(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 097 743**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **82303404.6**

(51) Int. Cl.³: **E 01 H 5/06**

(22) Date of filing: **29.06.82**

(43) Date of publication of application:
11.01.84 Bulletin 84/2

(84) Designated Contracting States:
AT BE CH DE FR IT LI LU NL SE

(71) Applicant: **OGDEN ELECTRONICS LTD.**
c/o The Ogden Group of Companies
Otley Yorkshire(GB)

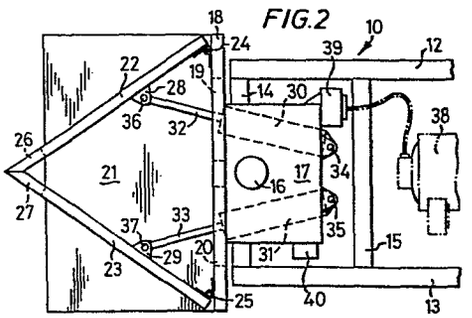
(72) Inventor: **Steel, James**
Cairn House Farm
Dalton Newcastle-Upon-Tyne(GB)

(74) Representative: **Gordon, Richard John Albert et al,**
F.J. CLEVELAND & COMPANY 40-43, Chancery Lane
London WC2A 1JQ(GB)

(54) **Improved snow clearing device.**

(57) A snow plough (10) comprises a pair of blades (22, 23) which, in a normal position, comprise a 'V' formation, the trailing edge of each of which is pivotally connected to support means (18). The blades (22, 23) are operated alternately by drive means (30, 31, 32 and 33) so that, when the plough (10) is driven forwardly into snow with the apex of the 'V' leading, the snow is swept laterally of the path of the plough (10) alternately in opposite directions.

FIG.2



EP 0 097 743 A1

DESCRIPTION

This invention relates to apparatus for diverting a load and particularly, but not especially, for apparatus for clearing a path through snow by diverting snow in a direction transversely of the path.

It is known to provide snow ploughs in which a blade is provided at an angle so that snow is diverted transversely of the direction of motion of the plough through snow.

While known snow ploughs are suitable for clearing snow in certain conditions, they are not entirely satisfactory when used for clearing a path along a road lined with hedges because, as the snow is diverted laterally of the plough during forward motion of the plough, the snow becomes compacted between the plough and an adjacent hedge or hedges causing a build up of snow and results eventually in a barrier of frozen compacted snow impeding further progress of the plough.

According to the present invention, there is provided apparatus for diverting a load comprising guide means adapted to be directed towards the load for guiding the load laterally of a direction of motion towards the load, support means for the guide means, the guide means being movable relative to the support means with a component of velocity in a direction laterally of the said direction of motion, and drive means for moving the guide means relative to the support means so that, when the apparatus is directed in the said direction towards the load and the guide means is moved by the drive means, the load is swept in a lateral direction of the said direction.

The guide means may be adapted to move perpendicular to said direction and said lateral direction.

The guide means may comprise a pair of components adapted to form a wedge, each component being movable relative to said support means.

Each said component may be pivotally connected to the support means.

The guide means may co-operate with a platform for receiving the load, the components being operable to sweep across a surface of the platform.

The support means may be adapted to be detachably secured to a vehicle.

The drive means may be adapted to be controlled by operation of the vehicle.

Following is a description, by way of example only and with reference to the accompanying drawings, of one method of carrying the invention into effect.

In the drawings :-

FIGURE 1 is an elevation of an apparatus in accordance with the present invention.

FIGURE 2 is a plan view of the apparatus in an operating condition.

FIGURE 3 is a plan view of the apparatus

in another operating condition, and

FIGURE 4 is a plan view of the apparatus in a further condition of operation.

Referring now to the drawings, there is shown a snow plough 10 comprising a frame 11 adapted to be secured to the front of a vehicle, the frame comprising a pair of spaced parallel members 12, 13 connected by a transverse forward cross member 14 and a transverse rearward cross member 15 extending parallel to and rearwardly of the cross member 14. The forward cross member 14 has substanding from a central portion thereof a mast 16 on which is slidably mounted a housing 17, the housing being moved upwardly longitudinally of the mast 16 by hydraulic pressure from a ram (not shown), downward movement of the housing 17 longitudinally of the mast 16 being under controlled reduction of pressure in the ram. The housing 17 has secured to a forward surface thereof an upstanding back plate 18 having apertures 19, 20. The back plate 18 has extending forwardly from a lower portion thereof a platform 21 and at opposite sides of a front surface thereof the back plate 18 has pivotally connec-

ted thereto a corresponding one of a pair of movable plates 22, 23, the movable plate 22 being pivotally connected to the back plate 18, as shown at 24 and the movable plate 23 being pivotally connected to the back plate 18 as shown at 25. A forward edge portion of the movable plate 22 is provided with a rearwardly extending slot 26 and a forward edge portion of the movable plate 23 is provided with a rearwardly extending slot 27. The movable plate 22 is provided with a rearwardly extending knuckle bracket 28 and the movable plate 23 is provided with a rearwardly extending knuckle bracket 29.

The housing 17 has located therein a pair of cylinders 30, 31 for operating a corresponding one of a pair of rams 32, 33. An end portion of the cylinder 30 remote from the ram 32 is pivotally connected to the housing 17, as shown at 34 and an end portion of the cylinder 31 remote from the ram 33 is pivotally connected to the housing 17 as shown at 35. The ram 32 extends through the aperture 19 of the back plate 18 and is pivotally connected at an end portion thereof remote from the cylinder 30 to the bracket 28 of the movable plate 22 as shown at 36. The ram 33 extends through the aperture 20

in the back plate 18 and an end portion thereof remote from the cylinder 31 is pivotally connected to the bracket 29 of the movable plate 23 as shown at 37.

Supply of hydraulic fluid is directed to the cylinders 30, 31 from a control valve 38 of a power take-off pump on the vehicle which supplies a control valve 39 mounted on the housing 17. The control valve 39 is connected to the cylinders 30, 31 by way of a change-over valve 40 which is arranged to supply hydraulic fluid alternately to the cylinders 30, 31.

In use, the members 12, 13 of the frame 11 are secured to the front of a vehicle and the control valve 39 is connected to the power take-off control valve 38 of the vehicle. The hydraulic cylinder (not shown) for raising the housing 17 relative to the mast 16 also is connected to the control valve 38 of the power take-off apparatus.

The control valve 38 is operated so that the rams 32, 33 locate the movable plates 22, 23 in the position shown in Figure 2. The vehicle then is

driven forwardly towards snow to be cleared and the snow is diverted laterally of the platform 21 by the plates 22, 23. When the depth of snow in a direction forwardly of the plough 10 is such that ground engaging wheels of the vehicle lose traction with the ground, the driver of the vehicle operates the control valve 38 of the power take-off apparatus fo the vehicle so that the control valve 39 supplies hydraulic fluid to the cylinder 31 and actuates the ram 33 causing the movable plate 23 to pivot on the axis 25 in an outward direction of the platform 21 to the position shown in Figure 3. In consequence, snow is swept to the left of the platform by movement of the plate 23. The hydraulic fluid forced out of the cylinder 31 as the ram 33 is urged outwardly of the cylinder is directed to the cylinder 30 causing the ram 32 to be drawn inwardly of the cylinder 30 whereby the movable plate 22 is pivoted on the axis 24 inwardly of the platform 21 to a position substantially parallel to the back plate 18, as shown in Figure 3. When the ram 33 has extended to a limiting position out of the cylinder 31, the change over valve 40 is operated to reverse the flow of hydraulic fluid whereby the ram 32 is operated to move outwardly of the cylinder 30

and the ram 33 is drawn inwardly of the cylinder 31. The result is that the movable plates 22, 23 pivot about their respective axes 24, 25 in a clock-wise direction, when viewed in Figure 3, and snow which had collected on the platform 21 during forward motion of the vehicle is swept from the platform by movement of the movable plate 22. When the ram 32 has extended to a limiting position out of the cylinder 30, the movable plates 22, 23 are located in the positions shown in Figure 4.

It will be appreciated, therefore, that as the vehicle continues to move forwardly, the movable plates 22, 23 are pivoted about their respective axes 24, 25 in synchronism one with another to sweep snow which collects on the platform 21 successively to the left and to the right of the forward path of movement of the vehicle. In this manner, less tractive effort is required by the vehicle to push the plough 10 into the snow because the plough 10 is continually shedding the snow instead of compacting the snow in advance of the vehicle to an extent where the vehicle ground wheels lose traction with the ground.

If the snow drifts are encountered during

forward motion of the vehicle, or a part of a road to be cleared is lined with hedges or banks, the control valve 38 from time to time is operated so as to arrest pivotal movement of the plates 22, 23 when the plates are in either of the positions shown in Figure 3 or Figure 4 and the vehicle is driven forwardly into the snow until the ground wheels of the vehicle lose traction or until the platform 21 is covered with snow. The plough 10 then is raised on the mast 16 to a level above the side hedges or higher than the depth of snow, and the control valve 38 subsequently is operated with a result that the movable plates 22, 23 are again operated sequentially by the respective rams 32, 33 causing the snow located on the platform 21 to be swept over the hedges or the surface of the snow. The control valve 38 subsequently is operated to control lowering of the plough 10 on the mast 16 and the procedure is repeated.

In this manner, the plough operates effectively as a digger with the advantage that snow which collects on the platform 21 is deposited without the necessity of turning the plough.

CLAIMS

1. Apparatus for diverting a load comprising guide means adapted to be directed towards the load for guiding the load laterally of a direction of motion towards the load, support means for the guide means, the guide means being movable relative to the support means with a component of velocity in a direction laterally of the said direction of motion, and drive means for moving the guide means relative to the support means so that, when the apparatus is directed in the said direction towards the load and the guide means is moved by the drive means, the load is swept in a lateral direction of the said direction.

2. Apparatus as claimed in claim 1 wherein the guide means is adapted to move perpendicular to said direction and said lateral direction.

3. Apparatus as claimed in claim 1 or claim 2 wherein the guide means comprises a pair of components adapted to form a wedge, each component being movable relative to said support means.

4. Apparatus as claimed in claim 3 wherein each said component is pivotally connected to the support means.

5. Apparatus as claimed in claim 3 or claim 4 wherein the guide means co-operates with a platform for receiving the load, the components being operable to sweep across a surface of the platform.

6. Apparatus as claimed in any one of the preceding claims wherein the support means is adapted to be detachably secured to a vehicle.

7. Apparatus as claimed in any one of the preceding claims wherein the drive means is adapted to be controlled by operation of the vehicle.

8. Apparatus for diverting a load substantially as hereinbefore described and as illustrated in the accompanying drawings.

FIG.1

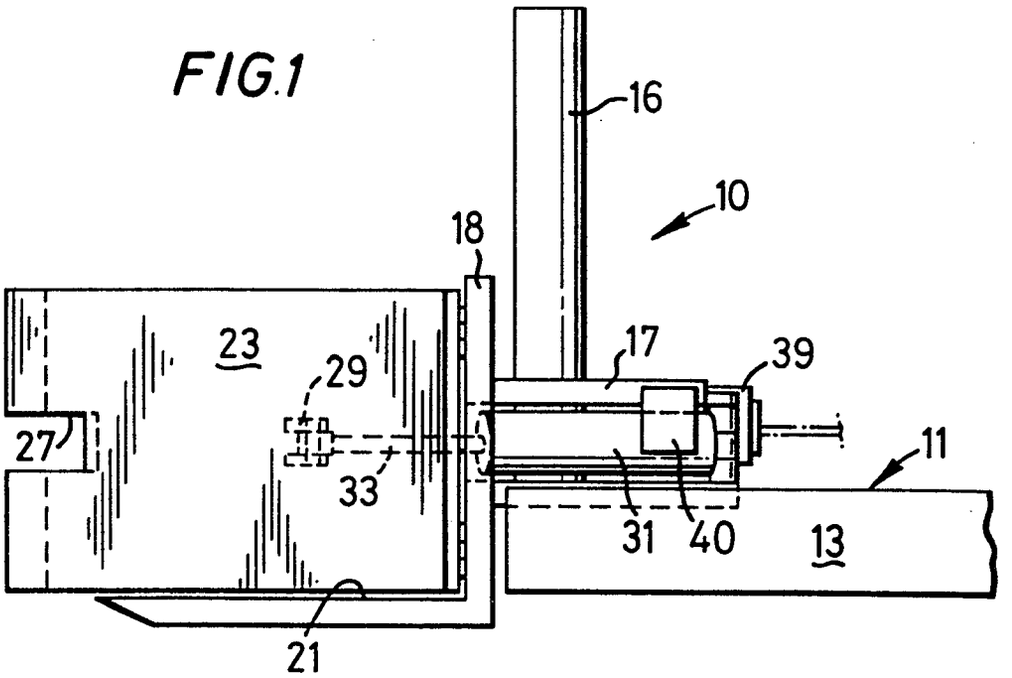
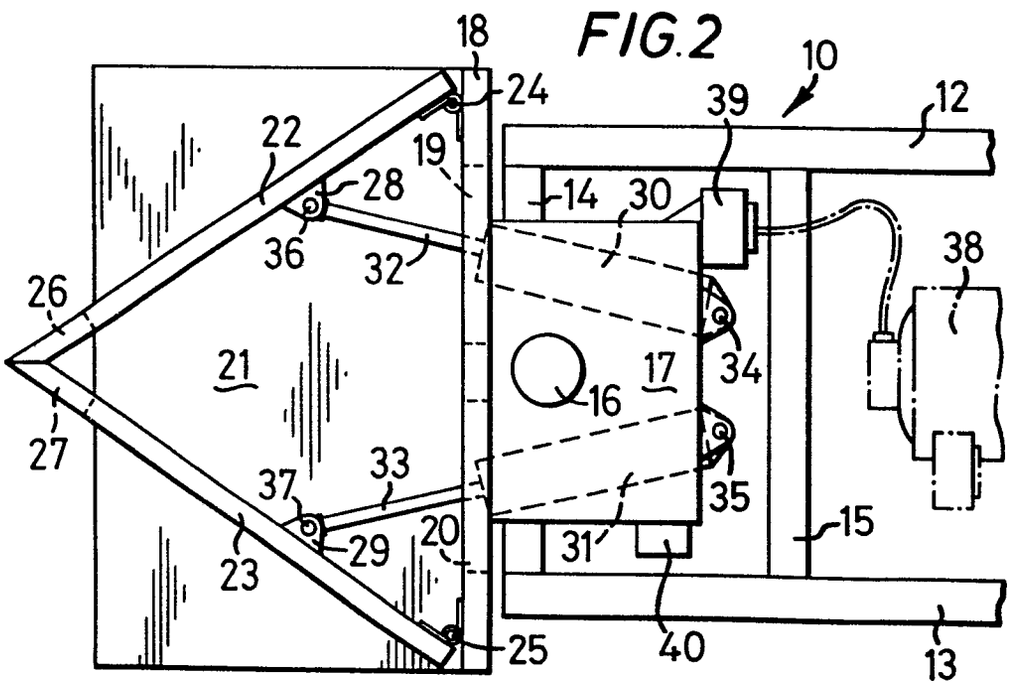

16
10
18
23
29
17
39
27
33
11
31
40
13
21

FIG.2


18
24
10
39
12
22
19
28
14
30
36
32
38
26
21
16
17
34
27
33
37
35
29
20
31
15
23
25
40
13

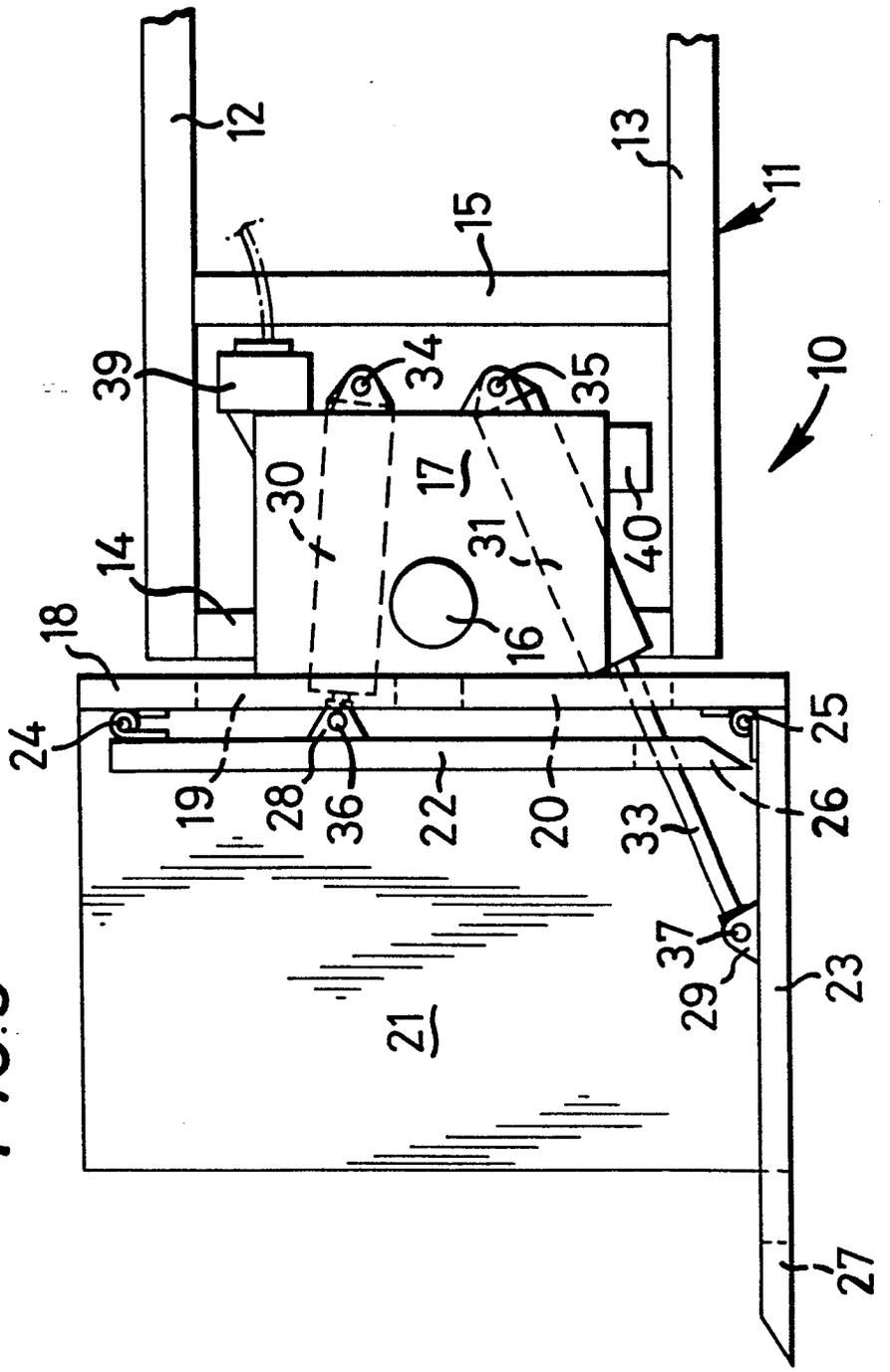
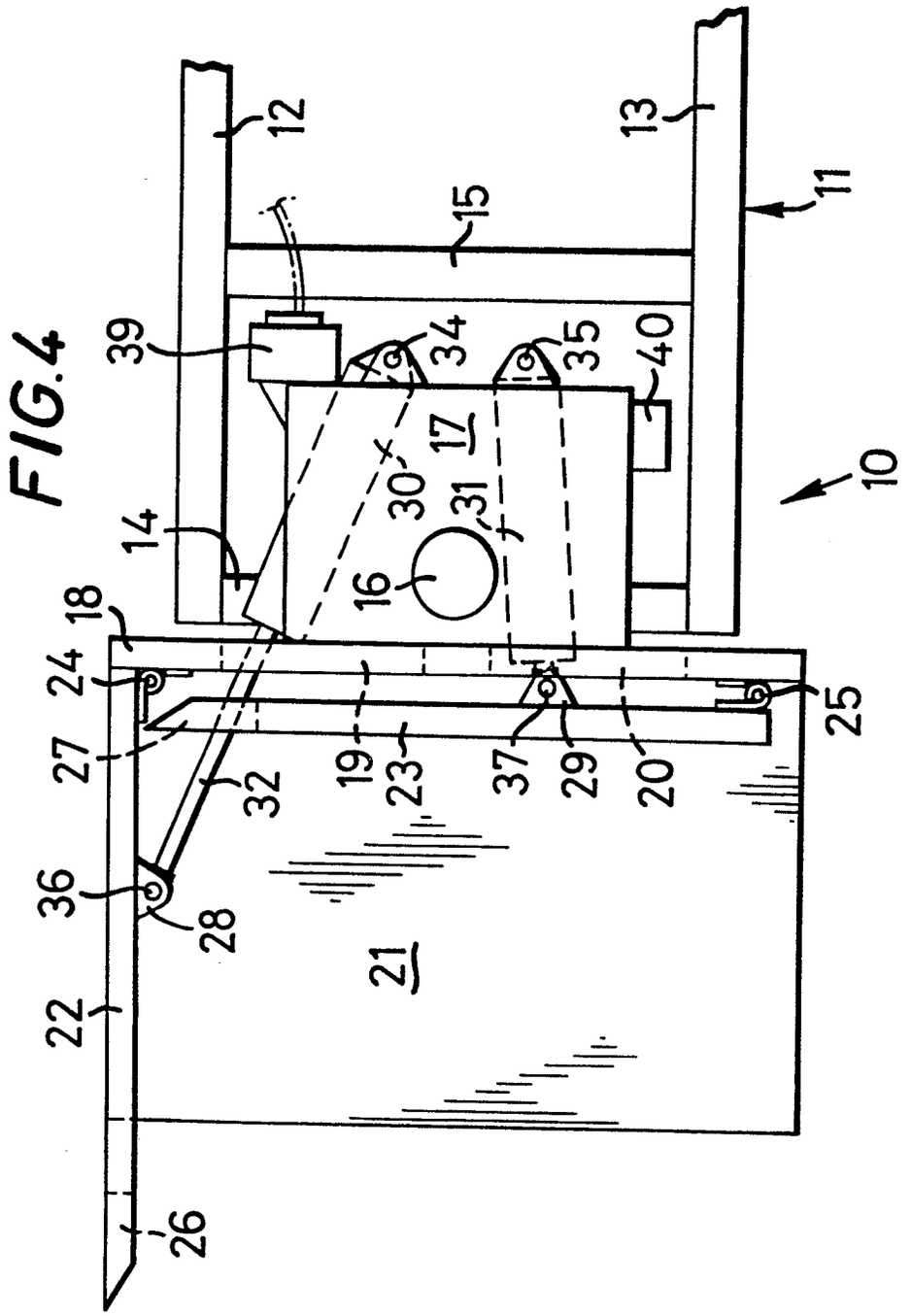

12
13
11
15
10
39
34
35
30
17
31
40
14
16
18
24
25
19
28
36
22
20
33
26
37
29
23
21
27

FIG.3

FIG.4


12
13
11
15
39
34
35
40
17
30
31
10
14
16
18
24
25
27
32
19
23
37
29
20
36
28
21
22
26

European Patent Office

EUROPEAN SEARCH REPORT

0097743
Application number

EP 82 30 3404

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	CH-A- 562 374 (MELLA) *The whole document*	1-3,8	E 01 H 5/06
Y	FR-A-2 077 118 (BIALLER) *The whole document*	1,8	
A	CH-A- 126 365 (STEIMER) *Page 2, left-hand column, line 19 - right-hand column, line 3; figures 1,3,4*	1,8	
A	US-A-3 028 692 (BROCK) *Column 3, line 45 - column 4, line 35; figures 10-16*	1,8	
A	US-A-3 881 261 (LAVOIE) *Column 1, lines 54-67; column 2, lines 35-40; figures 1,5a-5d*	1,8	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) E 01 H
A	US-A-3 422 552 (GABEL) *Column 1, line 53 - column 2, line 4; figures 1-4*	2,7,8	
A	US-A-1 656 613 (WALTER) *Page 1, lines 85-105; page 2, lines 4-15; figures 1,2*	4-6,8	
A	US-A-4 074 448 (NIEMELA)		

-/-

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	04-03-1983	SPIEGEL R.P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503. 03.82

European Patent Office

EUROPEAN SEARCH REPORT

0097743
Application number

EP 82 30 3404

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)
A	US-A-3 599 355 (LOCKWOOD)		
A	DE-C- 573 437 (ZSCHÖRNIG)		

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	04-03-1983	SPIEGEL R.P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503. 03.82