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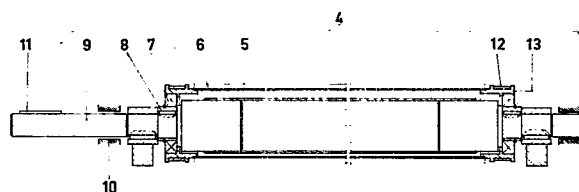
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⑤ **A napping machine, a method of napping a fabric, and a fabric napped according to this method.**

⑦ A napping machine for raising a nap on a fabric or textile(t) comprises a drawing roll (15) for drawing the fabric or textile(t) between top napping rolls (4) and bottom napping rolls (4). Each napping roll is rotably mounted on eccentrics mounted on rotably drive shafts. As the fabric is drawn between the napping rolls the napping rolls oscillate by virtue of the eccentrics.

A napping machine as described may be much smaller than prior proposed machines, providing a superior napping treatment with a minimum of wasted fibres.



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TITLE MODIFIED
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"A NAPPING MACHINE"

This invention relates to a napping machine comprising rolls which act on a textile fabric to raise a nap. The invention also relates to a method of napping a fabric or textile with napping rolls
05 to raise a nap.

It is known in connection with the manufacture of textiles or fabrics to use napping machines which tear at the yarns making up the textile or fabric so that some of the fibres of the actual yarns are torn up so as to give the fabric furry or woolly appearance and
10 a very soft feel. This form of treatment is very useful for certain textiles or fabrics, such as for example, those to be used for the production of blankets.

Conventional napping machines are very bulky and complex and operate unsatisfactorily. A typical conventional napping machine
15 comprises a very large drum on the periphery of which a large number of napping rolls are mounted. Each napping roll is provided with hooks or prongs on the outer periphery thereof. In use of the napping machine a textile or fabric to be napped is drawn around the periphery of the drum and the napping rolls rotate so that the hooks
20 or prongs act on the fabric or textile. Thus the fabric is acted on by the napping rolls which raise a nap on the surface of the fabric closest to the large drum. The napping is thus given just to one side of the textile or fabric as the textile or fabric advances.

In the use of such prior napping machines the textile or fabric
25 has to travel a long distance and the usual practice is to provide

two such napping machines in cascade so that both sides of the fabric or textile can be napped. It is common practice for the textile or fabric to be passed through the two napping machines than once. In practice large premises are required to accomodate two napping machines as described above and considerable energy is consumed in operating the napping machines to provide a satisfactory napping effect.

It will be appreciated that napping, as at present carried out, is not ideal so far as the actual processing machinery is concerned and the mechanism by which the process is carried out is also not ideal. The hooks or prongs of the teasing rolls tear rather than gently extract the fibres from the yarns, leading to considerable waste and heavy losses of valuable fibre material. Also problems arise in connection with the removal of the waste fibres that become tapped in the hooks or prongs and fibres that become discharged into the local environment. Problems of environmental health can arise where fibres are discharged into the air. In use of many prior proposed napping machines a considerable percentage of the fibres treated are removed form the fabric.

The present invention seeks to reduce or obviate the above described disadvantages of prior napping machines. In a napping machine in accordance with the invention there is provided one or more groups each comprising at least four napping rolls, means for advancing a fabric or textile between top napping rolls and bottom napping rolls forming said group, each napping roll being mounted on members which are eccentrically mounted on rotationally driven shafts, means being provided to retard the otherwise free rotation of the napping rolls.

Preferably the napping rolls are hollow metal cylinders having a teasing covering.

Conveniently each napping roll is freely rotatably mounted on bearings provided at the ends of the roll the bearings engaging members which are mounted eccentrically at the ends of shafts.

Advantageously the means for retarding the rotation of the rolls

are two adjustable band brakes common to the two rolls of the top pair and bottom pair respectively.

Preferably the shafts are driven by a transmission which also drives the said means for advancing the web or textile.

05 Conveniently a single group of four rolls is provided.

Preferably the distance between the top napping rolls and the bottom napping rolls is adjustable.

10 A method of napping in accordance with the invention comprises the steps of drawing the fabric or textile between top napping rolls and bottom napping rolls, each said napping roll being rotatably mounted on members which are eccentrically mounted on shafts that are rotatably driven, the otherwise free rotation of the napping rolls being retarded by brake means, the rolls being in contact with the fabric or textile to raise a nap.

15 The invention also relates to a textile or fabric when napped by such a method.

20 A napping machine in accordance with the invention can be very much smaller than the above described conventional prior napping machine. The machine in accordance with the invention can provide an effective napping treatment in a single pass, with a minimum of waste, thus reducing the cost of effecting the napping treatment.

One embodiment of a napping machine in accordance with the invention is described in detail below by way of example with reference to the accompanying drawings, in which:

25 Figure 1 is a perspective view of a napping machine according to the invention;

Figure 2 is a vertical sectional view of one of the napping rolls of the group of napping rolls of the machine of Figure 1;

Figure 3 is part of Figure 2 on an enlarged scale; and

30 Figures 4 and 5 are diagrammatic cross-sections through the group of napping rolls of the machine of Figure 1 in two different operating conditions.

Referring to the drawings, a napping machine in accordance with

the invention comprises a strong transverse frame 1 with side uprights members 2 supporting a group 3 of four napping rolls 4.

Each roll 4 of the group 3 is mounted to rotate freely, an eccentric is located between the roll and a rotating shaft. On rotation
05 of the rotating shaft the axis of the roll will move or oscillate by virtue of the action of the eccentric. The group comprises a pair of top rolls intended to act on the upper surface of a textile or fabric and a pair of bottom rolls intended to act on the lower surface of the textile or fabric. The rolls 4 are acted on in the said pairs by adjustable
10 retarding means, as will be described hereinafter in greater detail.

Figures 2 and 3 show details of the assembly of each roll 4. The roll 4 is a hollow metal cylinder 5 having a teasing covering 6, comprising a band or web or the like from which a number of bent needles or prongs extend at an angle of 45°. The cylinder 5 is mounted
15 with by end bearings 7 on eccentrics 8 located on a shaft 9. The shaft 9 is rotatably mounted in supports 10 and is rotated by a motor by way of a chain or ribbed belt drive driving a sprocket or the like 11 at one end of shaft 9.

Also, two adjacent rolls 4, 4' (and 4" and 4''') of the group
20 3 are retarded together (Figures 2 and 5) by a single retarding element or brake 12 (and 12') which extends around the roll ends 13; the retarding element or brake is usually gentle in its action, which can be adjusted by tightening or slackening (Figure 5) a screw 14 (or 14').

The apparatus also comprises a drawing roll 15 (Figure 1) operated
25 by the motor which drives the shafts 9 and used to draw a fabric or textile to be napped through the napping machine.

A fabric or textile t to be napped is introduced (see Figure 4) between the top pair and bottom pair of rolls 4 of the group 3, the fabric moving from a reel of the fabric, for example, towards the
30 drawing roll 15. In operation, when the motor driving the machine starts the textile or fabric t is drawn through the machine and the four shafts 9 are rotated by the chain drive driving the sprockets 11. As the shafts 9 rotate, the rolls 4 disposed thereon tend to oscillate radially

because of the action of the eccentrics 8 and also the rolls rotate both to follow the rotation of the shafts 9 and to follow the movement of the textile or fabric being processed as it is pulled by the roll 15. The napping rolls therefore execute a very irregular composite motion, the laws governing which can be varied to some extent by adjusting the braking means 12, which retard the otherwise free rotational movement of the rolls.

In their irregular movement the four napping rolls move towards and away from the fabric cyclically and irregularly, the fabric therefore being engaged and disengaged continuously and with limited and irregular rotations by two napping rolls from the top and two napping rolls from the bottom. This continuous irregular engagement and disengagement occurs at a high frequency of some 1000 cycles per minute and ensures very effective napping on both faces of the fabric; some of the fibres are raised to form a nap without being torn from the fabric. Only a negligibly small percentage of fibres are torn from the fabric as compared with the corresponding figure for the above described conventional prior proposed machine. Basically, most of the fibres are napped gently with rapid and delicate movements without being torn from the yarns which make up the fabric. The fabric or textile is thus properly napped on both faces after in a single pass through the machine. Also, the treatment is such that the surface appearance of the fabric is more compact and softer than in the case of conventional treatment.

The above described machine can of course be adapted to treat different kinds of fabric or textile, for example, fabrics or textiles of various thicknesses, just by adjusting the relative position of the top and bottom rolls.

A machine in accordance with the invention can also comprise more than one set of napping rolls, for instance, two or even three sets disposed in cascade, if necessary to meet special processing requirements or if required to provide a better treatment of some textiles. It is to be appreciated, each set can comprise more than

four rolls and have, for instance, three top rolls and three bottom rolls located respectively above and below the fabric or textile to be napped.

05 The advantages of the above described teasing machine in accordance with this invention will be readily appreciated . The machine requires a minimum of space and, for example where at present a pair of conventional roll type napping machines are installed, from 5 to 8 napping machines in accordance with the invention and as described above can readily be accomodated. Also the described napping machine treats
10 the fabric or textile simultaneously on both its faces and as a rule requires only a single pass of the fabric or textile through the machine to effect such napping so that the times required to nap the fabrics or textile on both faces (which is the usual treatment) is reduced substantially as compared with conventional practice. Thus processing
15 costs drop appreciably. There may be a further drop in costs since fewer personnel may be required to supervise the operation of the machines.

However, one main benefit of utilising the above described machine in accordance with the invention relates to the quality of the napped
20 product. The napping machine described above can considerably improve the feed and appearance of the napped fabric or textile and simultaneously reduce waste; consequently, appreciably softer, thicker, bulkier and better looking fabrics or textiles can be prepared from a given starting fabric or good-quality products can be prepared from fabrics of
25 poorer quality than are used at present.

Finally, the appreciable reduction in waste minimises the waste problems and greatly benefits the environment in which the processing work is performed.

CLAIMS

1. A napping machine having rolls (4) which act on a textile or fabric to raise a nap, characterised in that said machine comprises one or more groups (3) each consisting of at least four napping rolls (4), means (15) for advancing a fabric or textile (t) between top napping rolls (4,4') and bottom napping rolls (4'', 4''') forming said group (3) each napping roll (4) being rotatably mounted on members (3) which are eccentrically mounted on rotationally driven shafts (9), means (12) being provided to retard the otherwise free rotation of the napping rolls (4).

2. A machine according to claim 1 characterised in that the napping rolls (4) are hollow metal cylinders (5) having a teasing covering (6).

3. A machine according to claim 1 or 2 characterised in that each napping roll (4) is freely rotatably mounted on bearings (7) provided at the ends of the roll (4) the bearings (7) engaging members (3) which are mounted eccentrically at the ends of shafts (9).

4. A machine according to any one of claim 1 to 3 characterised in that the means (12) for retarding the rotation of the rolls (4) are two adjustable band brakes (12,12') common to the top rolls (4,4') and to the bottom rolls (4'',4''') respectively.

5. A machine according to any one of claims 1 to 4 characterised in that the shafts (9) are driven by a transmission which also drives the said means (15) for advancing the web or textile.

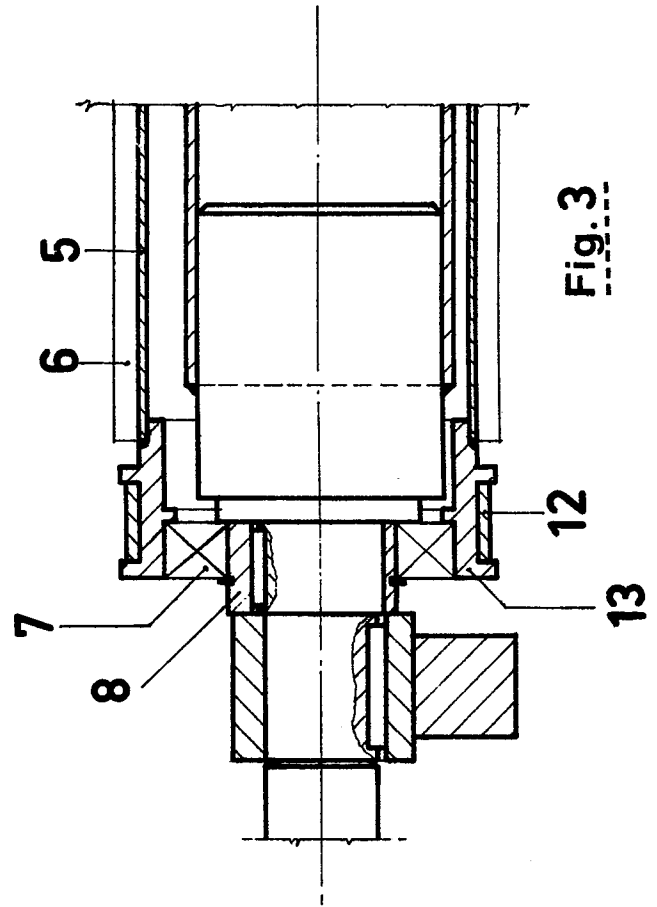
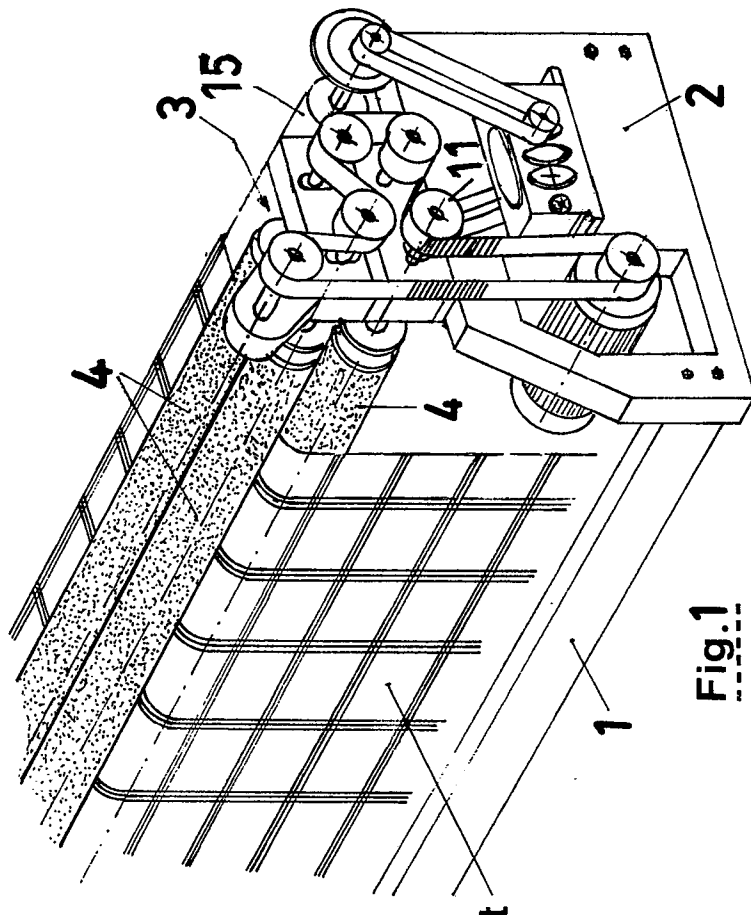
6. A machine according to any one of claims 1 to 5 characterised

in that a single group (3) of four rolls (4) is provided.

7. A machine according to any one of the preceding claims characterised in that the distances between the top rolls (4, 4') and the bottom rolls (4'', 4''') is adjustable.

05 3. A method of napping a fabric or textile by treating the fabric or textile (t) with napping rolls to raise a nap, characterised in that said method comprises the steps of drawing the fabric or textile (t) between top napping rolls (4, 4') and bottom napping rolls (4'', 4'''), each said napping roll (4) being rotatably mounted on members (3)
10 which are eccentrically mounted on shafts (9) that are rotatably driven, the otherwise free rotation of the napping rolls (4) being retarded by brake means (12), the rolls (4) being in contact with the fabric or textile (t) to raise a nap.

9. A textile or fabric characterised in that the textile or fabric
15 has been napped by a method according to claim 3.



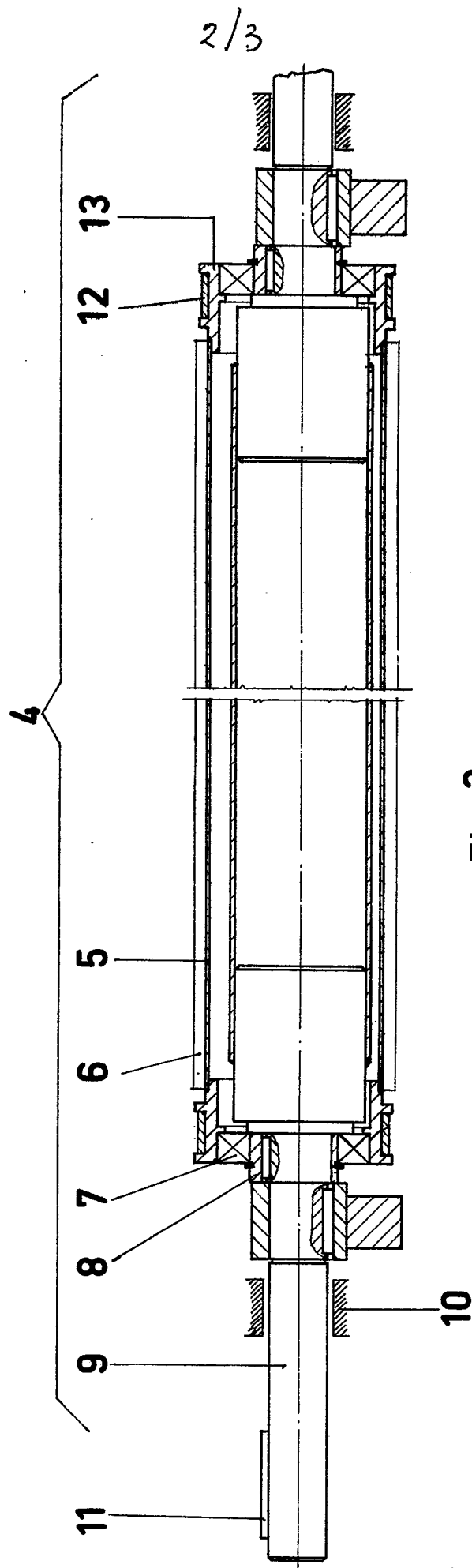


Fig. 2

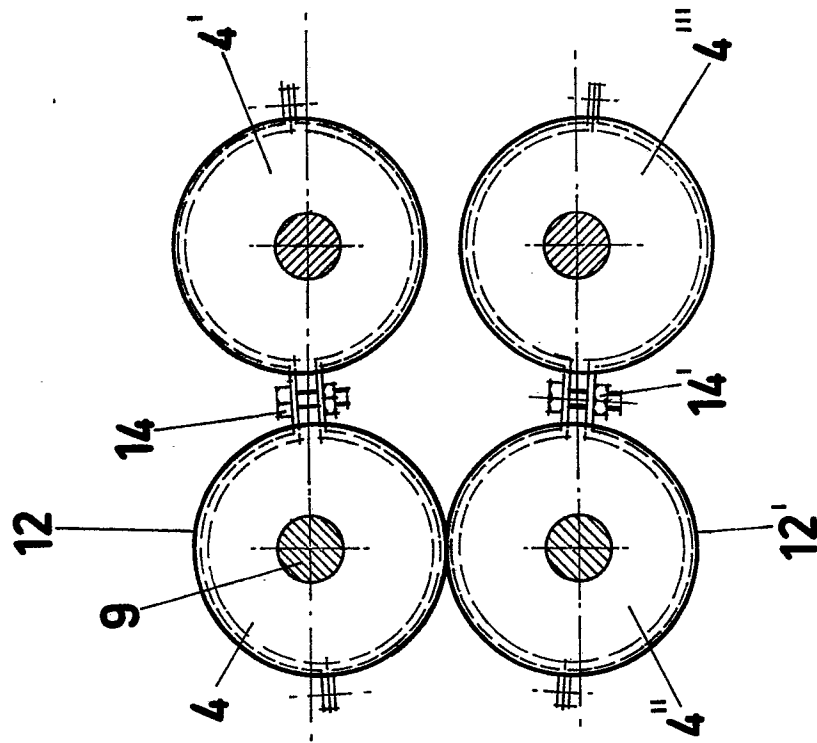


Fig. 5

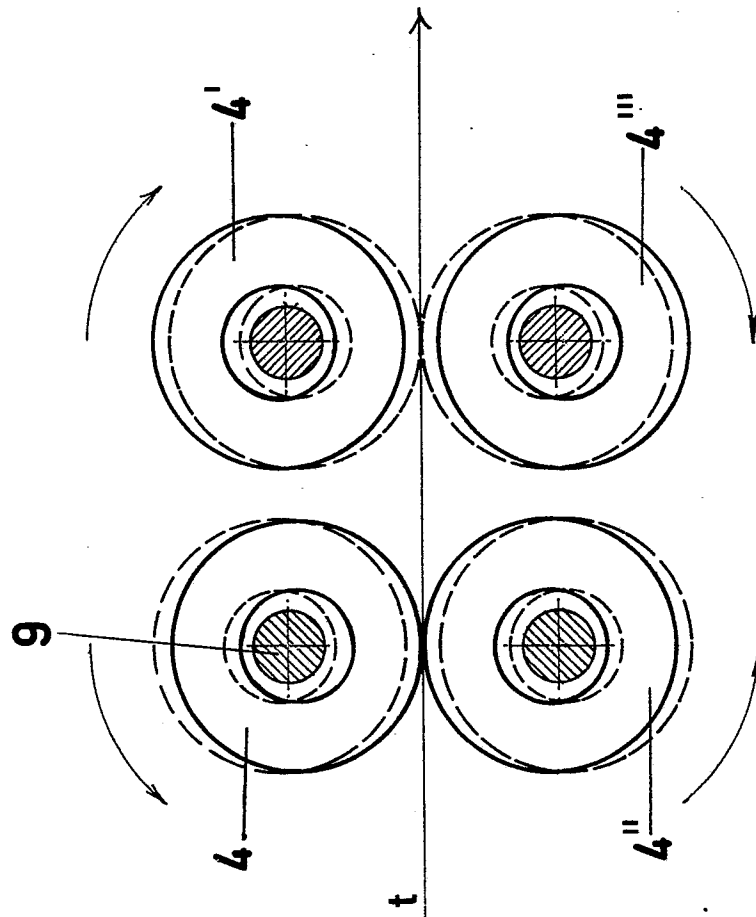


Fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

0016939
Application number

EP 80 10 0707

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	FR - A - 2 397 481 (CAMI) * In full *	1-3, 5-9	D 06 C 11/00
			TECHNICAL FIELDS SEARCHED (Int.Cl. ³)
			D 06 C
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22-05-1980	Examiner PET 17