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(71) Applicant: **CARCLO ENGINEERING GROUP P.L.C.**
**Acre Street Lindley**
**Huddersfield HD3 3EB West Yorkshire(GB)**

(72) Inventor: **Grimshaw, Keith**
**Lower East Lee East Lee Lane Eastwood**
**Todmorden West Yorkshire(GB)**

(72) Inventor: **Lydall, Kenneth**
**140 New Mill Road Brockholes**
**Huddersfield West Yorkshire(GB)**

(74) Representative: **Lees, Clifford et al,**
**APPLEYARD, LEES & CO. 15, Clare Road**
**Halifax Yorkshire, HX1 2HY(GB)**

(54) **Improvements in or relating to card-clothing.**

(57) The invention relates to a method of producing a card-clothing assembly which includes a plurality of strips of metallic-wire type card-clothing in a side-by-side array. A longitudinally extending flexible spine is applied to the array, the spine having sufficient adhesion to the card-clothing strips to remain attached to them and sufficient inherent cohesion to maintain the side-by-side array of the strips. In addition, the spine is preferably capable of being peeled off the array of card-clothing strips.

The invention also relates to a card-clothing assembly having a plurality of strips of metallic-wire type card-clothing in a side-by-side array in which a longitudinally extending flexible spine is applied to the array.

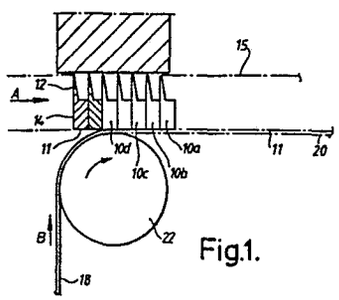


Fig.1.

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"Improvements in or relating to card-clothing."

BACKGROUND TO THE INVENTION.

The conventional flat for use on a carding machine is clothed with flexible foundation type card-clothing, and the strip of flexible foundation type card-clothing which is applied to the flat is called the "top". In recent years metallic-wire type card-clothing, in which the teeth are formed in one edge of a strip of steel wire, has been used to provide the "top" for flats. When metallic-wire type card-clothing is used for this purpose, it is necessary to arrange short strips of the wire in a side-by-side array and then to secure that array to the flat, so that each metallic-wire strip extends transversely of the flat. This usually entails setting the card-clothing strips in or on a holder which is itself then secured to the flat by clips, similar to the clips used to hold flexible foundation type "top" to the flat. Thus, the holder can be thought of as a replacement for the flexible foundation type top.

No matter what method is used for securing the metallic-wire strips to the flat, there are problems in manipulating the strips and holding them in an assembly suitable for use as "top". The present invention provides a method of assembling card-clothing strips, suitable for use as "top" which is extremely simple and which provides a card-clothing strip assembly which is very readily manipulable. The invention also includes a card-clothing assembly produced by the method and carding machine components fitted with such a card-clothing assembly. Whilst the assembly is especially useful for the clothing of flats, it is to be understood that it is not restricted to this paricular application of the card-clothing.

GENERAL FEATURES OF THE INVENTION.

According to a first aspect of this invention a method of

producing a card-clothed assembly comprising a plurality of strips of metallic-wire type card-clothing arranged in a side-by-side array is characterised in that there is applied to at least one of the longitudinally extending surfaces of the array a longitudinally extending flexible spine having a sufficient adhesion to the card-clothing strips to remain attached to each of the strips with which it makes contact, and sufficient inherent cohesion to maintain the wire strips in the side-by-side array. It is to be understood that the expression "adhesion" is intended to be broadly interpreted to include not only adhesion by use of an adhesive material but also adhesion obtained, for example, by the teeth of the card-clothing becoming impaled or embedded in the spine.

Preferably, the flexibility of the spine is such that the card-clothing assembly is completely lank and pliable in the longitudinal direction; that is to say, if the assembly is supported at a single point along its length, it will collapse on both sides of that point as would, for example, a wristlet watch chain. This is in complete contrast to the conventional metallic card-clothing "top" which is made as rigid as practicable in the longitudinal direction.

Preferably the spine is applied to one or both of the obverse and reverse surfaces of the card-clothing array. In this specification the expression "obverse surface" refers to that surface of the card-clothing array which is constituted by the teeth of the card-clothing strips, and the expression "reverse surface" refers to the surface constituted by the bases or undersides of the rib portions of the wire strips (i.e. the surface opposite to the obverse surface).

Preferably the spine is capable of being peeled off the array of card-clothing strips. It is further preferred that the width of the spine does not exceed the width of the card-clothing array.

In a first method of carrying out the invention,

the spine comprises a tape having a self-adhesive surface. The tape may comprise a self-adhesive plastics film such as that used for packaging; but it is preferred to use a tape which is coated with a more powerful adhesive than that supplied for domestic and office use. This method lends itself particularly to the application of the spine to the reverse surface of the card-clothing array, since the tape is well adapted to adhesion to the relatively flat surface formed by the bases of the ribs of the card-clothing strips. However, the tape can be applied if desired to the obverse surface of the card-clothing array. The adhesive tape is of course, highly flexible, and if this method of forming the assembly is used, then the assembly has a flexibility in the longitudinal sense similar to that of a wristlet watch chain. In fact, the card-clothing assembly produced by this method will drape.

In a second method of carrying out the invention a thermo-plastic (hot melt) material is applied to the surface of the card-clothing array and allowed to set to form a plastics "tape" on the array. Providing the thermoplastic material is correctly chosen, it will form a "tape" which has flexibility and which can be peeled off the array when required. This second method is particularly applicable to the obverse surface of the array, because the teeth of the card-clothing become embedded in the thermo-plastics material.

In a third method of carrying out the invention, a flexible tape is impaled on the teeth of the card-clothing array to an extent that the individual wire strips are secured to the tape by frictional engagement of the teeth of each strip with the tape. This method provides a less secure attachment of the spine to the card-clothing array, since there may be no adhesive as such, the adhesion being provided substantially or entirely by the frictional and hooking engagement between the teeth and the tape.

It will be appreciated that various combinations of the above described methods of carrying out the invention are possible. The preferred combination is the use of self-

adhesive tape on the reverse surface of the array and hot melt plastics on the obverse surface. The following methods and combinations are suggested as practicable possibilities, although the list is not necessarily exhaustive:-

(a) self-adhesive tape on the reverse surface.
(b) self adhesive tape on the obverse surface.
(c) hot melt plastics on the reverse surface.
(d) hot melt plastics on the obverse surface.
(e) self-adhesive tape on the reverse surface, and hot melt plastics on the obverse surface (the preferred method).
(f) hot melt plastics on both the obverse and reverse surfaces.

According to a second aspect of the invention a card-clothing assembly comprises a plurality of strips of metallic-wire type card-clothing in a side-by-side array having secured to at least one of its longitudinally extending surfaces a longitudinally extending flexible spine having adhesion to the card-clothing strips whereby it remains attached to each of the strips with which it makes contact and having sufficient inherent cohesion to maintain the strips in the side-by-side array.

A card-clothing assembly in accordance with the second aspect of the invention may be made by any of the preferred methods of the first aspect of the invention, its essential characteristics being determined by the kind of card-clothing employed, the longitudinal spacing of the strips of wire and the method of forming the assembly.

The invention also includes a carding or like machine element (e.g. a flat or a roller) having applied thereto a card-clothing assembly formed by the method of the first aspect of the invention or in accordance with the second aspect of the invention.

Methods of manufacturing card-clothing assemblies in accordance with the invention will now be described by way of examples only, with reference to the accompanying drawings, in which:-

Figure 1 is a diagram showing a first method of forming a card-clothing assembly,

Figure 2 is an end view of the completed assembly,

Figure 3 is an end view similar to Figure 2, but showing another method of carrying out the invention, and

Figure 4 is an end view similar to Figure 2, but showing a further method of carrying out the invention.

Referring to Figure 1, there is illustrated a method of forming a card-clothing assembly for use as the "top" to be applied to a flat of a revolving flat type carding machine. Since revolving flat type carding machines are very well known, and since the flat itself may be of conventional construction, there is no necessity to describe the carding machine or the flat.

The "top" is constituted by a series of short strips 10a, 10b, 10c, 10d, ..... which are cut from a long length of metallic-wire type card-clothing, and assembled on the cutting machine in an abutting side-by-side array as illustrated in Figure 1. Metallic-wire type card-clothing is in itself well known, but it is necessary to mention for present purposes, that the wire has the general cross-section illustrated in Figure 1, providing a tapered and relatively narrow upper portion 12 in which the teeth are formed, and a wider rib portion 14, which ensures the spacing of the rows of teeth provided by the strips 10a, 10b, 10c ..... . The assembly of the metallic-wire type strips 10 is carried out in a jig so that in addition to the abutting relationship, the bases of the ribs of the card-clothing strips together form a continuous flat reverse surface 11. The assembly of the strips continues until the length of the array is sufficient to extend along the effective length of the flat to which the

"top" is to be applied. It will be appreciated, that the length of the array is the sum of the thickness of the rib portions 14 of the strips 10, and that the width of the "top" is equal to the length of the individual strips 10. Furthermore, when the strips have been accumulated into an array, the obverse surface indicated at 15 in Figure 1 is constituted by the tips of all the teeth formed in the strips 10 which constitute the array, and there is a flat reverse surface 11 constituted by the bases of the rib portions 14 of the array.

In assembling the strips 10 in the side-by-side formation necessary to produce the "top", as each strip is cut from the stock of wire being fed into the machine, it is moved in a longitudinal direction indicated by the arrow A in Figure 1, so that the array is accumulated by moving to the right as seen in Figure 1. The longitudinal direction indicated by the arrow A is of course at right angles to the length of the stock where it is being fed to the cutting station.

Now it will be appreciated, that whilst it may be possible to hold the strips 10 in an array in a jig on the machine, the whole array would collapse into the individual strips, when removed from the jig, unless some means were provided for holding the strips together. Conventionally, this is done by fitting the array as it is formed into a sheet metal channel, and bending over the edges of the flanges of the channel, to nip on the ends of the strips. The metal channel together with the rib portions 14 of the strips 10, thereby provides an effective "foundation" for the "top". However, this necessitates the provision of a separate metal channel member, and this, together with the assembly of the strips into the channel, adds to the cost of producing the "top".

As illustrated in Figure 1, a tape 18 supplied in the direction of the arrow B from a stock (not shown) is applied to the reverse surface of the card-clothing array

whilst the array is being constituted by feeding the strips of wire longitudinally of the machine. The tape 18 is made of plastics film, and is similar to the self-adhesive tape which is used for packaging purposes. However, in this method, a tape is used, which is coated with an adhesive more powerful than that normally used for domestic and office purposes.

The end 20 of the tape 18 is secured to the reverse surface at the right hand end of the array by pressing its adhesive surface into engagement with the reverse surface 11, and then, as the array traverses in the direction of the arrow A, further tape 18 is fed from the stock, and is pressed on to the reverse surface of the array by a pressure roller 22. The tape 18 thereby becomes secured to each of the strips on the reverse surface. The tape 18 is of approximately the same width as the card-clothing array as indicated in Figure 2, but this is not essential. However, the tape should preferably not be wider than the card-clothing array.

As a result of the assembly method illustrated in Figures 1 and 2, there is provided an assembly constituted by the array of strips 10 of metallic-wire type card-clothing, held together in side-by-side arrangement, by a spine comprising the tape 18. This assembly can be removed from the machine, and of course, the individual metallic-wire strips are retained in the assembly, which is readily manipulable, and which can be secured by clips or by use of an adhesive to the flat. Furthermore, since the spine comprising the tape 18 is flexible, the assembly itself is flexible, and can in fact be coiled up if required for transporting and fitting. The flexibility of the assembly is similar to that of a wristlet watch chain.

It will be appreciated, that the "top" assembly provided by the method illustrated in Figure 1 and 2, constitutes a new article, since hitherto, there has not existed an assembly of metallic-wire type card-clothing strips, of a flexible nature.

This is because all the prior art methods of forming such a card-clothing assembly have involved the provision of a relatively rigid "spine". It will also be appreciated that the method of securing the strips together by use of the self-adhesive tape 18 is extremely economical both as regards the material which is used, and the operation required to apply the tape to the strips of card-clothing wire. However, a distinguishing feature of the assembly is the fact that the adhesive tape can be peeled off the card-clothing array if required. Thus, even if the tape were replaced by a strip of material of low flexibility (resulting in a correspondingly relatively rigid assembly) the ability of the spine to be peeled off the card-clothing array would provide a more adaptable assembly than one with a fixed spine.

Turning now to Figure 3, there is illustrated another method of securing an array of strips of card-clothing wire 10 together in side-by-side arrangement. The card-clothing wire strips are themselves constituted in the same manner as described above with reference to Figure 1, and the cutting off and assembly of the strips into an array is also the same. However, in this method, a "tape" 24 of hot melt plastics material is extruded on to the obverse face 16 of the card-clothing array, so that some of the teeth 12 of each card-clothing strip 10 become embedded in the "tape" 24. When the extruded hot melt "tape" becomes sufficiently set, it is secured to each of the strips 10 with which it has engagement, by the fact that the tips of the teeth are embedded in the plastics material.

The hot melt plastics "tape" 24 may be flexible, and in any case, it provides a spine holding the strips of card-clothing wire in the required side-by-side array. From the point of view of manipulation of the "top" therefore, the "tape" 24 has a similar effect as the tape 18 described with reference to Figures 1 and 2. Also, the "tape" 24 can be peeled off the teeth of the card-clothing array, once the

completed "top" has been secured to the flat on which it is to be used. One advantage of the method shown in Figure 3, is that the spine is not provided on the reverse surface of the "top" and hence, it does not interfere in any way with the fitting of the "top" on the flat. Of course, the plastics film tape 18 illustrated in Figures 1 and 2 may be so thin, that it makes no practical difference to the fitting of the "top" to the flat, or, if it is narrower than the "top" it may be accommodated in a recess in the flat.

In a preferred method which is not illustrated in the drawings, both the plastics film adhesive tape 18 and the extruded hot melt "tape" 24 are applied to an array of card-clothing wire strips. Thus, there are two spines, one provided by the self-adhesive tape 18 on the reverse surface 11, and the other provided by the hot melt "tape" 24 on the obverse surface 15, of the card-clothing array. It will be appreciated, that when this combination method is used, the metal strips 10 are more securely fastened to each other, and it is possible to remove either of the two spines, without permitting the array to collapse.

In Figure 4, there is shown a somewhat different method of forming a card-clothing assembly suitable for use for example, as card-clothing "top". Again, there are short strips 10 of metallic-wire type card-clothing assembled on a machine into an array as described with reference to Figures 1 and 2. However, in this construction, each strip 10 is formed with a rectangular notch 26 in each end of its rib portion 14, and these notches form continuous grooves along the front and rear edges of the array of card-clothing wire strips.

A strip of hot melt plastics material 28 is extruded and pressed into each of the grooves formed by the notches 26, and the grooves are substantially filled by these plastics strips. Now since the strips of plastics engage with all the strips 10 and extend throughout the length of the array, they provide spines which have a similar effect to the spines

provided by the "tapes" 18 and 24 previously described, and it is not necessary to apply a spine to either of the obverse and reverse faces of the array - though of course, the strips 28 could be used in combination with the arrangements shown in Figures 2 and 3, or indeed with any of the other spine combinations previously referred to. In some instances, it may be preferable to employ spines such as those formed by the strips 28 since these are contained wholly within the contours of the card-clothing array.

The hot melt plastics strip 28 can be peeled away from the card-clothing array if required, but in view of their containment within the contours of the array, this may not be necessary. In fact, although the hot melt plastics strips 28 will normally be flexible, they could be made of rigid material, in which case the completed card-clothing assembly would be rigid in a longitudinal sense.

The notches 26 need not be in the front and rear ends of the card-clothing strips. As indicated in chain-dotted lines at 30, they could be formed in the ribs 14 from the base or underside. In fact, the notches could be replaced or supplemented by holes formed through the ribs 14 and aligned to form a continuous hole, with the plastics material embedded therein. It will also be appreciated, that it is not essential to have two sets of notches forming two longitudinal grooves. In some instances, it might be sufficient to have only a single longitudinal groove, particularly if this is formed in the bases of the ribs of the card-clothing strips.

In the specific examples described above, the invention is employed to produce "tops" for use on the flats of a revolving flat type carding machine. It will be understood however, that the method could be used to provide "top" for stationary flats, and even for stationary flats of the kind which are curved to the curvature of the cylinder of the carding machine. Indeed, the method could be

employed to provide metallic-wire type card-clothing strips, which could then be secured to rollers of carding or like machines. A possible application of such strips is on a comber half lap roller of a cotton combing machine.

1. A method of forming a card-clothing assembly comprising a plurality of strips of metallic-wire type card-clothing arranged in a side-by-side array characterised in that there is applied to at least one of the longitudinally extending surfaces of said array a longitudinally extending flexible spine (18,24,28,30) having a sufficient adhesion to the card-clothing strips (10) to remain attached to each of the strips with which it makes contact, and sufficient inherent cohesion to maintain the wire strips (10) in the side-by-side array.

2. A method of forming a card-clothing assembly according to Claim 1, characterised in that said spine (18,24,30) is applied to at least one of the obverse (15) and reverse (11) surfaces of said card-clothing array.

3. A method of forming a card-clothing assembly according to Claim 1 or Claim 2, characterised in that the application of said spine is such that it remains capable of being peeled off said array of card-clothing strips.

4. A method of forming a card-clothing assembly according to any one of Claims 1 to 3, characterised in that said spine comprises a tape (18) having a self-adhesive surface, said tape being applied to said card-clothing array in a manner to cause said self-adhesive surface to engage with said at least one longitudinally extending surface of said card-clothing array.

5. A method of forming a card-clothing assembly according to any one of Claims 1 to 3, characterised in that a thermoplastics material (24) is applied to said at least one longitudinally extending surface of said card-clothing array and allowed to set to form a plastics "tape" on the array.

6. A method of forming a card-clothing assembly according to any one of Claims 1 to 3, characterised in that a flexible tape is impaled on the teeth of the card-clothing array to an extent that the individual card-clothing wire strips are secured to the tape by frictional engagement of the teeth of each strip with said tape.

7. A card-clothing assembly comprising a plurality of strips of metallic-wire type card-clothing in a side-by-side array characterised in that there is secured to at least one of its longitudinal extending surfaces (15,11), a longitudinally extending flexible spine (18, 24, 28, 30) having an adhesion to the card-clothing strips such that it remains attached to each of said strips with which it makes contact and having sufficient inherent cohesion to maintain said strips in the side-by-side array.

8. A card-clothing assembly according to Claim 7, characterised in that said spine is capable of being peeled off the array of card-clothing strips.

9. A card-clothing assembly according to Claim 7 or Claim 8, characterised in that the width of said spine (18, 24, 28, 30) does not exceed the width of the card-clothing array.

10. A card-clothing assembly according to any one of Claims 7 to 9, characterised in that the spine comprises a tape (18) having a self-adhesive surface.

11. A card-clothing assembly according to any one of Claims 7 to 9, characterised in that the spine comprises a tape (24) of thermo-plastics material applied to the card-clothing array.

12. A card-clothing assembly according to any one of Claims 7 to 9, characterised in that the spine comprises a flexible tape impaled on the teeth of the card-clothing array to an extent such that the individual card-clothing wire strips are secured to the tape by frictional engagement of the teeth of each strip with the tape.

13. A card-clothing assembly according to any one of Claims 7 to 9, characterised in that the spine (28,30) is located in a longitudinally extending groove in the card-clothing array.

14. A carding or like machine element having applied thereto a card-clothing assembly in accordance with any one of Claims 7 to 13.

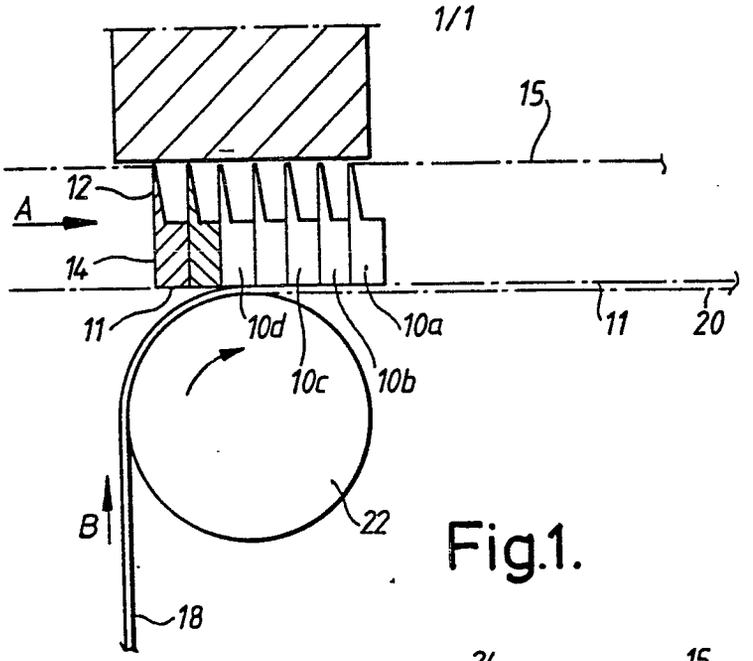


Fig.1.

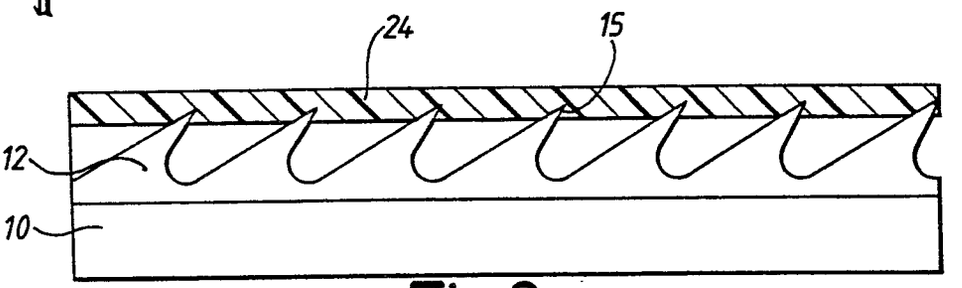


Fig.3.

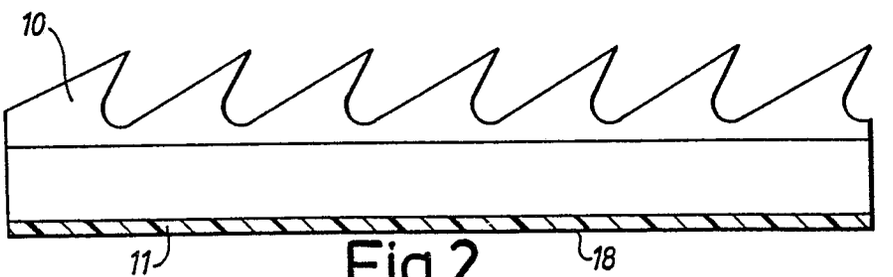


Fig.2.

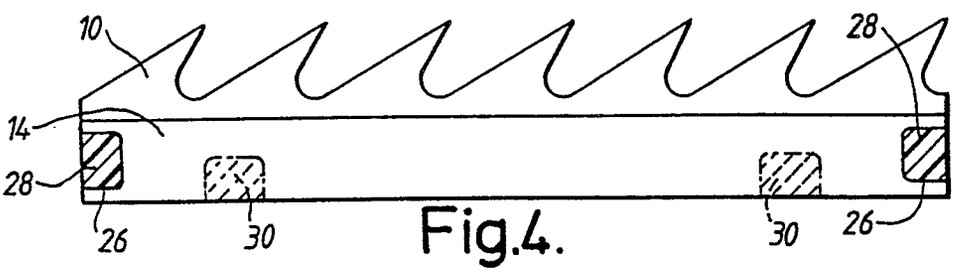


Fig.4.

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# EUROPEAN SEARCH REPORT

0067599
Application number

EP 82 30 2778

## 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) |
|---|---|---|---|
| X | US-A-4 221 023 (HENDERSON, W.E. et al.)<br><br>*The whole document*<br><br>--- | 1,3,4, 5,7,8, 9,10, 11,13, 14 | D 01 G 15/92<br>D 01 G 15/88 |
| A | FR-A-2 254 660 (FRIED. KRUPP GmbH)<br><br>--- | | |
| A | GB-A-1 309 229 (ASH WORTH, BROS., INC.)<br><br>----- | | |

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 | 17-09-1982 | MUNZER E. |

CATEGORY OF CITED DOCUMENTS

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