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

(11) EP 2 201 176 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
21.08.2013 Bulletin 2013/34

(21) Application number: **07818213.6**

(22) Date of filing: **18.09.2007**

(51) Int Cl.:
E01C 19/48 *(2006.01)*

(86) International application number:
PCT/EP2007/008111

(87) International publication number:
WO 2009/036779 (26.03.2009 Gazette 2009/13)

(54) **SCREED FOR A PAVER FINISHER**

BOHLE FÜR EINEN DECKENFERTIGER

TABLE DE FINISSEUR

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

(43) Date of publication of application:
30.06.2010 Bulletin 2010/26

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EP 2 201 176 B1

Printed by Jouve, 75001 PARIS (FR)

Description

Subject

[0001] The present invention refers to a screed of a paver finisher according to the main claim. The paver finisher with such a screed also being part of the present invention.

Prior Art

[0002] Paver finishers of the prior art equipped with extendible screeds are known in a number of solutions. An extendible screed generally consists of a central fixed section, which determines the basic laying width, and of at least two sections which move perpendicularly to the centre line of the machine, sliding on a guide set, integral with the central section. See WO-2004/081287-A that provides, supported by a central screed, two opposed extension screeds, placed on the same transverse line and ahead of a central screed sector with respect to the advancing direction, said extension screeds being also vertically movable end pivoted within the vertical plane.

[0003] Generally, the maximum laying width that can be achieved by an extendible screed, as described above and without the application of additional extensions, is equal to or less than twice its basic width.

[0004] The prior arts, which can be considered more similar to the present solution, are identifiable in JP-102521/1995 - (Kokai) and US6595719, see also JP-07102521A. In particular, said solutions allow the laying width to be enlarged considerably by means of telescopic extendible mobile sectors placed one behind the other and both behind the central fixed sector.

[0005] The disadvantages of these US6595719 and JP-07102521A prior solutions, that places the extensible screeds behind the central screed as stated above, are basically the following:

- Very asymmetrical distribution of the material in front of the mobile sectors.
- Difficulty in maintaining the driving direction due to said asymmetry.
- High resistance of the material against the screed end plates whenever the mobile sectors are closed.
- Need to fit a moulding board extendible ahead of the mobile sector located at the very back of the screed assembly in order to limit the heap of the material, for a total of three mouldboards limiting the thickness of the material layer;
- Additional sectors of augers to be applied whenever the mobile sectors are extended over 800 mm and to be removed whenever said sectors are closed.

Scope of the Present Invention

[0006] The scope of the present invention is to avoid such disadvantages, realising an improved apparatus and machine.

Disclosure of the Invention

[0007] The invention is characterised by the main claim, whose combined features allow all the problems described above to be solved.

Advantages

[0008] The present invention applying one ahead the other two extension screeds (1c,1d) ahead of a central screed (1 a, 1 b), and behind auger means with respective extensions (Sc1,Sc2), completely eliminates the aforementioned problems and allows a compact machine to be made that is capable of extending the laying width of a road pavement up to a maximum of 2.5 times the basic width of its screed avoiding all the drawbacks of both previous solutions.

Description of a Preferred Solution

[0009] The invention will be described as follows, according to its preferred solutions, as shown in the enclosed Figures, where:

- Figures 1, 2, 3, 4 and 12 represent solutions of the prior art, where Fig. 12 represents the solution most similar to the present invention, as previously mentioned.
- Figures 5 and 6 show, according to the present invention, a schematic top view of the paver finisher and of its rear section respectively. Said rear section being substantially engineered to be towed (system not shown as part of the known art).
- Fig. 6 shows two section views of a road pavement, convex and concave respectively, made by the machine shown in Fig. 6.
- Fig. 7 shows the schematic cross section (Sect. B-B) of a screed sector of the present invention as shown in Fig. 6.
- Fig. 8 schematically shows the sliding system of an extendible screed sector, in this case the sector (1 c) of Fig. 6.
- Fig. 9 represents a view of a vertical longitudinal section of Fig. 6, according to the present invention.
- Fig. 10 represents an alternative (traditional solution) to the extendible system of the auger set.

Detailed Description of the Prior Art Solutions according to Figures 1, 2, 3, 4, 12

[0010] A paver finisher (Fig.1) is a machine of known technology which always consists of two main units:

- The tractor (T), which moves the whole screed unit, receives the material discharged by the trucks into

a hopper (H) and feeds it to the screed unit (B) by means of conveyors (N1 and N2), in turn followed by a set (C) of distributing augers (C1 and C2).

- The screed unit (B) which spreads the material (asphalt mix, lean concrete, stabilized unbound mix) in a uniform layer, levelled and pre-compacted to make a road pavement.

[0011] The overall transport width of the machine must comply with the limits allowed by the different countries, whilst the paving width must be advantageously wider to cover at least a road lane in a single pass. The screed must therefore be engineered so as to adjust its width to that more conveniently required by the work specifications. Generally, the extendible screeds consist of a central fixed sector, in turn consisting of two hinged sectors (B1) and (B2), connected to the tractor by two tow arms (A1) and (A2), and by two sectors (B3) and (B4) mobile in the direction of the laying width. With reference to the direction of the laying progress, the central sectors can be located ahead of the mobile sectors (Fig. 1), or behind them (Fig. 2) respectively.

[0012] Each tow arm is rigidly connected to the central section of the screed, whilst the connection to the tractor is made through a ball joint which can be moved vertically. This type of constraint gives the screed a floating movement. The movement of the tractor (in the direction of the arrow) forces the screed to climb over the material with an angle of attack "ω", which is determined by the balance of the forces acting on the screed: tow force, screed weight, material resistance, material carrying capacity. The extendible sectors (B3) and (B4) generally move with respect to the central section by means of hydraulic cylinders, or by other known systems.

[0013] Whenever the mobile sectors are extended outwards by more than approximately 800 mm it becomes necessary to fit additional auger sectors (C3) and (C4) to carry the material up to the outer ends of the screed and to remove said auger sectors whenever the mobile sectors are closed.

[0014] The most common screeds can extend their basic width (L) up to twice (2L). Wider laying widths can be obtained by fitting individual extensions (B5, B6, B7, B8, ...) and the relevant necessary auger sectors (C5, C6, C7, C8, ...).

[0015] Also the solutions of Fig. 4 are of the known art, where sectors (B1 b) and (B2b) are mobile with reference to sectors (B1a) and (B2a), in turn mobile with reference to fixed central sectors (B1) and (B2).

[0016] Whenever the mobile sectors are extended, adequate auger extensions (C1a) and (C2a) must be fitted.

[0017] All solutions are designed to reach the maximum laying width by means of screeds that in their minimum overall width comply with the limits allowed for transport.

Detailed Description of the Present Invention (Figures 5, 6, 6a, 7, 8, 9, 10, 11)

[0018] The subject of the invention is shown in Figures 5 and 6, in which are schematically represented:

- The tractor (T) of a paver finisher, of the known art, comprising a receiving hopper (H),
  the conveyors (N1 and N2) carrying the material toward the rear section of the machine, the tow arms (A1) and (A2) of the screed (B), a set (C) of distributing augers.
- The screed unit (B) consisting of three elements, one fixed and two extendible, having such characteristics in order to reach a laying width at least equal to 2.5 times the width of the fixed central element (1a + 1 b).

[0019] The invention, as substantially shown in Fig. 6, use an opposite solution compared to the solutions of the prior art and particularly to the solution claimed in the patent US 659571, by eliminating the disadvantages and the complexity of an intermediate moulding board and locating the extendible sectors ahead of the central fixed sector, with reference to the paving direction of progress.

[0020] The screed of the present invention can be applied indifferently to any paver finisher, of the known art, equipped with:

- a set of main augers C1, C2 (Fig. 11), to which sets of auxiliary augers Sc1, Sc2 are added whenever the extendible screed sectors are opened over about 800 mm, said sets of main and auxiliary augers representing the traditional known technique,
- a set of main central augers C1, C2 (Fig. 6) followed, in the paving direction of progress, by two sets of auxiliary augers (2c), (2d) extendible in the direction perpendicular to the centre line of the machine; said auger sectors being automatically extended and synchronised with the extension of the screed mobile sectors so that the distance between the ends of the auxiliary augers and the screed end plates (3a) and (3b) does not exceed about 800 mm (Fig. 6).

[0021] Where the arrangement of the screed (B) comprises:

- a pair of central sectors (1a,1b) with central hinge (Ac) parallel to the centre line of the machine,
- two offset mobile sectors (1c, 1d), which can be extended or closed independently and are:

  a) located between said pair of fixed central sectors (1a,1b) and said augers (C1,C2, Sc1, Sc2) (Fig. 10), or alternatively (C1,C2, 2c, 2d) (Fig. 6)
  b) connected to end plates (3a, 3b) which extend forward, i.e. towards the auger centre line, up to the auger area, to retain the material being laid down, the hinge (Ac) being suitable to allow a

proper actuator to incline the fixed sectors (1 a), (1 b) and the mobile right and left sectors (1d), (1c) so as to obtain a linear, convex, or concave pavement section profile.

- the auger sets, in any alternative solution, and the screed not being interdependent in any case.

[0022] The preferential solution (Fig. 6) provides that the augers consist of two main elements (C1) and (C2) and of two auxiliary extendible side elements (2c) and (2d), where the function of said auxiliary elements can be replaced by an alternative less advantageous solution, consisting of sectors (Sc1) and (Sc2) to be applied only when needed, according to the know art, as shown in Fig. 10.

[0023] In detail, the screed (B) (Fig. 5) comprises a central fixed section, with a central hinge (Ac) (Fig. 6) on the centre line of the machine to constitute two sections (1 a) and (1 b), connected to the tow arms (A1) and (A2) respectively, plus two said mobile sectors (1 c) and (1 d) which can be extended in the direction perpendicular to the machine centre line, i.e. in the direction of the pavement width.

[0024] As mentioned above, an actuator of the known art, by means of the hinge (Ac) can make an angle between the screed bottom plates of left sections (1 a + 1c) and of right sections (1 b + 1d) so as to make linear, convex, or concave (Fig. 6a) pavement section profiles.

[0025] With reference to the paving progress direction as shown by the arrow, the mobile sectors (1c) and (1d) are located ahead of the central fixed sectors (1a) and (1b); sector (1c) is in turn located ahead of sector (1d). The positions of sectors (1c) and (1d) can be interchanged, giving a totally equivalent functional solution.

[0026] The screed end plates (3a) and (3b) are connected to the mobile sectors (1c) and (1d) respectively.

[0027] The mobile sectors (1c) and (1d) each have a length about equal to that of the central sector (1 a + 1 b), of basic paving width "L", it is therefore possible to extend the overall paving width up to a value equal to or wider than 2.5 times the basic paving width "L".

Operation

[0028] The characteristic items of a screed sector are schematically shown in Fig. 7.

[0029] The material, spread by the augers in front of the screed (in the direction of the work progress) is forced by the tow action of the tractor to flow under the screed bottom plate (Pl), the flow being made easier by the alternate vertical movement of a tamper bar (Tp) which slightly extends underneath the leading edge of the screed bottom plate. Some screed versions do not include the tamper bar, and the flow of the material under the screed bottom plate is simply facilitated by the inclination "ω" that is maintained by the plate with reference to the laying plane. Angle "ω" (angle of attack) is characteristic of any screed and represents the inclination assumed by the screed plate when all forces are balanced (traction, screed weight, resistance of material in front of the screed, friction between screed plate and material, material carrying force). Fig. 8 schematically shows how the sliding system of a mobile sector, with reference to the fixed sector, is preferably arranged, in this case sector (1 c) of Fig. 6.

[0030] Sector (1 c) slides perpendicularly to the machine centre line, guided by a pair of supports (Sa) and (Sb), properly constrained to the support arm (4a).

[0031] Sector (1 d) slides as the above, being properly constrained to the support arm (4b). The support arms (4a) and (4b) being rigidly connected to the side ends of the central sectors (1a) and (1b) respectively.

[0032] The core of the mobile screed sector (Fig. 7), which includes the screed plate (Pl), the tamper bar (Tp), the vibrators (Vb) and the screed plate heating equipment, is properly connected to the side walls (Wa) and (Wb) of the supporting frame (Ts). Said supporting frame comprises the guide (Gm) and an anti-rotation unit (Ar), sliding on bushings within the support (Sb), with wall (Wb) sliding on bushings along the external surface of the guide (Gf).

[0033] The support (Sa) is connected to the support arm (4a), but it can move vertically with respect to the latter (see Fig. 9). The support (Sb) moves vertically along with the support (Sa), but it is possible to modify its angular position with respect to it around a rotation axis, coinciding with the centre line of the guide (Gf).

[0034] The cylindrical guide (Gf) is rigidly connected to the support (Sa): the hydraulic cylinder (P) being rigidly connected to said guide (Gf) and with the centre line of said cylinder (P) coinciding with the centre line of said guide (Gf).

[0035] The mobile guide (Gm), operated by the cylinder (P), slides on bushings inside the guide (Gf) and along its centre line.

[0036] The section view A-A is shown in Fig. 9.

[0037] The mobile screed sectors are not aligned crosswise with the central fixed screed sector, therefore it is necessary to adjust their vertical position independently so as to bring the trailed edges (Ua), (Ub), (Uc) of all screed bottom plates (Pl) to lean upon the same plane, as shown in Fig. 9.

[0038] With reference to section A-A (Fig. 9), concerning the mobile screed sector (1 c), the support (Sa) can move vertically along guides (Gv) with respect to the support arm (4a), the vertical movement being operated through a screw/nut-screw coupling by the actuator (Rc), or by other known systems with the same function.

[0039] The coupling of the tow arms (A1) and (A2) with the central screed sector is generally made as schematically shown in Fig. 9.

[0040] A pin (Pn) on each side allows the inclination of the whole screed to be changed with respect to the tow arms (A1) and (A2) and to keep it locked in position by means of the turnbuckles (Tr) (one on each side).

[0041] However it may be necessary to carry out small adjustments to said inclination for the mobile screed sectors (1 c) and (1d) in order to obtain perfect coplanarity of the trailed edges of the screed bottom plates.

[0042] For this purpose, the support (Sb) can rotate around the centre line of the guide (Gf), dragging in the rotation the lower part of the relevant extendible sector.

[0043] The adjustment is carried out by the screw adjuster (Rg) and by known locking devices (e.g.: bolts) to keep the position.

Another Advantageous Solution of the Present Invention

[0044] The overall layout of the screed, as above described; does not consent an even distribution of the material in front of the three sectors, and possible problems of heaping or of poor feed may arise. Advantageously, as schematically shown in Figures 6 and 10, mouldboards (Rc) and (Rl) have been provided in order to limit the thickness of the material fed to the central screed sectors (1 a) and (1 b) and to the most backward mobile screed sector (1d).

[0045] Vertical guides (Gv) are fixed to the tow arms (A1) and (A2); the central mouldboard (Rc) slides inside said guides (Gv) with enough side play to compensate for the difference in height of the tow arms and for their angular displacements caused by the central articulation (Ac) between sectors (1 a) and (1b).

[0046] The vertical displacement of the mouldboard (Rc) is operated by hydraulic cylinders, or by other known devices (not shown).

[0047] The horizontal guide (Go) is fixed to the mouldboard (Rc); the side mouldboard (Rl) can slide within said guide (Go); said mouldboard (Rl) being moved by the mobile sector (1d) in a direction perpendicular to the machine centre line; on the end plate (3b) of said sector (1d) a constraint is provided which does not hinder the reciprocal movements of the mouldboard (Rl) and the end plate (3b).

[0048] Advantageously, the vertical movements of the mouldboards (Rc) and (Rl) are managed by an automatic control system of the thickness of the material being supplied by the augers to the screed sectors (1a), (1b) and (1d).

[0049] The operating facility of the machine, in its more simple arrangement as shown in Figures 10 and 11, is considerably limited by the necessity to add additional auger sectors (Sc1) and (Sc2) whenever the mobile sectors are extended more than about 800 mm and to remove said auger sectors when the mobile screed sectors are closed; said solution being traditionally common to all pavers equipped with extendible screeds.

[0050] The invention, previously schematically shown in Fig. 6, solves the problem in a very advantageous way compared to the prior solutions.

[0051] The cross beam (5), supporting the auger set (C1) and (C2), is connected to the tractor in such a way as to be moved in a vertical direction. Two guides (Gc) are fixed to the cross beam (5); within said guides the support arms (2a) and (2b), of the auxiliary auger sectors (2c) and (2d) respectively, can slide in a direction perpendicular to the machine centre line; said auxiliary auger sectors (2c) and (2d) being located just behind the main augers (C1) and (C2) in the direction of the paving work progress. The support arms (2a) and (2b) are independently operated by hydraulic cylinders, or by other known systems.

[0052] The solution allows the auxiliary auger sets to move vertically along with the main augers, whilst the cross movements of the support arms (2a) and (2b) are operated in synchronisation with the movements of the relevant screed mobile sectors whenever they are extended more than a preset value (about 800 mm), or return below said value in the closing phase.

[0053] It is not necessary to add further auger sets within the maximum paving width which can be achieved only by the extension of the screed mobile sectors.

Comments on the Most Similar Prior Art (Fig. 12)

[0054] Fig. 12 compares a solution similar to that of the invention, but with evident disadvantages:

- Highly asymmetrical distribution of the material in front of the extendible sectors.
- Difficulty in maintaining the driving direction of the machine caused by said asymmetry.
- Great resistance of the material against the end plates (Pl1) and (Pl2) in the closing phase of the extendible sectors.
- Need to include a vertical mouldboard, sliding ahead of the most backward mobile screed sector in order to limit the heap of material, taking to a total of three the mouldboards (P1), (P2), (P3), which limit the thickness of the material.
- Additional auger sectors (Sc1) and (Sc2), to be applied whenever the mobile sectors extend more than about 800 mm and to remove them when said sectors are closed.

[0055] In conclusion, as advantageously claimed, the main characteristics of the present invention are those described hereinafter.

[0056] A screed for a paver finisher (Fig. 6) of the type comprising sectors (1 c) and (1d), independently extendible and retractable, substantially sliding on guides connected to the support arms (4a) and (4b) respectively, in turn solid with the central screed fixed sectors (1 a) and (1 b) respectively. Said extendible sectors (1 c) and (1 d) being located one behind the other and ahead of the central fixed screed sectors, in the direction of the paving work progress. Said extendible sectors (1 c) and (1 d) therefore being able to have a length similar to that of the whole central sector (1 a + 1 b), having a basic laying width "L". Said solution being suitable for obtaining a maximum laying width of at least 2.5 times the basic lay-

ing width "L".

[0057] The solution concerning the extendibility of the screed is substantially similar to that of patent US6595719, but completely upside down, that is back to front so that the mobile sectors are located between the central sector (which is therefore located at the very rear) and the augers (C), said extendible sectors (1d,1c) externally carrying end plates (3a,3b), which extend forward towards the augers centre line, located upstream, to constitute a substantially "U" shaped kind of a box to contain the material being laid down.

[0058] In this way the material is efficiently retained within said "U" shaped area to be better distributed over the full laying width, preventing loss and leakage.

[0059] A screed to equip a paver finisher capable of obtaining a laying width at least equal to 2.5 times its basic length, without the application of external extensions.

[0060] Said screed (Fig. 6) consisting of:

- a central fixed section of a certain basic length "L", with a central hinge (Ac), parallel to the machine centre line, constituting two units (1 a) and (1 b) articulated to give a linear, convex, or concave profile of the mat cross section (Fig. 6a); said units (1 a) and (1 b) being fitted, at their external ends, with the support arms (4a) and (4b) of the extendible sectors (1 c) e (1 d) respectively.
- a first extendible sector (1d), with a length about equal to that of the whole central sector (1 a + 1 b) and located ahead of this in the direction of the paving work progress.
- a second extendible sector (1 c), with a length about equal to that of the whole central sector (1 a + 1 b) and located ahead of the first extendible sector (1 d) in the sense of the paving work progress.
- said extendible sectors (1c), (1d) being independently mobile in respect of the central sector (1a + 1 b) in the sense of the laying width and in vertical direction.

[0061] A screed, as above, where said extendible sectors (1 c), (1 d) are connected to the support arms (4a) e (4b) respectively, which are part of the central section, by means of height adjusting devices (Rc), (Gv) Fig. 9.; said height adjustment being necessary to obtain the coplanarity of the trailed edges (Uc), (Ud) of the screed bottom plates of the extendible sectors (1c), (1d) respectively with the relevant trailed edges of the bottom plates (Ua) and (Ub) of the central sectors (1 a) and (1 b) respectively.

[0062] A screed as above, where each extendible sector is equipped with devices (Sb), (Rg) (Fig. 9) for the fine adjustment of the relevant angle of attack, with respect to the angle of attack "ω", assumed by the central section.

[0063] A screed as above, where the extendible sectors (1c), (1d) bear, at their external ends, end plates (3a), (3b) respectively to retain the material being fed by the augers; said end plates being in contact with the surface to be paved and free floating in a vertical direction.

[0064] A screed as above, where the height of the material layer fed by the augers towards the central section is properly adjusted by a mouldboard (Rc) (Fig. 10); said mouldboard (Rc) sliding in a vertical direction within the guides (Gv) fixed to the tow arms (A1) and (A2) and being moved by hydraulic cylinders, or by equivalent functional devices; said mouldboard (Rc) being fitted with a horizontal guide (Go) to support a further mouldboard (Rl) limiting the height of the material layer fed by the augers to the most backward extendible sector (1d), in the direction of the paving work progress. Said mouldboard (Rl) being mobile in a vertical direction, solid with the first mouldboard (Rc), and crosswise along with the movement of the extendible section (1d); said mouldboard (Rl) being connected to the end plate (3b).

[0065] A screed as above, where the material is distributed in front of it by two main sectors of augers (C1) and (C2) (Fig. 6) independently operated and by two auxiliary auger sectors (2c) and (2d), located behind the main augers. Said auxiliary augers (2c) and (2d) being operated together with the main auger sectors (C1) and (C2) respectively and said auxiliary augers being extendible crosswise, in a direction perpendicular to the machine centre line, with movements controlled by the extension, or closing of the relevant mobile screed sectors (1c) and (1d). Said auxiliary augers (2c) and (2d) being supported by arms (2a) and (2b) respectively, sliding within guides (Gc) by means of known devices, where said guides (Gc) are fixed to the crossbeam (5), supporting the main augers (C1) and (C2).

Claims

1. Screed for a paver finisher of the type comprising sectors (1c, 1d), independently extendible and retractable, substantially sliding on guides connected to support arms (4a, 4b) respectively, in turn solid with the central screed fixed sectors (1a and 1b, respectively), said extendible sectors (1 c, 1 d) being located one behind the other and ahead of the central fixed screed sectors, in the direction of the paving work progress, said extendible sectors (1c, 1d) being able to have a length similar to that of the whole central sector (1a + 1b) having a basic laying width "L", said solution being suitable for obtaining a maximum laying width of at least 2.5 times the basic laying width "L",
   wherein said screed further consists of:

   - a central fixed section of a certain basic length "L", with a central hinge (Ac), parallel to the machine centre line, constituting two units (1a and 1b) articulated to give a linear, convex, or concave profile of the mat cross section; said units

(1a and 1b) being fitted, at their external ends, with the support arms (4a, 4b) of the extendible sectors (1c,1d, respectively), said extendible sectors (1c,1d) being connected to tow arms (A1,A2, respectively);

- a first extendible sector (1d), with a length about equal to that of the whole central sector (1a + 1b) and located ahead of this in the direction of the paving work progress;
- a second extendible sector (1 c), with a length about equal to that of the whole central sector (1a + 1b) and located ahead of the first extendible sector (1d) in the direction of the paving work progress;
- said extendible sectors (1c, 1d) being independently mobile with respect to the central sector (1 a + 1 b) in the direction of the laying width and in a vertical direction;
- said screeds including a screed bottom plate (PI), a vertically movable tamper bar (Tp) which slightly extends underneath the leading edge of the screed bottom plate (PI), vibrator means (Vb) and screed plate heating equipment,
- said first and second extendible sectors are connected to side walls (Wa, Wb) of a supporting frame (Ts);
- said supporting frame comprising a first guide (Gm) and an anti-rotation unit (Ar), sliding on bushings within a support (Sb), with wall (Wb) sliding on bushings along the external surface of a second guide (Gf);

and wherein said extendible sectors (1c, 1d) are connected to the support arms (4a, 4b, respectively), which are part of the central section, by means of height adjusting devices (Rc, Gv), said height adjustment being provided to obtain the co-planarity of the trailed edges (Uc, Ud) of the screed bottom plates of the extendible sectors (1 c, 1d, respectively) with the relevant trailed edges of the bottom plates (Ua, Ub) of the central sectors (1 a, 1b, respectively);

- each extendible sector is equipped with devices (Sb, Rg) for the fine adjustment of the relevant angle of attack, with respect to the angle of attack "ω", assumed by the central section;
- said extendible sectors (1c, 1d) bear, at their external ends, end plates (3a, 3b, respectively) to retain the material being fed by the augers; said end plates being in contact with the surface to be paved and free floating in a vertical direction;

and wherein the height of the material layer fed by the augers towards the central section is properly adjusted by a mouldboard (Rc); said mouldboard (Rc) sliding in a vertical direction within guides (Gv) fixed to tow arms (A1, A2) and being moved by hydraulic cylinders, or by equivalent functional devices; said mouldboard (Rc) being fitted with a horizontal guide (Go) to support a further mouldboard (Rl) limiting the height of the material layer fed by the augers to the most backward extendible sector (1d), in the direction of the paving work progress, said mouldboard (Rl) being mobile in a vertical direction, solid with the first mouldboard (Rc), and crosswise along with the movement of the extendible section (1d); said mouldboard (Rl) being connected to the end plate (3b);

said augers being two main sectors of augers (C1, C2) and a set of auxiliary augers (2c, 2d); said auxiliary augers being located behind the main augers and being supported by arms (2a, 2b, respectively), sliding within guides (Gc) solid with the crossbeam (5); said auxiliary augers (2c, 2d) being operated together with the main auger sectors (C1, C2) and being vertically mobile along with the same; said auxiliary augers being independently extendible crosswise, by means of known devices, in a direction perpendicular to the machine centre line, and being coordinated with the movement of the relevant screed extendible sector, in order to allow an even distribution of the material over the full working width of the screed up to the end plates (3a, 3b), connected to the external ends of the extendible sectors (1 c, 1 d) of said screed, the central part of which is hinged at the centre (Ac) to constitute two sections (1 a, 1b), which can be mutually inclined to get a linear, convex, or concave mat cross section profile.

2. Paver finisher equipped with a screed according to the previous claim.

Patentansprüche

1. Abgleichbohle für einen Deckenfertiger mit Sektoren (1c; 1d), die unabhängig voneinander ein- und ausziehbar sind, im wesentlichen auf Führungen gleitend, die mit Stützarmen (4a; 4b) verbunden sind bzw. fest mit den festen Sektoren (1a bzw. 1 b) der zentralen Abgleichbohle verbunden; wobei die ausziehbaren Sektoren (1c; 1 d) hintereinander liegen und vor den zentralen festen Sektoren, in Richtung des Arbeitsfortschritts, wobei die ausziehbaren Sektoren (1c; 1d) in der Lage sind, eine Länge ähnlich der des gesamten zentralen Sektors (1a + 1b) einzunehmen, mit einer Grund-Verlegebreite "L", wobei besagte Lösung zum Erhalten einer maximalen Verlegebreite mindestens 2,5mal so groß wie die Grund-Verlegebreite "L" geeignet ist,
wobei besagte Abgleichbohle des weiteren aus folgendem besteht:

- einem zentralen festen Abschnitt mit einer gewissen Grundlänge "L", mit einem zentralen Ge-

lenk (Ac), parallel zur Maschinen-Mittellinie, der zwei gelenkige Einheiten (1a und 1b) bildet, um ein lineares, konvexes oder konkaves Profil des Mattenquerschnitts zu ergeben; besagte Einheiten (1a und 1 b) sind an ihren äußeren Enden mit den Stützarmen (4a; 4b) der ausziehbaren Sektoren (1 c, 1 d, bzw.) versehen; besagte ausziehbare Sektoren (1 c, 1 d) sind mit Zugarmen (A1 bzw. A2) verbunden;

- einem ersten ausziehbaren Sektor (1 d), mit einer Länge ungefähr gleich der des gesamten zentralen Sektors (1a + 1 b) und vor diesem in Richtung des Arbeitsfortschritts gelegen;
- einem zweiten ausziehbaren Sektor (1c), mit einer Länge ungefähr gleich der des gesamten zentralen Sektors (1a + 1b) und vor dem ersten ausziehbaren Sektor (1 d) in Richtung des Arbeitsfortschritts gelegen;
- besagte ausziehbare Sektoren (1c; 1 d) sind unabhängig voneinander gegenüber dem zentralen Sektor (1a + 1b) in Richtung der Verlegebreite und in senkrechter Richtung beweglich;
- besagte Abgleichbohlen umfassen eine Abgleichbohlengrundplatte (Pl), eine senkrecht bewegliche Tamperleiste (Tp), die sich etwas unterhalb der Vorderkante des Bodenglättblechs (Pl) erstreckt, Vibratormittel (Vb) und Glättblech-Heizung,
- der erste und der zweite ausziehbare Sektor sind mit Seitenwänden (Wa; Wb) eines Tragrahmens (Ts) verbunden;
- besagter Tragrahmen umfasst eine erste Führung (Gm) und einen Verdrehschutz (Ar), der auf Laufbuchsen innerhalb einer Stütze (Sb) gleitet, mit einer Wand (Wb), die auf Laufbuchsen entlang der Außenfläche einer zweiten Führung (Gf) gleitet;

und wobei besagte ausziehbare Sektoren (1c; 1d) mit den Stützarmen (4a bzw. 4b) verbunden sind, die Teil des Mittelabschnitts sind, mittels Höheneinstellungsvorrichtungen (Rc; Gv), wobei die Höheneinstellung vorgesehen ist, um die Komplanarität der geschleiften Ränder (Uc; Ud) der Bodenplatten der ausziehbaren Sektoren (1c bzw. 1 d) mit denen der Bodenplatten (Ua; Ub) der zentralen Sektoren (1 a bzw. 1 b) zu erhalten;

- jeder ausziehbare Sektor ist mit Vorrichtungen (Sb; Rg) zur Feineinstellung des betreffenden Ansatzwinkels ausgestattet, in bezug auf den Ansatzwinkel "ω", den der Mittelabschnitt einnimmt;
- besagte ausziehbare Sektoren (1c; 1d) tragen an ihren äußeren Enden Endplatten (3a bzw. 3b), um das Material festzuhalten, das von den Bohrern geliefert wird; wobei die Endplatten in Kontakt mit der zu pflasternden Fläche sind und in senkrechter Richtung frei treiben;

und wobei die Höhe der von den Bohrern zum Mittelabschnitt gelieferten Materialschicht von einer Abstreichplatte (Rc) eingestellt wird; besagte Abstreichplatte (Rc) gleitet in senkrechter Richtung in Führungen (Gv), die an Zugarmen (A1, A2) befestigt sind und von hydraulischen Zylindern bewegt werden, oder von gleichwertigen funktionalen Vorrichtungen; besagte Abstreichplatte (Rc) ist mit einer waagrechten Führung (Go) ausgestattet, um eine weitere Abstreichplatte (Rl) abzustützen, so dass die Höhe der von den Bohrern zum hintersten ausziehbaren Sektor (1 d) gelieferten Materialschicht begrenzt wird, in Richtung des Arbeitsfortschritts, besagte Abstreichplatte (Rl) ist in senkrechter Richtung beweglich, einstückig mit der ersten Abstreichplatte (Rc), und quer zu der Bewegung des ausziehbaren Querschnitts (1 d); wobei die Abstreichplatte (Rl) mit der Endplatte (3b) verbunden ist;
wobei besagte Bohrer zwei Hauptsektoren von Bohrern (C1, C2) und ein Satz Hilfsbohrer (2c, 2d) sind; wobei die Hilfsbohrer hinter den Hauptbohrern positioniert sind und von Armen (2a bzw. 2b) gestützt werden, die in Führungen (Gc) gleiten,
die einstückig mit dem Querbalken (5) sind; die Hilfsbohrer (2c; 2d) werden zusammen mit den Hauptbohrersektoren (C1, C2) betrieben und sind mit ihnen zusammen senkrecht beweglich; wobei die Hilfsbohrer unabhängig voneinander kreuzweise ausziehbar sind, mittels bekannter Vorrichtungen, in einer Richtung senkrecht zur Maschinen-Mittellinie, und mit der Bewegung des ausziehbaren Sektor koordiniert sind, um eine gleichmäßige Verteilung des Materials über die volle Arbeitsbreite der Abgleichbohle bis zu den Endplatten (3a; 3b) zu gestatten, die mit den äußeren Enden der ausziehbaren Sektoren (1c; 1 d) der Abgleichbohle verbunden sind, deren Mittelteil in der Mitte (Ac) gelenkig ist, um zwei Abschnitte (1 a; 1b) zu bilden, die zueinander geneigt werden können, um ein lineares, konvexes oder konkaves Mattenquerschnittprofil zu erhalten.

2. Deckenfertiger ausgestattet mit einer Abgleichbohle nach dem vorherigen Anspruch.

Revendications

1. Poutre lisseuse pour un finisseur de type comprenant des secteurs (1c, 1d), indépendamment rétractables et extensibles, substantiellement coulissant sur des guides reliés à des bras de support (4a, 4b) respectivement, à leur tour fixés aux secteurs fixes centraux (1a et 1b, respectivement), lesdits secteurs extensibles (1 c, 1 d) étant situés l'un derrière l'autre et devant les secteurs fixes centraux, dans la direction de la progression du travail de pavage, lesdits

secteurs extensibles (1c, 1d) étant capables d'avoir une longueur similaire à celle du secteur central entier (1a + 1 b) ayant une largeur de pose de base "L", ladite solution étant apte à obtenir une largeur de pose maximale d'au moins 2,5 fois la largeur de pose de base "L",
où ladite poutre lisseuse est en outre composée de:

- une section fixe centrale d'une certaine longueur de base "L", avec une charnière centrale (Ac), parallèle à la ligne médiane de la machine, constituant deux unités (1a et 1b) articulées pour donner un profil concave ou convexe ou linéaire de la section transversale de la couche de revêtement; lesdites unités (1a et 1 b) étant équipées, à leurs extrémités externes, avec les bras de support (4a, 4b) des secteurs extensibles (1c, 1d, respectivement) ; lesdits secteurs extensibles (1c,1d) étant reliés à des bras de traction (A1, A2, respectivement) ;
- un premier secteur extensible (1 d), avec une longueur environ égale à celle du secteur central entier (1a + 1b) et situé devant ce dernier dans la direction de la progression du travail de pavage;
- un deuxième secteur extensible (1 c), avec une longueur environ égale à celle du secteur central entier (1 a + 1 b) et situé devant le premier secteur extensible (1 d) dans la direction de la progression du travail de pavage;
- lesdits secteurs extensibles (1 c, 1 d) étant indépendamment mobiles par rapport au secteur central (1a + 1b) dans la direction de la largeur de pose et dans une direction verticale;
- lesdites poutres lisseuses comprenant une plaque de base (Pl), un dameur verticalement mobile (Tp) qui s'étend légèrement au-dessous du bord d'attaque de la plaque de base (Pl), des vibreurs (Vb) et un équipement de chauffage pour la plaque de la poutre lisseuse,
- lesdits premier et deuxième secteurs extensibles sont liés à des parois latérales (Wa; Wb) d'un cadre de support (Ts);
- ledit cadre de support comprenant un premier guide (Gm) et une unité anti-rotation (Ar), coulissant sur des bagues dans un support (Sb), avec une paroi (Wb) coulissant sur des bagues le long de la surface externe d'un deuxième guide (Gf);

et où lesdits secteurs extensibles (1c, 1d) sont liés aux bras de support (4a, 4b, respectivement), qui font partie de la section centrale, au moyen de dispositifs de réglage de la hauteur (Rc, Gv), ledit réglage de la hauteur étant pourvu pour obtenir la coplanarité des bords traînés (Uc, Ud) des plaques inférieures des secteurs extensibles (1 c, 1 d, respectivement) avec les bords traînés des plaques inférieures (Ua, Ub) des secteurs centraux (1a, 1b, respectivement);

- chaque secteur extensible est équipé avec des dispositifs (Sb, Rg) pour le réglage de précision de l'angle d'attaque relatif par rapport à l'angle d'attaque "ω" adopté par la section centrale;
- lesdits secteurs extensibles (1c; 1d) portent, à leurs extrémités externes, des plaques terminales (3a, 3b, respectivement) pour conserver le matériel apporté par les tarières;

lesdites plaques terminales étant en contact avec la surface à paver et flottant librement dans une direction verticale;
et où la hauteur de la couche de matériel apportée par les tarières vers la section centrale est ajustée par une cloison (Rc) ; ladite cloison (Rc) coulisse dans une direction verticale dans des guides (Gv) fixés à des bras de traction (A1 A2) et est déplacée par des cylindres hydrauliques, ou par des dispositifs fonctionnels équivalents ; ladite cloison (Rc) est équipée avec un guide horizontal (Go), pour supporter une ultérieure cloison (Rl) qui limite la hauteur de la couche de matériel apportée par les tarières au secteur extensible plus en arrière (1 d), dans la direction de la progression du travail de pavage, ladite cloison (Rl) étant mobile dans une direction verticale, fixée à la première cloison (Rc), et transversalement au mouvement de la section extensible (1 d) ; ladite cloison (Rl) étant reliée à la plaque terminale (3b);
lesdites tarières étant deux secteurs principaux de tarières (C1 C2) et un ensemble de tarières auxiliaires (2c, 2d) ; lesdites tarières auxiliaires étant situées derrière les tarières principales et supportées par des bras (2a, 2b, respectivement), coulissant dans des guides (Gc) fixés à la traverse (5) ; lesdites tarières auxiliaires (2c, 2d) fonctionnant avec les secteurs des tarières principales (C1, C2) et étant mobiles verticalement avec ces derniers ; lesdites tarières auxiliaires étant indépendamment extensibles de façon tranversale, au moyen de dispositifs connus, suivant une direction perpendiculaire à la ligne médiane de la machine, et étant coordonnées avec le mouvement du secteur extensible relatif, afin de permettre une distribution uniforme du matériel sur l'entière largeur de travail de la poutre lisseuse jusqu'aux plaques terminales (3a, 3b), reliées aux extrémités externes des secteurs extensibles (1 c, 1 d) de ladite poutre lisseuse, dont la partie centrale est articulée au centre (Ac) pour constituer deux sections (1a; 1b), qui peuvent être mutuellement inclinées pour obtenir un profil de section transversale de la couche de revêtement linéaire, convexe ou concave.

2. Finisseur équipé avec une poutre lisseuse conformément à la revendication précédente.

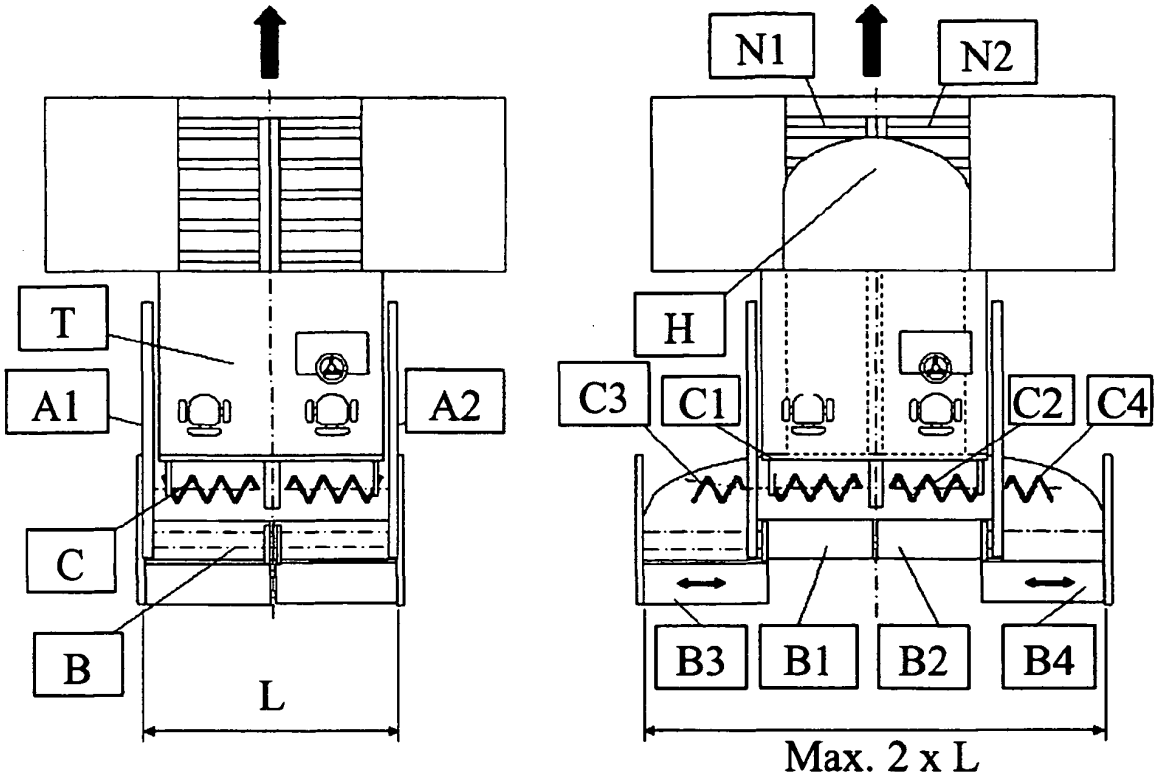

Fig. 1

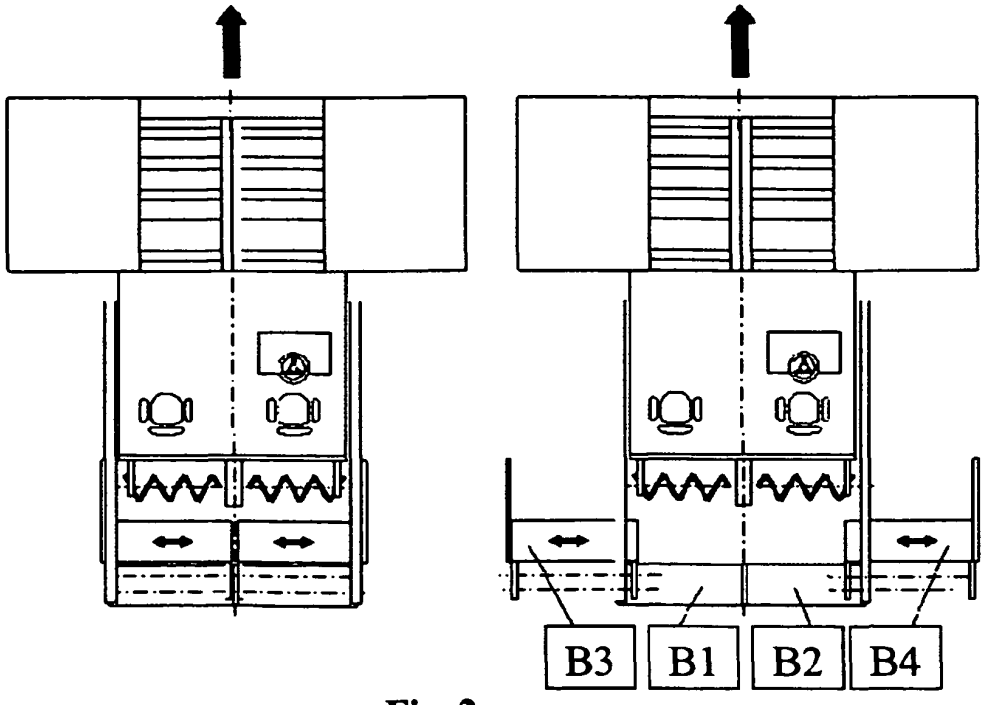

Fig. 2

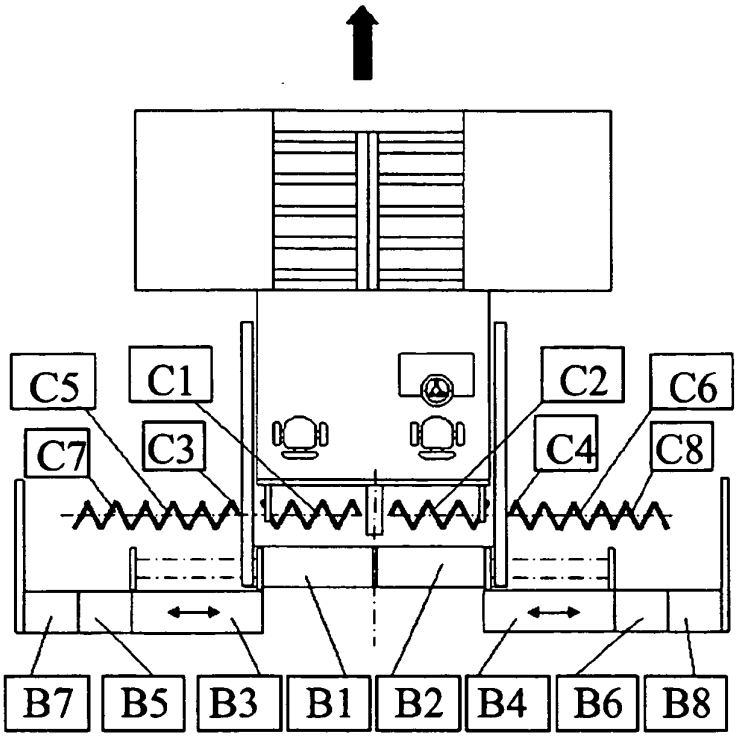
C5
C1
C2
C6
C7
C3
C4
C8
B7
B5
B3
B1
B2
B4
B6
B8

Fig. 3

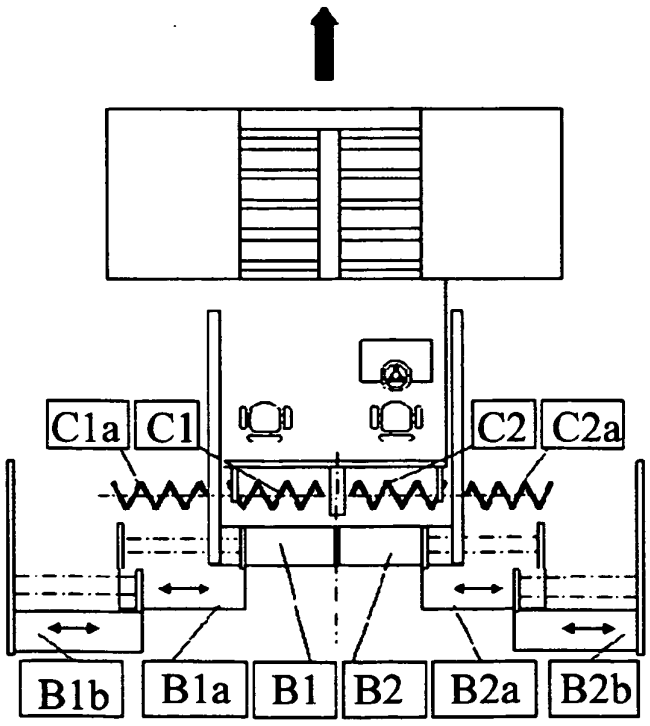
C1a
C1
C2
C2a
B1b
B1a
B1
B2
B2a
B2b

Fig. 4

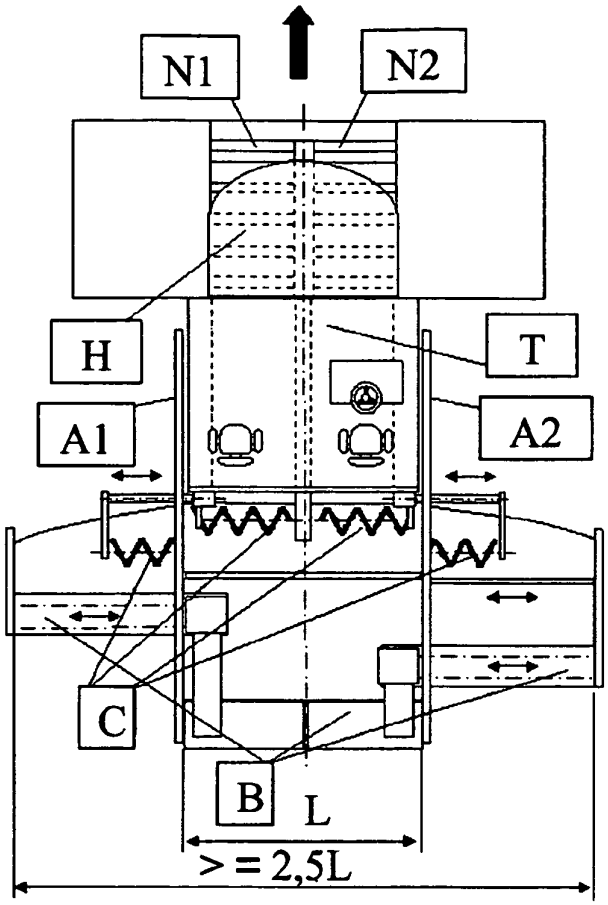

Fig. 5

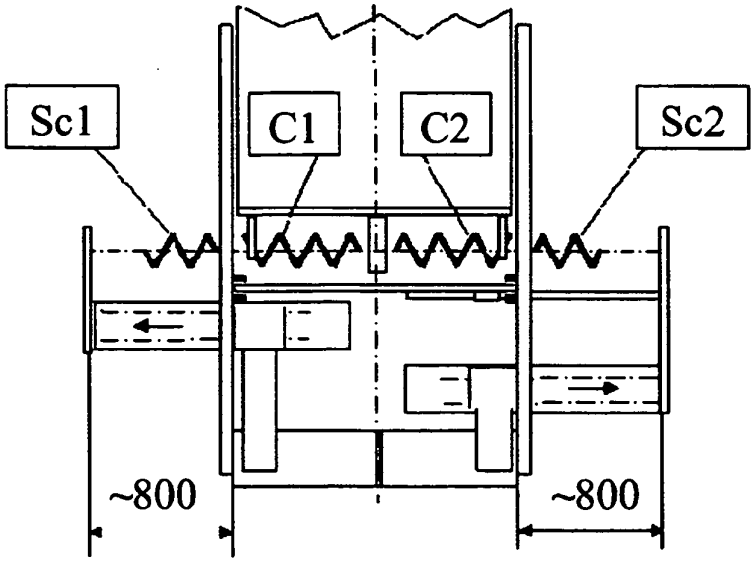

Fig. 11

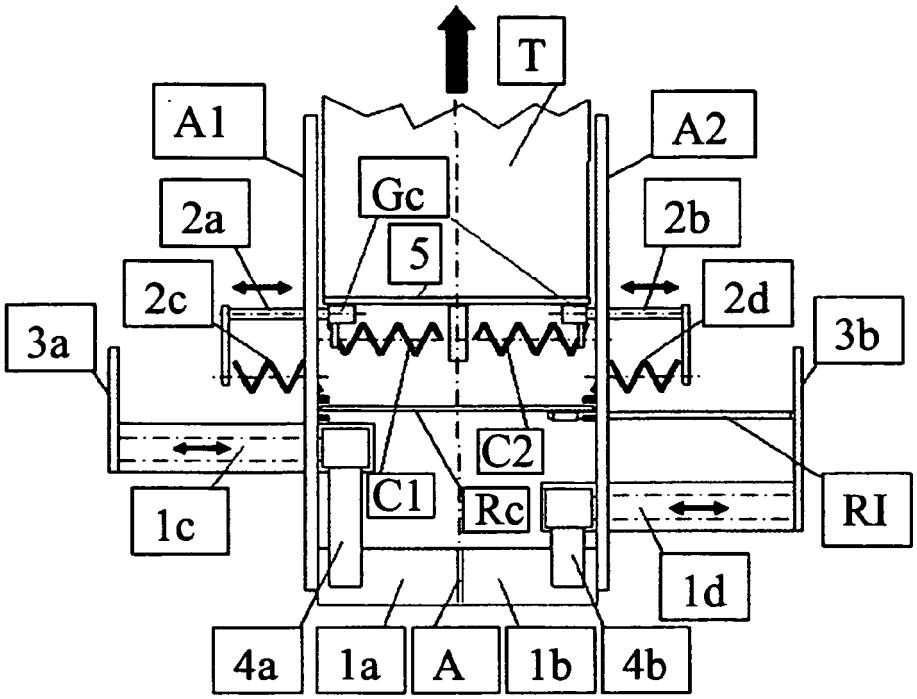
T
A1
A2
Gc
2a
2b
5
2c
2d
3a
3b
C2
C1
Rc
RI
1c
1d
4a
1a
A
1b
4b

Fig. 6

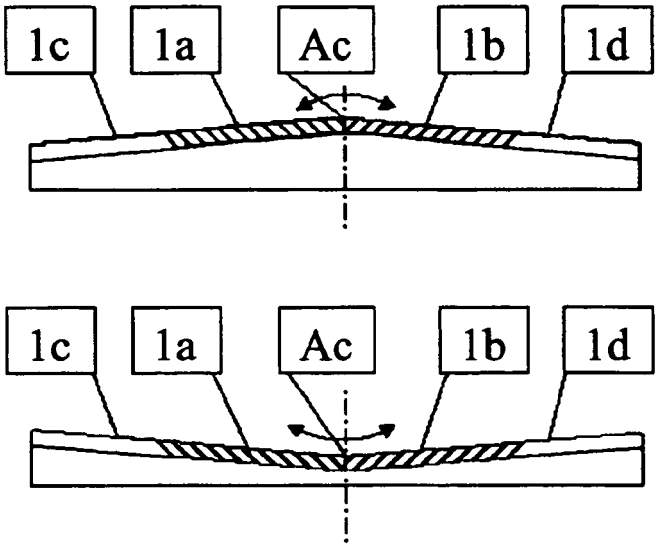
1c
1a
Ac
1b
1d
1c
1a
Ac
1b
1d

Fig. 6a

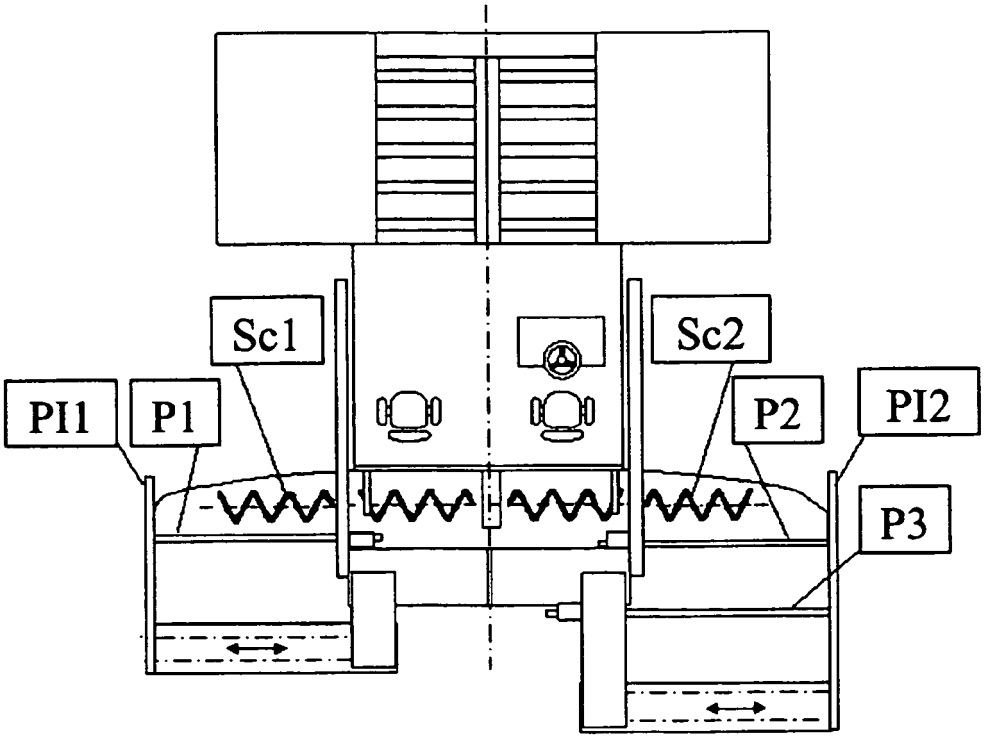

Fig. 12

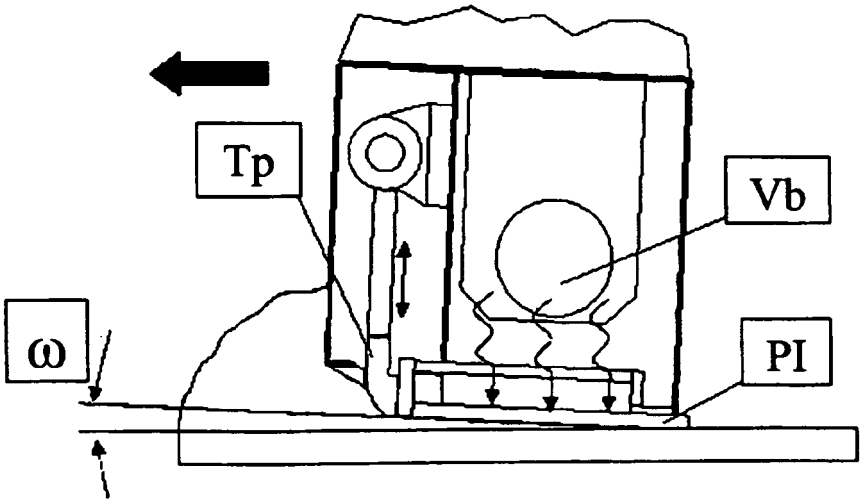

Fig. 7

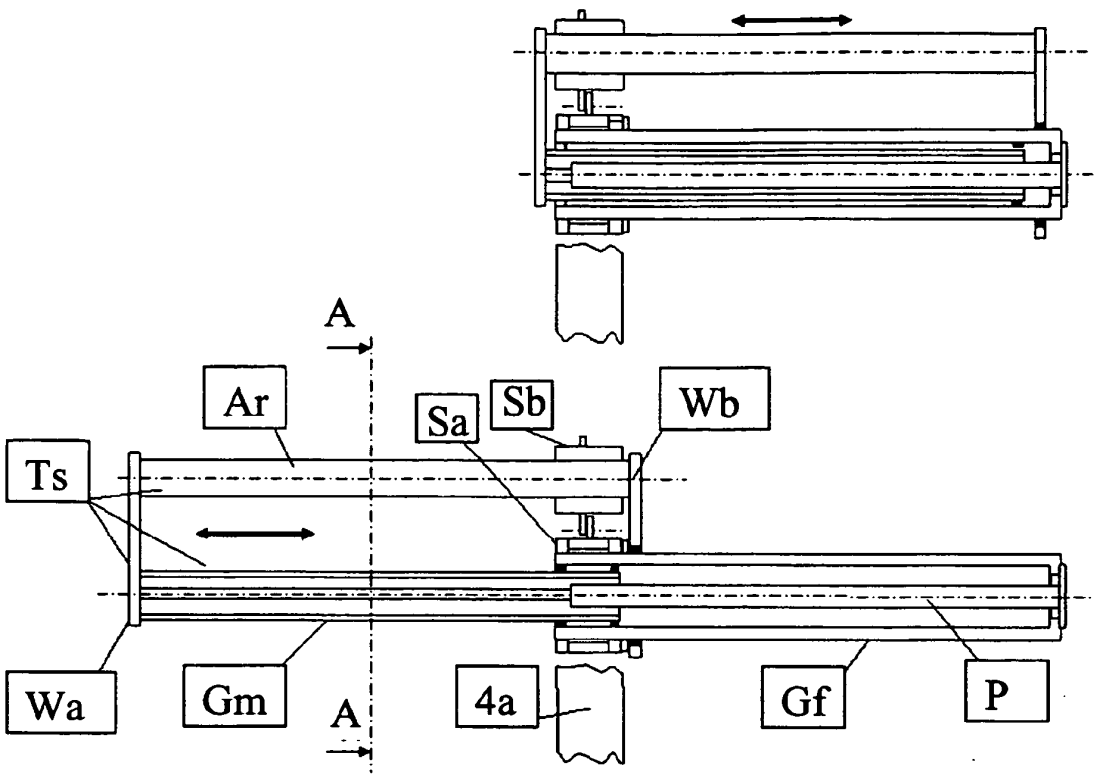
A
Ar
Sa
Sb
Wb
Ts
Wa
Gm
A
4a
Gf
P

Fig. 8

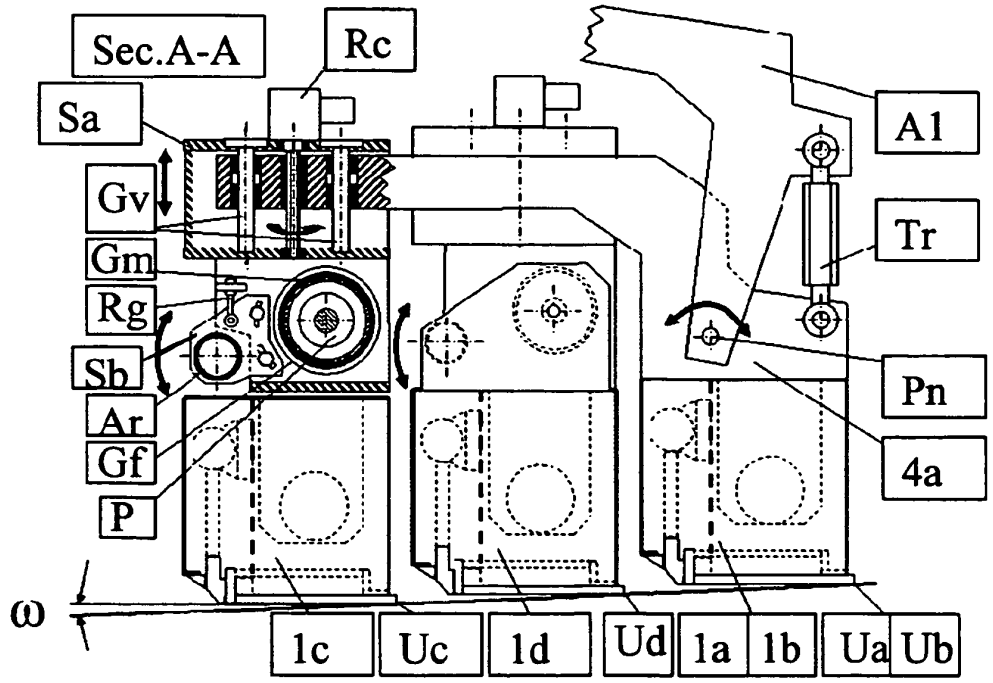
Sec.A-A
Rc
Sa
Gv
Gm
Rg
Sb
Ar
Gf
P
A1
Tr
Pn
4a
ω
1c
Uc
1d
Ud
1a
1b
Ua
Ub

Fig. 9

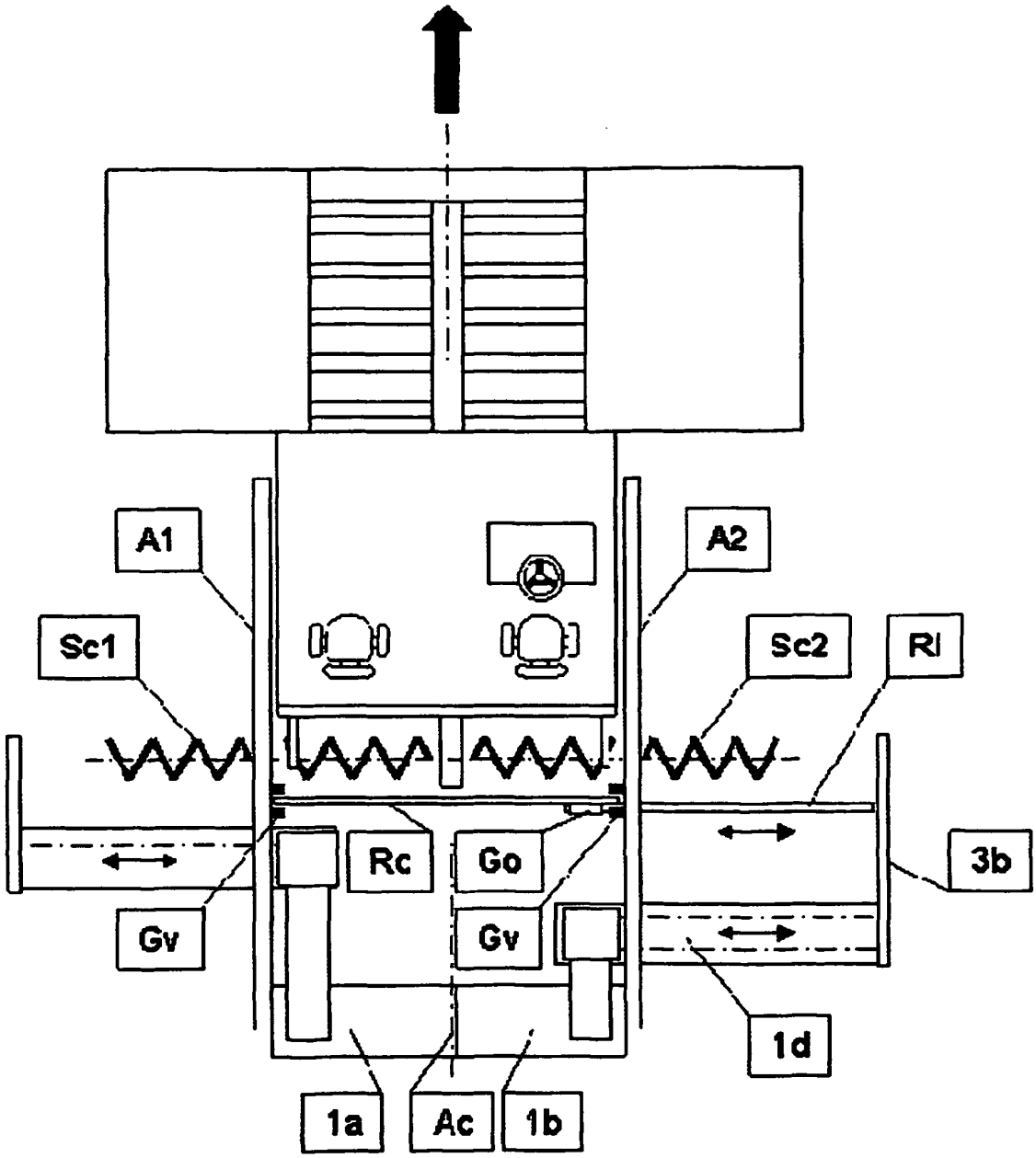

Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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