

(19)



(11)

EP 2 090 374 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.08.2009 Bulletin 2009/34

(51) Int Cl.:
B05B 13/04 (2006.01) **B05D 1/02** (2006.01)
B05D 1/34 (2006.01) **B05D 5/06** (2006.01)

(21) Application number: **09150417.5**

(22) Date of filing: **13.01.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA RS

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(30) Priority: **14.02.2008 IT VI20080040**

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(54) **Machine for painting or colouring products with large surfaces**

(57) The finding concerns a machine for painting or colouring products (P) with large surfaces, through the use of airbrushes or spray guns (K), arranged above the products (P) to be painted. Such products (P) are equipped with means (T) that make them advance along a predetermined direction. Moreover, at least four of said

airbrushes or spray guns (K) are foreseen and they are equipped with alternate rectilinear movement means (1,2,3,4) perpendicular to the advancing direction of the products (P) to be painted. Such a machine is characterised in that each airbrush or spray gun (K) is equipped with independent movement means (1,2,3,4) with respect to one another.

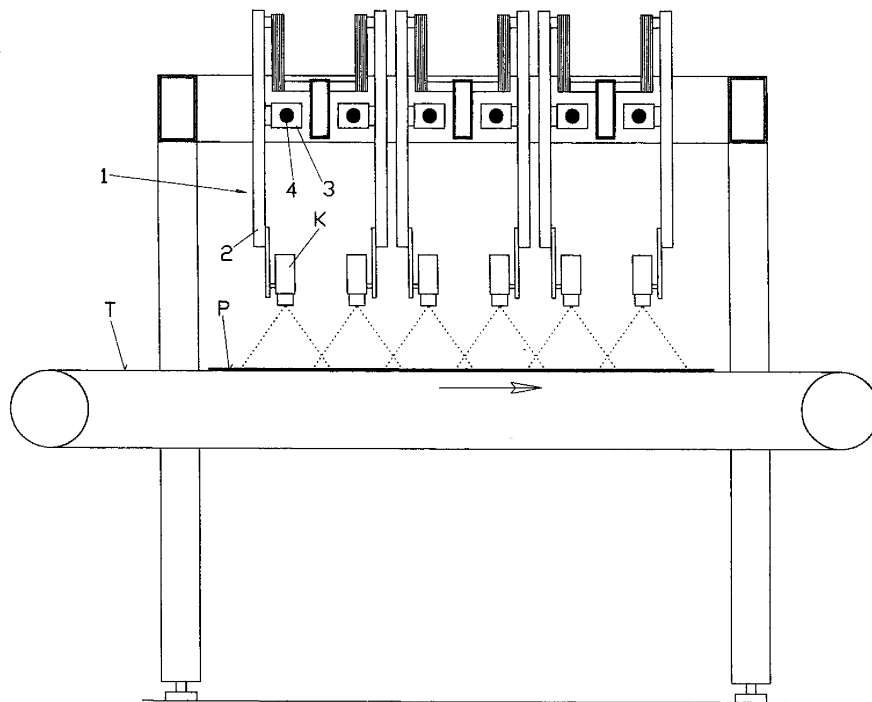


FIG.1

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Description

[0001] The present finding concerns a machine for painting or colouring products with large surfaces, through the use of airbrushes or spray guns, arranged above the products to be painted, according to the general part of claim 1.

[0002] The painting of continuous or discontinuous products consists of covering the surface with one or more layers of covering or colouring material, in greater or smaller amounts according to the degree of covering that one wishes to obtain: large amounts with covering products or small amounts with transparent products. The main tool to carry out painting is so-called "spray painting", in which the product is arranged on a means of transport, which can consist of a conveyor belt (protected or washed at the end of painting), or else wires arranged a certain distance apart and the spraying action of the surface takes place through the use of airbrushes or spray guns that move above the product with a movement that may be rotary, elliptical or alternate transversal, with respect to the advancing direction thereof.

[0003] Each of the aforementioned three spray systems has operative drawbacks, which greatly limit their use.

[0004] Rotary spraying, where the airbrushes are arranged on a turntable, has the drawback that on the two sides of the product to be painted there is a substantial difference in covering.

[0005] This drawback is overcome with continuous elliptical spraying, in which the airbrushes or spray guns are mounted on a chain that runs between two transmission wheels.

[0006] This system does, however, have the drawback of expensive mechanics and substantial bulk, due to the fact that the two wheels must have a large diameter, to avoid interference between the two spray cones generated by the two airbrushes or the two spray guns, which run on two arms of the chain.

[0007] An alternative embodiment of elliptical spraying that reduces bulk is the one that foresees using three transmission wheels with smaller diameter, two of which are arranged on one side of the product to be painted and the other on the opposite side.

[0008] In this way, the airbrushes or spray guns describe a triangular trajectory.

[0009] This way of operating does, however, have the drawback that on the two sides of the painted surface the overlapping of the spray cones takes place at different times: on the side with one wheel the overlapping times are shorter compared to the side with the single wheel, for which reason a disuniformity of absorption and drying of the sprayed product is generated.

[0010] In transversal spraying a single arm is used on which from two to six airbrushes or spray guns are mounted, fixedly connected to one another.

[0011] With such an embodiment, by varying the transportation speed of the product to be painted it is also

necessary to proportionally vary the translation speed of the airbrushes or spray guns, to always ensure a uniform and homogeneous covering.

[0012] In practice, up to a useful spraying width of 2.4 m it is possible to maintain translation speeds of the spray guns that do not involve an alteration of the spray cone; higher translation speed have the consequence of a greater dispersion of the product, known as "over spray".

[0013] Alternatively, for useful widths above 3.4-3.6 m, two arms are used, which work in opposition and on which up to four airbrushes or spray guns are mounted for each arm.

[0014] In the current state of the art, the movement of the two arms takes place through a single control and both translate with the same speed, determined uniquely by the useful width, by the advancing speed of the product to be painted and by the distance between the two arms, to make uniform spraying on the entire surface.

[0015] With this way of operating, since the airbrushes or spray guns move at a single well-defined speed, it is not however possible to make so-called "design effects" on the painted surface.

[0016] The purpose of the present finding is to make a spraying machine of the type that has transversal movement of the airbrushes or spray guns, which is more effective, more flexible and more productive than known machines.

[0017] Such a purpose is accomplished with a spray machine in which each airbrush or spray gun is equipped with independent movement with respect to one another and where the motion of each airbrush or each spray gun can be either uniform or varied, within the working range; this makes it possible to vary the distance between the spraying trajectories or "strips".

[0018] The finding shall be better understood from the description of a possible embodiment thereof, given as a non-limiting example, with the help of the attached tables of drawings, where:

Fig. 1 (table I) represents a schematic front elevation view of the cabin present in the machine according to the finding;

Fig. 2 (table II) represents a schematic side elevation of the above;

Fig. 3 (table III) represents a schematic plan view of the cabin itself.

[0019] As can be seen in the figures, in the spraying cabin the skin "P" advances on a conveyor belt "T" to be subjected to the painting action of its surface through airbrushes or spray guns, indicated with reference letter "K", which run alternately and perpendicularly with respect to the advancing dimension of the conveyor belt and that deposit strips of paint onto the surface itself of a width equal to the diameter of the spray cone and that are, through the effect of the combination of the two per-

pendicular motions, slightly inclined, forming two strips shaped like a "V" for each cycle (outward and return stroke of the airbrush or spray gun). Said airbrushes or spray guns are arranged above the products to be painted.

[0020] Constructively, each airbrush or spray gun K is mounted on a structure 1, which is independent from the structures that support the other airbrushes or spray guns; said structure consists of a vertical shaft 2, equipped with a trolley 3, which runs on a rectilinear guide bar 4, which crosses the conveyor belt T perpendicularly. The trolley 3 is controlled in its "back and forth" movement by a corresponding motor member 5 thereof, applied to the end of said bar.

[0021] Operatively, each airbrush or spray gun, in its transversal movement, makes a painted strip on the skin, of a width equal to the diameter of the spray cone, which is positioned independently with respect to the painted strip made by the spray gun immediately after.

[0022] In practice, it is possible to adjust the starting time of each individual spray gun, anticipating the starting of one spray gun with respect to the starting of the spray gun immediately after and it is possible for the spray cones to not operate longitudinally aligned, but rather staggered apart with respect to the next one; it is also possible to make painted strips that can partially overlap with one another.

Claims

1. MACHINE FOR PAINTING OR COLOURING PRODUCTS WITH LARGE SURFACES, through the use of airbrushes or spray guns (K), arranged above the products to be painted, said products being equipped with means that make them advance along a predetermined direction, at least four of said airbrushes or spray guns being foreseen and being equipped with alternate rectilinear movement perpendicular to the advancing action of the products to be painted, said machine being **characterised in that** each airbrush or spray gun is equipped with independent movement with respect to one another.
2. MACHINE, according to claim 1, **characterised in that** the products are positioned on a wire conveyor belt, a continuous conveyor belt or a roller conveyor belt.
3. MACHINE, according to claim 1 or 2, **characterised in that** the speed of each airbrush or of each spray gun stays uniform for the entire working width, with different speed values with respect to one another.
4. MACHINE, according to claim 1 or 2, **characterised in that** each airbrush or spray gun runs with variable speeds within the working width, independently from each other.
5. MACHINE, according to claim 1 or 2, **characterised in that** the speed of each airbrush or of each spray gun is uniform and equal for all of the airbrushes or all of the spray guns.
6. MACHINE, according to claim 1 or 2, **characterised in that** the acceleration of each airbrush or spray gun (K) can be varied independently from each other.
7. MACHINE, according to claim 1 or 2, **characterised in that** each airbrush or spray gun (K) can be mounted on a structure (1) that is independent from the other structures that support the other airbrushes or spray guns.
8. MACHINE, according to claim 5, **characterised in that** the support structure (1) of the airbrush or spray gun (K) consists of a vertical shaft (2), equipped with a trolley (3) that runs on a rectilinear guide bar (4), which crosses the conveyor belt (T) perpendicularly, the trolley being controlled in its "back and forth" movement by a corresponding motor member thereof (5), applied to the end of said bar.
9. MACHINE, according to one or more of the previous claims, **characterised in that** each airbrush or spray gun, in its transversal movement, makes a painted strip on the surface of the product to be painted, of a width equal to the diameter of the spray cone, which is positioned independently with respect to the painted strip made by the airbrush or spray gun immediately before or after.
10. MACHINE, according to one or more of the previous claims, **characterised in that** the starting of each individual airbrush or each individual spray gun is adjustable by anticipating the starting of one airbrush or spray gun with respect to the starting of the airbrush or spray gun immediately before and after.
11. MACHINE, according to one or more of the previous claims, **characterised in that** the spray cones, in operative step, do not operate longitudinally aligned, but rather staggered one with respect to the next.
12. MACHINE, according to one or more of the previous claims, **characterised in that** it makes painted strips that overlap one another for half of their width.

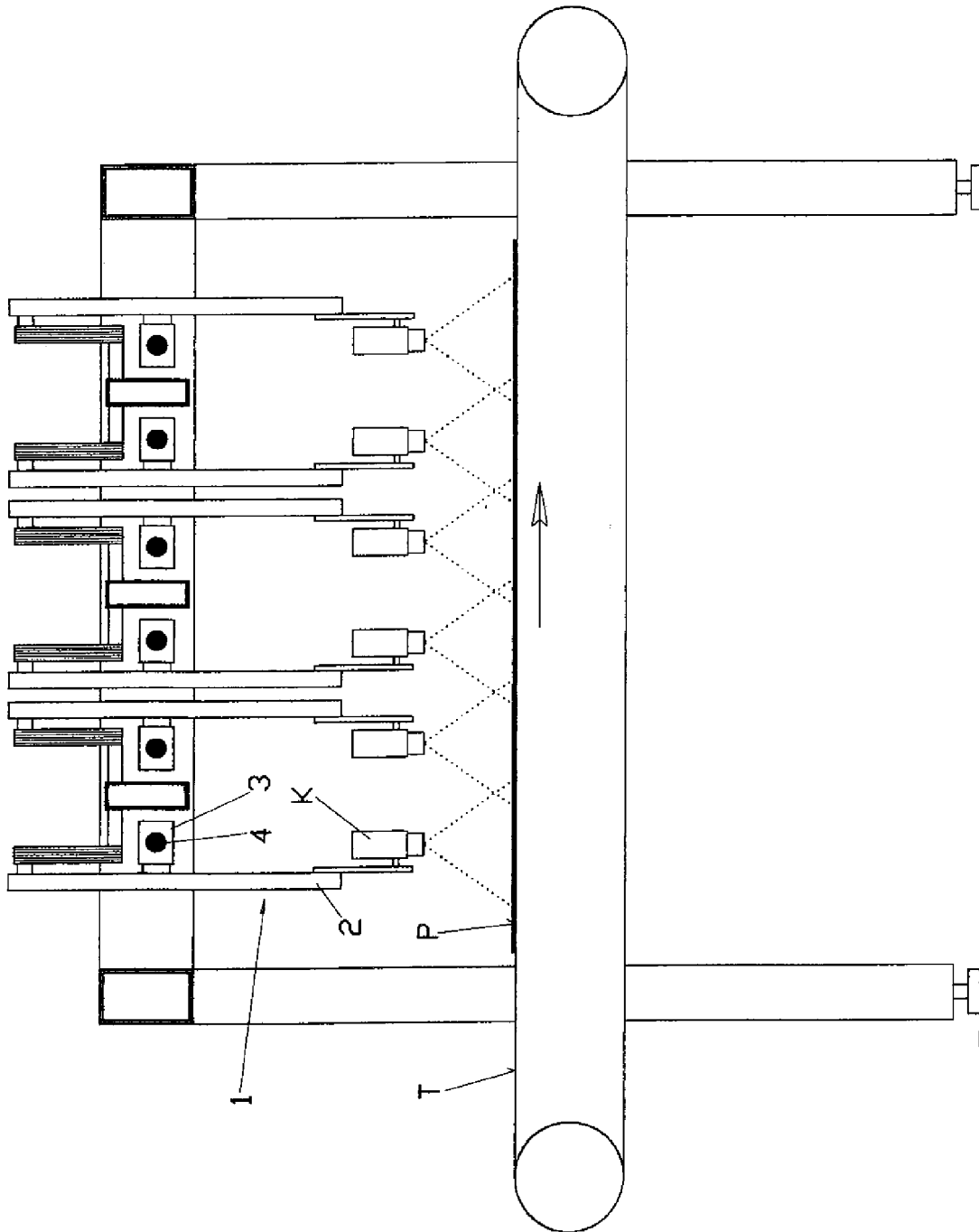


FIG.1

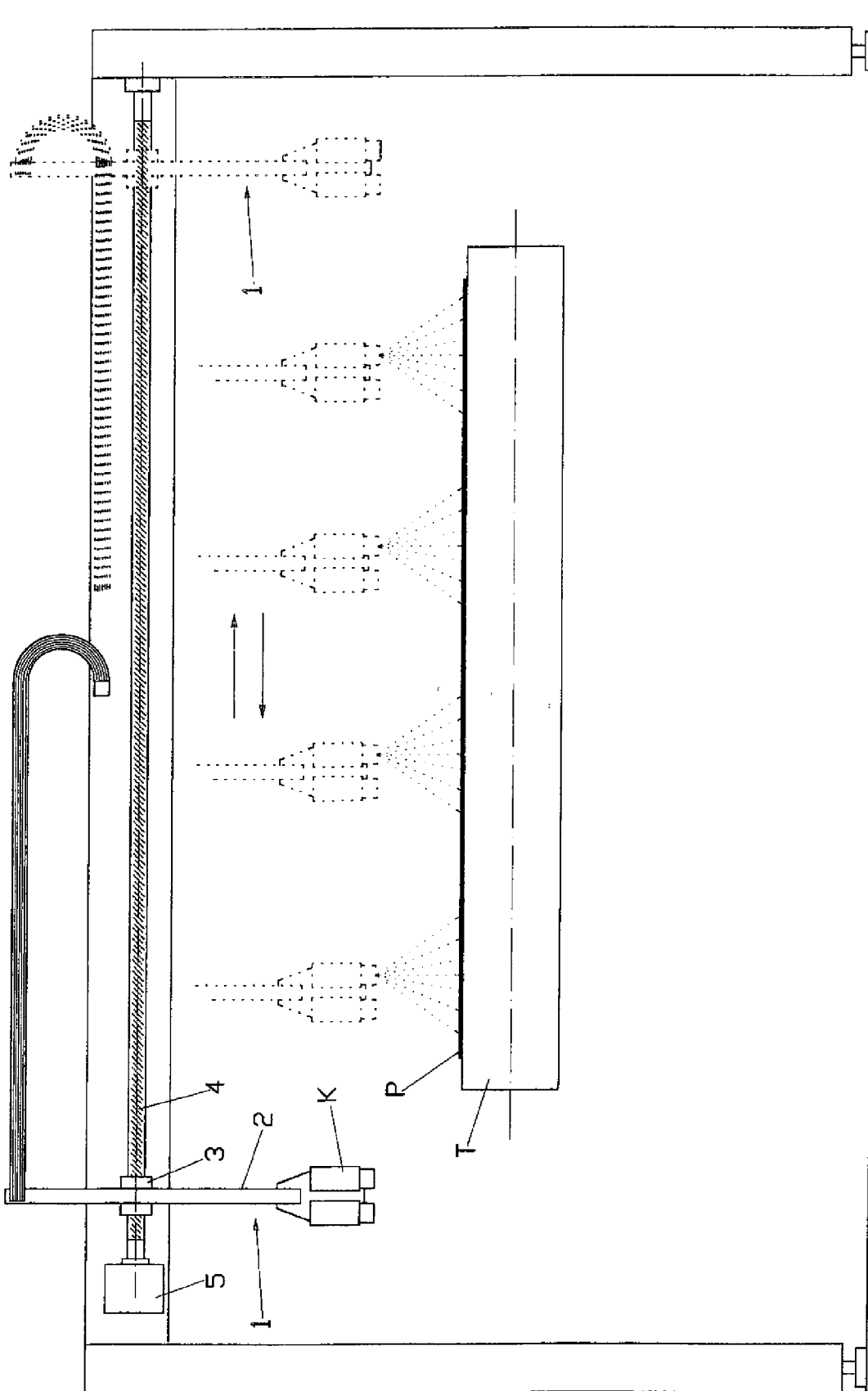


FIG.2

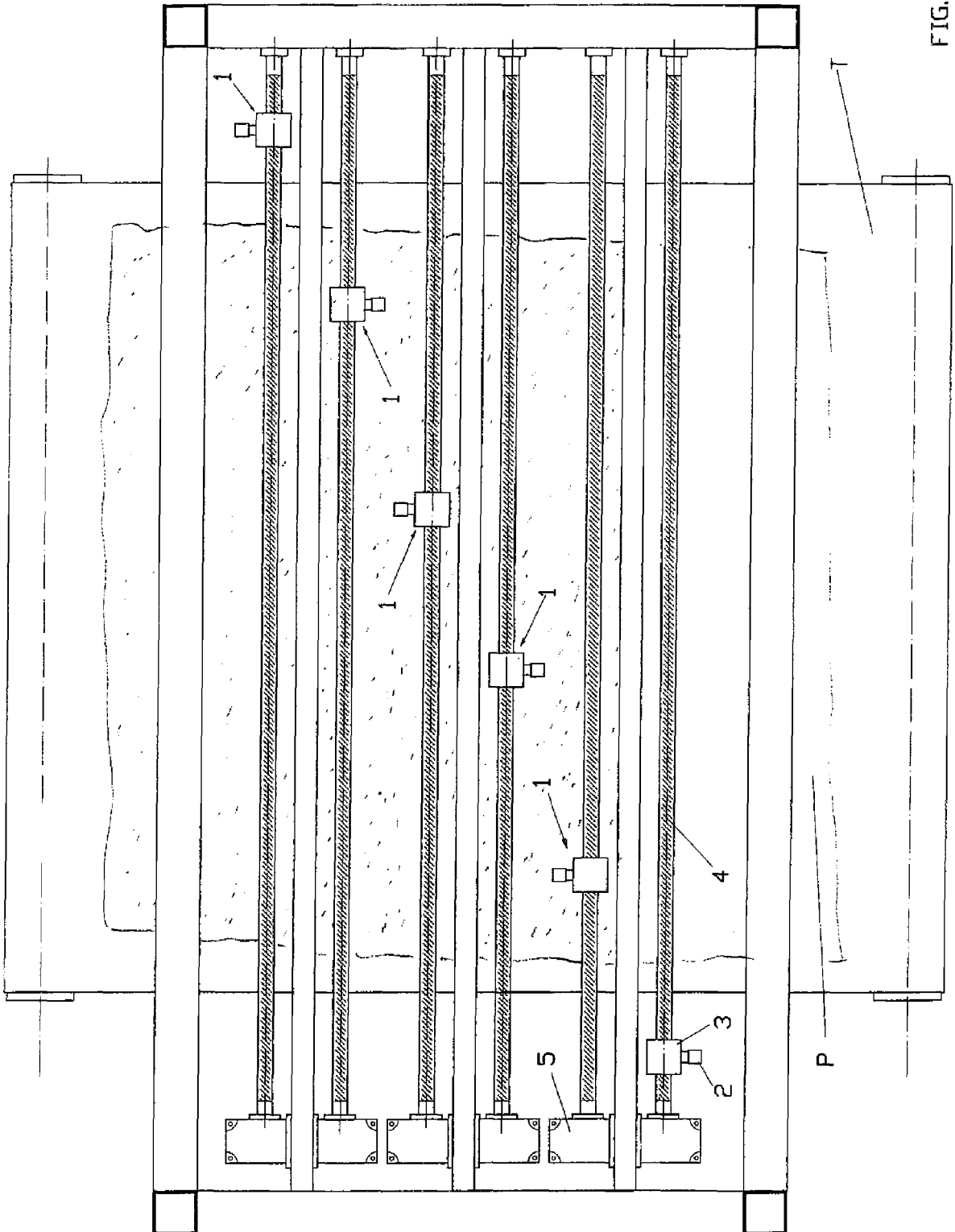


FIG.3



EUROPEAN SEARCH REPORT

Application Number
EP 09 15 0417

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2003/234272 A1 (LAMOTHE CHRISTIAN [FR] ET AL LAMOTHE CHRISTIAN [FR] ET AL) 25 December 2003 (2003-12-25) * paragraphs [0002], [0024], [0028] - [0032], [0034]; figures 1A,1B,5 *	1-12	INV. B05B13/04 B05D1/02 B05D1/34 B05D5/06
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 April 2009	Examiner Endrizzi, Silvio
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	

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EPO FORM 1503 03.82 (POAC01)

ANNEX TO THE EUROPEAN SEARCH REPORT
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