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I-33100 Udine(IT)(54) **Automatic asphalt paver machine for roads and other paved areas.**

(57) A self-propelled or towed automatic asphalt paver finishing machine for roads and other paved areas involving rearward enlargeable and adjustable in height, asphalt layer distribution means (B) for the distribution in uniform way and compacting of at least one stratum of asphalt, characterized in that

before said asphalt layer distribution means are disposed spray-jet means to jet fluid substances on the road surface (A) that are independently adjustable in height (7) from the successive asphalt layer distribution means (B,6)

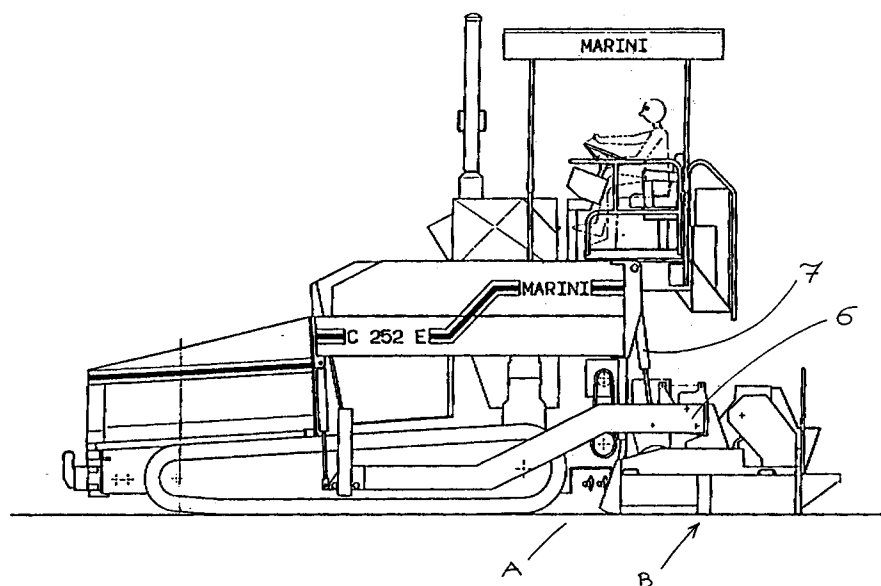


Fig. 1.

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The present invention concerns a automatic asphalt paver machine for roads and other paved areas.

In prior art prior we know from PCT/SE81/00117 and IT-1144171 or EP-0049260 (AB SKANSKA CEMENTCJUTERIET Sweden) a "Process for tack coating in road surface".

This solution raising the convenience to apply one anchorage stratum immediately before laying the bituminous stratum on the road surface.

This solution consists in applying an anchorage tack coating on the road surface (bitumen emulsion and water) before lying the asphalt carpet to perform a best sticking.

Namely the road surface is previously cleaned and a thin anchorage film of sticking bituminous substance is sprayed before spread the next asphalt carpet.

Finishing machines (pavers) are well known to dispose on the road surface new asphalt layers, these self-movable machines or movable system crawler, involve in adjustable order in rearward height asphalt distribution cochlea means, followed by rolling compacting means having a minimum width to which rearward are associated movable sideways roller compacting means having the further function to widen and compact the asphalt on a larger extension on the road if compared of the width of the paver machine.

Similarly said cochlea means are symmetrically transversely laterally extendible to distribute and to stretch the asphalt according as per a greater width to the minimum width of the machine to satisfy the exigencies of a side spread by means of said enlargeable compacting means.

The solution PCT/SE81/00117 corresponding to IT-1144171 or EP-0049260 (AS SKANSKA CEMENTCJUTERIET) does not suggest how we can realize in effective way a bituminous stick spray upwards of said enlargeable carpet distribution compacting rolling means.

Furthermore we verified that it is useful to have an on road spray device before of said enlargeable carpet distribution means, this not only for what indicated in the above-mentioned disclosures but also for other scopes as for example:

- the washing of the road or its cleaning before the deposition of the bituminous stratum,
- solvents bituminous application, and so on.

So not necessarily only the spray of a stick substance as disclosed in said patent.

Scope of the present invention is to allow the machine to explicate a more wide operation activity that can include the method above-mentioned or different, having the possibility to utilize said means for other scopes as said to spray or jet a fluid on a road paving before of said carpet distribution enlarging and compacting means In order

to make possible to operate the spray-jet means at different advancing speed with constant superficial treatment and with different asphalt carpet width distribution.

This and other scopes are reached with the present invention as claimed, by means of a self-propelled or towed automatic asphalt paver finishing machine for roads and other paved areas involving rearward enlargeable and adjustable in height, asphalt layer distribution means for the distribution in uniform way and compacting of at least one stratum of asphalt, characterized in that before said asphalt layer distribution means are disposed spray-jet means to jet fluid substances on the road surface that are independently adjustable in height from the successive asphalt layer distribution means.

With this solution it is possible to vary the height of the spray-jet, in function of the pressure variation of the jet to the scopes to maintain constant wrap it of jet that invests the treating surface.

Advantageously said spray-jet means are enlargeable by means of at least two spray sets transversely disposed and operatively downwards oriented mounted on displacement cross means, to move from a reunited substantially central position to a position substantially more or less externally enlarged in opposition in order to cover different road width surface in conformity at least to the prearranged width in said asphalt carpet enlargeable distribution means.

With this solution we obtain also the evident advantages to apply any fluid (also air jets) to wash or to clean or also to pre-treat the road surface before the deposition of the bituminous stratum, in different widths. The invention is better understood with the joined description and data supplied for example only, in which:

Figure 1 represents a schematic side view of the finishing-machine (paver) according to invention.

Figure 2 represents a schematic side view of the rear pavement finishing device according to invention.

Figure 3 represents a schematic top view of the rear pavement finishing device according to invention in restricted minimum widening position.

Figure 4 represents a schematic top view of the rear pavement finishing device according to invention in extended maximum widening position.

Figure 5 represents a perspective schematic view of the disposition of the two movable spray-jet sets.

Figures 6 and 7 represent two schematic view of the spray-jet amplitude and respective different high of the spray-jet nozzles from the road surface in proportion of different advancing speed.

The Figures disclose that the invention regards a self-propelled or towed paver finishing-machine

involving rearward adjustable means in enlargeable height (B), for the distribution in uniform way of at least one stratum of asphalt or similar bituminous concrete and its compacting, involving upwards of said asphalt layer enlargeable distribution and compacting means (B), spray means or jet means to spray fluids substances on the road surface (A), these means being adjustable in height by dynamic-fluid (cylinder) independent device (7).

Said spray means of fluids substances (A) include at least two sprayer sets (1,1') transversely disposed with downwards oriented nozzles mounted on displaceable means, to be transversely extended on opposed side from a reunited substantially central position (Fig.3) to a substantially side extended more or less wider position (Fig.4) in order to cover a different width of road surface in conformity at least of the prearranged width in said asphalt carpet enlargeable distribution finishing compacting means (B). Advantageously said sprayers means are transversely extendable to form a continuous crossing spray lines.

In one alternative solution said sprayers means (1,1') are alternatively transversely movable.

Advantageously said spray means for the fluid road coating or wetting, include also a central device with alternatively transversely movable sprayer means (2).

Said spray central device is orientated to extend the spray at least longitudinally.

Advantageously in reduced widening the sprayers in interference are excluded by well known means, avoiding with this wetting unevenness. For the same reason, because the machine can advance at different speed we would have with spray flow constancy a different superficial wetting level of the road.

To obviate to this drawback according to invention the spray flow is varied in function of the speed of advancement varying correspondingly the delivery pressure.

It is however known for scientific principle that increasing the delivery pressure the spray jet widens consequently gives a distribution unevenness with layers overlap.

For this reason according to invention the sprayer device is also adjustable in height.

Figures 6 and 7 disclose that with V1 speed of advancement we have for example, with a pressure p1, a spray angle β , consequently in order to obtain a spray amplitude "D" on the road surface, we distance the sprayer at a height H from the road surface in proportion.

If we change the speed of advancement to V2>V1, to increase the flow we have to increase the delivery pressure proportionally to p2 and consequently the spray amplitude β 1 becomes of greater angle, consequently to maintain constant the spray am-

plitude (spray band) on the road and to avoid spray overlaps, we lower the sprayer to a level $h < H$.

For what concerns instead the oscillating of the sprayers as for example central sprayer or other if prearranged, in order to have a superficial constancy of the treatment, the oscillation frequency of the oscillation device is variable in direct proportion to the variation of the advancing speed. Said asphalt layer enlargeable distribution and compacting means (B) are adjustable in height by means of lateral arms (6)) and involve asphalt bidirectional distribution coclea means (clockwise-counterclockwise) acting as divaricators (3) transversely extendable in opposition (3') and rearward are disposed asphalt layer roller compacting means (vibrators, rolls Etc), involving central compacting means of minimum fixed width (4) to compact a restricted central band road area surface and rear, two transversely movable in opposition compacting means to enlarge and compact the carpet in the opposed sides in larger with then the width of the machine (5).

The machine includes furthermore to assist the spray system:

- tank for the storage of a fluid of 3000 liters;
- spray circuit with volumetric control and regulation of the spray pressure;
- auxiliary cleanness circuit and compressed air jet means;
- heating circuit to heat the main spray circuit.

With this system it is possible to spray fluids upwards of the deposition of the stratum of conglomerate with variable dosages from 500 to 1000 grammes/m², in uniform way, deprived of overlaps or discontinuity in the speed range of the machine between 4 and 12 meters/min., with spray width (and successive asphalt layer stretching) from 2,5 and 4,80 meters or with the prolongations addition between 3,7 and 6 meters.

Claims

1. A self-propelled or towed automatic asphalt paver finishing machine for roads and other paved areas involving rearward enlargeable and adjustable in height, asphalt layer distribution means (B) for the distribution in uniform way and compacting of at least one stratum of asphalt, characterized in that before said asphalt layer distribution means are disposed spray-jet means to jet fluid substances on the road surface (A) that are independently adjustable in height (7) from the successive asphalt layer distribution means (B,6).
2. A paver finishing-machine according to claim 1, characterized in that said spray-jet means (A) are enlargeable in width.

3. A paver finishing-machine according to claim 1, characterized in that said spray-jet means (A) include at least two spray sets (1,1') transversely disposed and operatively downwards oriented, placed on displacement cross means, to move from a reunited substantially central position (Fig.3) to a position substantially more or less externally enlarged in opposition (Fig.4) in order to cover a different width road surface (B). 5 10
4. A paver finishing-machine according to claims 1 and 3 characterized in that it comprises command means and operators devices such that when said spray-jet means are reentered in interference on respective spray band, exclude for the respective spraying action of the superfluous sprayers. 15
5. A paver finishing-machine according to claim 1, characterized in that said spray-jet means are transversely extended to form a continuous spray cross line. 20
6. A paver finishing-machine according to claim 1, characterized in that said spray-jet means (1,1') are alternatively transversely movable. 25
7. A paver finishing-machine according to claim 1, characterized in that said spray-jet means include also a central spray-jet device alternatively transversely movable (2). 30
8. A paver finishing-machine according to claim 1, characterized in that said spray-jet means include also a central spray device alternatively transversely movable (2) and orientated to extend the spray-jet at least longitudinally. 35
9. A paver finishing-machine according to claim 1, characterized in that the oscillation device of said spray-jet means includes devices and command means such to make possible the variation of the respective oscillation frequency in direct proportion to the variation of the speed of advancement of the machine. 40 45
10. A paver finishing-machine according to claim 1, characterized in that said enlargeable distribution means and rear compacting layer asphalt means (B) adjustable in height (6,7) involve asphalt layer distribution means with bidirectional right-left cochlea divaricator (3) transversely in opposition extendible (3') and rearward compacting-rolling means, involving a central compacting means of minimum fixed width (4) for the compacting of the standard minimum central band and two opposite transversely movable extensions to compact the respective side extension bands (5). 50 55

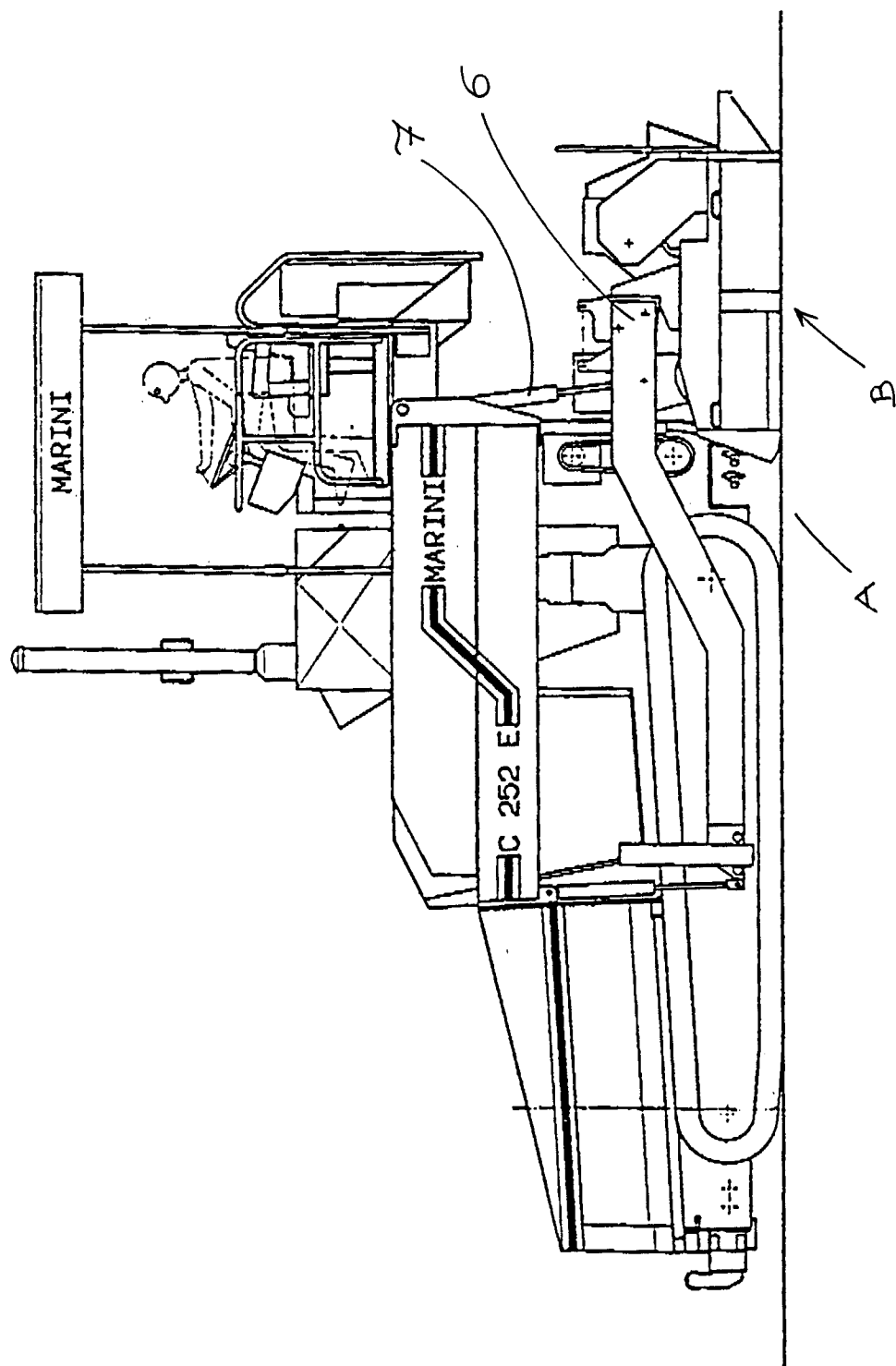


Fig. 1-

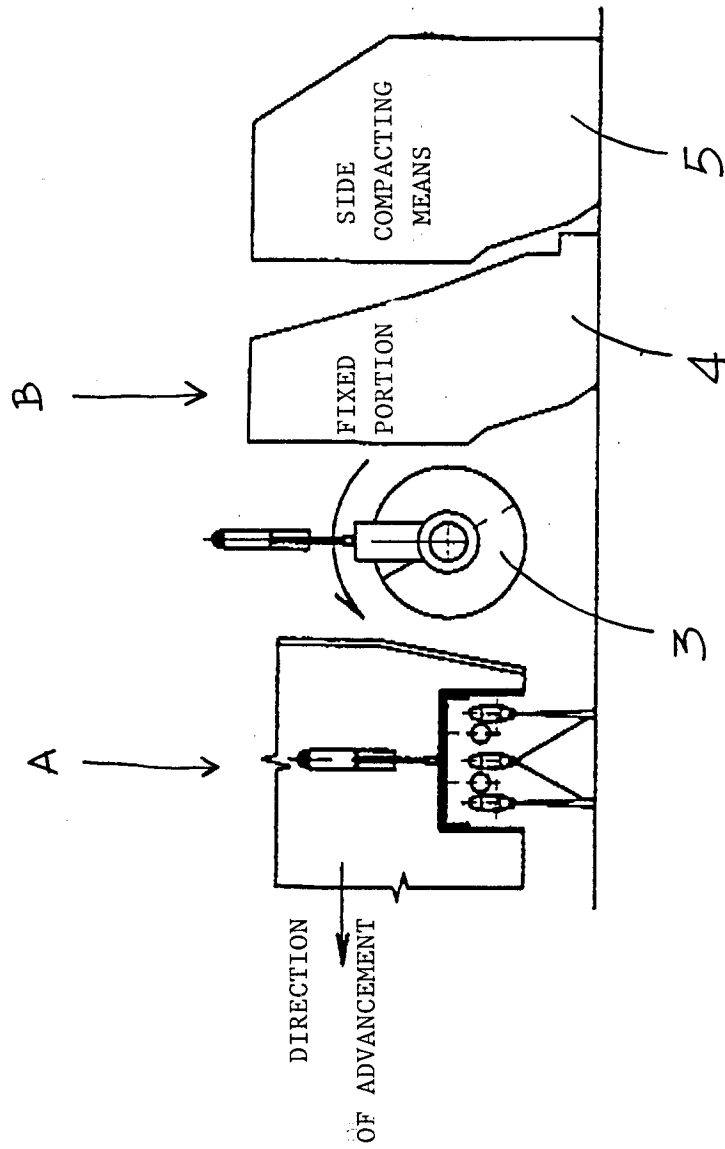


FIG. 2-

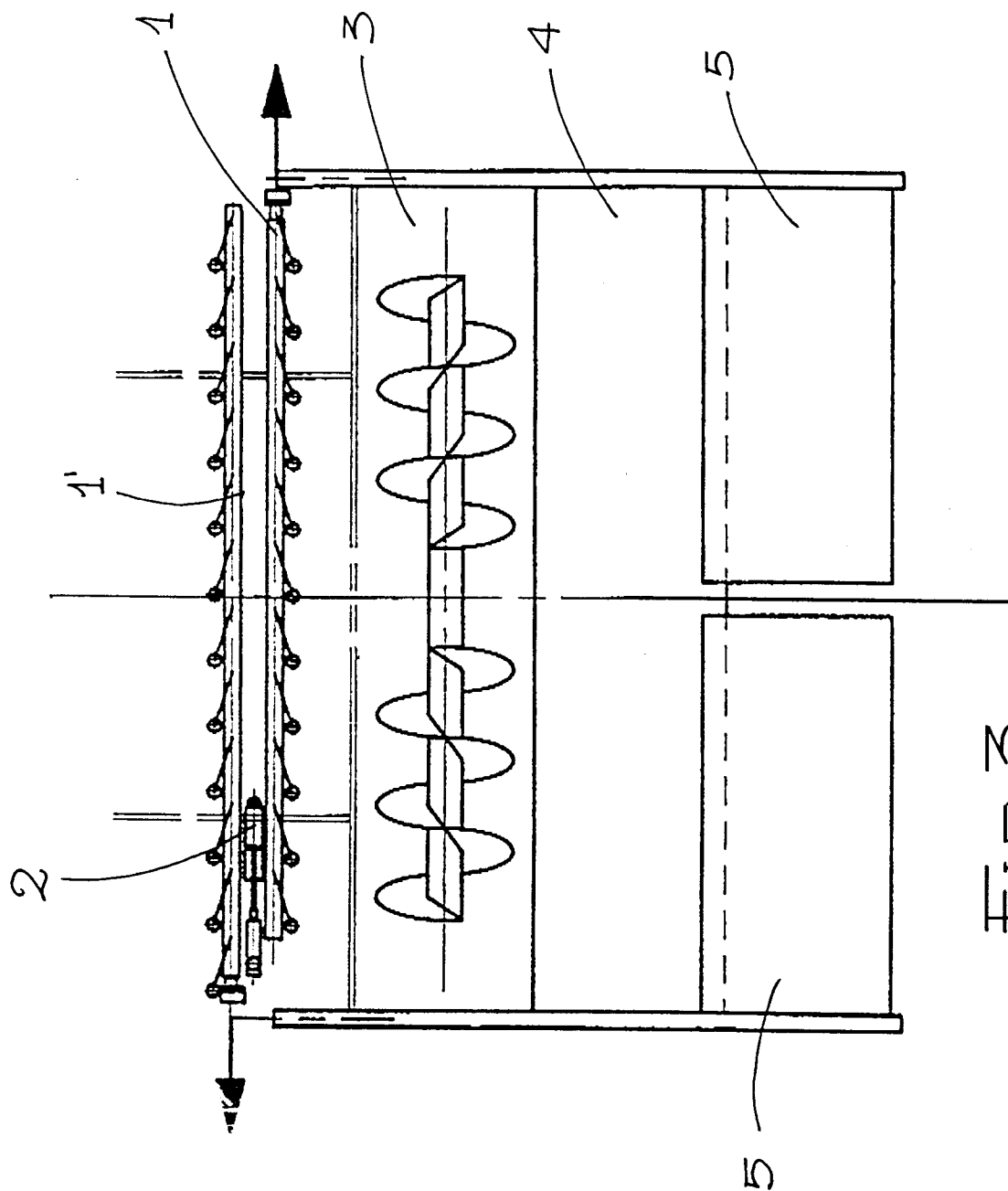


Fig. 3-

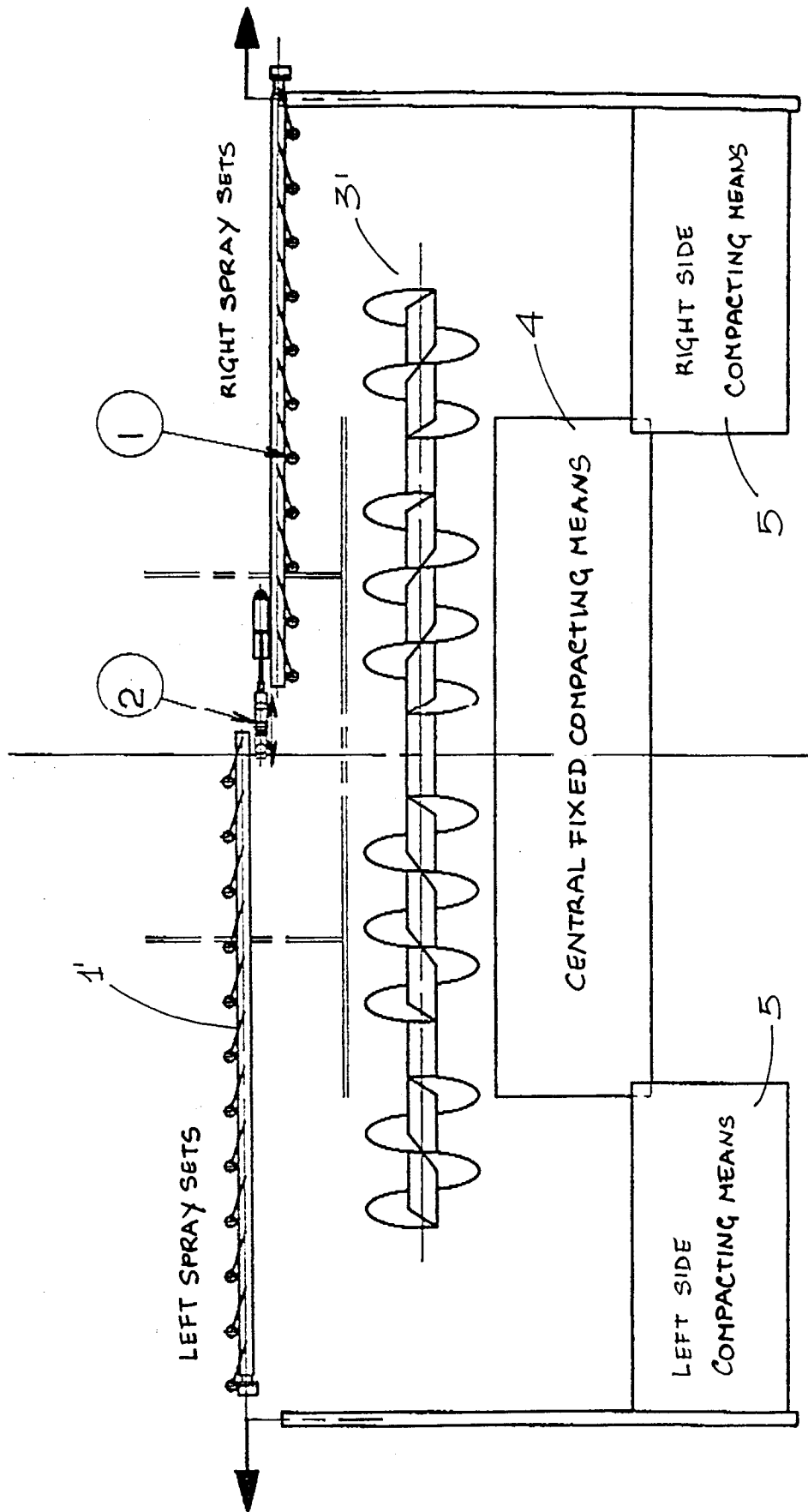


Fig. 4.

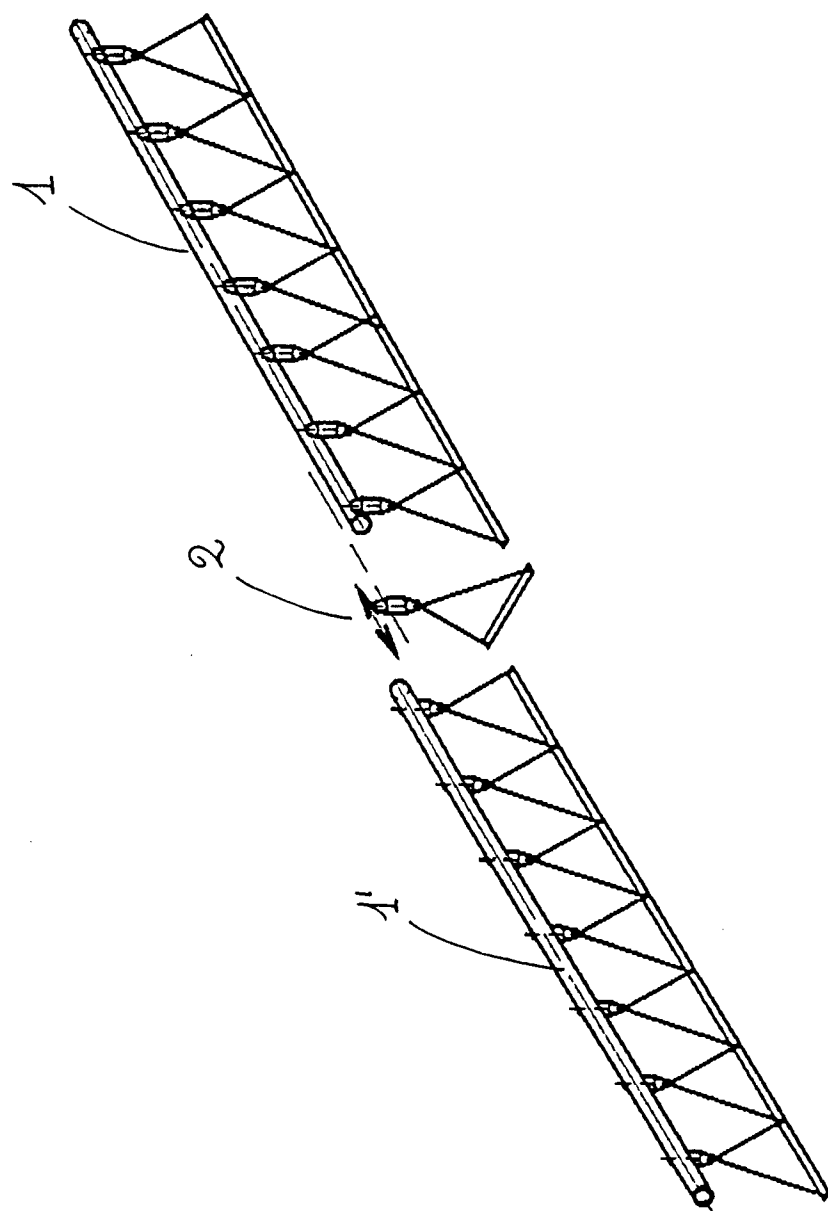


Fig. 5.

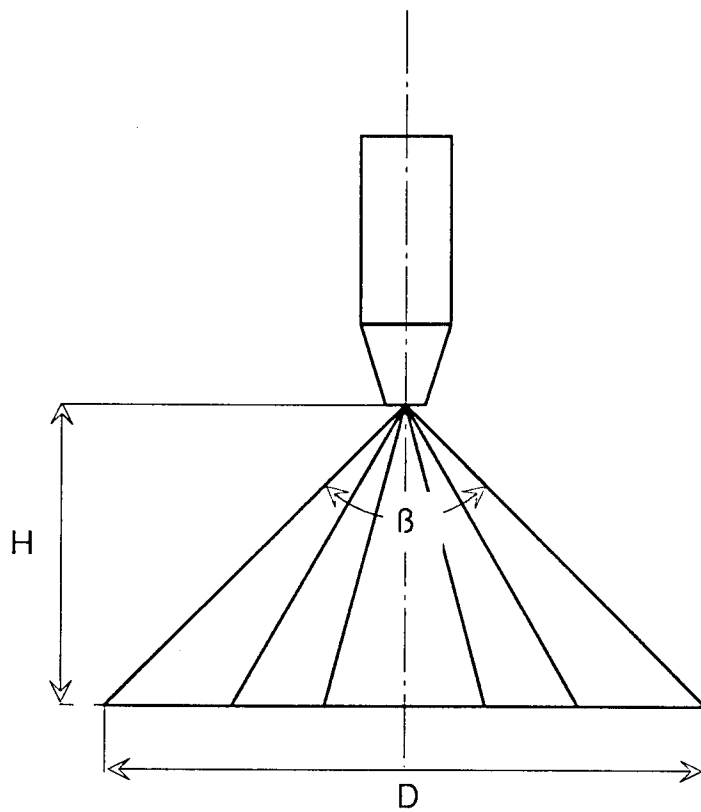


FIG. 6

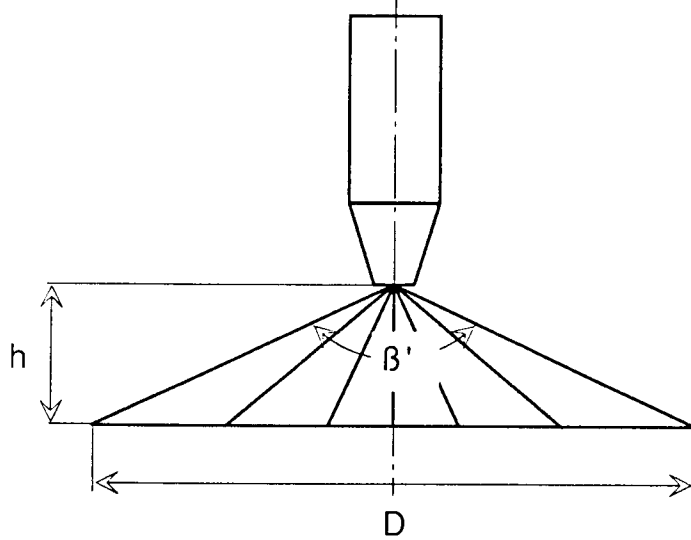


FIG. 7



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EUROPEAN SEARCH REPORT

Application Number

EP 91 10 4507

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	EP-A-0 292 337 (SCREG ROUTES ET TRAVAUX PUBL-ICS) * column 1, line 30 -paragraph 57 ** column 3, line 21 - column 4, line 38 ** column 5, line 53 - column 6, line 10 ** column 6, line 34 - line 46 ** column 7, line 32 - line 38; figures 1-4 *	1-3,5,9,10	E 01 C 19/48 E 01 C 19/17
Y	EP-A-0 279 795 (WHITE CONSOLIDATED INDUSTRIES INC.) * column 3, line 49 - line 61 ** column 4, line 34 - line 47; figures 1,2 *	1-3,5,9,10	
A	EP-A-0 186 780 (DYNAPAC AKTIEBOLAG) * the whole document *	1,2,5,9	
A	DE-A-1 577 825 (LECHLER BAUTZENSCHUTZCHEMIE KG) * page 5, paragraph 3 -paragraph 6; figures 1-3 *	4,6	
A	GB-A-1 041 511 (JOHNSTON BROTHERS (ENGINEERING)LIMITED) * page 1, line 11 - line 24 ** page 1, line 31 - line 49 ** page 2, line 82 - line 86; figure 1 *	2,3,7-9	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	DD-A-114 974 (WÖHRN) * page 2, right column, line 12 - line 32; figures 1-3 *	1	E 01 C
A	US-A-4 231 678 (CARTERNOCK) * abstract ** column 3, line 52 - column 4, line 7 ** column 5, line 2 - line 6 ** column 7, line 24 - line 28; figures 1,3 *	1,10	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 08 October 91	Examiner DE COENE P.J.S.
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document			