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(12) # EUROPEAN PATENT APPLICATION

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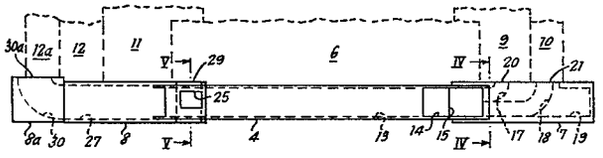
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(54) **Improvements relating to carding engines.**

(57) A carding engine having frame structures (4, 7, 8) at each side thereof between which are mounted a main carding cylinder (6) and associated takerin (9) and doffer (11). Each frame structure is of hollow construction and incorporates therein internal ducting (13 etc.) opening into the frame structure at openings (20, 29) adjacent to the region of cooperation between the takerin and main cylinder and between the main cylinder and doffer. Other openings are located in other regions of roller cooperation. The ducting opens from the upper surface of the frame structure at an opening (14) to which a vacuum extraction duct can be connected.



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IMPROVEMENTS RELATING TO CARDING ENGINES

This invention relates to carding engines.

One of the main problems in operating carding engines is efficient collection of the very large quantities of dust and waste material that are thrown from the cooperating rollers during operation. Pollution of the atmosphere in the card room by such material must be avoided as much as possible and many attempts have been made in the past to improve the efficiency of waste material collection, none with complete success. The invention seeks to provide a high efficiency waste collection system.

According to the present invention in a carding engine having frame structures at each side of the carding engine between which are rotatably mounted the main carding cylinder and associated rollers, each frame structure is of hollow construction and incorporates therein internal ducting opening into therespective frame structure adjacent to at least one region of cooperation between the main cylinder and an associated roller, and opening from the frame structure at a location in which a vacuum extraction duct can be mounted.

Use of the frame structures at each side of the card for extraction purposes leads to a number of advantages. The openings into the frame structures can be designed so that they are located in the optimum positions, usually in the immediate vicinity of the ends

of those cooperating rollers where dissipation of dust and waste material occurs, so that collection of this material is virtually immediate and occurs at each side of the card. Use of ducting within the frame structures also significantly enhances the appearance of the carding engine and reduces space requirements. The ducting may be defined wholly or partially by the internal faces of elements forming the hollow frame structures, or by additional dividing means within those structures.

Preferably the opening from each frame structure is through an upper surface of the frame structure, the opening being substantially bisected by the longitudinal centre line of the ducting within the frame structure. Thus, the ducting and the vacuum extraction duct connected to the opening from the frame structure can be looked upon as being substantially coplanar, with correspondingly high efficiency of air flow through the ducting and into the extraction duct. The extraction duct may also effect extraction from the flat strips region and from the internal area of the flats assembly. Again, this leads to high efficiency and elegance of design. Extraction can be either to high level or to an underfloor extraction system.

Although advantage can be gained by extraction into ducting within each frame structure from only one region of cooperation between the cylinder and a roller it is preferred that ducting opens into each frame structure through an inner face thereof adjacent to the regions of cooperation between the main cylinder and a doffer roller, and between the main carding cylinder and a takerin roller. It is also advantageous if ducting opens into the inner faces of each frame structure adjacent to the regions of cooperation between a feed roller and the takerin roller and between a stripper roll and a high speed stripping roller. However, extraction from either of the two latter regions could alternatively be by way of ducts

separate from the frame structure, both mounted thereon and desirably communicating with the main vacuum extraction duct. Obviously extraction can also be effected from other regionsinto the frame structure if required. When extraction into the frame structure is effected from all the aforesaid locations then conveniently the opening from the frame structure may be divided by a baffle extending transversely of the frame structure, with ducting extending in opposite longitudinal directions within the frame structure from the baffle. This facilitates integration of the vacuum extraction duct with the frame structure and by using a suitably shaped baffle smooth air flow into the extraction duct from each side of the baffle can readily be achieved.

The invention can readily be applied to many different arrangements of frame structure, and may, for example be incorporated into a carding engine wherein the frame structures comprise a single frame element at each side of the carding engine. However, it is also applicable to carding engines wherein each frame structure comprises a plurality of longitudinally aligned and connected frame sections, each section rotatably supporting one or more of the carding cylinder and associated rollers. In this case each frame section will incorporate ducting, the ducting in one frame section connecting with the ducting in an adjacent frame section.

In order that the invention may be better understood a particular embodiment of carding engine in accordance therewith will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:-

Figures 1 and 2 combine to form a schematic side elevation of a carding engine;

Figure 3 is a schematic plan view of the frame member on one side of the carding engine;

Figure 4 is a cross-section on the line IV-IV of Figure 3; and

Figure 5 is a cross-section on the line V-V.

The drawings show the frame structure at only one side of a carding engine, it being understood that the structure at the other side of the carding engine is similar and of opposite hand.

The carding engine includes a floor-engaging sub-frame, shown generally as 1, that includes uprights, one at each corner of the sub-frame. Each upright terminates in an upper post 2 supporting a pivot bearing on which is supported by bearing pads 3 a first frame section 4. The frame section 4 supports a bearing assembly schematically indicated as 5 for a main carding cylinder, the general location of which is indicated at 6 in Figure 3. The cylinder extends between the first frame sections at the two sides of the carding engine and ties those frame sections together. It will be seen that the frame section 4 is allowed a degree of universal swivelling movement relative to the sub-frame, so freeing the frame sections from stress transmission.

At the takerin end of the first frame section 4 there is provided a second frame section 7 suitably mounted on the first frame section, and at the doffer end of the first frame section there is provided a third frame section 8, again suitably mounted on the first frame section. The second frame section 7 is provided with bearing means for a takerin and for a feed roller, the positions of these elements being indicated at 9 and 10 of Figure 3. The third frame section carries bearings for a doffer, the location of which is shown at 11 in Figure 3. The rollers extend between the respective frame sections at the two sides of the card. Bolted to the third frame section is a frame 8a for a CSM or other take-off unit, which includes a stripper and high speed stripping roller, the locations of which are shown at 12 and 12a respectively.

Each of the frame sections is of substantially rectangular cross-section and of hollow construction.

The first frame section has, in its upper part, internal ducting 13 extending longitudinally of the frame section and opening from the upper surface of the frame section at an opening 14. The opening is divided by a baffle 15 which is suitably curved to provide smooth flow passages to the opening 14 both from the main length of ducting 13 and from a further length of ducting 16 extending in the opposite direction to the ducting 13. The ducting 16 connects with ducting in the upper part of the second frame section 7. At the entry to that frame section the ducting is divided into three separate ducts 17 to 19 each communicating with the ducting 16. Ducting 17 opens into the frame section 7 at an opening 20 adjacent to the region of cooperation between the takerin 9 and the main carding cylinder 6. Ducting 18 opens into the frame section 7 at an opening 21 adjacent to the region of cooperation between the feed roller 10 and the takerin 9. Ducting 19 extends to a riser section 22 which communicates with a plenum chamber 23 to which the undercard cleaning system of the carding engine is connected.

Ducting 13 at the end opposite to the opening 14 is divided by a horizontal baffle 24 into an upper part which opens through the upper surface of frame section 4 through an opening 25, and a lower part 26 which opens from the end of the first frame section 4. The third frame section 8 has internal ducting 27 which connects with the part 26 and also has ducting 28 which overlies and communicates with the opening 25 in the frame section 4. Ducting 28 opens at 29 into the region of cooperation between the main carding cylinder and the doffer, while ducting 27 communicates with ducting 30 in the take-off unit and opens at 30a into the region of cooperation between the stripper and the high speed stripping roller.

At each side of the carding engine the upper part of the end of the cylinder is covered by a side guard 31 which is mounted on the upper surfaces of the centre frame sections 4. Adjacent to the side guard at each side of the

carding engine is a main outlet duct 32 secured by anchoring means 32a to the bend of the carding engine. The lower end of the duct 32 is designed to be received on the upper surface of the frame section 4 at a location overlying the opening 14, with the baffle 15 extending upwardly into the duct 32. It will be seen from the drawings that the longitudinal centre of the opening 14 lies along the longitudinal axis of the ducting within the framework sections and the vertical plane through this longitudinal centre line is also the vertical centre plane of the main outlet duct 32. Thus, for the majority of its length the whole of the ducting is substantially coplanar with the extraction duct, so resulting in highly efficient air flow. At one side of the carding engine a duct 33 leads from the flat strips removal plenum 34, and is secured by anchoring means 35 to the bend of the carding engine. The ducts 32 and 35 terminate in a mounting plate 36 having an upstanding open-top box section 36 onto which an exhaust duct connected to a source of vacuum may be connected. The inner side of the main outlet duct 32 may have openings for extraction into that duct from the internal area of the flats assembly which is also covered by a hood (not shown) extending across the width of the card.

Air flow in the ducts occurs as the result of the vacuum applied to the exhaust duct, which has the effect of applying suction at all the openings 20, 21, 29 and 30 and to the plenum chambers 23 and 24. The openings 20, 21, 29 and 30 each lie directly adjacent to an area of working relationship between two rollers of the carding engine where dust and waste is dissipated from those rollers, similar openings being present at each side of the card. Collection of such material is thus immediate and direct and the material is efficiently conveyed through the internal ducting in the frame sections and then through the extraction duct 32 to a suitable extraction system. At the same time, dust and waste is taken from the flats strips region by way of the duct 35, from within the

internal area of the flats and also from the under-card cleaning system via the plenum 23 and ducting 19.

It will be understood that sealing may be applied between the confronting ductings on frame sections 4 and 7, between the confronting ductings on frame sections 4 and 8, and between the extraction ducts 32 and the upper surface of the frame section 4. However there is no need to maintain particularly efficient seals at these points as the pressure within the hood and within the ductings is below ambient pressure. Any lack of sealing efficiency will thus merely result in additional ambient air being sucked into the cleaning system and will not result in waste being dissipated into the atmosphere.

The foregoing description has illustrated only one particular form of carding engine to which the invention may be applied, and it will be appreciated that the concept of internal extraction ducting can be embodied in other frame designs. In all cases the ducting is designed within the frame to give the most efficient collection from the waste-producing regions, and the most efficient transport of that waste through the ducting to an exhaust duct. It will also be understood that the principle is applicable to dust extraction from duo-cards, when additional inlets into the ducting within the frame will be provided in the centre transfer section of the carding engine.

CLAIMS:

1. A carding engine having frame structures at each side thereof, between which are mounted a main carding cylinder and associated rollers, in which each frame structure is of hollow construction and incorporates therein internal ducting opening into the respective frame structure adjacent to at least one region of cooperation between the main cylinder and an associated roller, and opening from the frame structure at a location in which a vacuum extraction duct can be mounted.

2. A carding engine according to claim 1 in which the opening from each frame structure is through an upper surface of the frame structure, the opening being substantially bisected by the longitudinal centre line of the ducting within the frame structure.

3. A carding engine according to claim 1 or claim 2 in which ducting opens into each frame structure through an inner face thereof adjacent to the regions of cooperation between the main cylinder and a doffer roller and between the main cylinder and a takerin roller.

4. A carding engine according to claim 3 in which ducting also opens into each frame structure through an inner face thereof adjacent to the regions of cooperation between a feed roll/roller and the takerin roller and between a stripper roll/roller and a high speed stripping roller.

5. A carding engine according to any one of the preceding claims in which the opening from each frame structure is divided by a baffle extending transversely of the frame structure, and ducting extends in opposite longitudinal directions within the frame structure from the baffle.

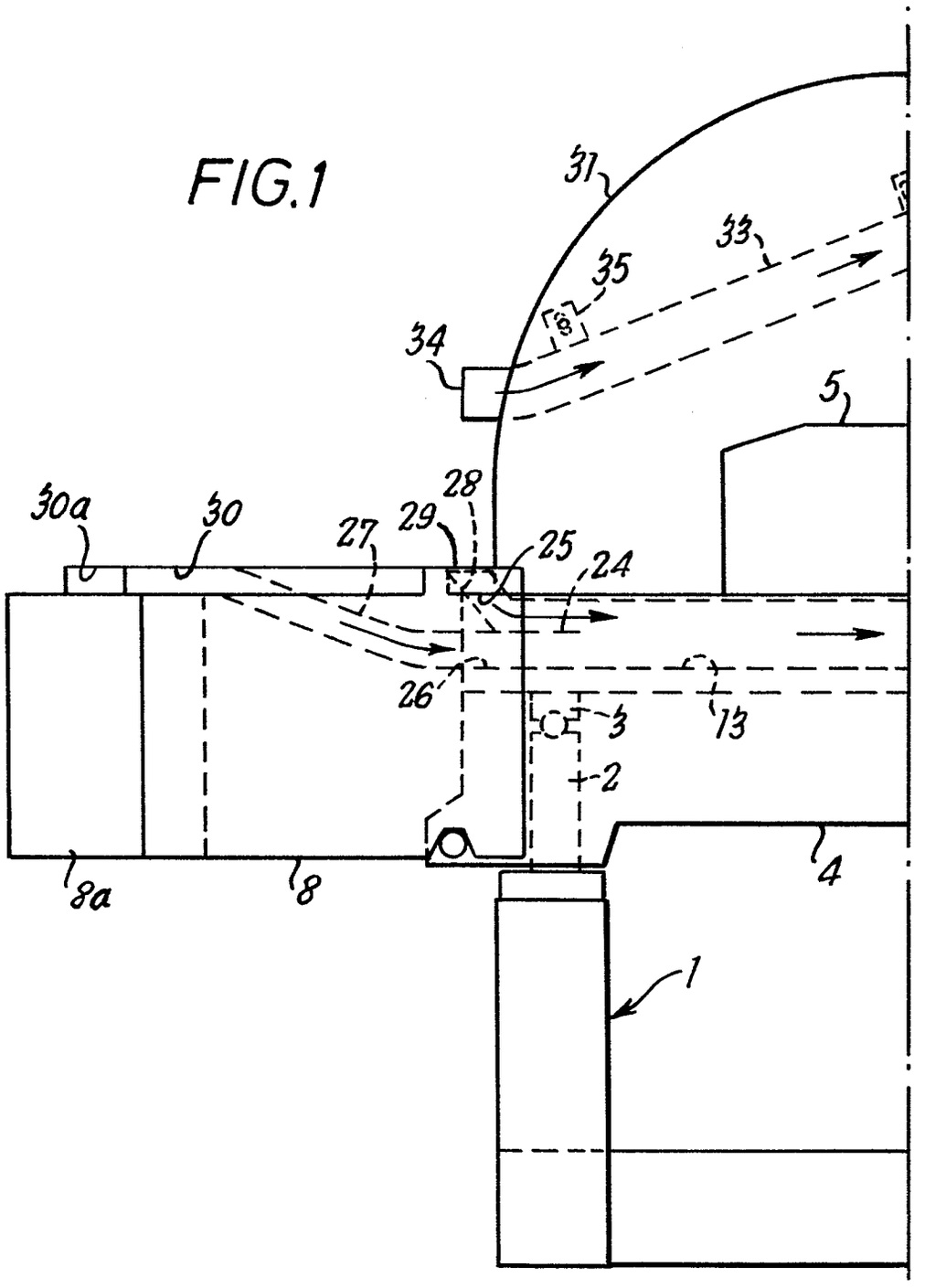
6. A carding engine according to any one of the preceding claims in which the frame structure comprises a plurality of longitudinally aligned and connected frame sections, each frame section rotatably supporting at least one of the main carding cylinder and associated rollers,

and each frame section incorporating ducting, the ducting in one frame section connecting with the ducting in an adjacent frame section.

7. A carding engine according to claim 6 in which ducting in one frame section is longitudinally aligned with ducting in an adjacent frame section in the region of connection between the ductings.

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FIG.1



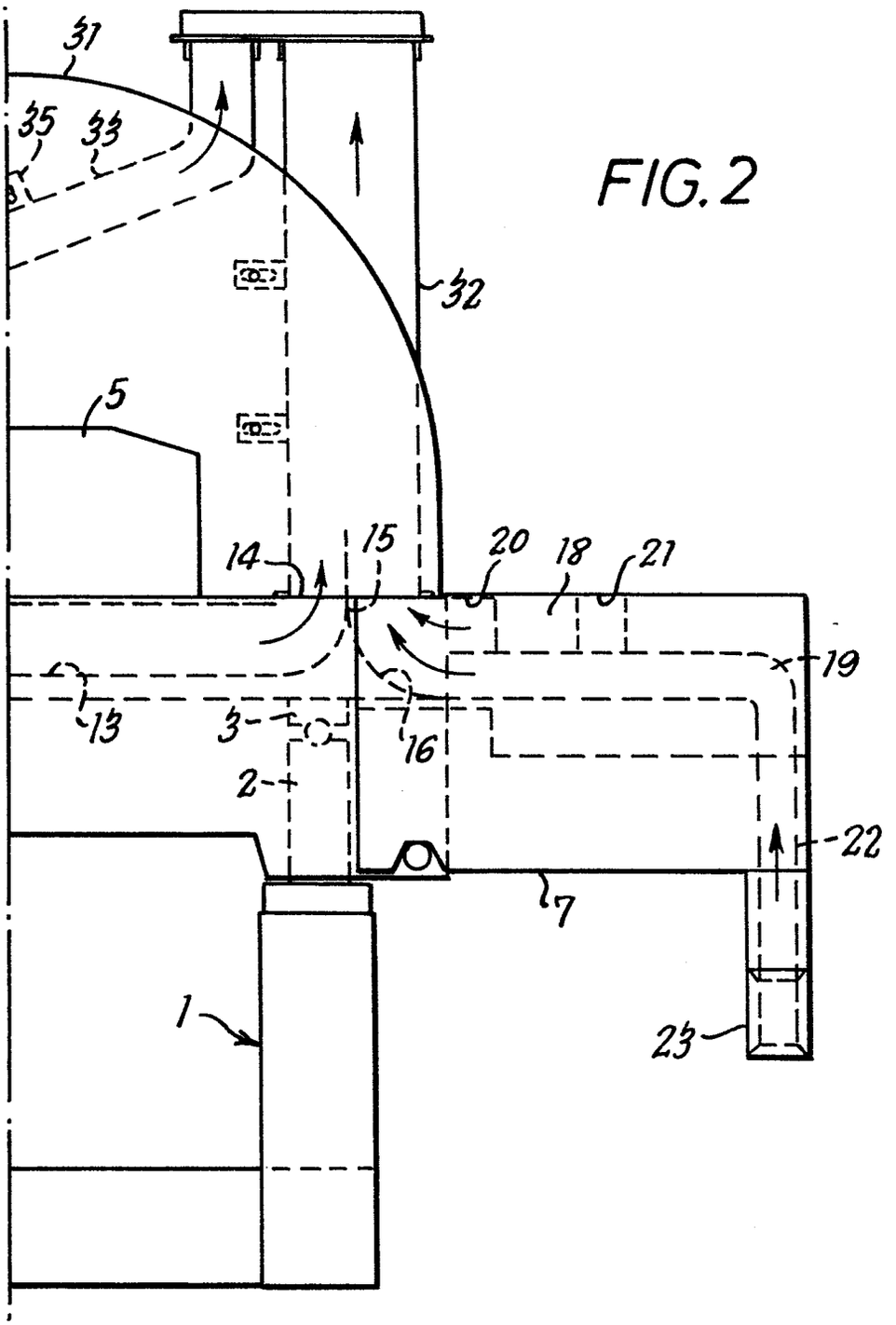


FIG. 2

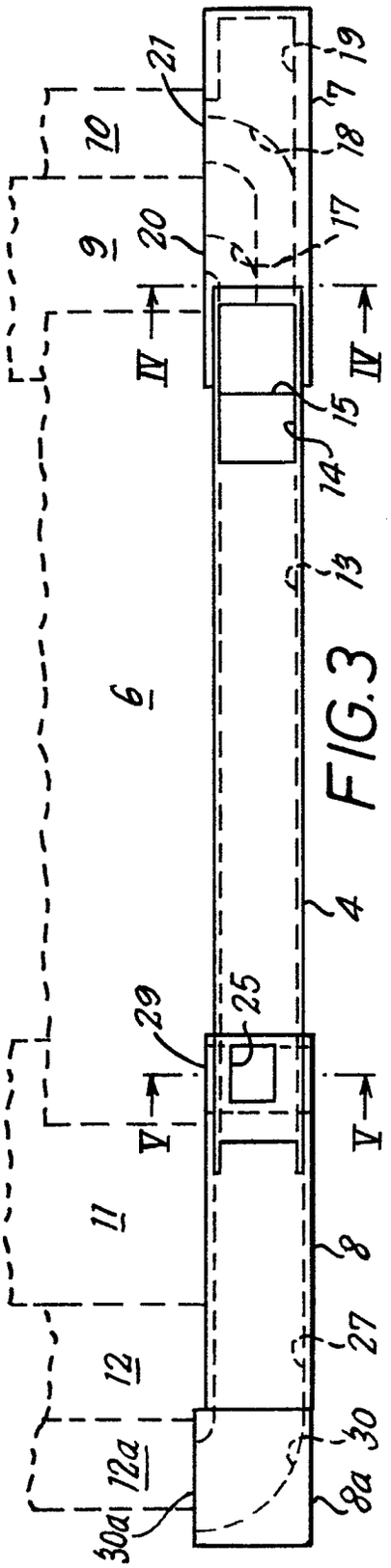


FIG. 3

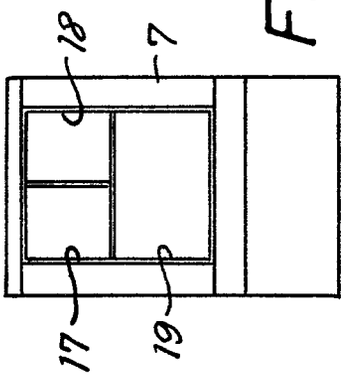


FIG. 4

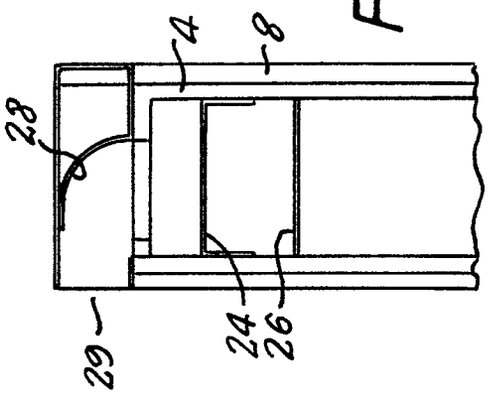


FIG. 5

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EUROPEAN SEARCH REPORT

0097020
Application number

EP 83 30 3305

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. ³)
A	FR-A-2 300 828 (ETABLISSEMENTS DEVAUZE) * Pages 4-5; figures 1-3 *	1	D 01 G 15/32 D 01 G 15/76
A	DE-A-2 752 691 (ENVIROTECH CORP.) * Pages 7-8; figures 1-3 *	1	
A	US-A-4 091 507 (H. SUTTER)		

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

D 01 G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	04-10-1983	MUNZER E.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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