



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 033 441 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**06.09.2000 Bulletin 2000/36**

(51) Int. Cl.<sup>7</sup>: **E01C 19/40**

(21) Application number: **00103466.9**

(22) Date of filing: **29.02.2000**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

(30) Priority: **02.03.1999 IT VI990018 U**

(71) Applicant: **BITELLI S.p.A.**  
**40061 Minerbio (BO) (IT)**

(72) Inventor: **Bitelli, Romolo**  
**S. Lazzaro (BO) (IT)**

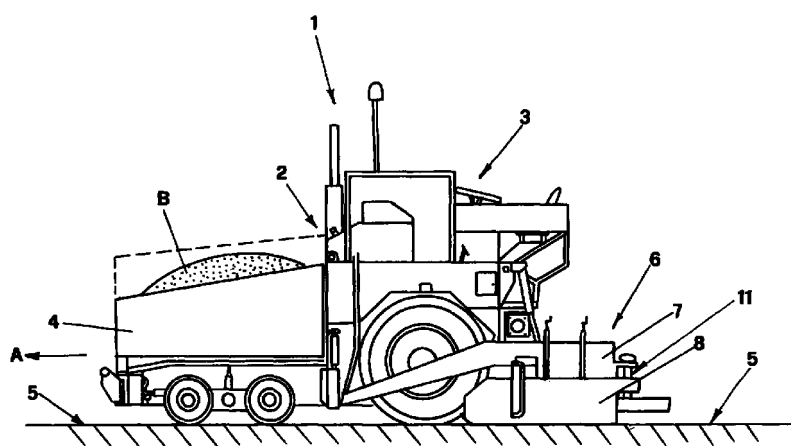
(74) Representative: **Bonini, Ercole**  
**c/o STUDIO ING. E. BONINI SRL**  
**Corso Fogazzaro 8**  
**36100 Vicenza (IT)**

(54) **Vibratory finishing machine for road asphalting**

(57) Self-driven vibratory finishing machine (1) for asphalting road surfaces (5) comprising first central compacting means (100) of the bitumen aggregate deposited, at least one pair of second compacting means (7) set along the sides of said machine (1) and supporting means (8) connected by joining means (11) to said second compacting means (7), holding flat elements (9) scraping along the surface being asphalted

(5) suited to side stopping said bitumen aggregate (B) being deposited.

Said joining means (11) produce a vertical rotation axis X for said supporting means (8) to take said supporting means (8) from their work position to their compact position.



**FIG.1**

**EP 1 033 441 A2**

## Description

[0001] This finding concerns a vibratory finishing machine used for asphaltting road surfaces especially suited to being transferred with its protruding parts in a compacted set-up.

[0002] It is known that asphaltting work on roads usually implements self-driven machinery, so-called vibratory finishing machines, which essentially consist of a frame, shaped to provide a driver's cab and housing the machine's means of traction.

[0003] The frame also supports a bin containing the hot bitumen aggregate that, retrieved by a conveyor belt, is deposited on the surface being asphalted by the action of a pair of worm screws standing side by side, set crossways to the machine's direction of travel and made to rotate by a mechanical transmission unit.

[0004] While the bitumen aggregate is still hot, it is uniformly distributed over the road coarse and then compacted by means of a device, called "grader unit", set behind the worm screws with respect to the machine's direction of travel.

[0005] The grader unit is connected to the end of a pair of heavy-duty arms set on the two sides of the machine pivoted to the machine's frame and with hydraulic jacks on the other end suited to raising and lowering the grader unit according to work needs.

[0006] More precisely the grader unit comprises compacting means and a plowshare component basically consisting of a heavy-duty plate bent to form an L-shape set crossways to the machine's direction of travel, with the longer wing basically perpendicular to the road coarse and the shorter wing parallel to the actual coarse.

[0007] The plowshare spreads the bitumen aggregate distributed by the worm screws preparing it for compacting performed by compacting means comprising a vertically oscillating beam set crossways to the machine's direction of travel, and made to vibrate by a device connected to it.

[0008] It is known that in general the compacting means on modern vibratory finishing machines can be classified as:

- first central compacting means having basically the same width as the plowshare;
- at least one pair of second lateral compacting means each being independently extensible in width from the first central compacting means.

[0009] These second compacting means carry out the vibratory finishing of the shoulders of the road course, adjacent to the central section, and these shoulders may be varied in width depending on work needs.

[0010] The same second compacting means each have, along one side of the machine, a supporting meansing a flat element with an essentially longitudinal construction. The flat element is vertically mobile with

respect to its supporting means, so that it can be lowered until it scrapes along the road course during the machine's work cycle to perform its function of side stop to the bitumen aggregate inside the work area of the vibratory finisher.

[0011] On completion of work on the road course, the vibratory finishing machine is set-up in its compacted format in order to facilitate transfer to another location.

[0012] For this purpose the aforesaid second lateral compacting means, which may be extended according to the needs of the work performed, are made to retract against the central compacting means and, together with the latter, they are then lifted by operating the hydraulic jacks.

[0013] In this way the danger while transferring the machine of the supporting meansing the lateral flat elements colliding against stationary obstacles brushing up against the side of the machine is reduced considerably.

[0014] However this overall width, even with the lateral compacting means fully retracted, is nevertheless greater than the front width of the machine.

[0015] Therefore a residual danger remains, due to the fact that the aforesaid supporting means, with their longer side aligned with the machine's direction of travel and raised to a limited height from the ground, may still encounter a stationary obstacle found on the ground or brushing up against the side of the machine, causing severe damage.

[0016] The main inconvenience is caused by the fact that this machine is not allowed to circulate freely since, according to current traffic rules, this freedom is solely reserved to vehicles not having protruding members and having an overall width of less than two and a half meters.

[0017] This finding intends to remedy the aforesaid inconvenience.

[0018] In particular a first scope of the finding is to produce a self-driven vibratory finishing machine that allows to reduce the machine's overall width so that it is allowed to circulate freely and facilitate its transfer from one place to another.

[0019] Another scope of the finding is to obtain the reduction in overall width by making simple manoeuvres, reducing the operator's actions and efforts to a minimum.

[0020] Said scopes are achieved by a self-driven vibratory finishing machine for asphaltting road surfaces that, in accordance with the main claim, comprises a frame housing means of traction and shaped to provide a driver's cab and supporting:

- storage and distribution means of the bitumen aggregate to be deposited on said road surfaces;
- first central compacting means of the bitumen aggregate deposited, set crossways to the direction of travel of said machine;

- at least one pair of second compacting means set along the sides of said machine, lateral and basically parallel to said first central compacting means, extensible crossways to the machine's direction of travel;
- supporting means connected by joining means to said second compacting means, holding flat elements with essentially longitudinal construction scraping along the surface being asphalted suited to side stopping said bitumen aggregate being deposited, vertically mobile with respect to said supporting means;

**characterised in that** said joining means produce a vertical rotation axis for said supporting means to take said supporting means from their work position to their compact position.

**[0021]** An advantage of the finding is that said joining means allow the supporting means to move vertically along their corresponding vertical rotation axis in order to take each supporting means from its work position to its uppermost position and subsequently to its compact set-up without interfering with other components on the machine.

**[0022]** According to a preferred form of execution said joining means comprise a kingpin connected to said second compacting means slidingly coupled with a cylindrical projection belonging to the same supporting means; a hole is made through said kingpin to receive a pin suited to holding each supporting means in its uppermost position.

**[0023]** According to the same preferred form of execution the lifting means of each support comprise a flexible cable with one end connected to the actual support and the other end to the main frame of the machine.

**[0024]** The scopes and advantages described above shall be better explained during the description of the aforesaid preferred form of execution of the finding, given as a guideline but not a limitation and illustrated in the attached diagrams, where:

- fig. 1 illustrates the vibratory finishing machine for asphaltting road surfaces under this finding;
- fig. 2 illustrates a side view of the machine in fig. 1 and one of its supporting means;
- fig. 3 illustrates an overhead view of the supporting means in fig. 2;
- fig. 4 illustrates an overhead view of the same supporting means in fig. 2 in an intermediary lateral extension position;
- fig. 5 illustrates a side view of the supporting means in fig. 2 in an intermediary idle set-up;
- figures 6 and 7 illustrate an overhead view of the supporting means in fig. 2 and of the machine in fig. 1, in the compact set-up.

**[0025]** The self-driven vibratory finishing machine for asphaltting road surfaces under this finding is illus-

trated in fig. 1, where it is generally indicated by number 1 and comprises a frame 2 housing means of traction and shaped to provide a driver's cab 3.

**[0026]** The frame 2 also supports the storage means of the bitumen aggregate B to be deposited, consisting of a mobile walled bin 4.

**[0027]** The aggregate B, by a suitable distribution means preferably consisting of a conveyor belt not illustrated, is deposited over the road surface 5 being asphalted.

**[0028]** The bitumen aggregate B is then compacted by the action of a vibrating beam belonging to a grader unit, generally indicated by 6, basically comprising a plowshare, first central compacting means 100 shown in fig. 3, and a pair of second compacting means 7, all set crossways to the direction of travel A of the machine.

**[0029]** The second compacting means 7 are each located on one of the two sides of the machine 1, as can be seen in fig. 7, and are set to the side and basically parallel to the first central compacting means indicated by 100.

**[0030]** The machine 1 is designed so that the second compacting means 7 can each be independently extensible crossways to the direction of travel A of the machine, to allow a widening of the work area.

**[0031]** As can be seen in more detail in fig. 2, each of the second compacting means 7 has supporting means 8 with an essentially longitudinal construction for a flat element 9, also essentially longitudinal in construction, vertically mobile with respect to its supporting means 8 which it is connected to by a pair of chains 91. Its movement is guided by the slotted holes 81 made in the supporting means 8 working together, preferably but not necessarily, with dowels 95 connected\* to the flat elements 9, to enable its adjustment in height from the ground 5.

**[0032]** In particular, the adjustment is obtained by operating the pair of handwheels 10 that, during the work cycle, enable the lowering of the flat element 9 until it comes into contact with the surface being asphalted 5, to side stop the layer of bitumen aggregate B and, while transferring the machine, to lift it from the ground.

**[0033]** With regards to the supporting means 8, they are connected to their corresponding second compacting means 7 by joining means generally indicated by 11, set at one end of the supporting means 8.

**[0034]** In particular the joining means 11 produce a vertical rotation axis X for each supporting means 8 and comprise a C-shaped stirrup 111 belonging to the second compacting means 7, having a gudgeon 112 which slidingly couples the supporting means 8 by a cylindrical projection 81.

**[0035]** The kingpin 112 also allows the supporting means 8 to move vertically along the same rotation axis X enabling the flat element 9 to be taken to a higher level than the footboard 12;

**[0036]** This is easier to appreciate by examining fig.

2 where the intermediary uppermost position is illustrated by a dotted line, occupied by the supporting means 8 and by the flat element 9, and the work position is a solid lines.

[0037] The vertical movement of the flat element 9 and thereby the supporting means 8 is obtained by the lifting means comprising a flexible cable 14 with one end hooked extractably to a lug 141 belonging to the frame 2 of the machine and the other end to a second lug 142 belonging to the supporting means 8.

[0038] A hole is made through the kingpin 112 suited to receiving a pin 13 which, when the supporting means is set in its uppermost position, is inserted beneath the cylindrical projection 81, thereby allowing to bear the actual supporting means 8.

[0039] A hole 83 is also made through each of the supporting means 8, as illustrated in fig. 3, suited to receive a screw 15 that allows to connect the supporting means 8 to the second compacting means 7 when it is in its work position, as illustrated in figures 2 and 3, and to the first compacting means 100 when it is in its compact set-up, as illustrated in fig. 6.

[0040] In practise the machine 1 set-up for work has the flat element 9 positioned as illustrated in fig. 2 by the solid line, with the supporting means 8 connected rigidly to the second compacting means 7 by screw 15.

[0041] On completion of the asphaltting work, the second compacting means 7, which may eventually be extended, are made to retract against of the first central compacting means, as illustrated in fig. 3.

[0042] Then, as shown in fig. 2, an operator hooks up the two ends of the flexible cable 14 in their respective two lugs 141 and 142 located on the frame 2 and on the top edge of the supporting means 8 respectively, so that the flexible cable 14 slides through the ring belonging to the pulley 143. Screw 15 is then removed from hole 13 to leave the supporting means 8 free to move vertically.

[0043] The operator, as can be seen in fig. 4, extend laterally each of the second compacting means 7 in direction of the arrow C, drawing each cable 14 under tension.

[0044] Since the cable is not extensible, the supporting means 8 is forced to move vertically guided by the kingpin 112 and by the slotted hole 81 dowel 95 combination, until it reaches its uppermost position illustrated as a dotted line in fig. 2.

[0045] The operator then inserts the pin 13 in the hole through the kingpin 112, thereby locking the supporting means 8 in place.

[0046] The bottom end 142 of the cable 14 is then unhooked from its lug to let the second compacting means 7 fully retract.

[0047] In conclusion the operator turns each supporting means 8 by approximately 270°, first taking it to an intermediary position by turning it approximately 180°, as illustrated in fig. 5 and then to its compact position illustrated in figures 6 and 7.

[0048] It should be noted how the supporting means 8 and the flat element 9, when in their final compact position, are set crossways to the direction of travel A of the machine 1, and how the two kingpins 112, are each square with the machine's direction of travel, parallel and kept apart to prevent any interference between supporting means 8 and flat elements 9.

[0049] The operator now can lock each supporting means 8 to the central compacting means 100 of the machine 1, preferably but not necessarily using the same screw 15.

[0050] When both supporting means 8 with their respective flat elements 9 are in their compact positions, the self-driven vibratory finishing machine 1 can be moved without danger, and it is without protrusions and has an overall width of less than two and a half meters.

[0051] To restore the pair of supports 8 to their work position the operations described above have to be repeated in reverse order.

[0052] It must be noted how the operator carrying out the manual operations described above does not have to make any significant physical effort thanks to the limited friction offered on kingpin 112 and what's more, he works under safe conditions.

[0053] From the above explanations it can be understood that the vibratory finishing machine under this finding will achieve all the set scopes and advantages.

[0054] Any variants that may be made to the working member of this invention shall however all be considered protected by this patent.

## Claims

1. Self-driven vibratory finishing machine (1) for asphaltting road surfaces (5) comprising a frame (2) housing means of traction, and shaped to provide a driver's cab (3) and supporting:
  - storage means (4) and distribution of the bitumen aggregate (B) to be deposited on said road surfaces (5);
  - first central compacting means (100) of the bitumen aggregate deposited set crossways to the direction of travel (A) of said machine (1);
  - at least one pair of second compacting means (7) set along the sides of said machine (1) lateral and basically parallel to said first central compacting means (100) extensible crossways to the direction of travel (A) of the machine;
  - supporting means (8) connected by joining means to said second compacting means (7), holding flat elements (9) with essentially longitudinal construction scraping along the surface being asphalted (5) suited to side stopping said bitumen aggregate (B) being deposited, vertically mobile with respect to said supporting

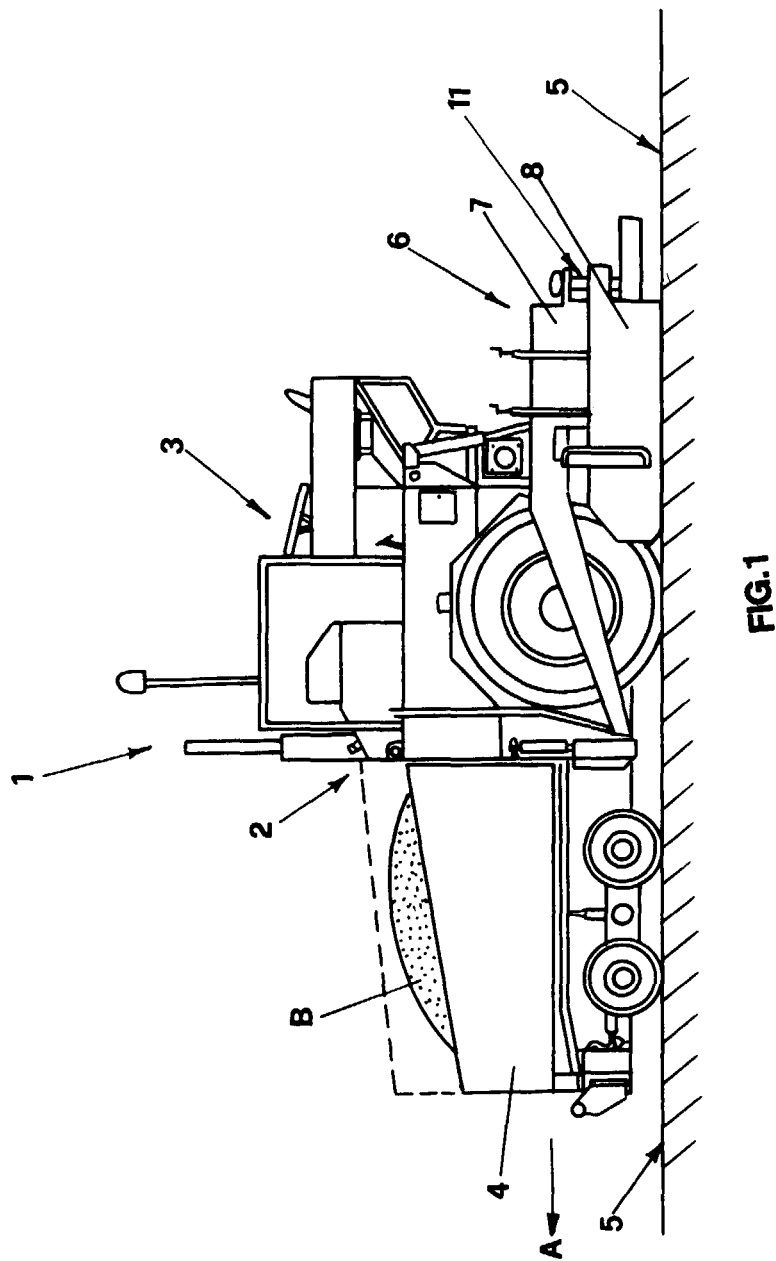
means (8);

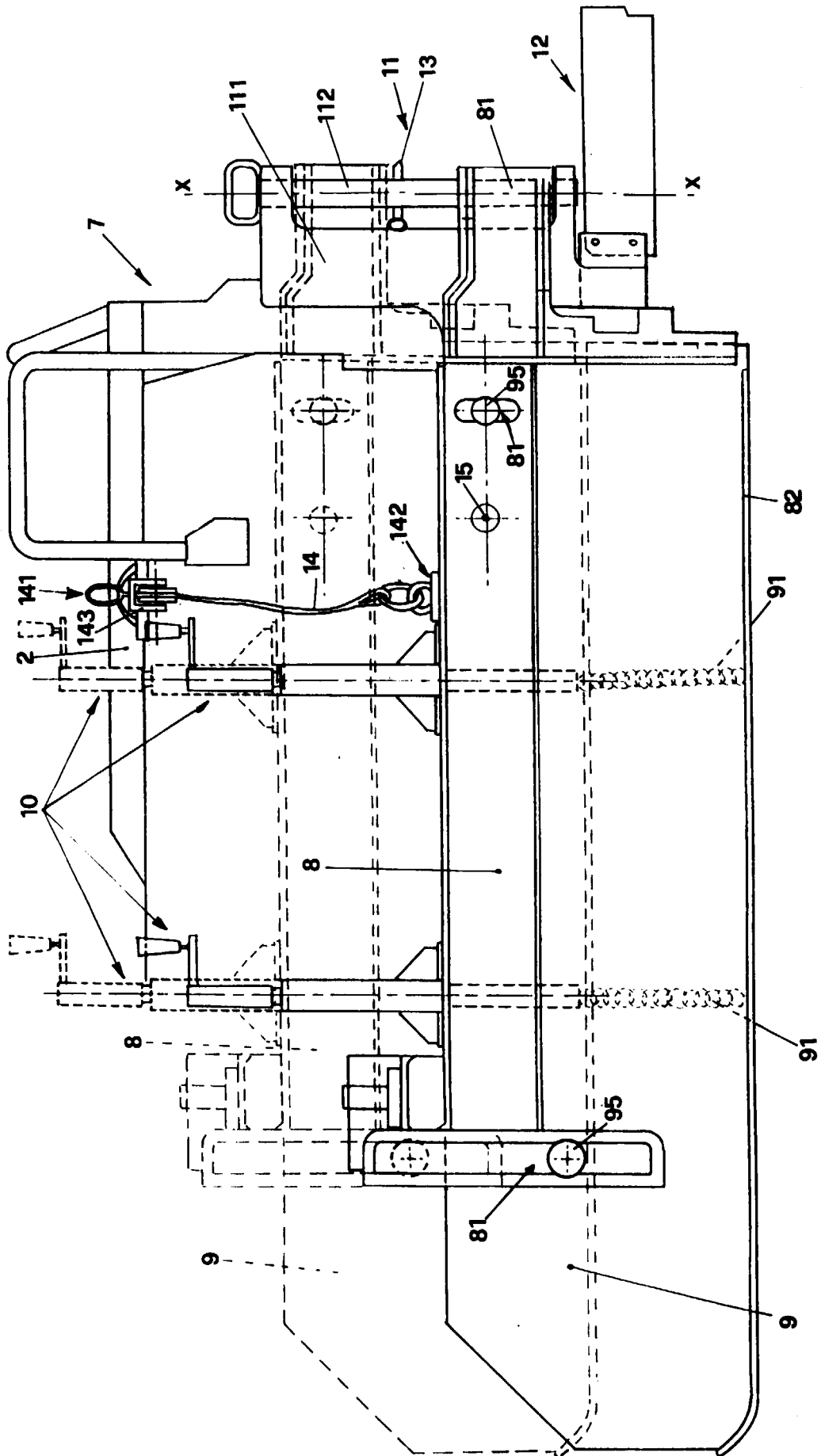
**characterised in that** said joining means (11) produce a vertical rotation axis (X) for said supporting means (8) to take said supporting means (8) from their work position to their compact position. 5

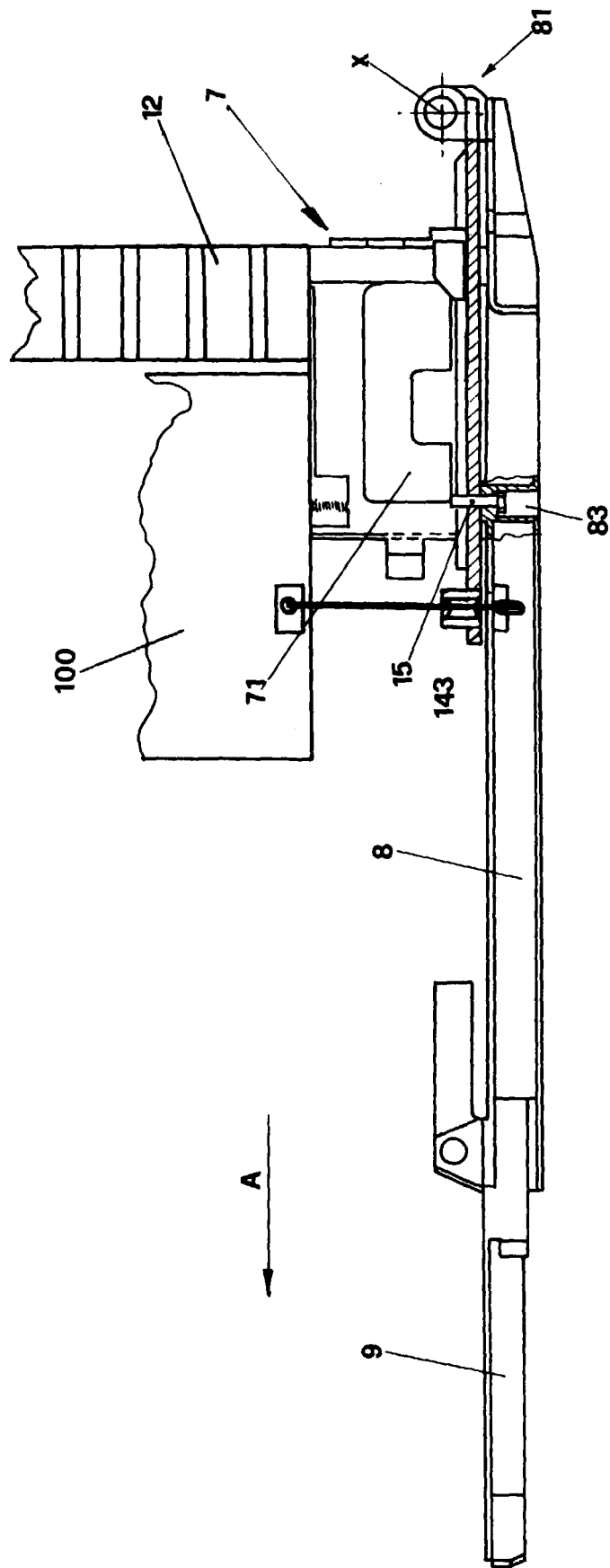
2. Vibratory finishing machine (1) according to claim 1) **characterised in that** said joining means (11) allow said supporting means (8) to move vertically along said vertical rotation axis (X) to take said support element (8) from its work position to its uppermost position. 10
3. Vibratory finishing machine (1) according to claim 1) **characterised in that** said joining means (11) comprise a kingpin (112) connected to said second compacting means (7) slidingly coupled with a cylindrical projection (81) belonging to said supporting means (8). 15  
20
4. Vibratory finishing machine (1) according to claim 3) **characterised in that** a hole is made through said kingpin (112) to receive a pin (13) suited to holding each supporting means (8) in its uppermost position. 25
5. Vibratory finishing machine (1) according to claim 2) **characterised in that** said supporting means (8) move vertically by lifting means (14;141 142) connected to said vibratory finishing machine. 30
6. Vibratory finishing machine (1) according to claim 5) **characterised in that** said lifting means comprise a flexible cable (14) with one end hooked to a lug (141) belonging to the frame (2) of the machine and the other end to a second lug (142) belonging to said supporting means (8), the lifting of said supporting means (8) being achieved by the extension of said second compacting means (7) against said cable flessibile (14). 35  
40
7. Vibratory finishing machine (1) according to claim 1) **characterised in that** a hole (83) is made through said supporting means (8) suited to receive a screw (15) suited to connecting said supporting means (8) to said second compacting means (7) in the two work and compact positions. 45

50

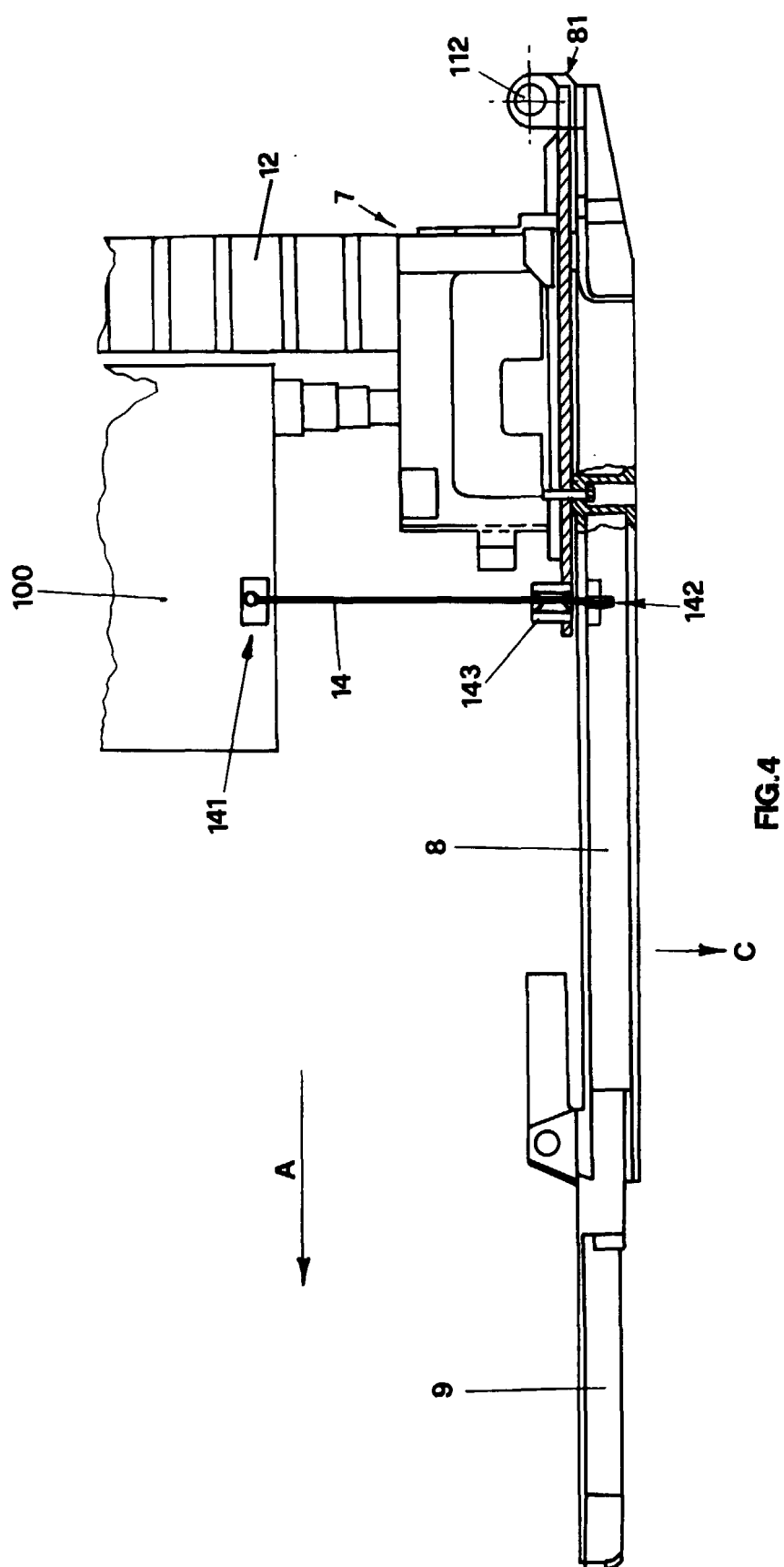
55

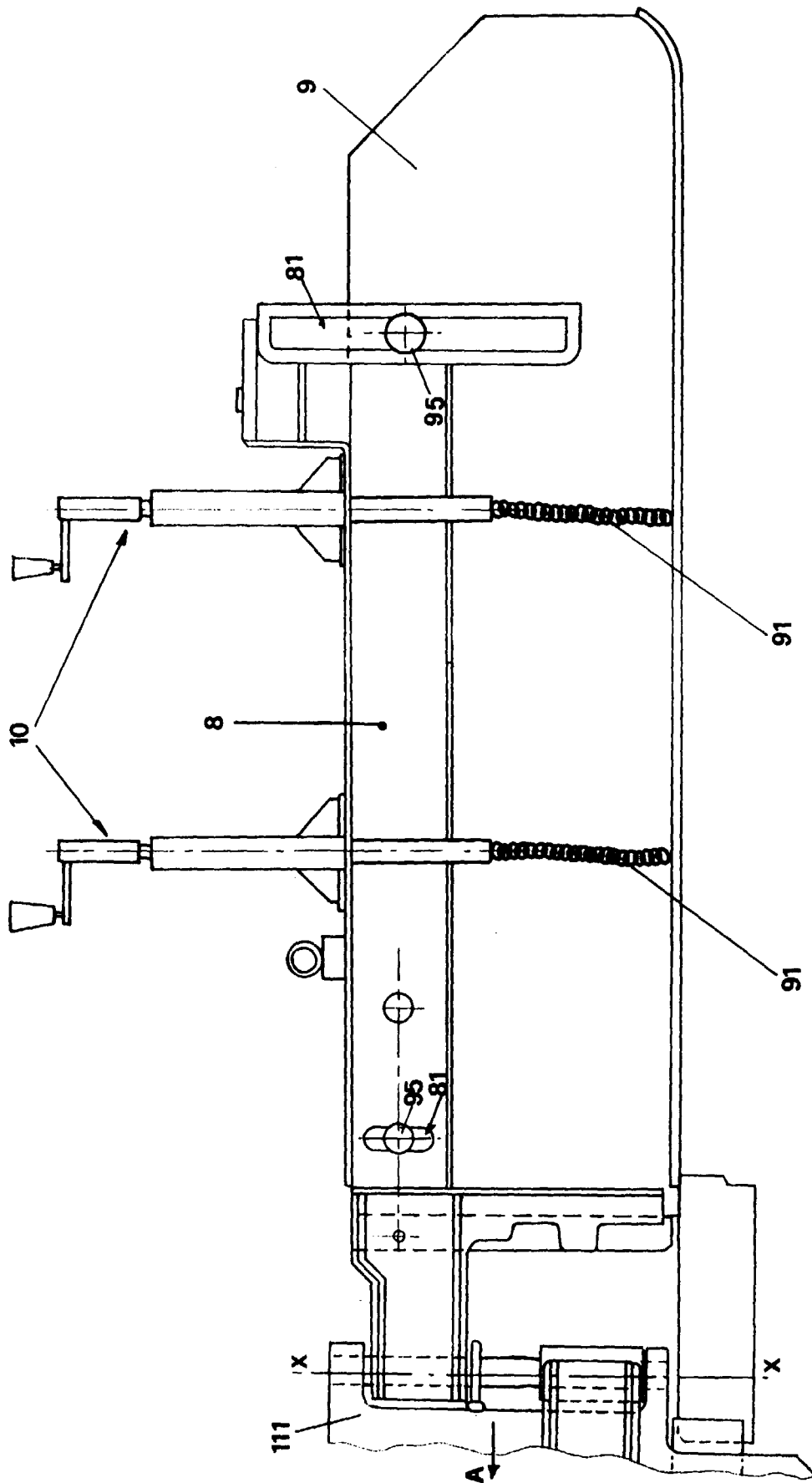












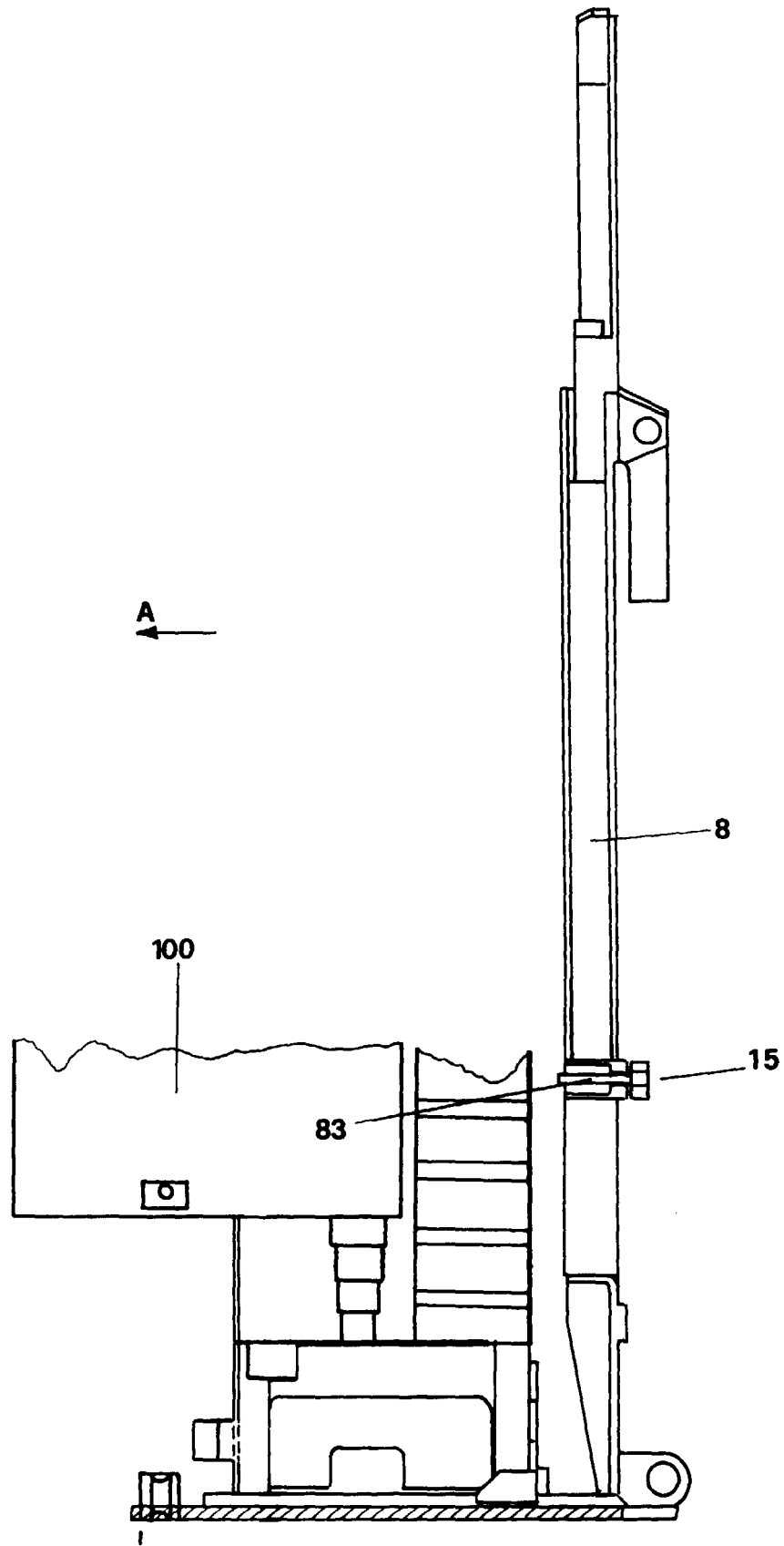


FIG. 6

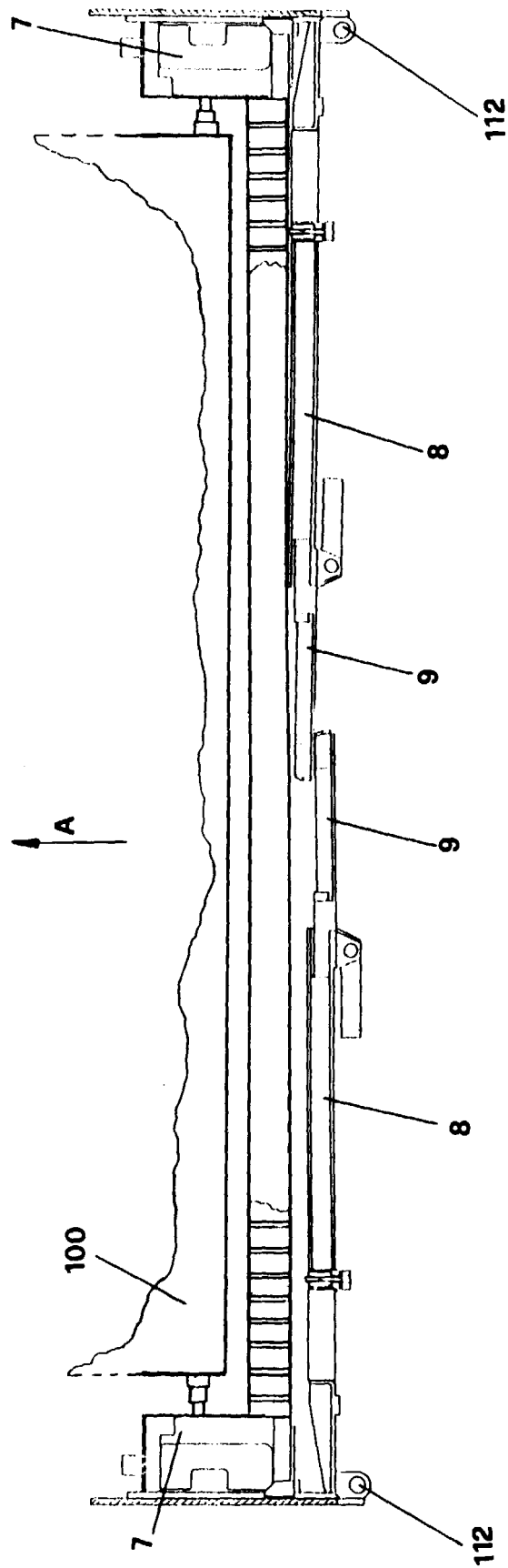


FIG. 7