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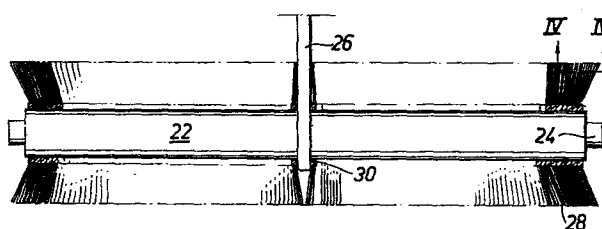
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㉖ **Device for sweepers or similar appliances fitted with brooms.**

㉗ Device for sweepers or the like fitted with brooms. The broom comprises resilient, bendable bristles (20) with different bending resistance in different directions. The bristles are so mounted in the sweeper that when they are brought into contact with the surface to be cleaned they are bent essentially in the direction of the lowest bending resistance and away from the desired direction of sweep. When the bristles leave the surface they spring back into the desired direction of sweep.



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Device for sweepers or similar appliances fitted with brooms

The present invention relates to a device for sweepers or similar appliances fitted with brooms. In the cleaning of streets or large floors, for example, the use of various types of sweepers fitted with brooms is already familiar. In these, the sweeping operation may, for example, be achieved by means of a broom roller which sweeps the refuse to one side, or with the aid of a refuse collector in which the refuse is also conveyed into the container by an elevator fitted with brooms.

In cleaning operations by means of a broom roller designed to propel the refuse to one side of the roller or the other, the roller itself must be adjustably mounted in a suspension device such that it can be set at an angle to the direction of travel and sweep the refuse in the desired direction. The adjusting device used to set the roller in a diagonal direction, normally at an angle of up to  $30^{\circ}$  towards either side, makes the design and operation of the sweeper more complicated and expensive.

In refuse collecting machines, lateral brooms are normally provided to sweep the refuse into a strip under the centre of the machine, which strip is then conveyed into a container located above the strip by means of an elevating device fitted with brooms. A common disadvantage of such machines is that the elevator and brooms fitted thereto tend to drop refuse beside the elevator brooms and leave two lesser strips of refuse on each side of the machine. In consequence of this the refuse collecting machine or sweeper must often be driven at least twice over the surface to be cleaned if all the refuse is to be efficiently removed.

The chief objective of the invention is to eliminate the disadvantages of the refuse sweeping machine provided with brooms, as described above, and to achieve a simple, cheap device whereby the refuse can be steered in the desired direction without the need for complicated suspension or adjusting devices.

This is achieved in that the invention provides for the broom of the sweeper to comprise resilient, bendable bristles with different moments of resistance depending on direction, which bristles are so mounted in the sweeper that when they are brought into contact with the surface to be cleaned they are bent essentially in the direction of the lowest moment of resistance and away from the desired direction of sweep and, when they lose contact with the surface, spring back in the desired direction of sweep. The bristles, when they spring back into their original position, will therefore propel the refuse in the desired direction; and if a number of sweeping devices or brooms so designed are mounted on a broom roller such that they sweep in the same direction, the refuse will be continually moved to one side of the broom roller without the need for the latter to be set diagonally to the direction of travel.

In a preferred embodiment of the invention the device described above is achieved in that the broom roller comprises a number of conical broom rings set beside each other, the bristles of which are of asymmetrical section, e.g. of oval section, and are so set in the broom rings that their lowest moment of resistance lies chiefly in the direction of the axis of the broom roller.

In fact, the use of conical brooms such as these on broom rollers is already known, although they have hitherto only been set so as to extend beyond the bearings of the broom roller shaft, or, if the latter also comprises central bearings, to span the supports at the middle of the shaft as well, the purpose being to ensure that the broom extends right to the end of the shaft and, where applicable, does not leave a gap at the centre of the roller.

However, the surprising effect achieved by the invention, i.e. that a number of such broom rings set in the manner described above are able to sweep the refuse in a given direction as described, cannot be achieved by the use of conical broom rings of conventional type; and neither, indeed, has this been sought after.

Further advantages and characteristics of the invention will be apparent from the claims and from the following detailed descriptions of a number

of embodiments of the sweeper considered in connection with the accompanying drawings. Figure 1 shows a perspective of the elevator of a sweeping device, the elevator being provided with brooms and having lateral brooms designed according to the terms of the invention. Figure 2 shows a modified version of the embodiment of Figure 1. Figure 3 shows a section along the line designated III-III in Figure 1. Figure 4 shows a section along the line IV-IV in Figures 3 and 5. Figure 5 shows a schematic representation of a front view of a broom roller designed as per the invention. Figure 6 shows a modified version of the broom roller of Figure 5. Figure 7 shows a device for adjusting the broom of a broom roller.

The illustration of Figure 1 shows an elevator device for refuse collecting machines, which may, for example, be of the type described in the Swedish patent application as published for opposition no. 7311985, which elevator comprises an endless belt 10 running round two rollers 12, 14, of which at least one is powered. The elevator is provided with brooms 16 in the normal manner for collecting the refuse from the surface which is to be cleaned. As described in the introductory paragraphs, a common disadvantage of such elevator devices is that the brooms 16 "drop" refuse along their edges such that two lesser strips of refuse may be formed behind the machine in which the elevator is mounted.

The present invention hence provides for the elevator to be provided with lateral brooms 18 comprising bristles 20 having a lower moment of resistance across the longitudinal axis of the elevator. This can be achieved, as exemplified in Figure 4, in that the bristles 20 are of asymmetrical section, e.g. are oval. Clearly, the section of the bristles may be other than that illustrated in the drawing, and the different moments of resistance in different directions may also be achieved in that the bristles are made up of composite materials having different individual properties, or by some other suitable means. If the lower moment of resistance which is a feature of the bristles is to be exploited for sweeping the refuse in the desired direction, the bristles themselves must be arranged such that they are bent away from the desired direction of sweep when the broom is applied to the surface to be

cleaned, whereupon they will spring back in the desired direction of sweep when they leave the surface and will propel or flick the refuse in the said direction. This is achieved, as illustrated in Figure 3, in that the lateral brooms 18 are set at an angle relative to the elevator brooms 16 and the surface against which the sweeping device is brought to bear. The bristles 20 are thereby given a tendency to bend outwards, i.e. to the right in Figure 3, when they are brought to bear against the surface; this takes place from one end of the broom 18 to the other, the broom moving in a circular arc, and when the bristles 20 leave the surface they spring back towards the left as seen in Figure 3 and thereby propel the refuse in towards the front of the elevator brooms 16, which then convey the refuse into the container (not illustrated here). The lateral brooms 18 illustrated in Figure 1 may be mounted beside every elevator broom, as shown, or beside a few only; or they may be mounted between the elevator brooms 16 or in some other arbitrary position relative to these, provided the operating conditions indicated above are thereby fulfilled.

In the embodiment of Figure 2, the lateral brooms 18a, besides being set at an angle relative to the elevator brooms 16 in the manner illustrated in Figure 3, are also set at an angle relative to the longitudinal axis or direction of travel of the elevator belt 10. The sweeping action performed by the lateral brooms 18a will therefore, in Figure 2, be made up of both the lateral action produced by the vertical inclination of the brooms 18a and the slight forward action brought about by the brooms' 18a being set at an angle to the direction of travel of the belt 10.

In the embodiment illustrated in Figure 5, a broom roller comprises a shaft 22 designed to be mounted in a sweeper by means both of journals 24 at each end of the roller and by a central bearing 26. In addition, the roller comprises a number of broom rings 28 which, at the ends of the roller, are conically mounted and whose bristles have a lower moment of resistance in the direction of the axis of the shaft 22 of the broom roller. This is achieved, for example, as in the embodiment described above, in that the bristles 20 are of oval section as illustrated in the section of Figure 4. When the roller is brought to bear against the surface to be swept, the bristles 20 of the conical broom rings 28 will

be bent outwards, i.e. towards the right at the right-hand end of the roller illustrated in Figure 5 and towards the left at the left-hand end. When the bristles 20 leave the surface and spring back into position, the refuse in front of the roller will be propelled inwards towards the centre of the roller. Clearly, if the broom rings 28 are conically mounted in the manner illustrated in the Figure, the individual items making up the refuse will be continuously propelled or swept from each end of the roller in towards its centre. If it is desired merely to prevent the refuse from escaping from the ends of the broom roller, it is possible, as illustrated by the embodiment of Figure 5, to arrange the broom rings 28 such that they become decreasingly conical towards the centre of the roller, those closest to the centre being mounted in a plane. Conical broom rings 30 may, however, be provided beside the central bearing 26 for the purpose of spanning the gap in the brooms of the roller that would otherwise occur as a result of the said bearing's 26 space requirements. Naturally, if so desired, a number of such conical broom rings 30, with their bristles arranged as illustrated in Figure 4, may be provided if a sweeping motion is desired to propel the refuse axially away from the central bearing 26.

The broom roller illustrated in Figure 6, for which the same reference numbers are used as for the parts it shares in common with the roller illustrated in Figure 5, comprises two additional broom roller parts or segments having conical broom rings 28 mounted in the manner described above, which broom rings propel the refuse towards the centre of the broom roller and a central broom roller part or segment having broom rings mounted in a plane 32 and propelling the refuse in the direction of travel of the sweeping machine in which the roller is mounted.

Mention has already been made of the necessity for conventional broom roller types to make provision for some sort of diagonal adjustment, i.e. it must be possible for the broom roller to be set at an angle relative to the driving machinery so as to enable the refuse to be swept to the right or left of the machine as desired. In the embodiment of the invention illustrated in Figure 7, the broom roller comprises an adjusting device enabling refuse to be swept to the left, straight ahead

or to the right of the sweeper without having to set the roller at an angle relative to the driving machine. This is achieved, as illustrated schematically in Figure 7, in that the broom roller comprises plane broom rings 34, the bristles 20 of which are mounted as described previously and illustrated in Figure 4, but which can be made to incline towards the central point as shown by means of an adjusting device. This adjusting device comprises rods or bands 36 provided with holes for the bristles 20, which rods 36 are moveable in the direction of the axis of the broom roller, as indicated by the arrow 38, by means of an adjusting device 40 fitted inside the hollow shaft 42 of the broom roller. When the adjusting device 40, which is linked to the rods 36 by a crossbar 44 protruding through extended openings or slots in the shaft 42, is moved to the left or right as illustrated in Figure 7, the bristles 20 will be inclined in either of these directions in relation to the broom ring 34 fixed to the shaft 42 and will therefore assume a conical aspect corresponding to the broom rings 28 illustrated in Figures 5 and 6. By this means the broom roller can be caused to sweep more or less vigorously in any direction required depending on the degree of conical adjustment of the bristles; and, moreover, the roller, in the central position illustrated, can be used for sweeping in its direction of travel.

Clearly, the embodiments illustrated and described above are simply examples of ways in which the invention may be realized, and the invention may be modified and varied within the framework of the following claims. Thus, although the invention has here been described in connection with powered sweeping appliances, it is clear that it may also be applied to other types of sweeping devices in which it is possible to arrange the bristles in the manner indicated.

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C L A I M S

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1. Device for sweepers or similar appliances fitted with brooms, *characterized* in that the broom comprises resilient, bendable bristles with different moments of resistance depending on direction, which bristles are so mounted in the sweeper that when they are brought into contact with the surface to be cleaned they are bent essentially in the direction of the lowest moment of resistance and away from the desired direction of sweep and, when they lose contact with the surface, spring back into the desired direction of sweep.

2. Device of claim 1, *characterized* in that the bristles, in order to provide different moments of resistance, are of asymmetrical section.

3. Device of claim 2, *characterized* in that the bristles are of oval section.

4. Device of any of claims 1-3, *characterized* in that the bristles are so arranged in the sweeper that they strike the surface at an inclination relative to the vertical and in the direction of the lowest moment of resistance.

5. Device of any of claims 1-4, particularly as applied to broom elevators in refuse collecting devices, *characterized* in that lateral brooms are mounted on the elevator and set at an angle relative to the elevator brooms and have bristles having their lowest moment of resistance essentially across the longitudinal axis of the elevator.

6. Device of any of claims 1-4, particularly as applied to broom rollers comprising broom rings, *characterized* in that a number of broom rings are conically mounted and provided with bristles having their lowest moment of resistance in the direction of the axis of the shaft of the broom roller.

7. Device of claim 6, *characterized* in that broom rings of varying conical aspect are mounted along the broom roller.

8. Device of either of claims 6 or 7, *characterized* in that the roller comprises broom rings mounted in a plane and that an adjusting device can be brought to bear on the bristles such that these can be given a degree of conical adjustment as desired or be inclined in a direction along the axis of the broom roller.



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Fig. 1

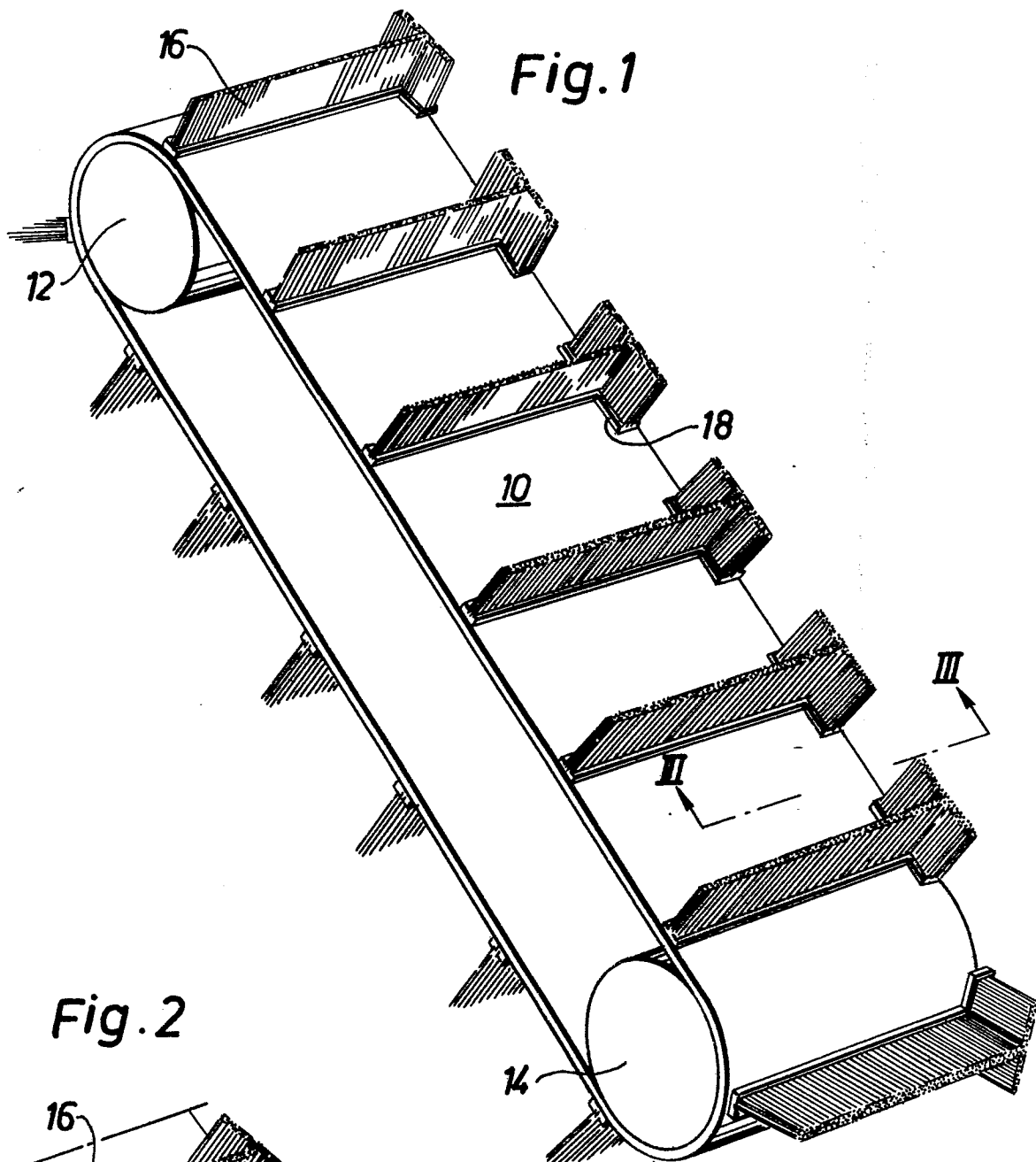


Fig. 2

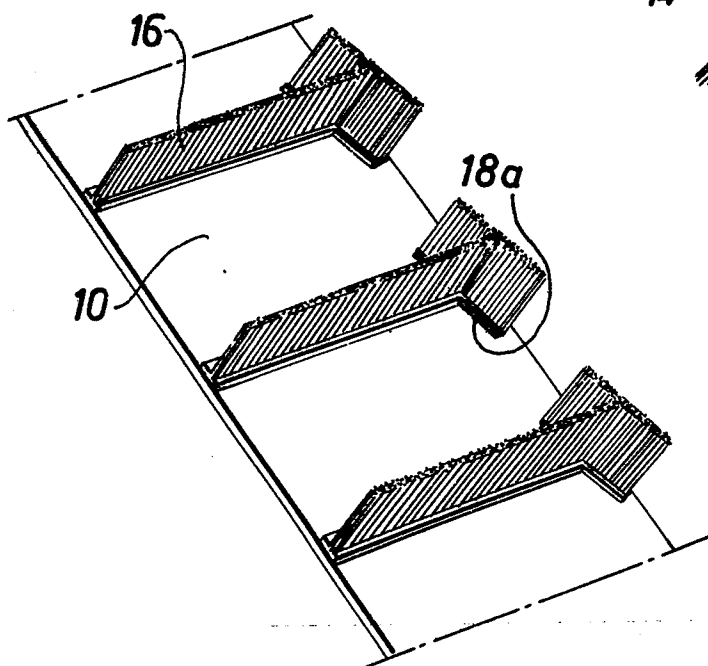


Fig. 3

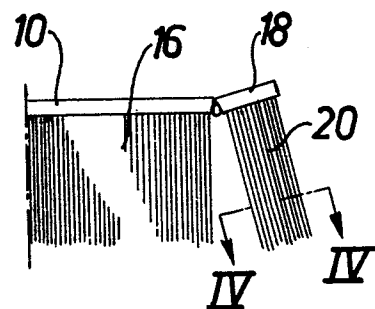


Fig. 4

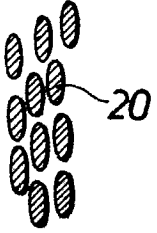


Fig. 5

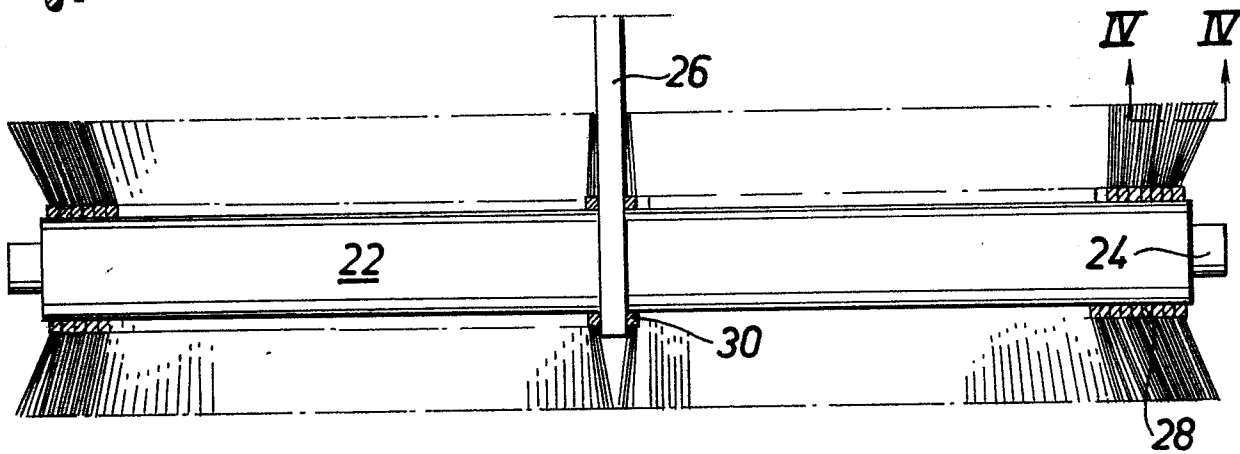


Fig. 6

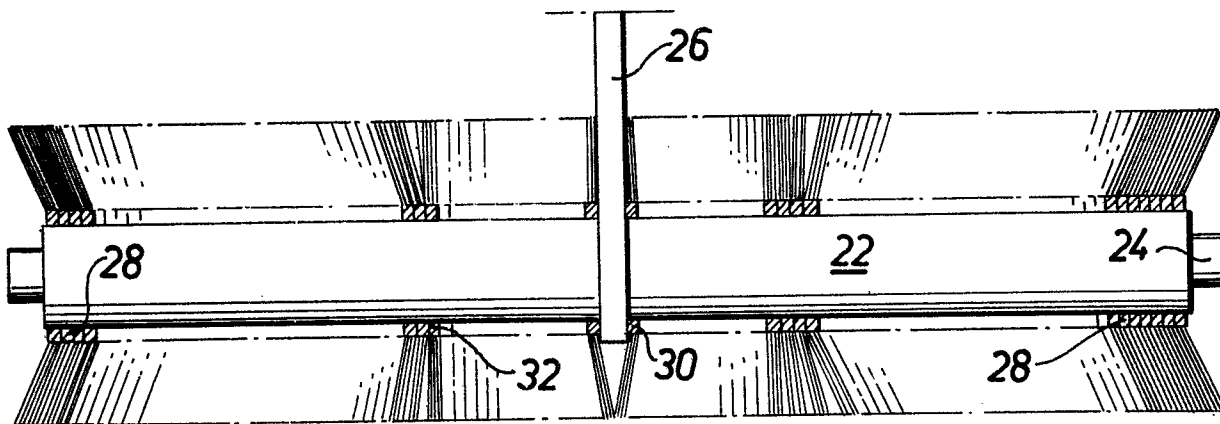
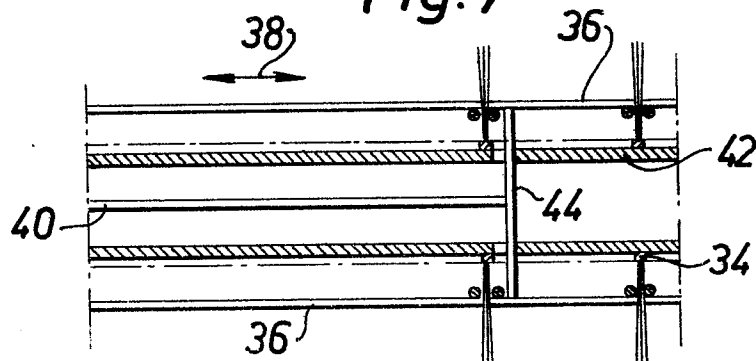


Fig. 7





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# EUROPEAN SEARCH REPORT

0072360

Application number

EP 82 85 0143

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)
Y	FR-A-2 303 901 (SOCIETE OUEST-VENDEE BALAIS S.A.) *Pages 1-2; claims 1,6; figure*	1	A 46 B 9/02 A 46 D 1/00 A 46 B 9/10 A 46 B 5/00 A 46 B 5/06
Y	US-A-3 121 040 (SHAW, G. et al.) *Columns 1,2; figures 1,5,6,10c,11B*	1,2,4	A 47 L 11/19 A 47 L 11/33
A	US-A-2 495 559 (WEILER, K.E.) *Column 2, lines 6-43; figures 4-5,7*	6,7	
A	GB-A- 869 968 (THE OSBORNE MANUFACTURING COMP.) *Page 3, lines 4-55; figures 5,8,9*	5	
A	GB-A- 732 917 (KENNETH ALEXANDER GRANT) *Page 2, lines 108-129; figures 2,4*	8	TECHNICAL FIELDS SEARCHED (Int. Cl. 3)  A 46 B A 47 L
A	US-A-3 839 763 (GOULD, W.)		
A	FR-A-1 601 967 (WAYNE MANUFACTURING COMP.)		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30-09-1982	Examiner MUNZER E.
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