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# EUROPEAN PATENT APPLICATION

21 Application number: 88500113.1

51 Int. Cl.<sup>5</sup>: D04B 15/02

22 Date of filing: 24.11.88

43 Date of publication of application:  
30.05.90 Bulletin 90/22

84 Designated Contracting States:  
AT BE CH DE ES FR GB GR IT LI LU NL SE

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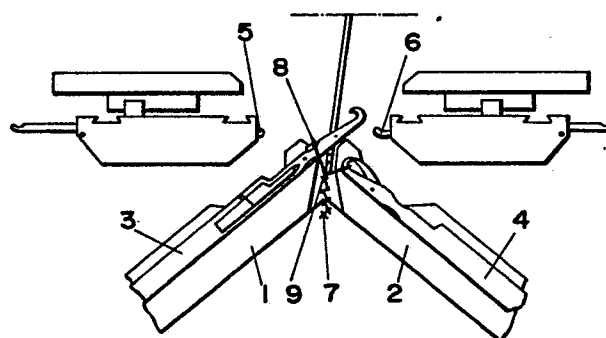
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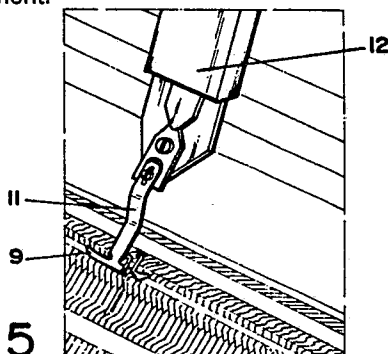
54 **Mesher's retention mechanism for knitting machines with lateral transference.**

57 This mechanism consists in a skid or rammer (9), conveniently associated to the carriage system (13) of the machine that moves with this carriage in the transference area, acting concretely over each mesh (8) in the moment when the mesh is transferred by the punch (6) to the corresponding needle, pushing down the mesh and maintaining it in permanent contact over the superior part of the needle (3), until the mesh reaches the needle's hook.

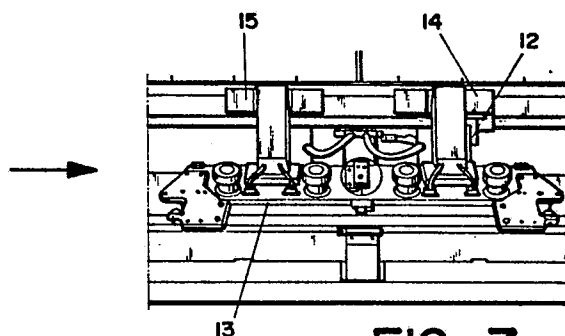
The skid or rammer, with its corresponding supporting arm (12), adopts the shape of an inverse "T", so that above mentioned rammer becomes operative when the carriage system (13) moves to the right as well as when it does it from right to left, placing the rammer (9) in two positions in the carriage system in accordance with the sense of direction of this carriage, both positions determined by two pistons (14, 15) acting over the extreme points of inversion of the carriage's movement.



**FIG.-3**



**FIG.-5**



**FIG.-7**

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## MESHES' RETENTION MECHANISM FOR KNITTING MACHINES WITH LATERAL TRANSFERENCE

### OBJECT OF THE INVENTION

The present invention refers to a mechanism aimed to constitute an accessory for a knitting machine with lateral transference, more concretely a mechanism intended to meshes' retention during that transference, so avoiding an eventual or accidental uncoupling of some of the meshes in respect to the corresponding needles.

### ANTECEDENTS OF THE INVENTION

In the above cited knitting machines and during the operation of lateral transference, an adequated traction effort from the stretcher of the fabric avoid the meshes to uncouple from the corresponding needles.

Nevertheless, when it is the case of very elaborated fabrics in which composition are used little elastic yarns which is to say with slight recovery it eventually produces the accidental detaching of some mesh with the consequent weaving defect.

Up to this date, the only solution to this problem is to increase the traction effort from the part of the fabric's stretcher, what means, from one side, a major wearing in the knitting head over which the needles slide under major pressure, there is a reduction in the output and speed of the machine, therefore the problem is not fully solved, for there is always a mesh scaping to the field of recuperation of the corresponding needle and, consequently, the said remains loose in the weaving context.

### DESCRIPTION OF THE INVENTION

The mechanism that this invention proposes has been conceived to solve problematic mentioned before at full satisfaction and without any of the aforementioned subsidiary problems, owing to the fact that such mechanism acts directly over the mesh and produces in these meshes, a similar effect, even superior to the one resulting from an optimal elasticity of the yarn, from the viewpoint of results.

More concretely, to obtain above mentioned effect, the mechanism that this invention proposes, materializes in a sort of skid or rammer dully associated to a supporting arm; the skid acts over the lateral transference area of the machine in every moment; the skid is placed on the carriage itself that moves longitudinally over the needles'

knitting lines.

Concretizing again, the above cited skid or rammer moves under an imaginary cross-point of a knitting head needle with those of the knitting head and presses down each yarn mesh during descent operation of the needle that must pick up the corresponding mesh which mesh is transfered to the needle by the corresponding transfer punch. Being the the skid or rammer in the position of pressing down the mesh makes sure that the ply of the loop formed by the mesh slides without loosing contact over the superior edge of the needle until reaching the bottom of the needle's hook.

Evidently and so that the supporting arm of the skid or rammer itself do not be an obstacle in the normal movement of the needles, this supporting arm must be phased out in respect to the operative end of the skid. Furthermore - and this is also evident - being so that the transference is effected in the two directions of the carriage movement the meshes' retention mechanism must become operative when it moves from left to right as well as it does it from right to left, a reason why the aforementioned ability must be maintained in both directions of movement it is because that cited skid or rammer adopts the shape of an inverse "T" out of which this skid or rammer itself constitutes its cross-section that will become operative alternatively in one or another of its ends, whilst its medium section constitutes the way to fix the skid or rammer to the supporting arm.

On the other hand, the skid or rammer must be always operative from his frontal extremity in the direction of movement, what is equivalent to the fact that the supporting arm must be able to adopt two positions in the carriage: one, when moving from left to right; and, the other, when moving from right to left. In this way, it has been foreseen that two pistons collaborate with the supporting arm of the skid or rammer. These two pistons alternatively provoke the change of position on the supporting arm and they do it precisely, when the carriage inverts its direction of movement in the extreme areas of the machine.

Is worthy to emphasize as one of the characteristics in the invention that, as far as to the ends of the machine are situated the yarn-guides through which the corresponding yarns are threaded (to prevent that the retention mechanism comes into collision with the yarn-guides); it has been foreseen that the limiting butts be established at both machine ends operating in such way that they can made ascend the skid or rammer.

## DESCRIPTION OF THE DRAWINGS

In order to complement the description which is being effected herein and with the object to help to a better understanding of the characteristics in the invention, we enclose a descriptive report, and as an integral part of it, a set of drawings on which appears represented in a rather illustrating way - not limitative - the following details:

**Figure 1.-** Shows in detail in transverse section of a knitting machine at level of transference point of a mesh in the moment of starting above transference from the part of the corresponding punch.

**Figure 2.-** Shows same detail as in the previous figure 1, in a sequenzy immediately after, when needle begins its ascent and consequent reception of the mesh.

**Figure 3.-** Shows again same detail as in fig.2, in a sequenzy immediately after in which the needle adopts the superior limit position as the retention mechanism has entered into function pressing the mesh downward keeping the mesh against the mentioned needle.

**Figure 4.-** Shows same detail as in fig.3, at the end of transference phase.

**Figure 5.-** Shows a detail in perspective of meshes retention mechanism on a working position over a knitting machine and during the carriage's movement from left to right.

**Figure 6.-** Shows a detail in perspective similar to that of fig.5, but corresponding to the carriage's move ment from right to left.

**Figure 7.-** Schematically shows a view of the position of the regulating means of position of the skid or rammer from the retention mechanism considering that the carriage system moves from left to right or from right to left.

**Figure 8.-** Finally, this figure shows a partial detail and also a perspective of one of the ends of the machine where appear the ascent butts for the already cited skid or rammer at the end of the course of the carriage system over the machine.

## PREFERENT EMBODIMENT OF THE INVENTION

As said beforehand, on figure 1 to 4 is represented transversally a flat knitting machine equipped with two knitting heads 1 and 2, over which are applicable the respective sets of needles 3 and 4. Together with the needles work transference punches 5 and 6 - whose description is besides the point - in such a way that, as it is also conventional, through the interstice exisating between knitting heads 1 and 2 hangs vertically the fabric 7, which takes shape helped by stretcher placed in the fabric's inferior and free border.

Concretely in figure 1 can be observed how the transference punch 6, pass to the needle 3, one mesh 8, through which needle 3 comes into ascendent movement as shown in figures 2 and 3.

At the end of the ascent phase of the needle 3 comes into action, with respect to the mesh 8, already cited, the skid or rammer 9 which constitutes the essential element of the envisaged retention mechanism, so tha said skid or rammer acts downwards over the mesh 8 forcing this mesh to maintain permanent contact over the superior part of the needle 3, during its descent till the limit point in which said mesh 9 remains linked to the hood 10 of the needle thus preventing lacking elasticity in the said mesh 8, or owing to any other cause, this mesh may adopt the position referred with 8' in the figure 4, in which the mesh liberates or uncouple itself from hook 10 of the needle 3.

Must be deducted from what has been previously exposed, that the skid or rammer 9, goes with each and all the needles of the machine as well as with the corresponding punches in the moment of transference, a reason why the said skid or rammer must be associated to the carriage system of the machine.

More concretely, as shown in figures 5 and 6, the skid or rammer 9 itself adopts the shape of the transversal section of a piece in the form of an inverse "T", whose medium and ascendent section 11 fix skid 9 a supporting arm 12 removably assembled on carriage system 13 of the machine, which supporting arm can adopt two positions, owing to the fact that the carriage ystem can move either right to left or left to right along the machine. To obtain this effect colaborate two pistons 14 and 15, with supporting arm 12. The 14 conveniently places the skid or rammer when the carriage goes left to right. The 15 does it when the carriage goes contrarywise, which is to say, from right to left, these pistons 14 and 15, acting automatically when the carriage reaches one and the other end of the machine, where the inverse movement takes place.

Finally, to the effect of avoiding that the skid or rammer clash against the yarns threaded in the extreme yarn-guides 16, it has been foreseen to place in each of the ends of the machine, butts 17 clearly represented in figure 8, which butts force to ascent the skid or rammer 9-11 in the direction of the arrow appearing on figure 8 already cited.

It is obtained in this way, with a very simple structure, that the skid or rammer 9 makes impossible the eventual uncoupling of not even a single mesh with respect to the corresponding needle during the transference, so that this skid or rammer becomes operative as well in the movement of the carriage from right to left as in the movement in contrary sense, thanks to its special shape as a inverse "T" being always operative the end of the

skid or rammer 9 already cited, which remains situated ahead the supporting arm 11, the carriage when moving forward thanks to the pistons 14 and 15 which cause that the supporting arm as a whole 11-12 - and consequently the skid or rammer - adopt two positions in the context of the carriage, one for each sense of movement of the carriage; at the same time to make the end's butts 17 elevate the skid or rammer in the machine's extremities zone where the skid becomes inoperative to avoid any interference or clash with other elements of the machine, concretely, the yarns-guide.

## Claims

1.- Meshes' retention mechanism for knitting machines with lateral transference whose essential characteristic consists in a skid or rammer conveniently embodied in the machine's carriage, the skid or rammer moves together with the machine and acts progressively on the different points of transference along the machine, between each mesh ceded by each transference punch and the corresponding receiving needles of this mesh, moving this mesh downwards and pressing it against the superior border of the needle provided that said mesh does not reach the needle's hook.

2.- Meshes' retention mechanism for knitting machines with lateral transference is, according to claim 1, characterized in that the skid or rammer adopts the shape of an inverse "T", its transverse section becoming operative on the meshes at its frontal extreme in accordance with the direction of carriage's advance whilst through the medium and ascendent section (see "T" shape) the skid or rammer is fixed to a removable supporting arm assembled over the car controlled by two pistons which are, at their time, automatically actioned each time the carriage reaches the extreme zones of the machine corresponding to its movement inversion thus producing short longitudinal moves on the supporting arm of the skid or rammer in order to adequate the position of the skid or rammer to the direction of carriage's movement.

3.- Meshes' retention mechanism for knitting machines with lateral transference characterized, according to previous claims 1 and 2, in that at the extremes of the machine, are placed elevator butts for the skids or rammers in extreme zones where said skids or rammers and inoperative butts that provoke an ascent or elevation of the skid or rammer in magnitude enough to avoid the clash of said skid or rammer with the yarns threaded in the yarn-guide occupying these zones.

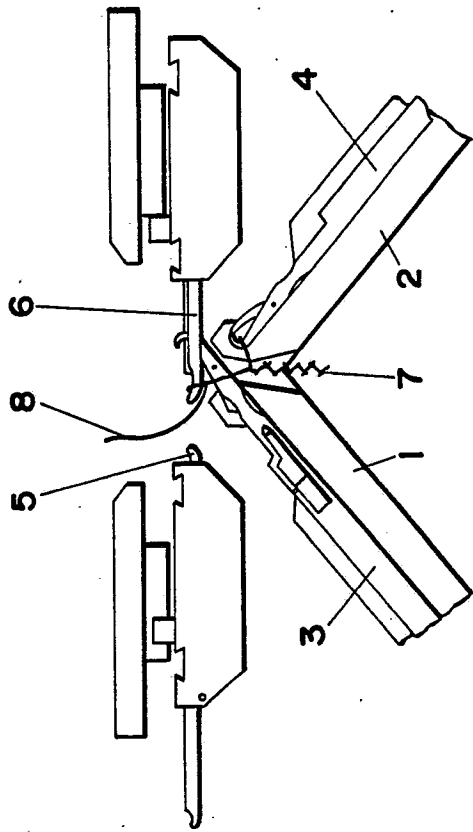


FIG-1

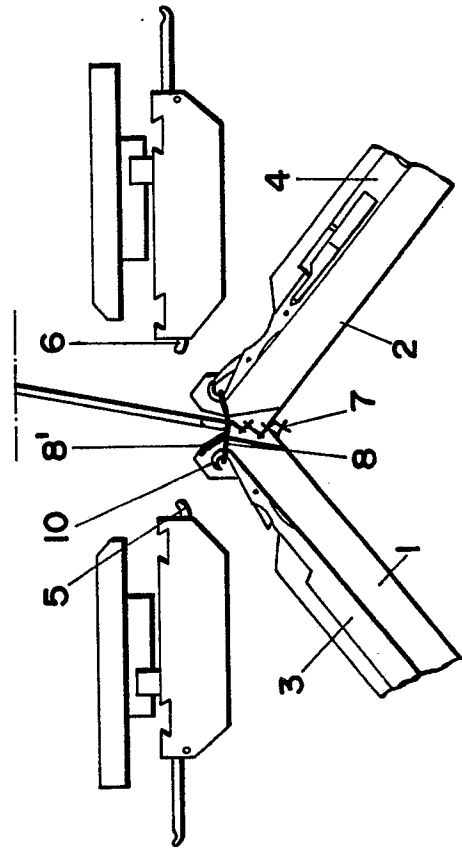


FIG-2

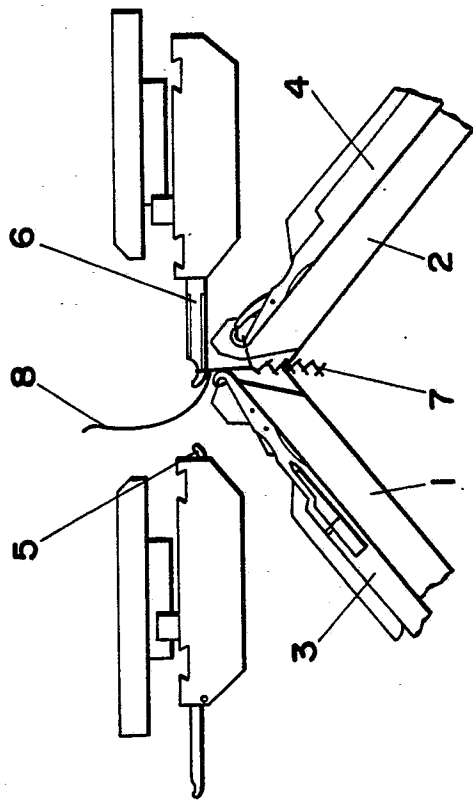


FIG-3

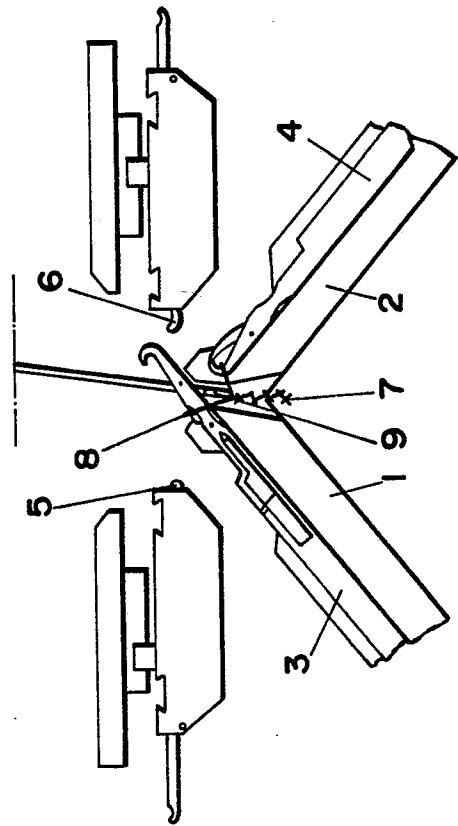


FIG-4

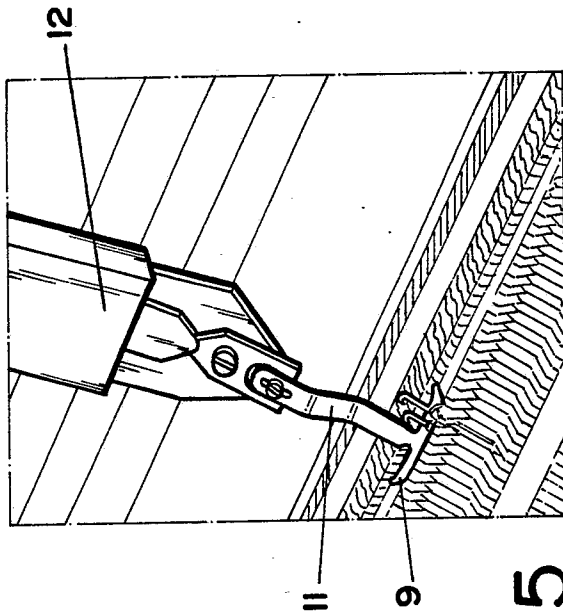


FIG.-5

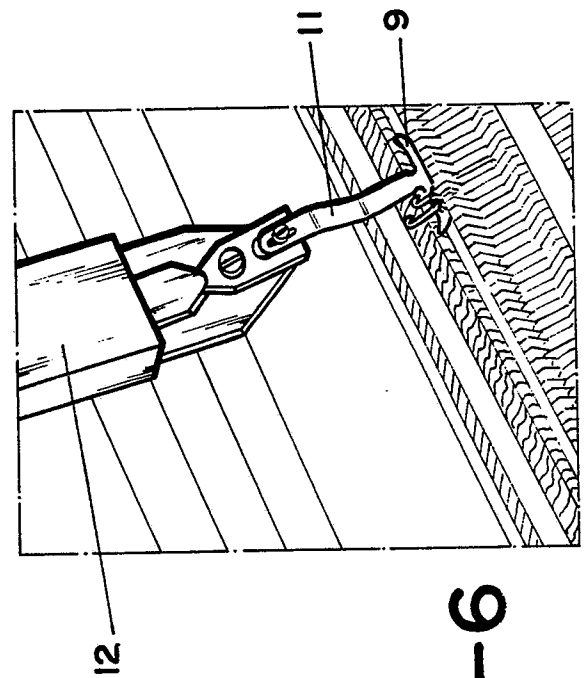


FIG.-6

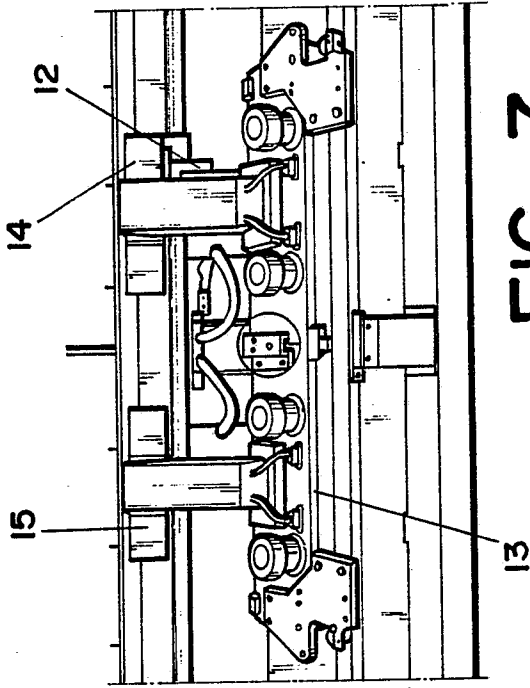


FIG.-7

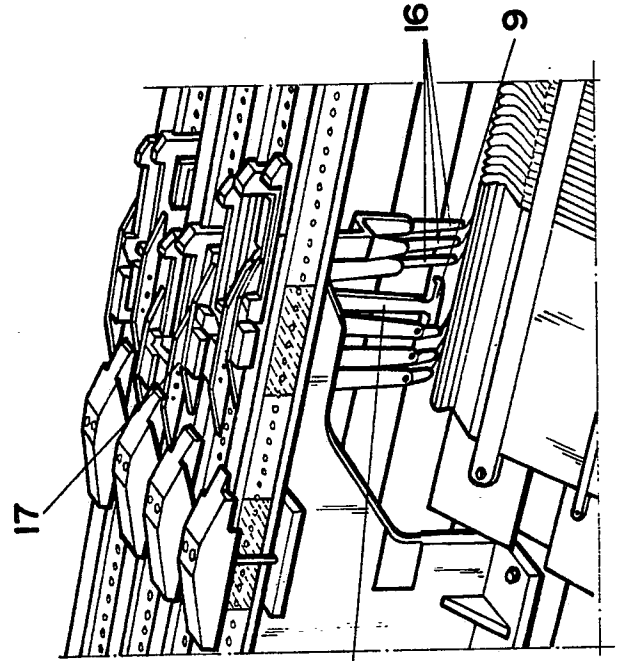


FIG.-8



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| 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.5) |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | BE-A-840229 (FABRIQUE NATIONALE HERSTAL S.A.)<br>---                          |                                                    | D04B15/02                                     |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | EP-A-0103033 (COMET MARTINELLI S.R.L.)<br>---                                 |                                                    |                                               |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GB-A-2001111 (SUPERBA S.A.)<br>-----                                          |                                                    |                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                               |                                                    | TECHNICAL FIELDS SEARCHED (Int. Cl.5)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                               |                                                    | D04B                                          |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                               |                                                    |                                               |
| Place of search<br>THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                               | Date of completion of the search<br>03 AUGUST 1989 | Examiner<br>VAN GELDER P.A.                   |
| <b>CATEGORY OF CITED DOCUMENTS</b><br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>I : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |                                                                               |                                                    |                                               |