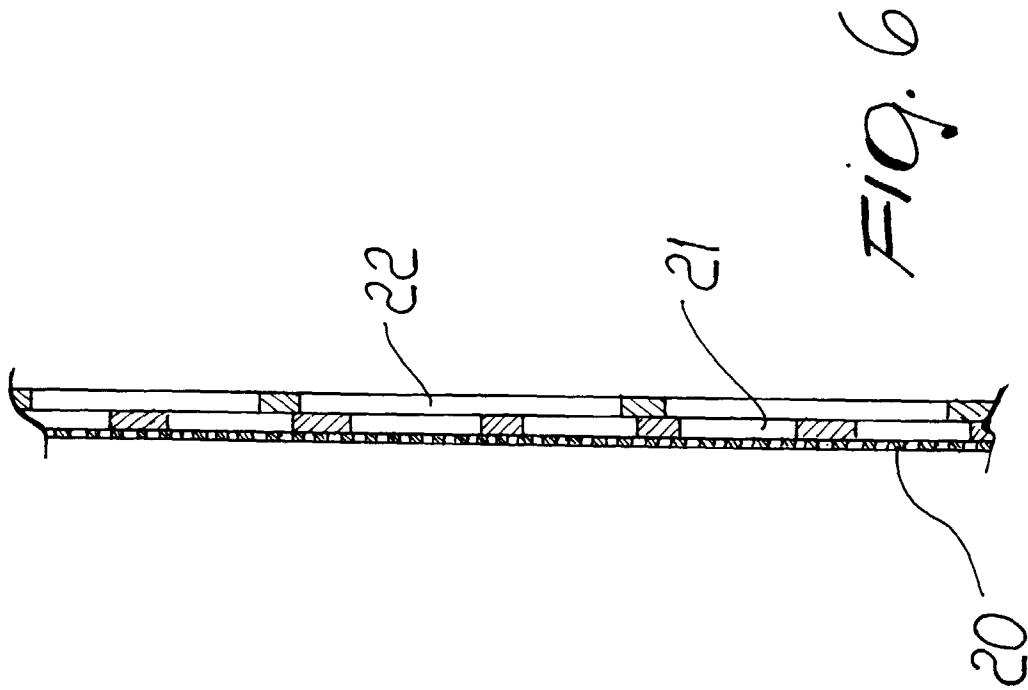
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EUROPEAN SEARCH REPORT

Application Number
EP 98 12 1133

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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 17 March 1999	Examiner Belibel, C
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 98 12 1133

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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