

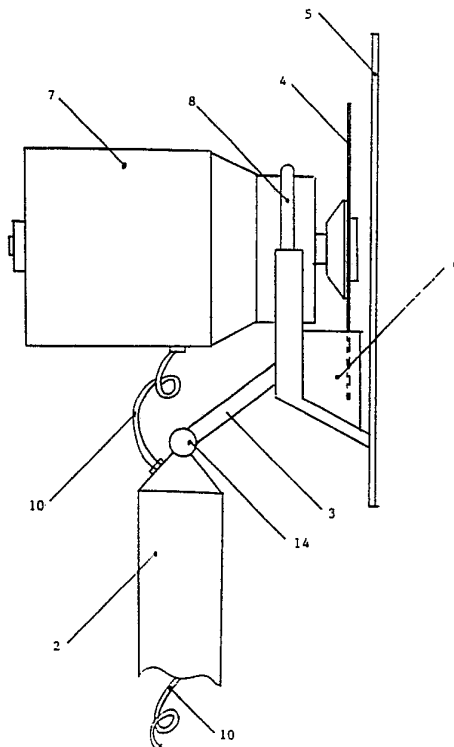


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : B27L 1/06, A01G 3/08	A1	(11) International Publication Number: WO 91/13736 (43) International Publication Date: 19 September 1991 (19.09.91)
(21) International Application Number: PCT/FI91/00073 (22) International Filing Date: 14 March 1991 (14.03.91) (30) Priority data: 901311 16 March 1990 (16.03.90) FI (71)(72) Applicant and Inventor: KOLEHMAINEN, Tenho [FI/FI]; Haavikkotie 4, SF-83330 Kaatamo (FI). (74) Agent: PITKÄNEN, Hannu; Savilahdentie 6 A, SF-70210 Kuopio (FI). (81) Designated States: AT (European patent), BE (European patent), CA, CH (European patent), DE, DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), LU (European patent), NL (European patent), NO, SE, SE (European patent), SU, US.		Published <i>With international search report.</i>

(54) Title: PRUNING DEVICE**(57) Abstract**

Objective of the invention is a pruning device for upright pruning of trees, to which pruning device belongs a shaft (1), an at the end (2) of the shaft through an articulated joint fastened support (3), an at the support fastened, rotatable cutting blade (4), an at the support fixed, with the cutting blade parallel running cutting support device (5) for leaning of the upright pruning device against the tree when cutting the branches as well as a with the cutting blade connected power source (6, 7) for the rotating of the cutting blade. When operating the present pruning devices the problem is the fact, that when using them the trunk of the tree is easily damaged, because the cutting is performed too close to the trunk of the tree. In the pruning device in accordance with the invention at the support (3) fastened on the end (2) of the shaft is fastened a fastening device (8), on which the cutting blade (4) is fixed adjustably parallel to the axis of the cutting blade for adjusting of the distance between the trunk of the tree and the cutting blade.



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PRUNING DEVICE

Objective for the invention is a pruning device for upright pruning of standing trees, to which pruning device belongs a shaft, an at the end of the shaft through an articulated joint fastened support, an on the support fastened, rotatable cutting blade, an on the support fixed, parallel to the cutting blade running cutting support device for leaning the upright pruning device against the tree when cutting the branches as well as a power source coupled with the cutting blade for rotating of the cutting blade.

The branches of the trees are pruned off at their growing stage in order to obtain knotless and better raw-material for sawn timber. The upright pruning of the trees takes nowadays place by sawing with either a manually operated, at the end of a shaft fixed saw or with different power sources equipped chain, circular or back and forth moving saw blades equipped saws. When using the manually operated saws the problem is the low working speed as well as the heaviness of the work, which is caused by the uncomfortable working position and which is still accentuated when pruning branches located very high up. When operating a manual saw also the risk of the branch breaking is big, whereat the stub of the branch is damaged.

With the help of the motor driven pruning devices the branches are easily got pruned, but the problem is the poor maneuverability of the pruning devices and the inaccurate result of the work. With the present pruning devices the branch can be cut off too close to the trunk of the tree, whereat also the trunk of the tree is damaged. When applying

the present devices the length of the remaining stub of the branch varies considerably by the case depending on the performer of the pruning operation and the prevailing pruning conditions, whereby no
5 even finishing of the work is achieved.

The objective of the invention is to bring forth a pruning device, with the help of which some disadvantages connected with the present pruning devices
10 are eliminated. In particular the purpose of the invention is to bring about a pruning device, by using of which the trunk of the tree is not damaged and the length of the stub remaining from the branch can be adjusted in advance. Further the aim of the
15 invention is to bring forward a pruning device, which is uncomplicated to its structure and easy to operate.

The objective of the invention is achieved by a
20 pruning device, which is mainly characterized by that, what has been presented in the claims.

The objective of the invention is achieved by a pruning device, in which on at the end of the shaft
25 of the pruning device by articulated joint fastened support is fastened a fixing device, on which the cutting blade is fastened adjustably parallel to the axis of the cutting blade in order to enable adjustment in regard of the distance between the
30 trunk of the tree and the cutting blade. When using the pruning device in accordance with the invention the pruning device is placed at the branch of the tree in such a way, that the cutting support device is against the trunk of the tree and the cutting
35 blade of the pruning device is moved against the branch of the tree. When cutting the branch of the tree the cutting support device is moving along

with the cutting blade in accordance with the trunk of the tree, whereat there is a certain distance between the cutting blade and the trunk. The distance between the cutting blade and the cutting support device is adjustable, whereby the length of the remaining stub of the branch is easily determined. The device in accordance with the invention is easy to operate, because it is not necessary to place it so accurately in regard of the branch of the tree as with the known devices must be done. One advantage is also the fact, that the sawing when using the device in accordance with the invention is performed from below upwards, whereat the branch to be cut cannot be torn off. In experiments for instance an about 30 per cent higher speed has been achieved and the damages on the trees have been around 50 per cent less compared with a hand saw. As the cutting operation is quick, the sticking danger of the saw blade does not exist, as the branch is cut entirely off.

In the following the invention is presented more in detail by referring to the attached drawing, in which

figure 1 presents the operation of a pruning device in accordance with the invention seen from the side schematically presented,

figure 2 presents one application of the pruning head of the pruning device in accordance with the invention seen from the side, and

figure 3 presents the device in accordance with figure 2 seen from another directions.

Figure 1 presents a pruning worker, who is equipped with a pruning device in accordance with the invention. To the pruning device belongs a steplessly adjustable shaft 1, at the one end of which is placed a rotatable

cutting blade 4. As the power source in this application is a combustion motor-generator combination 6, which is by a power cable 10 connected with the electric motor 7 fastened on the end of the shaft and which motor again for its part is arranged to rotate the cutting blade. The combustion motor-generator combination 6 is fastened on a rack 12 and the rack can be with the on it fastened harness 13 be put on the back of the worker. The power cable 10 is arranged to run protected inside the shaft.

In accordance with figures 2 and 3 on the end 2 of the shaft is with the help of a turning joint 14 fixed articulated the support 3. The electric motor 7 and thereto connected cutting blade 4 are fastened on the support parallel to the axis of the cutting blade adjustably with the help of the fastening device 8. In this application the fastening device is primarily arcuate corresponding to the form of the housing of the electric motor. The fastening device is fixed on its spot by means of retention screws or other as such known fastening devices. On the support is fastened further a parallel to the cutting blade running cutting support device 5, which in this application is formed of two parallel rods. The form and structure of the cutting support device can vary in the different applications of the invention. On the support has additionally at the spot of the cutting blade 4 been fastened the blade protection 9, which is arranged to prevent the falling of the arising sawdust and other debris directly on the worker.

When using the device in accordance with the invention the cutting blade is adjusted to the desired angle with the help of the adjustment joint 14 and the end of the shaft is brought near the branch of the

tree in such a manner, that the rods of the cutting support device are on both sides of the branch against the trunk of the tree. The device is moved in the direction of the branch, whereat the cutting blade
5 cuts the branch off and the stub of the branch remains. The length of the stub of the branch can be changed by adjusting the distance between the cutting blade and the rods of the cutting support device. When using the device the trunk of the tree is not damaged
10 and the stub of the branch is of desired length.

The invention is not limited to the presented favourable application, but it can vary within the frames of the inventional conception determined by the
15 claims.

CLAIMS

1. A pruning device for upright pruning of a tree, to which pruning device belongs a shaft (1), an at the end (2) of the shaft through an articulated joint fastened support (3), an at the support fastened, 5 rotatable cutting blade (4), an at the support fixed, with the cutting blade parallel running cutting support device (5) for leaning of the upright pruning device against the tree when cutting the branches as well as a with the cutting blade connected power 10 source (6, 7) for rotating of the cutting blade, c h a r a c t e r i z e d in, that on the support (3) is fastened a fastening device (8), on which the cutting blade (4) is fixed adjustably parallel to the axis of the cutting blade for adjusting of 15 the distance between the trunk of the tree and the cutting blade.

2. A pruning device in accordance with claim 1, c h a r a c t e r i z e d in, that on the support 20 (3) at the spot of the cutting blade (4) a blade protection (9) is fastened.

3. A pruning device in accordance with the claim 1 or 2, c h a r a c t e r i z e d in, that the 25 cutting support device (5) is formed by rods fixed on the end of the support (3).

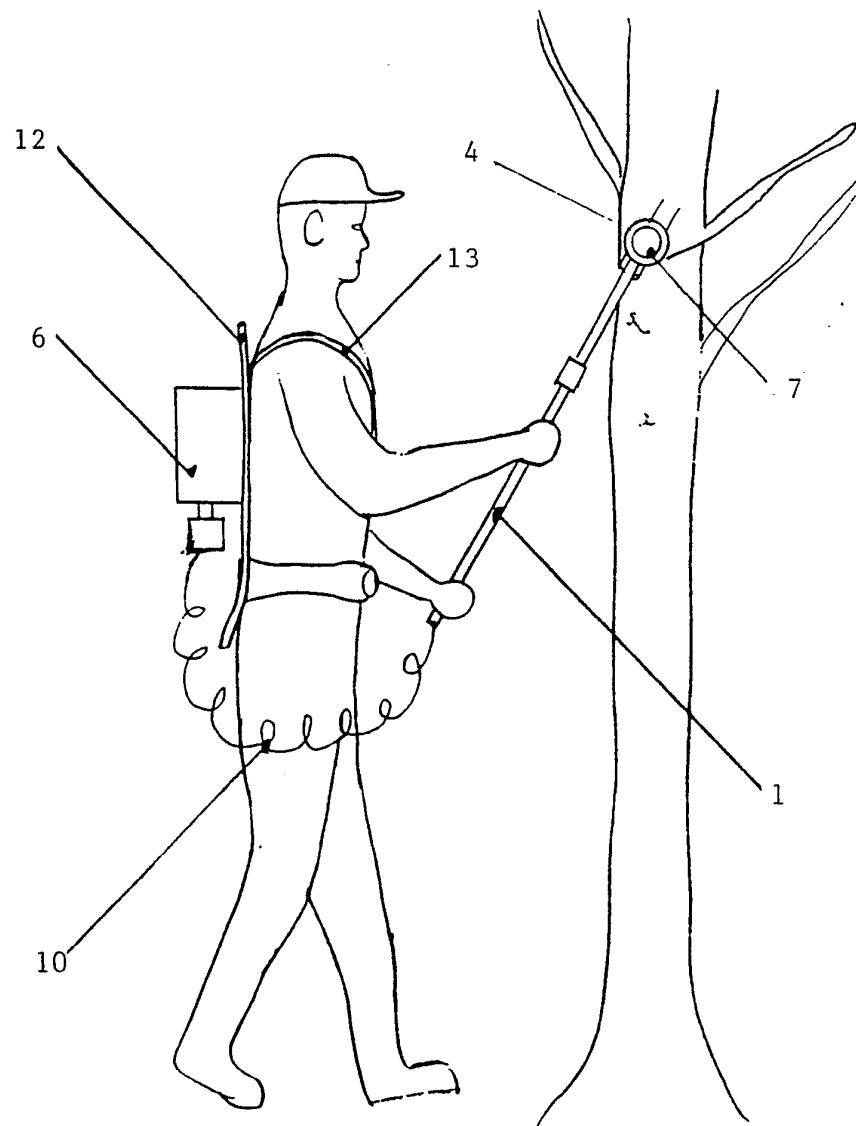


Fig. 1

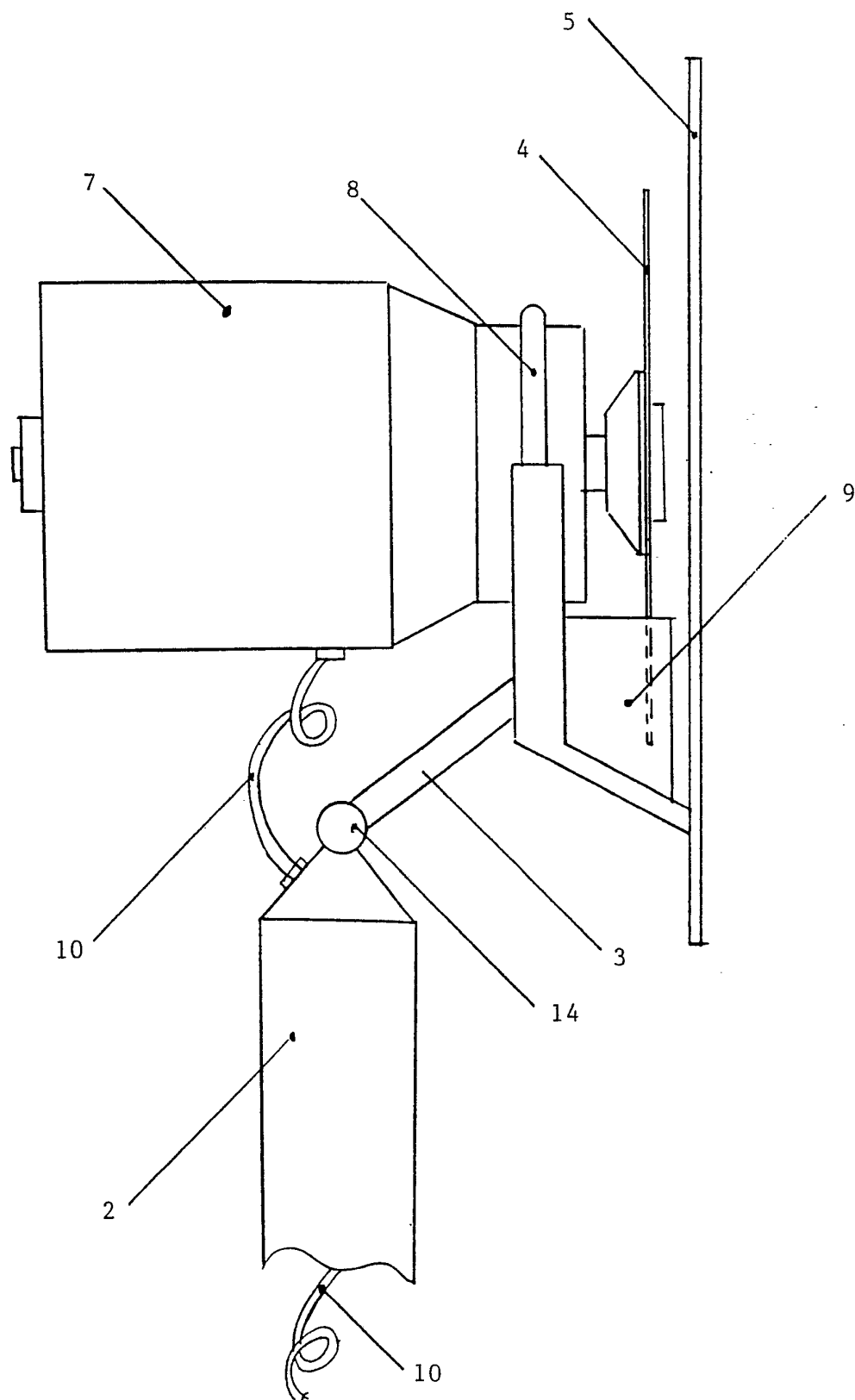


Fig. 2

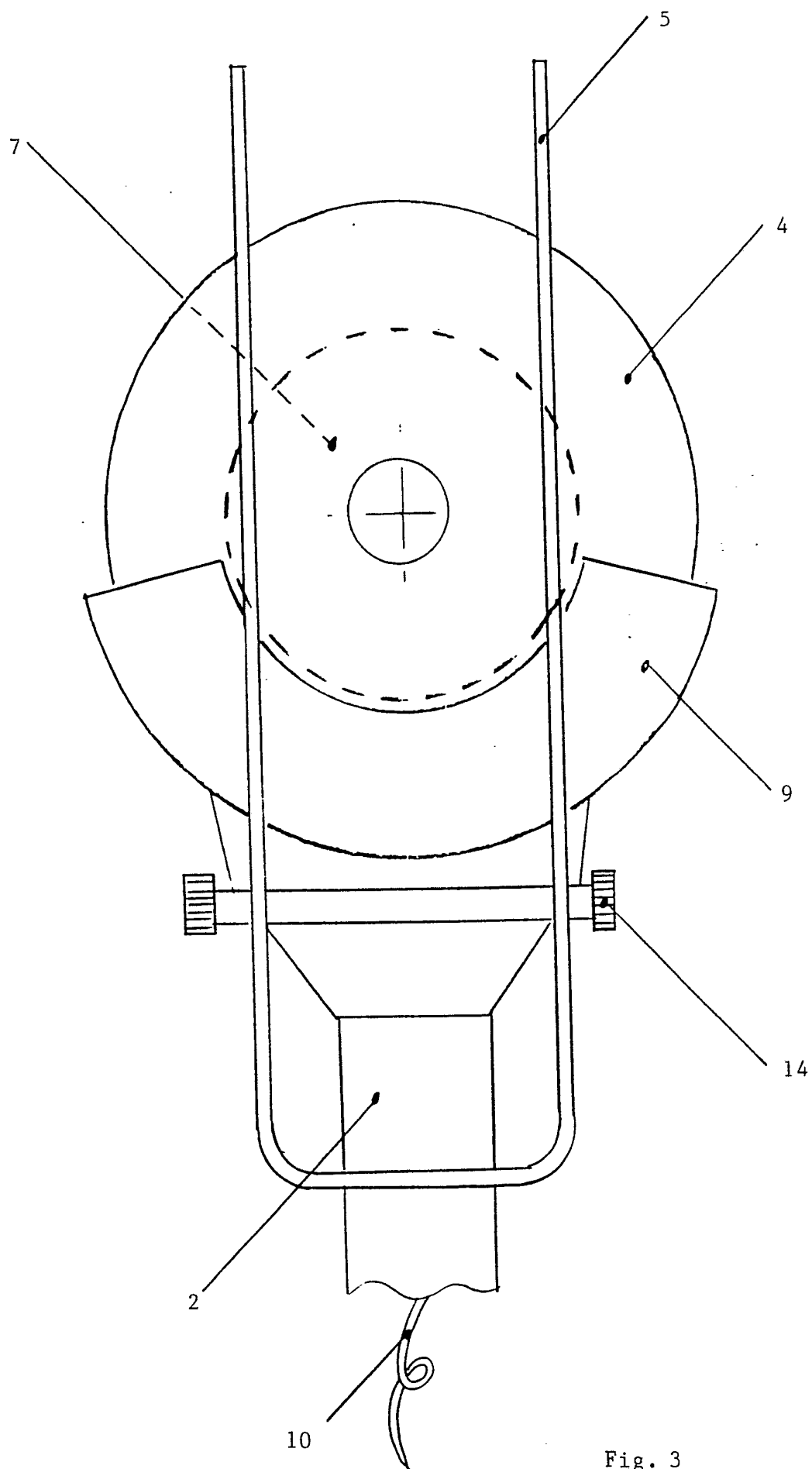


Fig. 3

INTERNATIONAL SEARCH REPORT

International Application No PCT/FI 91/00073

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC5: B 27 L 1/06, A 01 G 3/08		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC5	B 27 L; A 01 G; B 27 B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched ⁸		
SE,DK,FI,NO classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
A	SE, B, 366200 (N B ENGMAN OCH B I E JANSSON) 22 April 1974, see the whole document --	1-3
A	SE, B, 438977 (GÖRAN A NILSSON) 28 May 1985, see the whole document --	1-3
A	DE, A, 1944204 (GRONEMANN) 4 March 1971, see the whole document --	1-3
A	FR, A1, 2539269 (HAZARD ROBERT) 20 July 1984, see the whole document --	1-3
A	EP, A1, 0117848 (YAMADA MACHINERY INDUSTRIAL CO.,LTD.) 5 September 1984, see the whole document --	1-3
* Special categories of cited documents: ¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
7th May 1991	1991-06-14	
International Searching Authority	Signature of Authorized Officer	
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US, A, 3373489 (A.R. GILES) 19 March 1968, see the whole document -- -----	1-3

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/FI 91/00073**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the Swedish Patent Office EDP file on **91-03-23**
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
SE-B- 366200	74-04-22	NONE	
SE-B- 438977	85-05-28	DE-A-C- 3521685 JP-A- 61100134 US-A- 4658506	86-02-20 86-05-19 87-04-21
DE-A- 1944204	71-03-04	NONE	
FR-A1- 2539269	84-07-20	NONE	
EP-A1- 0117848	84-09-05	AU-D- 2508984 CA-A- 1207635 JP-A- 59155159	84-09-06 86-07-15 84-09-04
US-A- 3373489	68-03-19	NONE	