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(54) **Snowplough blade with adjustable width**

(57) A snowplough blade with adjustable width, of the type including: a first, stationary blade body (L1), supported by a frame (S) for suspension and coupling to a respective machine (O); and a second blade body (L2), connected to the first blade body (L1) by mutual coupling means, sliding and moving with respect to the latter, operated by actuating means (A) between a retracted po-

sition (R) and an extreme advanced position (EA), in which the snow-removing surface of the snowplough blade (L) is maximum. The second blade body (L2) is situated in front of the first blade body (L1). The first blade body (L1) includes a tubular cross-beam (1), connected to the suspension and coupling frame (S) and housing the actuating means (A).

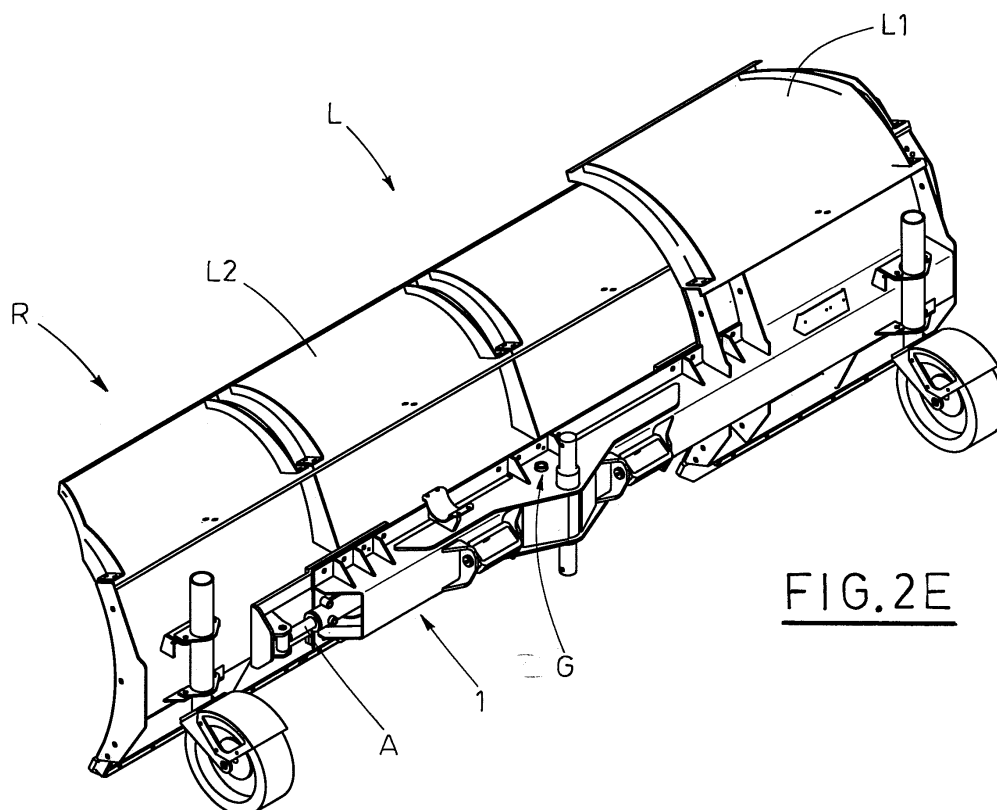


FIG. 2E

Description

[0001] The present invention relates to snowplough blades, that is apparatuses carried by suitable machines (agricultural tractors, trucks) in order to remove the snow from the ground.

[0002] The machines are operated to adjust their snow removing front part according to the contingent needs and the characteristics of the road paths (roads with reduced width, with one or more lanes, etc.)

[0003] Different types of snowplough blades with variable width are known to those expert in the field, and substantially they include: a first stationary blade body, carried by a frame for suspension and coupling to a respective vehicle. The first stationary blade body includes, situated in its lower part, shock absorbers for coupling with a flexible scraper which bends with respect to the first blade body in the direction opposite to the blade forward movement in case of collisions with obstacles or irregularities of the road surface; a second blade body, connected with its rear part to the first blade body, by means of mutual coupling, sliding and moving with respect to the latter between an inner retracted position, in which the front of the snowplough blade is formed only by the first blade body, and an extreme advanced position, in which the front of the blade is formed by the first and second blade bodies, arranged abreast, with the second blade body situated on the right with respect to the vehicle forward movement direction and having, likewise in its lower part, shock absorbing means for coupling with a related scraper.

[0004] In particular, the Utility Model Application no. BO2002U 000069, of the same Applicant, is distinguished by the fact that the first stationary blade body forms, on its rear surface, facing the second moving blade body, a shoulder for supporting mutual coupling means, so as to keep the second blade body at a distance with respect to the first blade, to delimit a free space.

[0005] When the second blade body is in the inner retracted position, the scraper of the first blade body moves into the free space while bending because of collision with obstacles or irregularities of the road surface.

[0006] In spite of the many technical-functional advantages of the above mentioned solution, some drawbacks must be pointed out, with reference to the enclosed Figures related to prior art, in which Figures 1A, 1B, 1C, 1D are corresponding plan views of the snowplough blade in as many significant configurations, and Figure 4 is a scheme of a snowplough machine, having a third lateral blade in work configuration.

[0007] The snowplough blade AL includes: a first blade body AL1, supported by a structure AS for suspension and coupling with a respective operative vehicle (not shown); and a second blade body AL2, connected to the rear part of the first blade body AL1, parallel thereto, by means of mutual sliding coupling means, and moved with respect to the first body between an inner retracted position (Figures 1A, 1C) and an extreme advanced po-

sition (Figures 1B, 1D) by operation of hydraulic jack, interposed between the structure AS and the second blade body AL2.

[0008] As it can be noted, the space occupied by the suspension and coupling structure AS connected to the first blade body AL1 defines a limit to the width of the second blade body AL2, when it is in the retracted position.

[0009] This fact limits also the maximum width of the snowplough blade AL as a whole, also considering that the maximum width of the first blade body AL1 is related to the vehicle width, for space and safety reasons.

[0010] Another width limit of the second blade body AL2 is imposed by practical reasons: actually, the vehicle driver can find it difficult to estimate the real dimension of the second blade body AL2 in extreme advanced position (see for instance Figure 1C) during the snow clearing, due to the his unfavorable position in the cabin (conventionally on the left).

[0011] This obviously results in a high risk of collisions and damages to the objects out of the road.

[0012] Another disadvantage of this configuration results from a limited, or lacking, utility of the lateral snowplough blade, situated on the right side (with respect to the forward movement direction) of some vehicles, when the second blade body AL2 is brought to the extreme advanced position (see Figure 4).

[0013] Therefore, the object of the present invention is to propose a snowplough blade with adjustable width, which can avoid the reported disadvantages of the prior art.

[0014] Another object of the present invention is to propose a snowplough blade, that, in minimum front width condition, allows the operative vehicle, to which it is connected, to operate in symmetry condition and that, in maximum front width condition, makes up a total dimension wider than the known solutions.

[0015] A further object of the present invention is to propose a snowplough with adjustable width, obtained according to a reliable and functional technical solution, whose costs are relatively limited with respect to the purposes to be obtained.

[0016] The above mentioned objects are obtained in accordance with the contents of the claims.

[0017] The characteristic features of the invention, which do not appear from what has been just said, will be better pointed out in the following, in accordance with the contents of the claims and with the help of the enclosed figures, in which:

- Figures 1A, 1B, 1C, 1D are corresponding plan views of a known technical solution (in this case the one described in the Application BO2002U 000069) in as many significant configurations;
- Figures 2A, 2B, 2C, 2D are plan views of the snowplough blade proposed by the invention in as many significant configurations;

- Figure 2E is a partial, perspective view of the proposed snowplough blade;
- Figure 2F is a schematic, rear and partial view of the snowplough blade, according to the invention;
- Figure 3 is a schematic, top view, comparing two possible positions of the driver's cabin in a snowplough carrying vehicle;
- Figure 4 is a schematic, top view of a snowplough carrying vehicle of known type, equipped with a lateral blade;
- Figure 5 is a schematic, top view of a vehicle, equipped with a lateral blade and carrying the snowplough blade proposed by the present invention.

[0018] With regard to the enclosed Figures, the reference L indicates the snowplough blade with adjustable width as a whole, proposed by the present invention. The snowplough blade L includes a first, stationary blade body L1, supported by a frame S, of a type known to those skilled in the field and thus not described in detail in its various elements, for suspension and coupling with a respective operative vehicle O (shown schematically only in Figures 4, 5).

[0019] A second blade body L2 is connected to the front of the first blade body L1, parallel thereto, by mutual coupling means of sliding type (not shown as known), and is operated to move in translation with respect thereto, by corresponding actuating means A, connected to said suspension frame S, between a retracted position R, in which the snow-removing surface of the snowplough blade L is formed only by the second blade body L2 (Figures 2A, 2C), and an extreme advanced position EA, in which the snow-removing surface of the snowplough blade L is formed by two blade bodies L1, L2, arranged one beside the other and with the second blade body L2 on the left of the first one (Figures 2B, 2D).

[0020] The first blade body L1 includes a tubular cross-beam 1, shaped in a suitable way to be connected externally to the suspension and coupling frame S.

[0021] Moreover, the tubular cross-beam 1 houses the actuating means A, including a hydraulic jack, whose ends are fastened respectively to the cross-beam 1 and to the second blade body L2.

[0022] According to the example shown in Figure 2F, the inner end G of the jack A, coupling it to the tubular cross-beam 1 is situated near the center line of the frame S.

[0023] It is to be noted that the snowplough blade L is symmetrical to the center line of the machine O when the snow-removing surface is minimum, that is when the second blade body L2 is in the retracted position R.

[0024] According to the present invention, the connection of the suspension and coupling frame S to the tubular cross-beam 1, integral part of the first blade body L1, is

not a limit for the width dimension of the second blade body L2, and consequently of the moving part of the snowplough blade L, as it occurred in the prior art and as it is possible to deduce comparing Figures 2A, 2B, 2C, 2D, with Figures 1A, 1B, 1C, 1D.

[0025] For example, once the width of the second blade body L2 has been determined (equal to the minimum snow-removing surface of the snowplough blade L), the first blade body L1 can have variable dimensions, up to a width comparable with the width of the second blade body L2.

[0026] This is made possible by providing a hydraulic jack extending along the whole length of the tubular cross-beam 1.

[0027] Therefore, advantageously, it is possible to obtain snowplough blades with adjustable width, with a long stroke between the minimum and maximum snow removing surfaces, thus avoiding successfully the disadvantages of the prior art reported in the introductory note. In this way, it is possible to adapt the snow-removing surface of the snowplough blade L to a variety of road and highway paths, in relation to their width, thus obtaining a considerable operation flexibility.

[0028] Figure 3 shows schematically, indicated with a continuous and broken lines, the position of the cabin of the machine O with respect to the snowplough blade L, in the maximum snow-removing surface configuration, respectively according to the invention and to the prior art.

[0029] As it can be seen, according to the present invention, the driver's position is closer to the first blade body L1 and this allows the driver to drive the operative vehicle O safely and to position the snowplough blade L in a better way close to the right side of the road, thus reducing considerably the risk of collision with, and/or damages to, objects out of the road.

[0030] Another advantage of the present invention can be seen in operative vehicles O having a lateral blade 2, situated on their right with respect to the movement direction (see Figure 5).

[0031] In this case, the total snow-removing surface removing the snow from the road surface is further increased.

[0032] Another advantage of the invention lies in the fact that it has conceived a snowplough blade with adjustable width, obtained according to a reliable and functional technical solution, whose costs are relatively contained with respect to the achieved advantages.

[0033] It is understood that what above has been described as a mere, not limiting example. Therefore, it is obvious that any changes or variants applied thereto remain within the protective scope defined by the following claims.

Claims

1. Snowplough blade with adjustable width, including: a first blade body (L1), supported stationary by a

frame (S) for suspension and coupling to an operative vehicle (O); a second blade body (L2), slidingly connected to said first blade body (L1) by mutual coupling means, and operated by actuating means (A) connected to said suspension frame (S), so that said second blade body moves with respect to said first blade body (L1) between a retracted position (R), in which the snow-removing surface of said snowplough blade (L) is minimum, and an extreme advanced position (EA), in which the snow-removing surface of said snowplough blade (L) is maximum and is formed by said blade bodies (L1, L2), arranged one beside the other, said snowplough blade (L) being **characterized in that** said second blade body (L2) is situated in front of said first blade body (L1) and **in that** the operation of the second blade body (L2) to said extreme advanced position (EA) determines its sliding leftwards with respect to said first blade body (L1).

2. Snowplough blade, according to claim 1, **characterized in that** said first blade body (L1) includes a tubular cross-beam (1), which is connected to said suspension and coupling frame (S) and whose inner space is occupied, at least partially, by said actuating means (A).
3. Snowplough blade, according to claim 1, **characterized in that** said actuating means (A) include a hydraulic jack housed inside said tubular cross-beam (1) and functionally interposed between the tubular cross-beam (1) and said second blade body (L2).
4. Snowplough blade, according to claim 1, **characterized in that** said snow-removing surface of the snowplough blade (L) is formed only by said second blade body (L2), when the latter is in said retracted position (R).
5. Snowplough blade, according to claim 1, **characterized in that** said snowplough blade (L) is symmetrical to the center line of said machine (O), when said snow-removing surface is minimum.

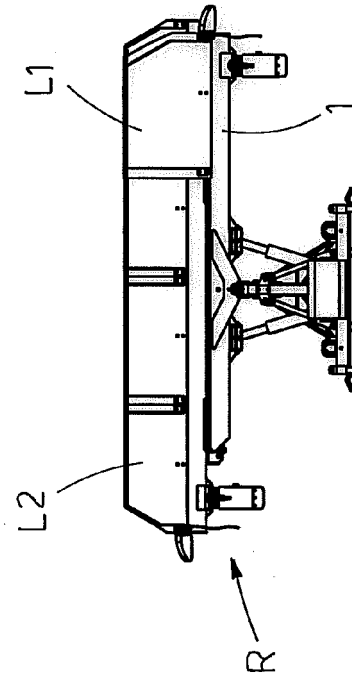
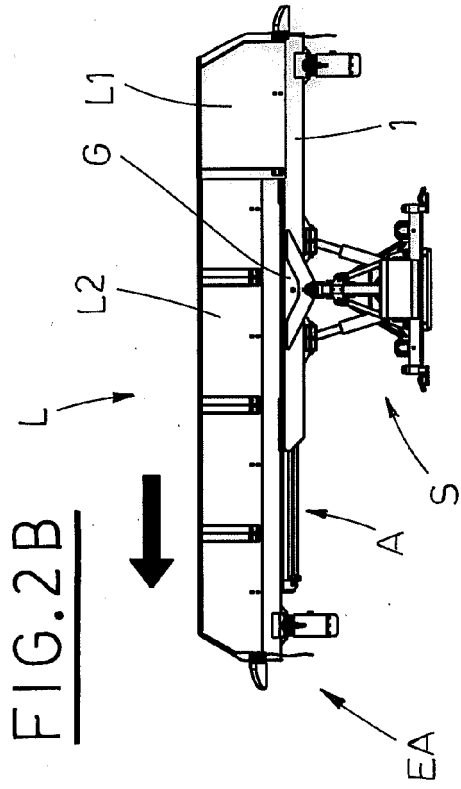


FIG.2A

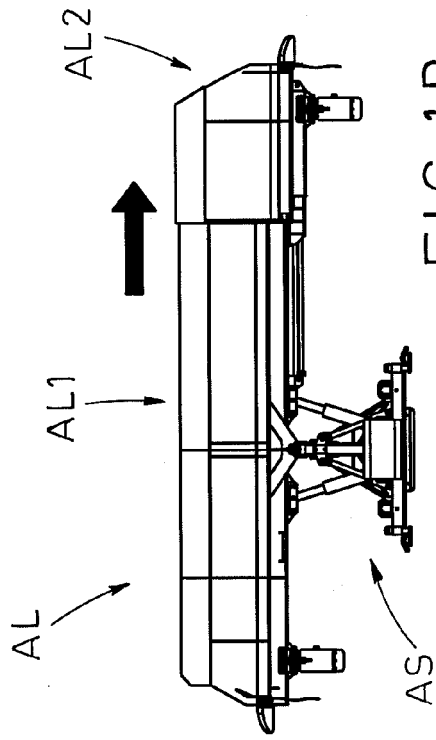


FIG.1B

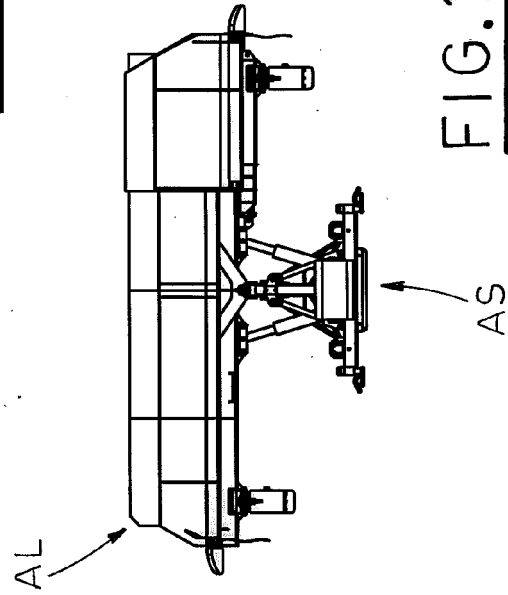
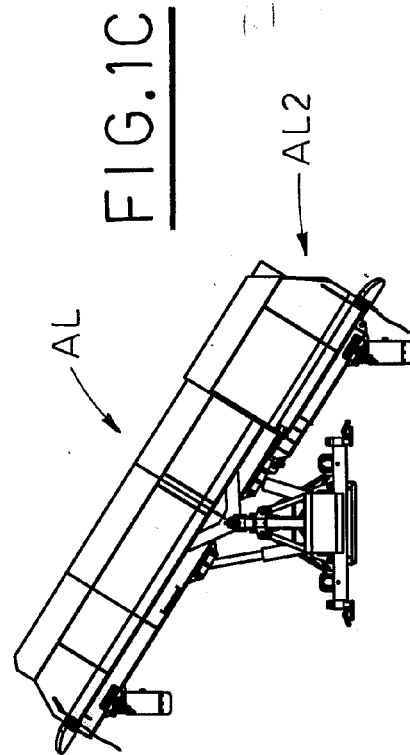
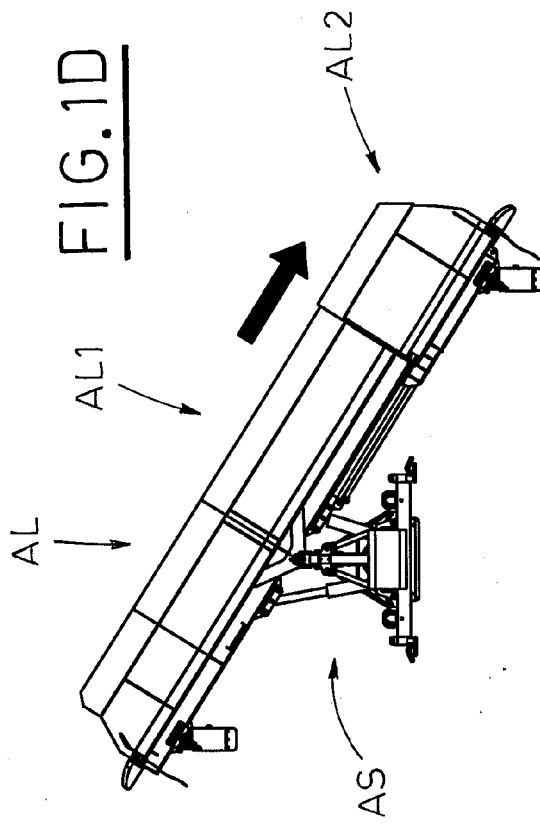
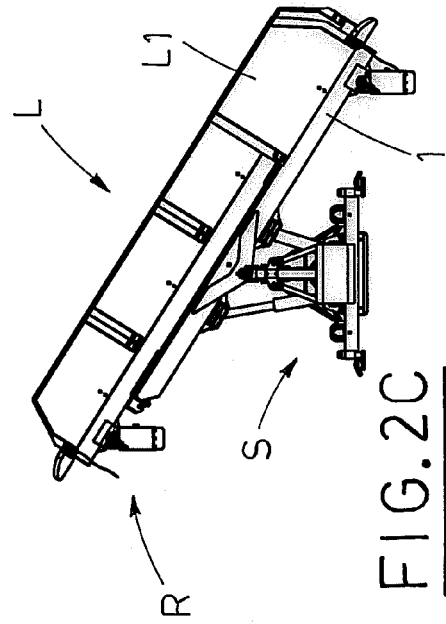
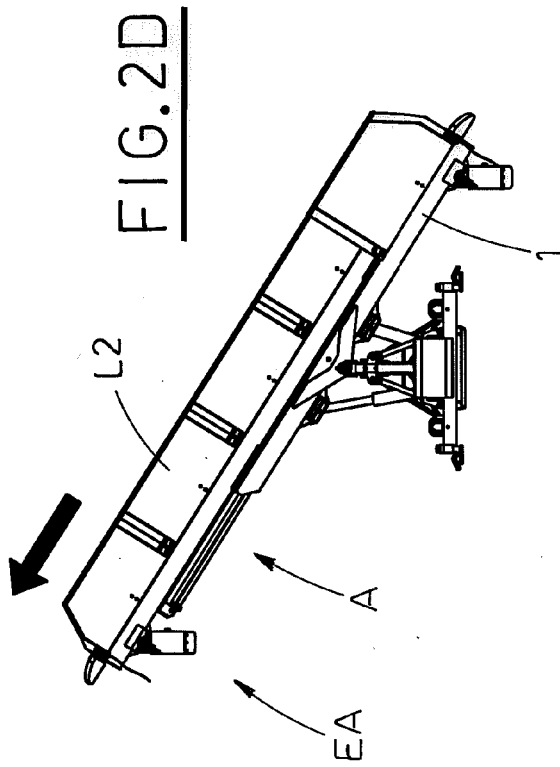
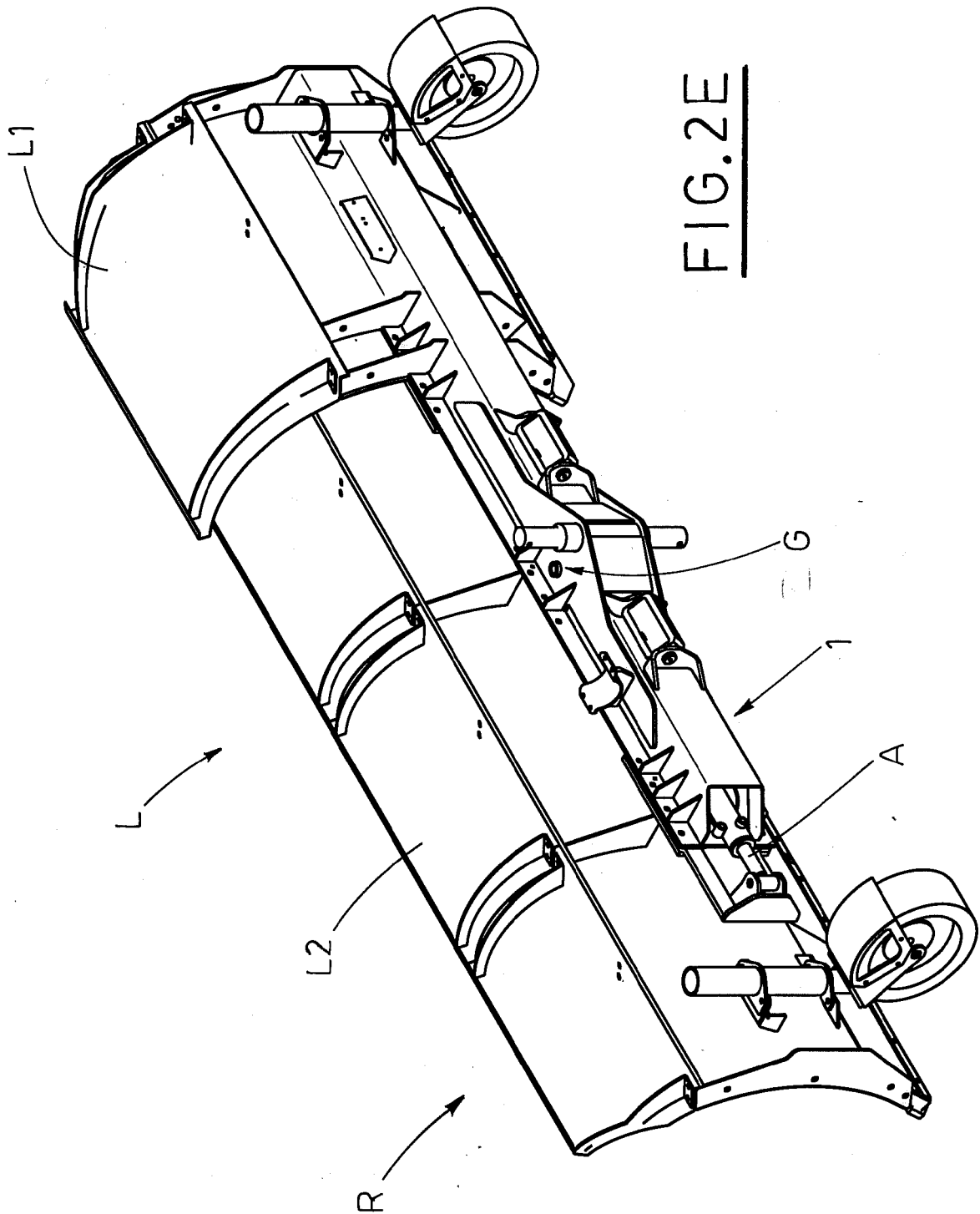


FIG.1A





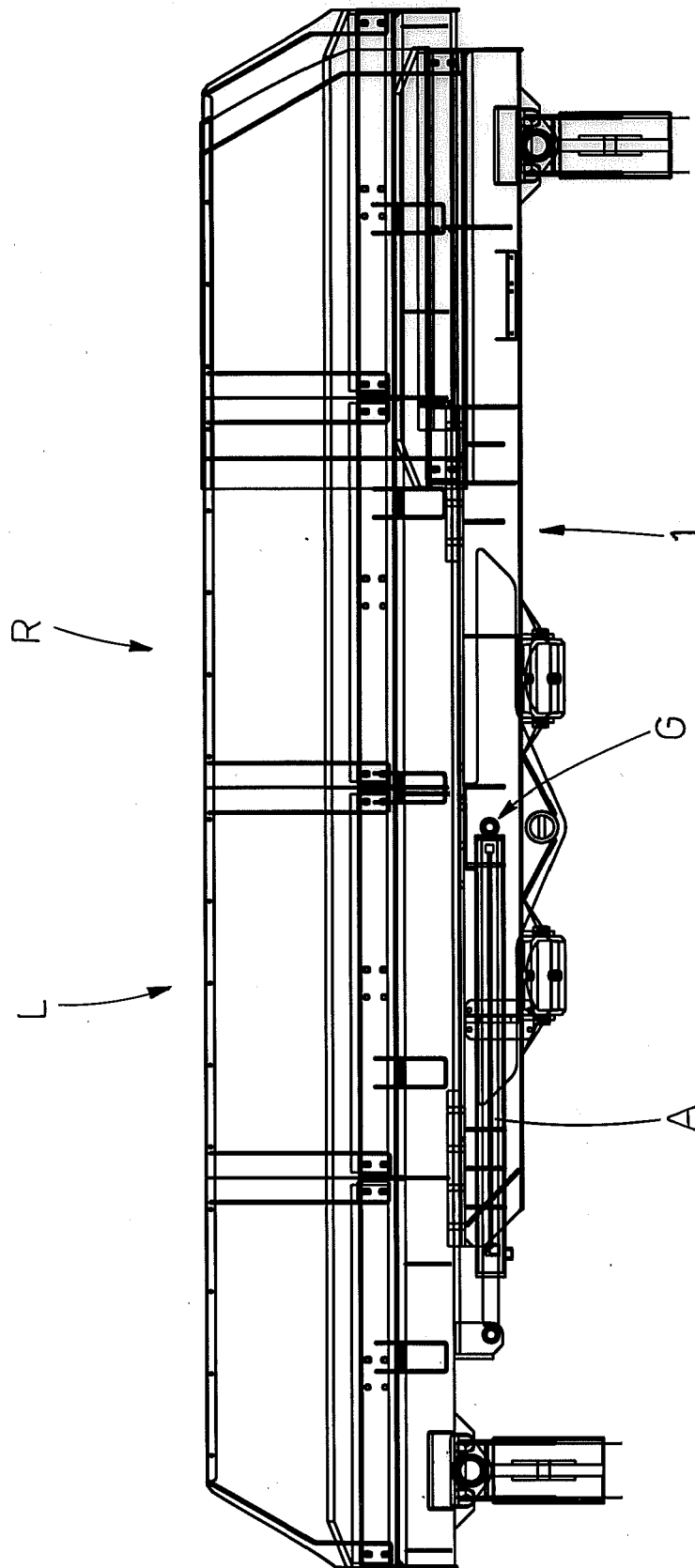
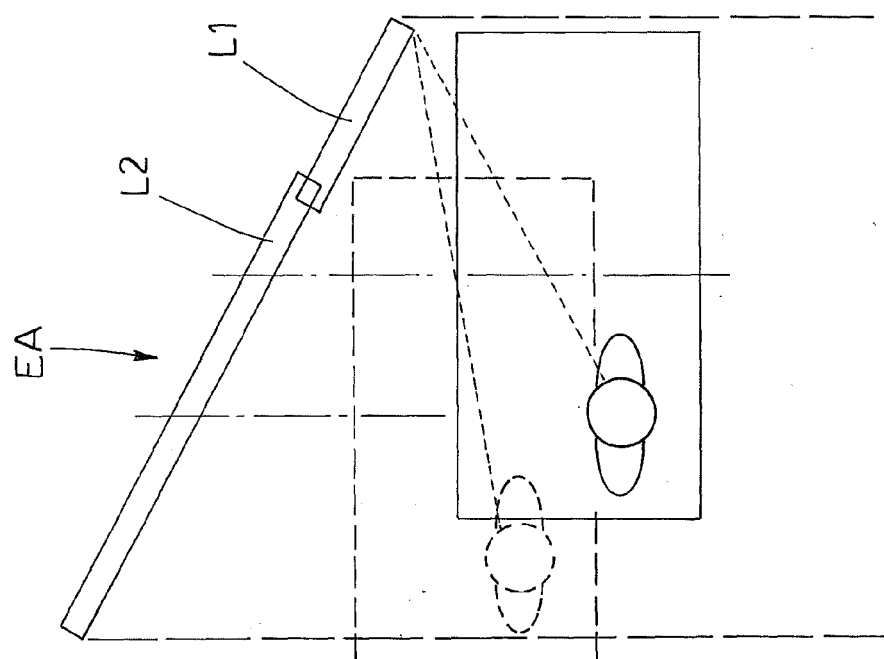
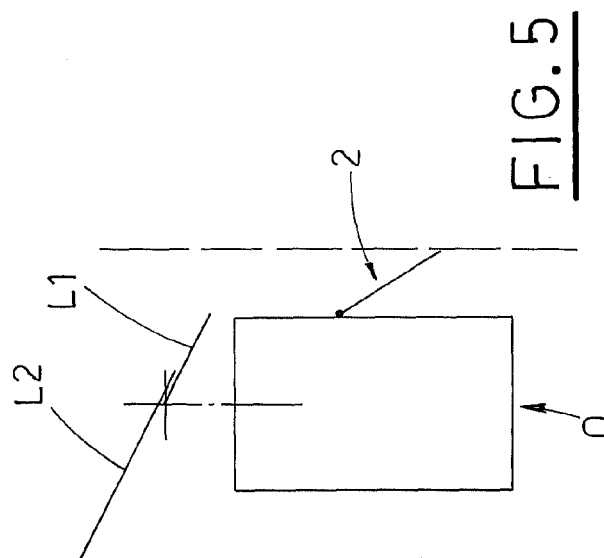
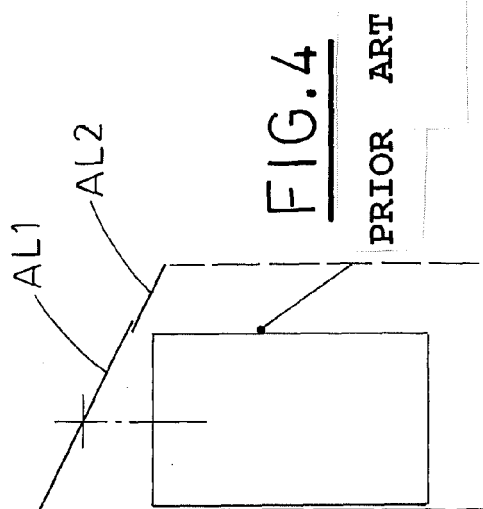


FIG. 2F





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 10 4878

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 63 022906 A (RAILWAY TECHNICAL RES INST; NIIGATA ENGINEERING CO LTD) 30 January 1988 (1988-01-30) * figures 1-3,11 *	1,4	INV. E01H5/06
X	US 4 369 847 A (MIZUNUMA WATARU [JP]) 25 January 1983 (1983-01-25) * column 2, lines 50-58 * * figures 2,3,5 *	1-3,5	
A	US 2003/226289 A1 (GEERLIGS KIRK A [US]) 11 December 2003 (2003-12-11) * the whole document *	1	
A	US 4 667 426 A (HOWARD RALPH E [US] ET AL) 26 May 1987 (1987-05-26) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E01H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 July 2007	Examiner Kerouach, May
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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 10 4878

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09-07-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 63022906 A	30-01-1988	JP 1756790 C JP 4043522 B	23-04-1993 16-07-1992
US 4369847 A	25-01-1983	JP 56116461 U JP 60019164 Y2	07-09-1981 10-06-1985
US 2003226289 A1	11-12-2003	NONE	
US 4667426 A	26-05-1987	NONE	