



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**18.04.2007 Bulletin 2007/16**

(51) Int Cl.:  
**E01C 19/48<sup>(2006.01)</sup> E01C 19/18<sup>(2006.01)</sup>**

(21) Application number: **05110100.4**

(22) Date of filing: **28.10.2005**

(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 NL PL PT RO SE SI SK TR**  
Designated Extension States:  
**AL BA HR MK YU**

(71) Applicant: **Antec S.p.A.**  
**20068 Peschiera Borromeo (Milano) (IT)**

(72) Inventors:  
• **Giovannini, Renato**  
**40068, ARGENTA (Ferrara) (IT)**  
• **Dell'orto Zineroni Casati, Ferdinando**  
**26016, SPINO D'ADDA (Cremona) (IT)**

(30) Priority: **11.10.2005 IT BS20050119**

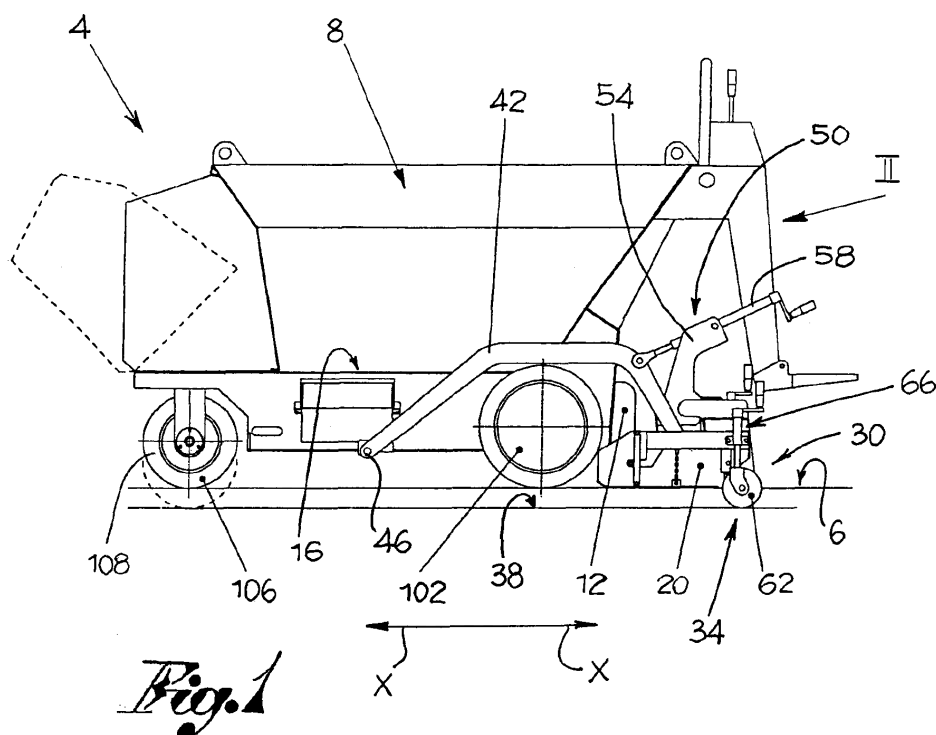
(60) Divisional application:  
**06115561.0**

(74) Representative: **Crippa, Paolo Ernesto**  
**JACOBACCI & PARTNERS S.p.A.**  
**Piazzale Arnaldo, 2**  
**25121 Brescia (IT)**

(54) **A finishing machine and a finishing method**

(57) A finishing machine (4) suitable for laying and levelling a layer of mix on a surface to be covered (6). The machine comprises a smoothing device (20) and feeler means operatively connected to the smoothing device (20) so as to ensure a predetermined minimum distance between the reference plane and the smoothing

device (20). The mix spreading is carried out by a distribution unit (12) comprising a pair of separators (78) arranged at an outlet portion (82) of mix feeding means (16). The machine is preferably moved by back driving wheels and a single front steering wheel (108). The finishing operation is particularly effective and the machine is easy to move and of simplified construction.



## Description

**[0001]** The present invention relates to a finishing machine suitable for laying a bituminous mix and for levelling the same, as well as the relevant method of laying and finishing.

**[0002]** In the prior art, finishing machines are quite cumbersome and slow to be operated and do not always allow laying the bituminous material in an accurate and even manner, especially in limited cross extension portions.

**[0003]** Such known machines further require wide operating spaces and a high number of workers to be operated.

**[0004]** The problem at the basis of the present invention is to provide a finishing machine which should solve the disadvantages mentioned above with reference to the prior art.

**[0005]** Such disadvantages and restrictions are solved with a finishing machine in accordance with claim 1 and with a method in accordance with claim 36.

**[0006]** Further embodiments of the finishing machine according to the invention are described in the following claims.

**[0007]** Further features and the advantages of the present invention will appear more clearly from the following description of preferred non-limiting embodiments thereof, wherein:

**[0008]** figure 1 shows a side view of a finishing machine according to an embodiment of the present invention;

**[0009]** figure 2 shows a front view of the finishing machine from the side of arrow II of figure 1;

**[0010]** figure 3 shows an enlarged detail of the finishing machine of figure 1;

**[0011]** figure 4 shows a partial of the detail of figure 3 from the side of arrow IV of figure 3;

**[0012]** figure 5 shows an enlarged detail of the finishing machine of figure 1 according to a further embodiment of the present invention;

**[0013]** figure 6 shows an enlarged detail of the finishing machine of figure 1;

**[0014]** figure 7 shows a side of the detail of figure 6 from the side of arrow VII of figure 6.

**[0015]** Elements or parts of elements in common between the embodiments described below are referred to with the same reference numerals.

**[0016]** With reference to the above figures, reference numeral 4 generically denotes a finishing machine for laying a layer of mix on a surface to be covered 6. The surface to be covered 6 may be, for example, a portion of a road surface or of a kerbstone, filled in advance, at least partly, with roadbed or crushed stone of various types.

**[0017]** According to an embodiment, the finishing machine 4 comprises a hopper or loading tank 8 for containing the mix; said hopper 8 may be of the type with fixed walls or it may exhibit at least one moving wall so as to facilitate the loading of hopper 8, for example with a mini-

shovel.

**[0018]** The finishing machine 4 comprises a distribution unit 12 of the mix on said surface to be covered 6 and feeding means 16 of the mix from hopper 8 to the distribution unit 12. The feeding means 16 may comprise a conveyor belt 18, suitable for receiving the mix and for conveying it towards the distribution unit 12.

**[0019]** The finishing machine 4 comprises a smoothing device 20 operatively connected to the machine and provided with at least one connecting edge 24 suitable for spreading and compressing the layer of mix laid by the distribution unit 12. The smoothing device 20 may be a hollow body and exhibits a connecting edge 24 that extends substantially transversally relative to a feeding direction X-X of the machine so as to form a wall that scrapes and spreads the mix according to a feeding direction of the machine. Preferably, the connecting edge 24 exhibits a chamfer 26 facing the side of the distribution unit 12.

**[0020]** Advantageously, machine 4 comprises feeler means 30 operatively connected to the smoothing device 20, and comprising at least one support element 34 suitable for interacting in abutment with a reference plane 38 so as to support the smoothing device 20 and ensure a predetermined minimum distance between the connecting edge 24 of the smoothing device 20 and the reference plane 38 relative to a direction perpendicular to the surface to be covered 6, according to the profile of the reference plane 38.

**[0021]** According to an embodiment, the smoothing device 20 is operatively connected to the machine by connecting arms 42 keyed on the machine about at least one connecting pin 46, so as to oscillate relative to said connecting pin 46, towards and away from the surface to be covered 6.

**[0022]** According to an embodiment, the machine comprises a pair of connecting pins 46 that are fixed relative to said machine.

**[0023]** According to a further embodiment, machine 4 comprises at least one connecting pin 46 that is mobile relative to said machine. The mobility of pin 46 may be obtained for example by realising slotted holes wherein the pin is inserted. Preferably, pin 46 is mobile along a direction perpendicular to the feeding direction X-X of the smoothing device, as well as to the surface to be covered 6.

**[0024]** According to an embodiment, the at least one pin 46 is operatively connected to motor means, suitable for changing the position of the pin; said motor means may comprise a screw and nut screw system or a cylinder and piston system; such systems may be manually, electrically, pneumatically or hydraulically actuated.

**[0025]** Preferably, the finishing machine 4 comprises a reaction element 50 operatively connected to machine 4 and to the smoothing device 20, so as to change the stand-by position of the smoothing device 20 relative to the machine.

**[0026]** According to an embodiment, the reaction ele-

ment 50 comprises an anchoring bracket 54, integral with machine 4 and operatively connected to the connecting arms 42 by an adjustable bar 58, so as to change the orientation of the connecting arms 42 and thus the position of the smoothing device 20 relative to the surface to be covered 6 and to an abutment plane of the feeler pin 30 or reference plane 38.

**[0027]** According to embodiment variations, the reaction element may comprise a screw and nut screw system or element or a cylinder and piston element. Such systems may be manually, electrically, hydraulically or pneumatically actuated.

**[0028]** According to an advantageous embodiment, the support element 34 comprises a wheel 62 suitable for rolling on the reference plane 38 following a profile of the reference plane 38, parallel to the feeding direction X-X of the machine.

**[0029]** Alternatively, the support element 34 may comprise a sliding block suitable for abutting against the reference plane 38, following the profile of the reference plane 38.

**[0030]** Preferably, the feeler means 30 comprise adjustment means 66 of the support element 34 suitable for adjusting the distance between the smoothing device 20 and the reference plane 38. Said adjustment means 66 may comprise a screw and nut screw element or they may comprise a cylinder and piston element; such elements may be controlled manually, electrically, pneumatically or hydraulically.

**[0031]** According to an embodiment, the smoothing device comprises a pair of panels 70 operatively connected to the smoothing device and provided with a second connecting edge 74 and with a second chamfer 76, preferably parallel to the connecting edge 24 and to chamfer 26 respectively.

**[0032]** Said panels 70 are extractable relative to a cross direction Y-Y, perpendicular to the feeding direction X-X of the machine, so as to be adaptable to the cross overall dimensions of the surface to be covered. Preferably, the feeler means 30 are constrained to at least one of said panels 70, so as to change the cross position of the feeler means 30 adapting them to the cross dimension of the surface to be covered 6.

**[0033]** According to an embodiment, the distribution unit 12 comprises a pair of separators 78 arranged at an outlet portion 82 of the feeding means 16, so as to intercept the mix coming from the feeding means 16 and distribute it onto the surface to be covered 6.

**[0034]** Advantageously, separators 78 have smaller cross overall dimensions than the extension of the outlet portion 82 of the feeding means 16, said cross overall dimensions being measured perpendicularly relative to the feeding direction X-X of the finishing machine 4.

**[0035]** Separators 78 may be converging in a connecting zone 86 arranged in the proximity of the outlet portion 82 of the feeding means 16.

**[0036]** According to further embodiments, separators 78 may be both planar and curved so as to be convex

on the side facing the outlet portion 82 of the feeding means 16.

**[0037]** Preferably, separators 78 are arranged symmetrically relative to the outlet portion 82 of the feeding means 16.

**[0038]** According to a possible embodiment, the separators are turnably mounted relative to an actuating pin 90 arranged, for example, at the connecting zone 86 (figure 6) or at a crosspiece 94 arranged opposed to separators 78 relative to the feeding means 16 (figure 7).

**[0039]** Preferably, the actuating pin 90 is arranged symmetrically relative to the outlet portion 82 of the feeding means 16, and the separators have the same dimensions so as to symmetrically divide the mix flow coming from the outlet section 82, into two side flows F (figure 7).

**[0040]** The actuating pin 90 may be arranged according to a direction substantially parallel to the surface to be covered 6, as well as to the feeding direction X-X, or the actuating pin 90 may be arranged according to a direction incident with the surface to be covered 6, for example on the smoothing device side; preferably, the actuating pin 90 is arranged on a plane parallel to the feeding direction X-X.

**[0041]** According to an embodiment, separators 78 are operatively connected to motor means suitable for operating the separators about said actuating pin 90. The motor means may comprise a compound lever 98 provided with a screw and nut screw system. Moreover, the motor means may comprise an electrical or hydraulic motor.

**[0042]** According to an embodiment, machine 4 comprises first operating means 102, arranged on the side of smoothing device 20 and second operating means 106, arranged at the side opposite the first operating means 102. The first operating means 102 comprise, for example, a pair of driving wheels, actuated by an electrical motor, a hydraulic motor, or by an internal combustion motor.

**[0043]** The second operating means 106 comprise a steering element arranged in a portion comprised between said first operating means 102 relative to the cross direction Y-Y perpendicular to the feeding direction X-X of the machine. In other words, the second operating means 106 are comprised within the cross overall dimensions of the first operating means 102. Preferably, the second operating means 106 comprise a wheel 108 arranged at the same distance from said first operating means relative to a direction perpendicular to the feeding direction of the machine. In other words, the finishing machine comprises a single front wheel 108 arranged symmetrically relative to the back wheels, within the cross overall dimensions of the same.

**[0044]** According to a further embodiment, the second operating means 106 comprise a sliding block or a track.

**[0045]** Preferably, the second operating means 106 are operatively connected to second adjustment means 110 suitable for adjusting the distance of the second operating means 106 from the surface to be covered 6. The

second adjustment means 110 may comprise a screw and nut screw system or a cylinder and piston system; said systems may be manually, electrically, pneumatically or hydraulically actuated.

**[0046]** According to a possible embodiment, the second operating means 106 are driving; for example, they may be actuated by a mechanical transmission system or by a hydraulic transmission system.

**[0047]** The operation of a finishing machine according to the invention shall now be described. In particular, the machine proceeds according to a feeding direction so as to move the distribution unit 12 and the smoothing device 20 at the portion of surface to be covered 6. The actuation of the feeding means 16 makes the mix fall by gravity, at the outlet section 82, directly onto the distribution unit 12.

**[0048]** Separators 78 of the distribution unit 12 intercept the mix flow symmetrically conveying it from opposite sides relative to the unit itself. The mix layer laid and distributed by the distribution unit 12 is then intercepted by the smoothing device 20 which is operatively connected to feeler means 30. Thanks to its weight or to the action of a special additional thrust device, the smoothing device 20 shaves and levels the mix evenly spreading it along the front of the connecting edge 24 and compressing it, levelling it below it. The support element 34 of the feeler means 30, during the machine feeding, rests on a reference plane 38, so as to ensure a predetermined minimum distance between the connecting edge 24 of the smoothing device 20 and the reference plane 38, and thus ensuring a fixed level of the layer of laid mix based on the minimum distance set through the feeler means 30, arranged in contact with the reference plane 38, from the latter.

**[0049]** In other words, the support element 34, adjusted in position with the feeler means 30 forms an abutment that prevents the smoothing device 20 from compressing the mix layer laid by the distribution unit 12 beyond a certain predetermined level. In fact, the support element 34 creates a stop to the approach movement of the smoothing device 20 towards the surface to be covered 6.

**[0050]** In case of the asphaltting of a kerbstone, as a reference plane for the feeler means it is possible to use the plane defined by the blocks or kerbs of the kerbstone that delimit the kerbstone on at least one side of the same. In accordance with an alternative embodiment, advancing the finishing machine on the kerbstone surface, it is possible to make the support element slide on the road surface adjacent the kerbstone itself.

**[0051]** As it can be understood from the description, the finishing machine according to the invention allows overcoming the disadvantages of the prior art.

**[0052]** In particular, it is possible to lay the bituminous mix even in small spaces such as a kerbstone, where so far a mini-shovel for carrying the material, a wheelbarrow and at least one worker to manually lay the mix. In other words, to asphalt small spaces so far, such as a kerbstone, the finishing machines of the known type are not used, but the mix is manually spread by at least one work-

er. Such operation is slow and often inaccurate.

**[0053]** The finishing machine according to the present invention allows being actuated autonomously by a single worker and does not require any manual laying that would be unavoidably slow and inaccurate.

**[0054]** The finishing machine, thanks to the use of a single front steering wheel allows being moved in small spaces having a limited steering radius.

**[0055]** The height adjustment of the front wheel ensures regular levelling of the machine relative to the surface to be asphalted even when the front wheel covers an uneven and rough portion as not yet covered by the mix layer. Thanks to the levelling between the front wheel and the back wheels, a better control of the smoothing device position is ensured.

**[0056]** The distributing separator exhibits small overall dimensions and requires reduced actuating power as compared to the screw systems typically used in the prior art.

**[0057]** The floating movement of the separator ensures an even distribution of the mix on the entire cross extension concerned by the passage of the smoothing device. Thanks to the floating movement of the separator it is possible to use mix distribution means of reduced dimensions. In fact, also separators of relatively reduced extension when rotated allow transversally distributing the mix even beyond the cross overall dimensions of the mix outlet. Thanks to the small separator, a lower actuating power is further required.

**[0058]** The levelling device ensures a minimum and constant height between the working edge or wall of the smoothing device and a reference plane. In this way, the planarity of the asphalted surface as well as the levelling of the same relative to the reference plane are ensured.

In fact, the smoothing device is not subject just to the driving force of the machine and to the forces transmitted by the laid mix layer, but it is also forced to move towards the laid layer relative to a predetermined minimum distance relative to the reference plane. The feeler means follow the profile of the reference surface during the laying operation, while the support element prevents the smoothing device from excessively compressing the layer of laid mix; in other words, a minimum distance is ensured between the smoothing device edge and the reference plane, and thus between the smoothing device edge and the surface to be asphalted, beyond which the smoothing device cannot sink.

**[0059]** Advantageously, the reference plane is given in case of kerbstones by stone blocks that laterally delimit the kerbstone itself.

**[0060]** A man skilled in the art may make several changes and adjustments to the finishing machine described above in order to meet specific and incidental needs, all falling within the scope of protection defined in the following claims.

## Claims

1. A finishing machine (4) for laying a layer of bituminous mix on a surface to be covered (6), comprising a hopper (8) for containing the mix, a distribution unit (12) of the mix onto said surface to be covered (6), feeding means (16) of the mix from the hopper (8) to the distribution unit (12), a smoothing device (20) operatively connected to the machine and provided with at least one connecting edge (24) suitable for spreading and compressing the mix layer laid by the distribution unit (12), **characterised in that** said machine comprises feeler means (30) operatively connected to the smoothing device (20), said feeler means comprising at least one support element (34) suitable for interacting in abutment with a reference plane (38) so as to support the smoothing device (20) and ensure a predetermined minimum distance between the connecting edge (24) of the smoothing device (20) and the reference plane (38) relative to a direction perpendicular to the surface to be covered (6), according to the profile of the reference plane (38). 5
2. A finishing machine (4) according to claim 1, wherein the smoothing device (20) is operatively connected to the machine by connecting arms (42) keyed on the machine about at least one connecting pin (46), so as to oscillate relative to said connecting pin (46). 10
3. A finishing machine (4) according to any one of the previous claims, wherein said at least one connecting pin (46) is fixed relative to said machine. 15
4. A finishing machine (4) according to any one of the previous claims, wherein said at least one connecting pin (46) is mobile relative to said machine. 20
5. A finishing machine (4) according to any one of the previous claims, wherein said connecting pin (46) is operatively connected to motor means, suitable for changing the position of the connecting pin (46). 25
6. A finishing machine (4) according to any one of the previous claims, comprising a reaction element (50) operatively connected to the machine and to said smoothing device (20), so as to change the standby position of the smoothing device (20) relative to the machine. 30
7. A finishing machine (4) according to any one of the previous claims, wherein the reaction element (50) is operatively connected to connecting arms (42) keyed to the machine about at least one connecting pin (46). 35
8. A finishing machine (4) according to any one of the previous claims, wherein the reaction element (50) is a screw and nut screw element. 40
9. A finishing machine (4) according to any one of the previous claims, wherein the reaction element (50) is a cylinder and piston element. 45
10. A finishing machine (4) according to any one of the previous claims, wherein the support element (34) comprises a wheel (62) suitable for rolling on the reference plane (38) following a profile of the reference plane (38). 50
11. A finishing machine (4) according to any one of the previous claims, wherein the support element (34) comprises a sliding block suitable for abutting against the reference plane (38) following the profile of the reference plane (38). 55
12. A finishing machine (4) according to any one of the previous claims, wherein the feeler means (30) comprise adjustment means (66) of the support element (34) suitable for adjusting the distance between the smoothing device (20) and the reference plane (38).
13. A finishing machine (4) according to any one of the previous claims, wherein said adjustment means (66) of the distance comprise a screw and nut screw element.
14. A finishing machine (4) according to any one of the previous claims, wherein the adjustment means (66) of the distance are of the cylinder and piston type.
15. A finishing machine (4) according to any one of the previous claims, wherein said distribution unit (12) comprises a pair of separators (78) arranged at an outlet portion (82) of the feeding means (16), so as to intercept the mix coming from the feeding means (16) and distribute it onto the surface to be covered (6).
16. A finishing machine (4) according to any one of the previous claims, wherein the separators (78) have smaller cross overall dimensions than the extension of the outlet portion (82) of the feeding means (16), said cross overall dimensions being measured perpendicularly relative to a feeding direction (X-X) of the finishing machine (4).
17. A finishing machine (4) according to any one of the previous claims, wherein the separators (78) are planar and converging in a connecting zone arranged in the proximity of the outlet portion (82) of the feeding means (16).
18. A finishing machine (4) according to any one of the previous claims, wherein the separators (78) are curved so as to be convex on the side facing the

outlet portion (82) of the feeding means (16).

19. A finishing machine (4) according to any one of the previous claims, wherein the separators (78) are arranged symmetrically relative to the outlet portion (82) of the feeding means (16).
20. A finishing machine (4) according to any one of the previous claims, wherein the separators (78) are turnably mounted relative to an actuating pin (90).
21. A finishing machine (4) according to any one of the previous claims, wherein the actuating pin (90) is arranged symmetrically relative to the outlet portion (82) of the feeding means (16).
22. A finishing machine (4) according to any one of the previous claims, wherein the actuating pin (90) is arranged according to a direction substantially parallel to the surface to be covered (6).
23. A finishing machine (4) according to any one of the previous claims, wherein the separators (78) are operatively connected to motor means suitable for operating the separators (78) about said actuating pin (90).
24. A finishing machine (4) according to any one of the previous claims, wherein said motor means comprise a compound lever (98) provided with a screw and nut screw system.
25. A finishing machine (4) according to any one of the previous claims, wherein said motor means comprise a motor of electrical or hydraulic type.
26. A finishing machine (4) according to any one of the previous claims, wherein the machine comprises first operating means (102), arranged on the side of smoothing device (20), and second operating means (106), arranged at the side opposite the first operating means (102), said second operating means (106) comprising a steering element arranged in a portion comprised between said first operating means (102) relative to a cross direction (Y-Y), perpendicular to the feeding direction (X-X) of the machine.
27. A finishing machine (4) according to any one of the previous claims, wherein said second operating means (106) comprise a wheel (62) arranged at the same distance from said first operating means (102) relative to a cross direction (Y-Y) perpendicular to the feeding direction (X-X) of the machine.
28. A finishing machine (4) according to any one of the previous claims, wherein said second operating means (106) comprise a sliding block.

29. A finishing machine (4) according to any one of the previous claims, wherein said second operating means (106) comprise a track.

5 30. A finishing machine (4) according to any one of the previous claims, wherein the second operating means (106) are operatively connected to second adjustment means (110) suitable for adjusting the distance of the second operating means (106) from the surface to be covered (6).

10 31. A finishing machine (4) according to any one of the previous claims, wherein said second adjustment means (110) comprise a screw and nut screw system.

15 32. A finishing machine (4) according to any one of the previous claims, wherein the second adjustment means (110) comprise a cylinder and piston system.

20 33. A finishing machine (4) according to any one of the previous claims, wherein the second operating means are driving.

25 34. A finishing machine (4) according to any one of the previous claims, wherein the second operating means are actuated by the first driving means by a mechanical transmission system.

30 35. A finishing machine (4) according to any one of the previous claims, wherein the second operating means are actuated by the first driving means by a hydraulic transmission system.

35 36. Method of finishing of a portion, comprising the steps of: laying a layer of mix, advancing according to a feeding direction with a finishing machine (4) provided with a smoothing device (20) operatively connected to feeler means (30) having a support element (34) that during the feeding abuts on a reference plane (38), so as to shave and keep a predetermined minimum distance between the smoothing device (20) and the reference plane (38), during the shaving step.

40 37. A finishing method according to claim 36, comprising the step of covering at least partly a portion of a kerbstone and of abutting said feeler means (30) on a reference plane (38) defined by the portion of working level determined by blocks that delimit the kerbstone on at least one side of the same.

45 38. A finishing method according to claim 36, comprising the step of abutting said feeler means (30) on a reference plane (38) defined by the road surface adjacent the kerbstone to be asphalted.

50 39. A finishing method according to any one of claims

36 to 38, comprising the step of laying the layer of mix conveying a mix flow on a pair of separators (78) arranged at an outlet portion (82) of the feeding means (16), so as to intercept the mix coming from the feeding means (16) and symmetrically distribute it onto the surface to be covered (6). 5

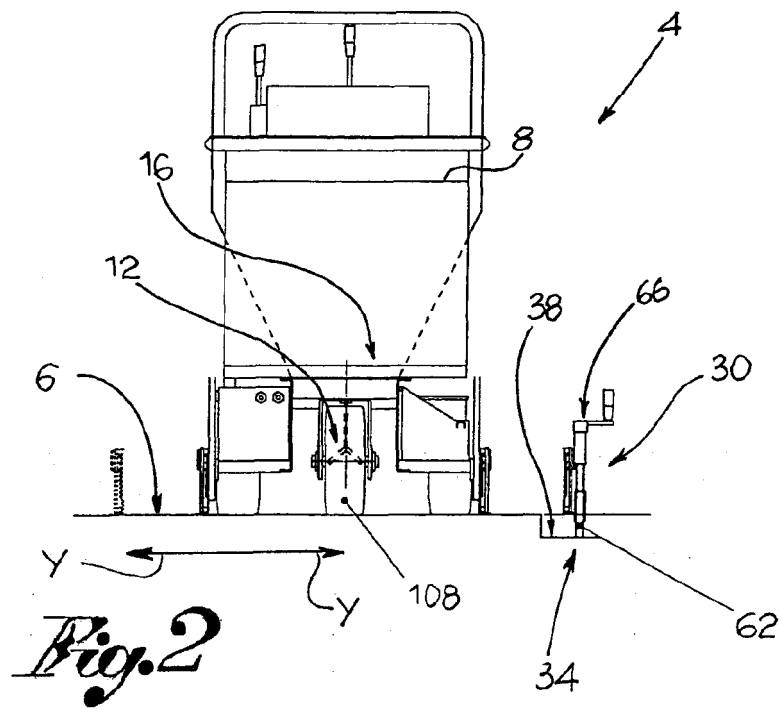
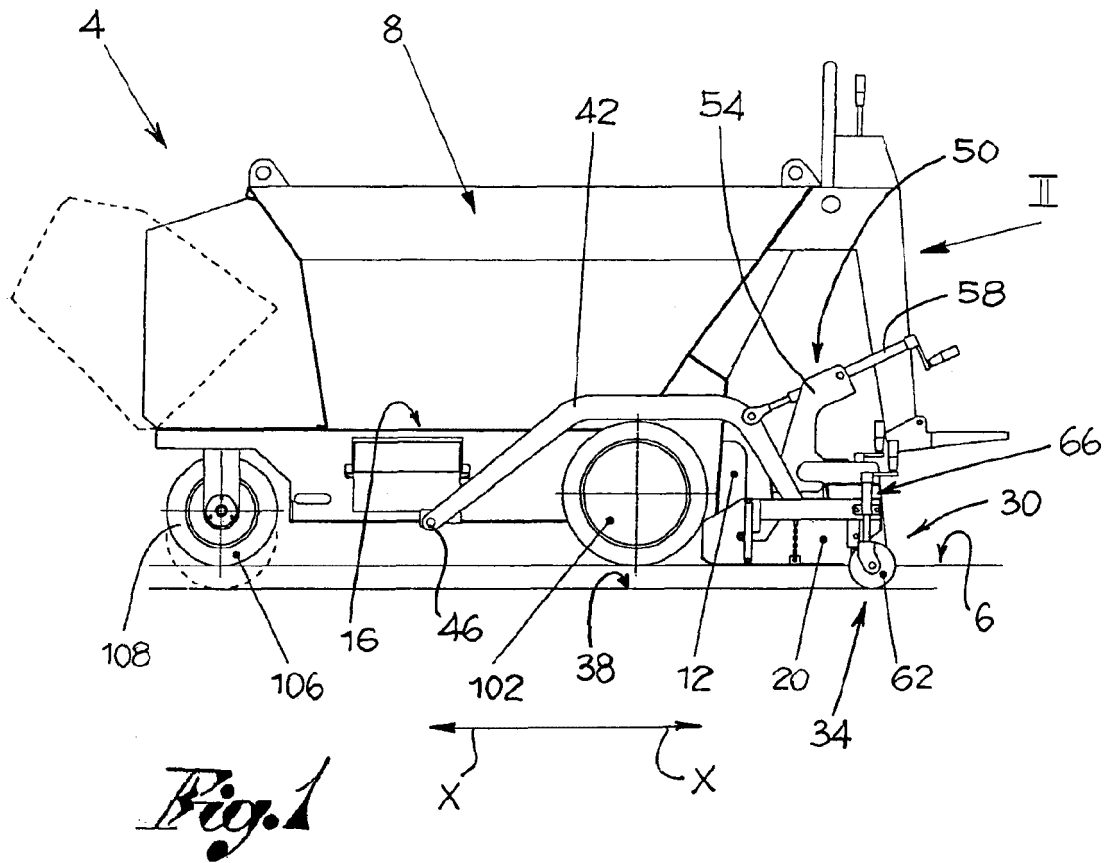
40. A finishing method according to claim 39, wherein during the feeding of the mix on the separators, the separators are moved in rotation relative to an axis parallel to the machine feeding direction, so as to distribute the mix beyond the cross overall dimensions of the separators. 10

41. A finishing machine (4) for laying a layer of mix on a surface to be covered (6), comprising a hopper (8) for containing the mix, a distribution unit (12) of the mix onto said surface to be covered (6), feeding means (16) of the mix from the hopper (8) to the distribution unit (12), a smoothing device (20) provided with at least one connecting edge (24) suitable for spreading and compressing the mix layer laid by the distribution unit (12), **characterised in that** said distribution unit (12) comprises a pair of separators (78) arranged at an outlet portion (82) of the feeding means (16), so as to intercept the mix coming from the feeding means (16) and distribute it onto the surface to be covered (6). 15 20 25

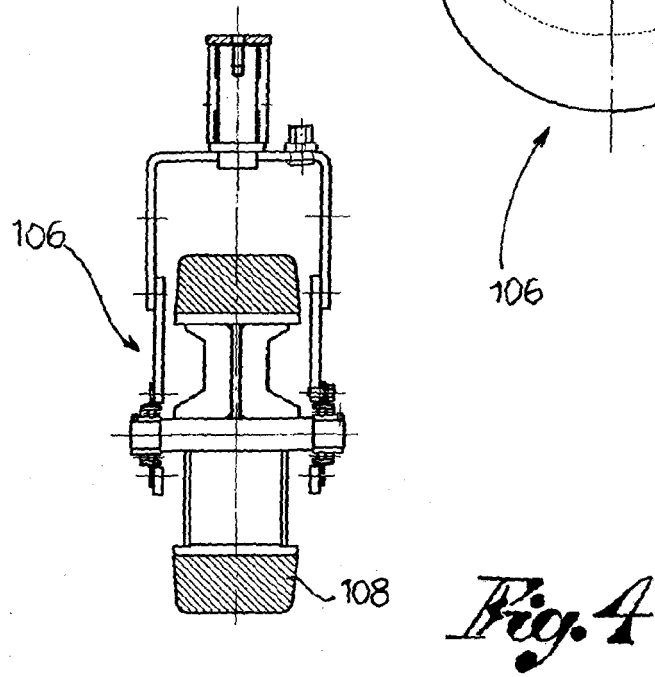
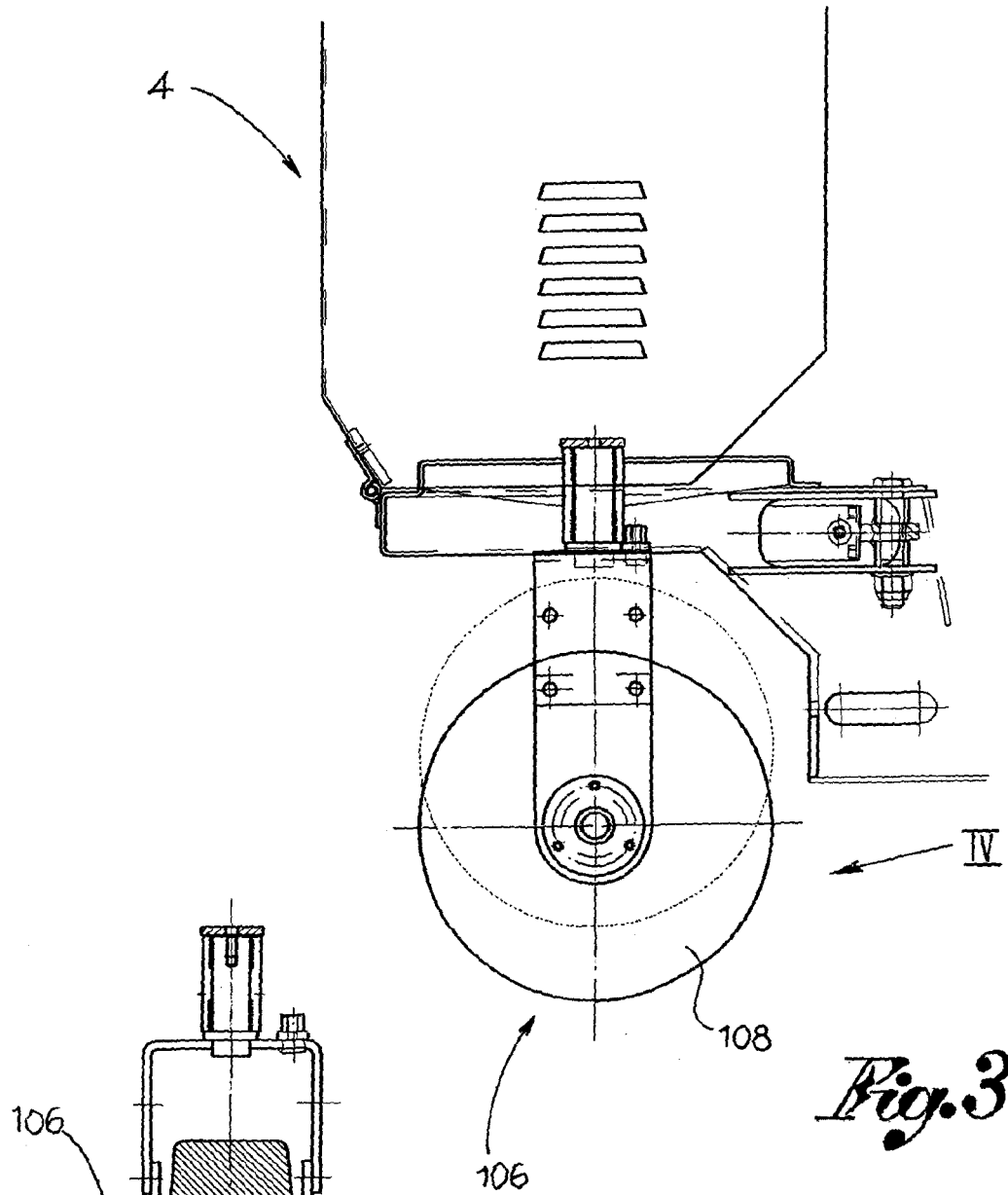
42. A finishing machine (4) for laying a layer of mix on a surface to be covered (6), comprising a hopper (8) for containing the mix, a distribution unit (12) of the mix onto said surface to be covered (6), feeding means (16) of the mix from the hopper (8) to the distribution unit (12), a smoothing device (20) provided with at least one connecting edge (24) suitable for spreading and compressing the mix layer laid by the distribution unit (12), **characterised in that** the machine comprises first operating means (102), arranged on the side of the smoothing device (20) and second operating means (106), arranged at a side opposite the first operating means (102), said second operating means (106) comprising a steering element arranged in a portion comprised between said first operating means (102) relative to a direction perpendicular to the feeding direction of the machine. 30 35 40 45

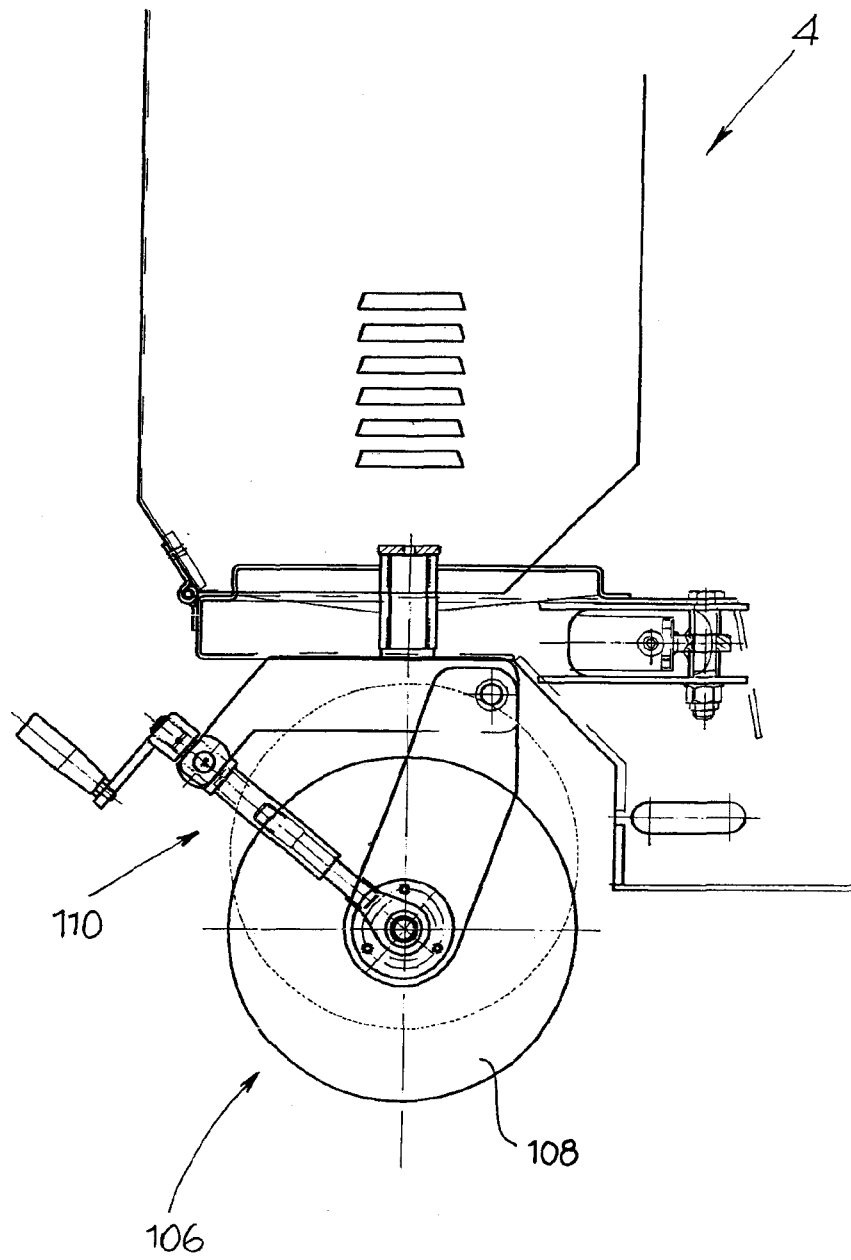
50

55

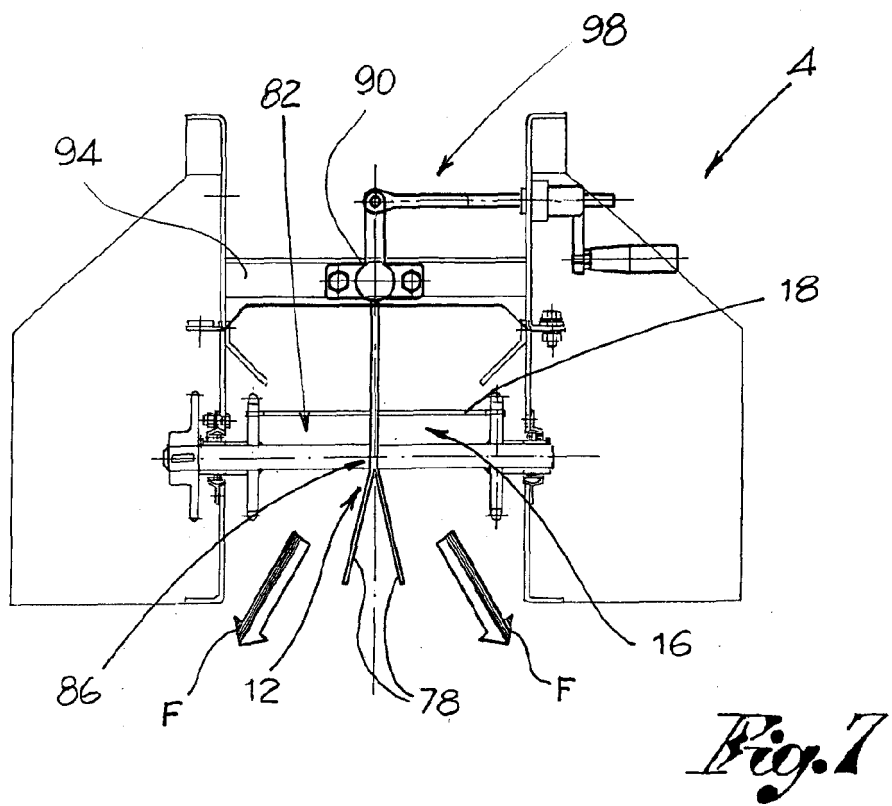
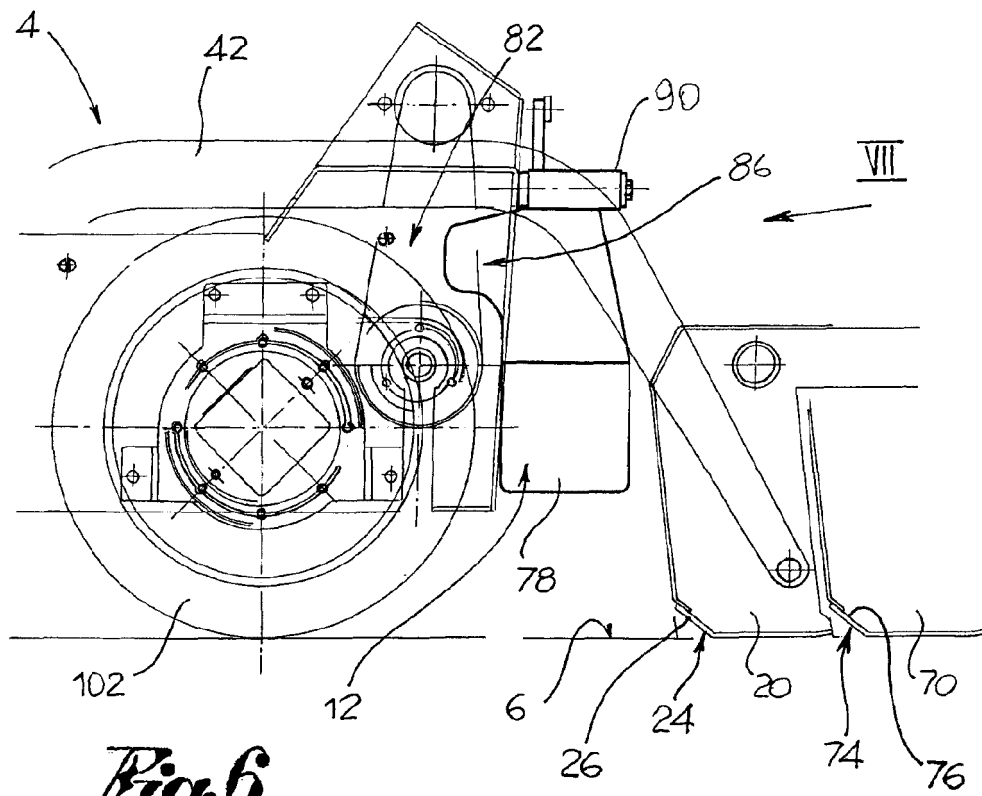








*Fig. 5*





**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:
- 1-14, 36-38



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-14,36-38

A finishing machine and finishing method ensuring a predetermined minimum distance between smoothing device and reference plan

---

2. claims: 15-25,39-41

A finishing machine and finishing method symmetrically distributing the mix onto the surface to be covered

---

3. claims: 26-35,42

A finishing machine and finishing method comprising first and second operating means

---

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

EP 05 11 0100

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

07-02-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3264958	A	09-08-1966	NONE	
-----				
DE 2713591	A1	05-10-1978	NONE	
-----				
US 5201604	A	13-04-1993	NONE	
-----				