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Vorrichtung zum Dekorieren von Gegenständen

Appareil de décoration d'objets

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## Description

**[0001]** The invention relates to an apparatus for decorating a wall of an object, in particular a wall arranged vertically, intended to become a visible face of an object, said object being able to be a bricks manufactured product such as a brick or a roof tile.

**[0002]** Apparatuses are known for decorating a wall of an object, in particular a manufactured product, such as, for example, a brick, which operate by decorating a surface of the manufactured product arranged horizontally. The manufactured product can be advanced along a conveyor belt to reach the decorating apparatus. The decorating apparatus works on the manufactured product by depositing a layer of decoration material, for example a liquid or pulverulent paint or enamel, on the free horizontal surface, i.e. the surface that is substantially parallel to a resting plane of the manufactured product on the conveyor belt, not in contact with the conveyor belt.

**[0003]** The decorating apparatus can be provided with applying means, such as nozzles, which are suitable for applying the decoration material to the horizontal surface of the manufactured product, which nozzles being placed at a height from the resting plane which is greater than that of the manufactured product. These nozzles thus operate by nebulising the colour from the top to the upper surface of the manufactured product. Document US 2,763,510 teaches a paint drop flinger according to the preamble of claim 1.

**[0004]** A drawback of apparatuses for decorating a prior art manufactured product is that they are not able to decorate vertical surfaces of the manufactured product located on the conveyor belt, i.e. the side walls of the manufactured product that is substantially perpendicular to the resting plane of the conveyor belt.

**[0005]** An object of the invention is to improve prior art apparatuses for decorating a wall of an object.

**[0006]** Another object is to obtain an apparatus for decorating a wall of an object that is relatively simple and cheap.

**[0007]** A further object is to obtain an apparatus for decorating a wall of an object that is able to decorate both a wall of an object arranged vertically and a wall of an object arranged horizontally.

**[0008]** According to the invention, an apparatus is provided for decorating a wall of an object as defined in claim 1.

**[0009]** The invention can be better understood and implemented with reference to the attached drawings, which illustrate a nonlimiting embodiment thereof, in which:

Figure 1 is a perspective view of a decorating apparatus for decorating a wall of an object according to the invention;

Figure 2 is a view from the left of the apparatus for decorating a wall of an object in Figure 1;

Figure 3 is an enlarged detail of Figure 1;

Figure 4 is a detail of Figure 1 that illustrates a decorating device of the decorating apparatus in Figure 1;

Figure 5 is a detail like the one in Figure 4 that illustrates a version of the decorating device;

Figure 6 is a plan view of an element for applying a decoration material that is part of the decorating device;

Figure 7 is a longitudinal section of the applying element in Figure 6;

Figure 8 is a plan view of a first alternative embodiment of the applying element in Figure 6;

Figure 9 is a longitudinal section of the applying element in Figure 8;

Figure 10 is a longitudinal section of a version of the applying element in Figure 8;

Figure 11 is a plan view of a second alternative embodiment of the applying element in Figure 6;

Figure 12 is a longitudinal section of the applying element in Figure 11;

Figure 13 is a longitudinal section of the second alternative embodiment of the applying element in Figure 11.

**[0010]** With reference to Figure 1, there is shown a decorating apparatus 1 according to the invention that is suitable for decorating a surface 2 of an object 3.

**[0011]** The decorating apparatus 1 decorates the object 3 by the use of a material in pulverulent form, for example a ceramic powder, which can be dropped inside the decorating apparatus 1 from an accumulating device that is not shown located above the decorating apparatus 1.

**[0012]** The object 3 can be a bricks manufactured product such as, for example, a brick, a roof tile or a slab.

**[0013]** The object 3 may have a substantially parallel-pipedon shape.

**[0014]** Conveying means 4 can be provided that is arranged for supporting and advancing the object 3 along an advancement direction A, such as to take the object 3 to the decorating apparatus 1.

**[0015]** A surface of the conveying means 4 defines a resting plane 5 for the object 3.

**[0016]** The conveying means 4 may comprise a conveyor belt of known type.

**[0017]** A surface 2 of the object 3 can be a first surface 2a that is substantially perpendicular to the resting plane 5, a second surface 2b, opposite the first surface 2a and which is also substantially perpendicular to the resting plane 5, a third surface 2c substantially parallel to the resting plane 5 and not in contact with the resting plane.

**[0018]** The surface 2 can also be a surface tilted by any angle with respect to the resting plane 5.

**[0019]** Each of the surfaces 2a, 2b and 2c can be intended to become a visible face once the object has been laid to make a building structure.

**[0020]** With reference to Figures 1-4, the decorating apparatus 1 comprises a decorating device 6 arranged

to the side of the conveying means 4.

**[0021]** In Figure 4 the front side of the decorating device 6 is shown in detail that faces the conveying means 4.

**[0022]** The decorating device 6 is suitable for decorating the first surface 2a and/or the second surface 2b and/or the third surface 2c of the object 3.

**[0023]** The decorating device 6 comprises a supporting structure 7 that can be stably connected to the conveying means 4 via connecting means of known type.

**[0024]** The supporting structure 7 may comprise a pair of uprights 8 that are reciprocally aligned on a side of the conveying means 4 along a direction that is substantially parallel to the advancement direction A.

**[0025]** The uprights 8 have a substantially parallelepipedon shape and extend along a direction that is substantially perpendicular to the resting plane 5.

**[0026]** On each of the faces 9, reciprocally facing one another, of the uprights 8 is obtained a groove 10 that can extend along the entire length of the uprights 8 or along a part thereof. The groove 10 is suitable for receiving, for example in a shapingly coupled manner, a corresponding protrusion, which is not illustrated, provided in slide means 11 with which the decorating device 6 is provided.

**[0027]** The groove 10 and the slide means 11 enables the decorating device 6 to be movable along a vertical direction V substantially perpendicular to the resting plane 5. This enables a height of the decorating device 6 to be adjusted with respect to the object 3.

**[0028]** The decorating device 6 further comprises further slide means, which are not illustrated, provided for moving the decorating device 6 along a horizontal direction O, substantially perpendicular to the vertical direction V. In this manner the decorating device 6 is movable towards or away from the conveying means 4.

**[0029]** In Figure 2 a continuous line shows a position of the decorating device 6 that is nearest the conveying means 4, whilst a broken line shows a position of the decorating device 6 that is further from the conveying means 4.

**[0030]** The decorating device 6 comprises spreading means 12 arranged for spreading and distributing the material in pulverulent form dropping from the accumulating device.

**[0031]** The spreading means 12 comprises a plurality of spatula elements 13. The spatula elements 13 can have a substantially parallelepipedon shape and extend along a direction that is substantially perpendicular to the advancement direction A.

**[0032]** The spatula elements 13 are rigidly fixed, for example by screws and bolts, to supporting elements 16.

**[0033]** The supporting elements 16 are reciprocally connected and, in turn, rigidly secured to a support 14.

**[0034]** The support 14 has a substantially parallelepipedon shape and extends along a direction substantially perpendicular to the uprights 8. In particular, the fixing elements 16 are connected to a lower surface 15 of the support 14 nearest to the resting plane 5 with respect to

the other supporting surfaces 14.

**[0035]** The spreading means 12 and the support 14 are interposed between the uprights 8 and the conveying means 4.

**[0036]** The support 14 is connected, on the upper part, in a rigid manner with a connecting element 17 that protrudes from the support 14 upwards.

**[0037]** In turn, the connecting element 17 is connected, on the upper part, to driving means 18. The driving means 18 is supported by the slide means 11.

**[0038]** The driving means 18 enables the support 14, and thus also the spreading means 12, to be movable with reciprocating motion along a direction that is substantially parallel to the advancement direction A.

**[0039]** For this purpose, the support 14 has a width that is less than a distance at which the uprights 8 are placed.

**[0040]** The driving means 18 is connected to further slide means 20 slidingly coupled with the slide means 11 in a direction that is substantially parallel to the advancement direction A.

**[0041]** The driving means 18 may comprise one or more pneumatic cylinders 19 each of which is provided with a respective stem that extends and retracts along a direction that is substantially parallel to the advancement direction A to move the connecting element 17 and, consequently, the spreading means 12, in the same direction.

**[0042]** Alternatively, the driving means 18 may comprise an electric motor 50 that drives the further slide means 20 by means of a connecting-rod crank system 27, shown in Figure 5, or the driving means 18 may comprise a linear motor that directly drives the further slide means 20.

**[0043]** Each spatula element 13 is provided with a lower end 21 that is tapered downwards.

**[0044]** Each lower end 21 contacts an upper surface 46 of a plate 22. In the plate 22 a plurality of through holes 23 are obtained inside which the material in pulverulent form, dropping by gravity, is passed in the manner which will be explained better below.

**[0045]** The material in pulverulent form dropping from the accumulating device in part drops directly into the through holes 23, and is in part accumulated on the upper surface 46 of the plate 22.

**[0046]** In use, the spreading means 12 is moved to brush the upper surface 46 of the plate 22. For this purpose, the spatula elements 13 are made of a material provided with good elastic features, such that the spatula elements 13 can bend by a small amount to be able to stick to the plate 22 and brush the plate 22.

**[0047]** When the spreading means 12 is driven by the driving means 18 to move with reciprocating motion it brushes the upper surface 46 that receives the material in powder form that drops by gravity from the accumulating device. The spreading means 12, as it moves, drags with itself a part of the material in pulverulent form. At the moment at which the spatula elements 13 reach

a through hole 23, the material in pulverulent form passes through the through hole 23 and drops downwards by gravity.

**[0048]** The spreading means 12 and the support 14 are inserted inside a containing element 24 that is open upwards, the bottom of which is constituted by the plate 22.

**[0049]** The containing element 24 prevents the material in pulverulent form that is delivered inside the decorating apparatus 6 from being released into the environment, except via the through holes 23 of the plate 22.

**[0050]** The containing element 24 and the plate 22 define a substantially box-shaped structure that is open upwards.

**[0051]** The material in pulverulent form delivered inside the decorating device 6 enters the containing element 24 and, in part, accumulates on the plate 22, in part passes through the through holes 23 and reaches a propelling device 29 suitable for projecting the material in pulverulent form against the object 3.

**[0052]** The propelling device 29 is arranged below the plate 22 such as to be able to receive the material in pulverulent form that drops by gravity through the through holes 23.

**[0053]** The propelling device 29 comprises a rotating support 30 that is rotatable around a rotation axis R substantially parallel to the advancement direction A.

**[0054]** The rotating support 30 extends in length along a direction that is substantially parallel to the advancement direction A and has a substantially parallelepipedon shape with a polygonal, for example hexagonal, base.

**[0055]** Alternatively the support 30 may have a cylindrical shape. The rotating support 30 comprises a first end 31 and a second end 32 that are opposite one another.

**[0056]** The first end 31 and the second end 32 are respectively connected to a supporting plate 33 of a pair of supporting plates 33. Each supporting plate 33 is fixed to a respective face 9 of the uprights 8.

**[0057]** The supporting plates 33 are substantially perpendicular to the advancement direction A and, thus, also to the conveying means 4.

**[0058]** Each supporting plate 33 projects from the respective face 9 to the conveying means 4.

**[0059]** On the supporting plates 33 openings 34 are obtained, for example in the shape of a slot, which are oriented along a direction substantially perpendicular to the resting plane 5 and dimensioned in such a manner as to enable the ends 31, 32 to slide therein.

**[0060]** The height of the rotating support 30 is thus adjustable.

**[0061]** The ends 31, 32 are fixed by known fixing means 25, the height of which is also adjustable, which fixes the ends 31, 32 to a respective external face 45 of the supporting plates 33.

**[0062]** One end of the rotating support 30, for example the first end 31, is further connected to movement means 35, which may comprise a motor 36 arranged for rotating

the rotating support 30.

**[0063]** The propelling device 29 further comprises a plurality of applying elements 37 fixed to the rotating support 30. Each applying element 37 of the plurality of applying elements 37 is arranged for collecting a part of the material in pulverulent form dropping by gravity from the plate 22 and coming from the accumulating device and subsequently for throwing the part against the object 3.

**[0064]** The applying elements 37 have an elongated shape.

**[0065]** A fixing end 44 of each applying element 37 is connected to the rotating support 30 by connecting means of known type. For example, they can be fixed directly to the support 30 by screws or equivalent connecting means.

**[0066]** A plurality of applying elements 37 can be provided, for example three applying elements 37 as shown in Figure 4, on each of the sides of the rotating support 30, reciprocally spaced away by a substantially fixed distance.

**[0067]** Each applying element 37 further comprises a free end 41, opposite the fixing end 44.

**[0068]** The applying elements 37 may have various shapes.

**[0069]** Some of the possible conformations of the applying elements 37 are shown in Figures 6 to 11.

**[0070]** Parts of the applying elements 37 that are substantially similar in the various illustrated conformations will be indicated by the same reference numbers.

**[0071]** In Figure 6 there is shown a first embodiment of an applying element 37', with a corresponding longitudinal section shown in Figure 7. In this embodiment the applying element 37' has a substantially rectangular plan shape with a rounded free end 41'. The applying element 37' may have a substantially uniform thickness along the length thereof, and may have a substantially rectangular longitudinal section, as shown in particular in Figure 7.

**[0072]** The applying element 37' can be provided with a ridge 38 to retain a greater quantity of material in pulverulent form on the free end 41'. The ridge 38 can be made of a rubber, silicone or spongy material.

**[0073]** In particular, the ridge 38 is arranged on a face 43 of the applying element 37', intended for receiving the material in pulverulent form.

**[0074]** In Figure 8 there is shown a second embodiment of an applying element 37'', with a first corresponding longitudinal section shown in Figure 9 and a second corresponding longitudinal section shown in Figure 10.

**[0075]** In this conformation the applying element 37'' has a substantially rectangular plan shape.

**[0076]** The applying element 37'' may have a substantially uniform thickness along the length thereof, and may have a substantially rectangular longitudinal section, as shown in particular in Figure 9.

**[0077]** Alternatively, the applying element 37'' may have, near the free end 41'', a broken polygonal longitudinal section, in particular like a "C", as shown in particular in Figure 10.

**[0078]** In this manner, the applying element 37", near the free end 41", has a seat 26 that is suitable for receiving the material in pulverulent form to be projected towards the object 3. This conformation can increase a quantity of material in pulverulent form that the applying element 37" can collect and then project towards the object 3.

**[0079]** In Figure 11 there is shown a third conformation of an applying element 37"', with a first corresponding longitudinal section shown in Figure 12 and a second corresponding longitudinal section shown in Figure 13.

**[0080]** In this conformation the applying element 37"' has a substantially rectangular plan shape for a portion, whilst, near the free end 41"' there is a zone 42 the width of which is wider than the substantially rectangular portion. The zone 42 has the object of enabling a quantity of material in pulverulent form to be collected that is greater than if the applying element 37"' has a substantially rectangular plan shape.

**[0081]** The applying element 37"' may have a substantially uniform thickness along the length thereof, and may have a substantially rectangular longitudinal section, as shown in particular in Figure 12.

**[0082]** Alternatively, the applying element 37"' may have near the free end 41"' a broken polygonal longitudinal section, similar to that of the element 37" shown in Figure 10, such as to assume a spoon shape, and has a seat 26' suitable for receiving the material in pulverulent form to be projected towards the object 3. This conformation enables a quantity of material in pulverulent form to be further increased than that the applying element 37"' can collect and thus project towards the object 3.

**[0083]** The applying elements 37 may comprise a ridge 38, shown in the embodiment of the applying elements 37' in Figures 6 and 7.

**[0084]** Above the rotating support 30 an abutting rod 39 is arranged that is orientated in a direction that is substantially parallel to the rotation axis R of the rotating support 30. The ends of the abutting rod 39 are inserted into respective slits 40 with the shape of arched slots obtained in the respective supporting plates 33 to which they are fixed by respective fixing elements 28, for example fixing nuts.

**[0085]** The slits 40 enable the position of the abutting rod 39 to be modified with respect to the rotating support 30.

**[0086]** The abutting rod 39 has a substantially cylindrical shape. The abutting rod 39 is arranged at a distance from the rotating support 30 such that, when the latter is rotated, each applying element 37 comes into contact with the abutting rod 39 and flexes until, through the effect of the rotation of the rotating support 30, it disengages from the abutting rod 39, being elastically released towards the object 3 in such a manner as to project the material in pulverulent form onto the vertical surface of the object 3 facing the decorating device 6.

**[0087]** The distance to which the propelling device 29 can project the material in pulverulent form is a function

of a plurality of factors, including the free inflection length of the applying element 37, the maximum inflection angle of the applying element 37 determined by the position of the abutting rod 39 with respect to the rotating support 30, and the elasticity of the material with which each applying element 37 is made.

**[0088]** Owing to the propelling device 29 and to the abutting rod 39, the material in pulverulent form that drops by gravity through the plate 22 and is partially collected by the applying elements 37 can thus be projected to a certain distance from the decorating device 6 until it reaches a surface 2 of the object 3.

**[0089]** By adjusting the height position of the slide means 11 and consequently the height position of the propelling device 29 with respect to the resting plane 5 of the object 3, it is possible to ensure that the material in pulverulent form is projected substantially only onto the first vertical surface 2a of the object 3, facing the decorating device 6, or also onto the third horizontal surface 2c. By arranging a second decorating device 6' on the opposite side of the conveying means 4, opposite to the decorating device 6, it is possible to decorate simultaneously also the second vertical surface 2b of the object 3.

**[0090]** Depending on the degree of humidity of the object 3, it may be necessary to provide on the surfaces 2 of the object 3 a layer of fixing material that facilitates the adhesion of the material in pulverulent form to said surfaces 2. This may, for example, be necessary if the material in pulverulent form has a low degree of humidity.

**[0091]** The decorating device 6 lastly comprises a recovery device, which is not illustrated, arranged below the propelling device 29 to accumulate the material in pulverulent form that is not collected by the applying elements 37. This material in pulverulent form that is not projected towards the object 3 is returned by the recovery device to the accumulating device to be again delivered inside the decorating device 6.

**[0092]** This enables a waste of material in pulverulent form to be limited or even avoided.

**[0093]** The decorating devices 6, 6' may comprise collecting means 48, shown in Figure 2. The collecting means 48 is arranged below the propelling device 29 and accumulates material in pulverulent form that the applying elements 37 are not able to retain whilst it drops by gravity.

**[0094]** The collecting means 48 comprises ends fixed by connecting means of known type to the supporting plates 33.

**[0095]** The collecting means 48 is arranged at a distance from the rotating support 30, such that, when the rotating support 30 is rotated, the applying elements 37 can come into contact with the material in pulverulent form accumulated in the collecting means 48 and collect a fraction thereof with their free end 41.

**[0096]** The material in pulverulent form dropping from the plate 22 will be added to said fraction of material in pulverulent form, such that the quantity of material in pul-

verulent form that each applying element 37 is able to project towards the object 3 at each revolution of the rotating support 30 is greater than if the collecting means 48 is not present.

[0097] The collecting means 48 is shaped in such a manner as to have a collecting surface 49 onto which the material in pulverulent form can be deposited.

[0098] Owing to the collecting means 48, it is thus possible to increase the quantity of material in pulverulent form to be projected towards the object 3.

[0099] The decorating apparatus 1 may lastly comprise a still further decorating device, which is not shown, arranged above the object 3 and aligned thereupon. The still further decorating device is suitable for decorating the third surface 2c.

[0100] The still further decorating device differs from the decorating device 6 inasmuch as it does not require the propelling device 29 and the material in pulverulent form is simply deposited by gravity on said third surface 2c.

[0101] The operation of the decorating apparatus 1 will be illustrated below.

[0102] When the object 3 whilst it advances on the conveying means 4 comes near the decorating apparatus 1, the decorating device 6 and/or the further decorating device 6' and/or the still further decorating device are driven.

[0103] For the sake of brevity and clarity, only the operation of the decorating device 6 will be illustrated below.

[0104] The accumulating device delivers a quantity of material in pulverulent form inside the collecting zone Z. The material in pulverulent form accumulates in part on the upper surface 46 of the plate 22 and in part drops towards the propelling device 29, passing through the through holes 23 of the plate 22.

[0105] Simultaneously, the driving means 18 is driven to move the spreading means 12 with reciprocating motion. The spreading means 12 during its movement brushes the upper surface 46 of the plate 22 and drags with it the pulverulent material accumulated on the upper surface 46 of the plate 22. When the spreading means 12 reaches the through holes 23 the material in pulverulent form drops inside the latter. Simultaneously, the movement means 35 is moved to rotate the rotating support 30 and, with it, the applying elements 37. Part of the material in pulverulent form that drops by gravity from the through holes 23 reaches the applying elements 37, accumulating against the ridge 38 or the seat 26, 26' of each applying element 37.

[0106] If the collecting means 48 is provided, the material in pulverulent form that does not reach the applying elements 37 drops into said collecting means 48 to be partially collected by the applying elements 37.

[0107] A still other part of the material in pulverulent form that drops by gravity from the through holes 23 reaches a bottom of the decorating device 6 and is recovered by the recovery device.

[0108] The material in pulverulent form that is collected and retained by the applying elements 37 is projected

towards the surfaces 2a, 2b, 2c of the object 3, as disclosed previously.

[0109] The decoration that can be obtained with the decorating apparatus 1 according to the invention on the surfaces 2a, 2b, 2c can be in the shape of blotches distributed in a substantially random manner, but it is also possible to deposit on said surfaces 2a, 2b, 2c a substantially continuous layer of material in pulverulent form.

## Claims

- Decorating apparatus that is suitable for decorating with a material in pulverulent form a surface (2a, 2b, 2c) of an object (3) that advances along an advancement direction (A), said decorating apparatus comprising at least one decorating device (6, 6'), said at least one decorating device (6, 6') being provided with a propelling device (29) suitable for projecting said material in pulverulent form towards said surface (2a, 2b, 2c) of said object (3), said propelling device (29) comprising at least one flexible element (37, 37'; 37"; 37''') that is suitable for receiving said material in pulverulent form and projecting the material in pulverulent form towards said surface (2a, 2b, 2c) of said object (3), said at least one flexible element (37, 37'; 37"; 37''') being fixed on a rotating support (30) that is rotatable around a rotation axis (R) that is substantially parallel to said advancement direction (A), said decorating device (6, 6') further comprising an abutting element (39) with which said at least one flexible element (37, 37'; 37"; 37''') interacts to flex and project said material in pulverulent form towards said surface (2a, 2b, 2c), **characterised in that** each end of said abutting element (39) is inserted into a respective slit (40) obtained in a supporting plate (33), said slit (40) enabling a position of said abutting element (39) to be modified with respect to said rotating support (30).
- Decorating apparatus according to claim 1, wherein said rotating support (30) is rotated by movement means (35), said movement means (35) comprising a motor (36).
- Decorating apparatus according to claim 1, or 2, wherein each end (31, 32) of said rotating support (30) is inserted into a respective opening (34) obtained in said supporting plate (33) and arranged below said slit (40), said opening (34) enabling a vertical position of said rotating support (30) to be modified.
- Decorating apparatus according to any one of claims 1 to 3, wherein said at least one flexible element (37, 37'; 37"; 37''') comprises a fixing end (44) for connecting said at least one flexible element (37, 37'; 37"; 37''') to said rotating support (30) and a free end (41, 41'; 41"; 41''') opposite said fixing end (44) for

retaining said material in pulverulent form and contact said abutting element (39).

5. Decorating apparatus according to any one of claims 1 to 4, wherein said at least one flexible element (37, 37'; 37"; 37''') comprises a ridge (38), arranged on a face (43) of said flexible element (37, 37'; 37"; 37'''), intended for receiving said material in pulverulent form, said ridge (38) is made of a rubber, or silicone material, or of a spongy material.

6. Decorating apparatus according to any one of claims 1 to 5, wherein said at least one flexible element (37, 37'; 37"; 37''') has a substantially rectangular plan shape and has a seat (26) that is suitable for receiving said material in pulverulent form to be projected towards said object (3).

7. Decorating apparatus according to any one of claims 1 to 6, wherein said at least one flexible element (37, 37'; 37"; 37''') has a zone (42) with a width that is larger near said free end (41''').

8. Decorating apparatus according to any one of claims 1 to 7, and further comprising:

- a containing element (24) for said material in pulverulent form, from which said material in pulverulent form drops by gravity onto said propelling device (29), said containing element (24) being arranged above said abutting element (39), said containing element (24) comprising a plate (22) on which at least one through hole (23) is obtained that is arranged for being traversed by said material in pulverulent form;
- spreading means (12) that is suitable for brushing an upper surface (46) of said plate (22) for distributing said material in pulverulent form on said upper surface (46) and pushing the material in pulverulent form through said at least one through hole (23), said spreading means (12) comprising at least one spatula element (13) that is driven to slide on said upper surface (46), in contact with said upper surface (46), said at least one spatula element (13) being connected to a support (14) connected to driving means (18) suitable for moving said support (14) with reciprocating motion in a direction that is substantially parallel to said upper surface (46).

9. Decorating apparatus according to claim 8, wherein said decorating device (6, 6') comprises slide means (11) slidably coupled with a pair of vertical uprights (8) of said decorating apparatus, said driving means (18) being supported by said slide means (11) and being connected to further slide means (20) slidably coupled with said slide means (11) in a direction that is substantially parallel to said upper surface (46).

10. Decorating apparatus according to any preceding claim, wherein said decorating device (6, 6') is movable along a horizontal direction (O), substantially perpendicular to said advancement direction (A).

11. Decorating apparatus according to claim 9 or 10, wherein said driving means (18) comprises a pneumatic cylinder (19) provided with a stem that drives said further slide means (20), or said driving means (18) comprises an electric motor (50) that drives said further slide means (20) by a connecting-rod crank system (27), or a linear motor that directly drives said further slide means (20).

12. Decorating apparatus according to any preceding claim, and further comprising collecting means (48) arranged below said propelling device (29) and comprising a collecting surface (49) on which said material in pulverulent form is deposited that is not deposited on said at least one flexible element (37, 37'; 37"; 37''').

13. Decorating apparatus according to claim 12, wherein said at least one flexible element (37, 37'; 37"; 37''') interacts with said collecting surface (49) when said rotating support (30) is rotated by said movement means (35) for collecting said material in pulverulent form deposited on said collecting surface (49).

14. Decorating apparatus according to any preceding claim, and further comprising a further decorating device (6') reciprocally facing said decorating device (6), said further decorating device (6') and said decorating device (6) being arranged on opposite sides of a conveying line (4) of said object (3).

15. Decorating apparatus according to any preceding claim, wherein said rotating support (30) has a substantially cylindrical shape, or a substantially prismatic shape, with a plurality of lateral faces, on each of said lateral faces a plurality of said flexible elements (37, 37'; 37"; 37''') being fixed.

## Patentansprüche

1. Dekorierungsapparatur, die geeignet ist, um eine Fläche (2a, 2b, 2c) eines Objektes (3), das entlang einer Förderrichtung (A) gefördert wird, mit einem Material in pulveriger Form zu dekorieren, wobei die Dekorierungsapparatur zumindest eine Dekorierungsvorrichtung (6, 6') aufweist, wobei die zumindest eine Dekorierungsvorrichtung (6, 6') mit einer Antriebsvorrichtung (29) versehen ist, die geeignet ist, um das Material in pulveriger Form in die Richtung der Fläche (2a, 2b, 2c) des Objektes (3) zu sprühen, wobei die Antriebsvorrichtung (29) zumindest ein flexibles Element (37, 37'; 37"; 37''') aufweist, das ge-

- eignet ist, um das Material in pulveriger Form aufzunehmen und das Material in pulveriger Form in die Richtung der Fläche (2a, 2b, 2c) des Objektes (3) zu sprühen, wobei das zumindest eine flexible Element (37, 37'; 37"; 37''') an einem rotierenden Träger (30) befestigt ist, der um eine Rotationsachse (R) rotierbar ist, die im Wesentlichen parallel zu der Förderrichtung (A) verläuft, wobei die Dekorierungsvorrichtung (6, 6') ferner ein Angrenzelement (39) aufweist, mit dem das zumindest eine flexible Element (37, 37'; 37"; 37''') interagiert, um das Material in pulveriger Form in die Richtung der Fläche (2a, 2b, 2c) zu biegen und zu sprühen, **dadurch gekennzeichnet, dass** jedes Ende des Angrenzelementes (39) in einen jeweiligen Schlitz (40) eingesetzt ist, der in einer Tragplatte (33) vorgesehen ist, wobei es der Schlitz (40) ermöglicht, eine Position des Angrenzelementes (39) in Bezug auf den rotierenden Träger (30) zu modifizieren.
2. Dekorierungsapparatur gemäß Anspruch 1, wobei der rotierende Träger (30) durch Bewegungsmittel (35) rotiert wird, wobei die Bewegungsmittel (35) einen Motor (36) aufweisen.
  3. Dekorierungsapparatur gemäß Anspruch 1 oder 2, wobei jedes Ende (31, 32) des rotierenden Trägers (30) in eine jeweilige Öffnung (34) eingesetzt ist, die in der Tragplatte (33) vorgesehen und unterhalb des Schlitzes (40) angeordnet ist, wobei die Öffnung (34) es ermöglicht, eine vertikale Position des rotierenden Trägers (30) zu modifizieren.
  4. Dekorierungsapparatur gemäß einem der Ansprüche 1 bis 3, wobei das zumindest eine flexible Element (37, 37'; 37"; 37''') ein Befestigungsende (44) aufweist, um das zumindest eine flexible Element (37, 37'; 37"; 37''') mit dem rotierenden Träger (30) und einem freien Ende (41, 41'; 41"; 41''') gegenüber dem Befestigungsende (44) zu verbinden, um das Material in pulveriger Form zu halten und das Angrenzelement (39) zu kontaktieren.
  5. Dekorierungsapparatur gemäß einem der Ansprüche 1 bis 4, wobei das zumindest eine flexible Element (37, 37'; 37"; 37''') eine Erhöhung (38) aufweist, die auf einer Fläche (43) des flexiblen Elements (37, 37'; 37"; 37''') angeordnet ist, die dazu vorgesehen ist, um das Material in pulveriger Form aufzunehmen, wobei die Erhöhung (38) aus einem Gummi, oder einem Silikonmaterial oder einem schwammförmigen Material gefertigt ist.
  6. Dekorierungsapparatur gemäß einem der Ansprüche 1 bis 5, wobei das zumindest eine flexible Element (37, 37'; 37"; 37''') eine im Wesentlichen rechteckige Grundform aufweist und eine Aufnahme (26) aufweist, die geeignet ist, um das Material in pulveriger Form aufzunehmen, das in die Richtung des Objektes (3) gesprüht werden soll.
  7. Dekorierungsapparatur gemäß einem der Ansprüche 1 bis 6, wobei das zumindest eine flexible Element (37, 37''') einen Bereich (42) mit einer Breite aufweist, die in der Nähe des freien Endes (41''') größer ist.
  8. Dekorierungsapparatur gemäß einem der Ansprüche 1 bis 7, die ferner aufweist:
    - ein Behälterelement (24) für das Material in pulveriger Form, von dem das Material in pulveriger Form durch Schwerkraft auf die Antriebsvorrichtung (29) tropft, wobei das Behälterelement (24) oberhalb des Angrenzelementes (39) angeordnet ist, wobei das Behälterelement (24) eine Platte (22) aufweist, auf der zumindest ein Durchgangsloch (23) vorgesehen ist, das angeordnet ist, um von dem Material in pulveriger Form durchquert zu werden;
    - Ausbreitungsmittel (12), die geeignet sind, um eine obere Fläche (46) der Platte (22) zu bürsten, um das Material in pulveriger Form auf der oberen Fläche (46) zu verteilen und das Material in pulveriger Form durch das zumindest eine Durchgangsloch (23) zu drücken, wobei die Ausbreitungsmittel (12) zumindest ein Spachtелеlement (13) aufweisen, das angetrieben wird, um auf der oberen Fläche (26) in Kontakt mit der oberen Fläche (46) zu gleiten, wobei das zumindest eine Spachtелеlement (13) mit einem Träger (14) verbunden ist, der mit Antriebsmitteln (18) verbunden ist, die geeignet sind, um den Träger (14) mit reziproker Bewegung in eine Richtung zu bewegen, die im Wesentlichen parallel zu der oberen Fläche (46) verläuft.
  9. Dekorierungsapparatur gemäß Anspruch 8, wobei die Dekorierungsvorrichtung (6, 6') Gleitmittel (11) aufweist, die in Gleitverbindung mit einem Paar von vertikalen Stützen (8) der Dekorierungsapparatur stehen, wobei die Antriebsmittel (18) von den Gleitmitteln (11) getragen werden und mit weiteren Gleitmitteln (20) verbunden sind, die in Gleitverbindung mit den Gleitmitteln (11) in einer Richtung stehen, die im Wesentlichen parallel zu der oberen Fläche (46) verläuft.
  10. Dekorierungsapparatur gemäß einem der vorherigen Ansprüche, wobei die Dekorierungsvorrichtung (6, 6') entlang einer horizontalen Richtung (O) beweglich ist, die im Wesentlichen rechtwinklig zu der Förderrichtung (A) verläuft.
  11. Dekorierungsapparatur gemäß Anspruch 9 oder 10, wobei die Antriebsmittel (18) einen pneumatischen

Zylinder (19) aufweisen, der mit einer Stange versehen ist, die die weiteren Gleitmittel (20) antreibt, oder wobei die Antriebsmittel (18) einen elektrischen Motor, der die weiteren Gleitmittel (20) durch ein Pleuelstangen-Kurbel-System (27) antreibt, oder einen Linearmotor aufweisen, der direkt die weiteren Gleitmittel (20) antreibt.

12. Dekorierungsapparatur gemäß einem der vorherigen Ansprüche, die ferner Sammelmittel (48) aufweist, die unterhalb der Antriebsvorrichtung (29) angeordnet sind und eine Sammelfläche (49) aufweisen, auf der das Material in pulveriger Form abgelagert wird, das nicht auf dem zumindest einen flexiblen Element (37, 37'; 37"; 37''') abgelagert ist.
13. Dekorierungsapparatur gemäß Anspruch 12, wobei das zumindest eine flexible Element (37, 37', 37", 37''') mit der Sammelfläche (49) interagiert, wenn der rotierende Träger (30) von den Bewegungsmitteln (35) rotiert wird, um das Material in pulveriger Form zu sammeln, das auf der Sammelfläche (49) abgelagert wurde.
14. Dekorierungsapparatur gemäß einem der vorherigen Ansprüche, die ferner eine weitere Dekorierungsvorrichtung (6') aufweist, die reziprok der Dekorierungsvorrichtung (6) zugewandt ist, wobei die weitere Dekorierungsvorrichtung (6') und die Dekorierungsvorrichtung (6) an gegenüberliegenden Seiten einer Förderstrecke (4) des Objektes (3) angeordnet sind.
15. Dekorierungsapparatur gemäß einem der vorherigen Ansprüche, wobei der rotierende Träger (30) eine im Wesentlichen zylindrische Form oder eine im Wesentlichen prismatische Form, mit einer Vielzahl von seitlichen Flächen aufweist, wobei an jeder der seitlichen Flächen eine Vielzahl der flexiblen Elemente (37, 37', 37", 37''') befestigt ist.

## Revendications

1. Appareil de décoration qui est apte à décorer d'un matériau sous forme pulvérulente une surface (2a, 2b, 2c) d'un objet (3) qui avance selon un sens d'avancement (A), ledit appareil de décoration comprenant au moins un dispositif de décoration (6, 6'), ledit au moins un dispositif de décoration (6, 6') étant pourvu d'un dispositif de propulsion (29) apte à projeter ledit matériau sous forme pulvérulente vers ladite surface (2a, 2b, 2c) dudit objet (3), ledit dispositif de propulsion (29) comprenant au moins un élément flexible (37, 37'; 37"; 37''') qui est apte à recevoir ledit matériau sous forme pulvérulente et à projeter le matériau sous forme pulvérulente vers ladite surface (2a, 2b, 2c) dudit objet (3), ledit au moins un élément

flexible (37, 37'; 37"; 37''') étant fixé sur un support rotatif (30) qui est mobile en rotation autour d'un axe de rotation (R) qui est sensiblement parallèle audit sens d'avancement (A), ledit dispositif de décoration (6, 6') comprenant en outre un élément d'appui (39) avec lequel ledit au moins un élément flexible (37, 37'; 37"; 37''') interagit pour fléchir et projeter ledit matériau sous forme pulvérulente vers ladite surface (2a, 2b, 2c), **caractérisé en ce que** chaque extrémité dudit élément d'appui (39) est insérée dans une fente respective (40) obtenue dans une plaque de support (33), ladite fente (40) permettant de modifier une position dudit élément d'appui (39) par rapport audit support rotatif (30).

2. Appareil de décoration selon la revendication 1, dans lequel ledit support rotatif (30) est entraîné en rotation par des moyens d'animation (35), lesdits moyens d'animation (35) comprenant un moteur (36).
3. Appareil de décoration selon la revendication 1 ou 2, dans lequel chaque extrémité (31, 32) dudit support rotatif (30) est insérée dans une ouverture respective (34) obtenue dans ladite plaque de support (33) et agencée en dessous de ladite fente (40), ladite ouverture (34) permettant de modifier une position verticale dudit support rotatif (30).
4. Appareil de décoration selon l'une quelconque des revendications 1 à 3, dans lequel ledit au moins un élément flexible (37, 37'; 37"; 37''') comprend une extrémité de fixation (44) destinée à relier ledit au moins un élément flexible (37, 37'; 37"; 37''') audit support rotatif (30) et une extrémité libre (41, 41'; 41"; 41''') à l'opposé de ladite extrémité de fixation (44) destinée à retenir ledit matériau sous forme pulvérulente et à entrer en contact avec ledit élément d'appui (39).
5. Appareil de décoration selon l'une quelconque des revendications 1 à 4, dans lequel ledit au moins un élément flexible (37, 37'; 37"; 37''') comprend une crête (38), agencée sur une face (43) dudit élément flexible (37, 37'; 37"; 37''') destinée à recevoir ledit matériau sous forme pulvérulente, ladite crête (38) est réalisée dans un matériau caoutchouteux, ou dans un matériau silicone, ou dans un matériau spongieux.
6. Appareil de décoration selon l'une quelconque des revendications 1 à 5, dans lequel ledit au moins un élément flexible (37, 37'; 37"; 37''') a une forme plane sensiblement rectangulaire et comporte un siège (26) qui est apte à recevoir ledit matériau sous forme pulvérulente destiné à être projeté vers ledit objet (3).

7. Appareil de décoration selon l'une quelconque des revendications 1 à 6, dans lequel ledit au moins un élément flexible (37, 37'') comprend une zone (42) d'une largeur qui est plus grande à proximité de ladite extrémité libre (41''). 5
8. Appareil de décoration selon l'une quelconque des revendications 1 à 7, et comprenant en outre:
- un élément conteneur (24) pour ledit matériau sous forme pulvérulente, à partir duquel ledit matériau sous forme pulvérulente tombe par gravité sur ledit dispositif de propulsion (29), ledit élément conteneur (24) étant agencé au-dessus dudit élément d'appui (39), ledit élément conteneur (24) comprenant une plaque (22) sur laquelle au moins un trou traversant (23) est obtenu qui est agencé pour être traversé par ledit matériau sous forme pulvérulente; 10
  - des moyens d'étalement (12) qui sont aptes à broser une surface supérieure (46) de ladite plaque (22) pour distribuer ledit matériau sous forme pulvérulente sur ladite surface supérieure (46) et à pousser le matériau sous forme pulvérulente à travers ledit au moins un trou traversant (23), lesdits moyens d'étalement (12) comprenant au moins un élément de spatule (13) qui est entraîné en coulissement sur ladite surface supérieure (46), en contact avec ladite surface supérieure (46), ledit au moins un élément de spatule (13) étant relié à un support (14) relié à des moyens d'entraînement (18) aptes à déplacer ledit support (14) d'un mouvement alternatif dans une direction qui est sensiblement parallèle à ladite surface supérieure (46). 15
9. Appareil de décoration selon la revendication 8, dans lequel ledit dispositif de décoration (6, 6') comprend des moyens coulissants (11) accouplés de manière coulissante à une paire de montants verticaux (8) dudit appareil de décoration, lesdits moyens d'entraînement (18) étant supportés par lesdits moyens coulissants (11) et étant reliés à d'autres moyens coulissants (20) accouplés de manière coulissante auxdits moyens coulissants (11) dans une direction qui est sensiblement parallèle à ladite surface supérieure (46). 20
10. Appareil de décoration selon l'une quelconque des revendications précédentes, dans lequel ledit dispositif de décoration (6, 6') est mobile selon une direction horizontale (O), sensiblement perpendiculaire audit sens d'avancement (A). 25
11. Appareil de décoration selon la revendication 9 ou 10, dans lequel lesdits moyens d'entraînement (18) comprennent un vérin pneumatique (19) pourvu d'une tige qui entraîne lesdits autres moyens coulissants (20), ou lesdits moyens d'entraînement (18) comprennent un moteur électrique (50) qui entraîne lesdits autres moyens coulissants (20) par un système bielle-manivelle (27), ou un moteur linéaire qui entraîne directement lesdits autres moyens coulissants (20). 30
12. Appareil de décoration selon l'une quelconque des revendications précédentes, et comprenant en outre des moyens de collecte (48) agencés en dessous dudit dispositif de propulsion (29) et comprenant une surface collectrice (49) sur laquelle ledit matériau sous forme pulvérulente est déposé qui n'est pas déposé sur ledit au moins un élément flexible (37, 37'; 37''; 37'''). 35
13. Appareil de décoration selon la revendication 12, dans lequel ledit au moins un élément flexible (37, 37'; 37''; 37''') interagit avec ladite surface collectrice (49) lorsque ledit support rotatif (30) est entraîné en rotation par lesdits moyens d'animation (35) pour collecter ledit matériau sous forme pulvérulente déposé sur ladite surface collectrice (49). 40
14. Appareil de décoration selon l'une quelconque des revendications précédentes, et comprenant en outre un autre dispositif de décoration (6') réciproquement en regard dudit dispositif de décoration (6), ledit autre dispositif de décoration (6') et ledit dispositif de décoration (6) étant agencés sur des côtés opposés d'une ligne d'acheminement (4) dudit objet (3). 45
15. Appareil de décoration selon l'une quelconque des revendications précédentes, dans lequel ledit support rotatif (30) a une forme sensiblement cylindrique, ou une forme sensiblement prismatique, avec une pluralité de faces latérales, sur chacune desdites faces latérales une pluralité desdits éléments flexibles (37, 37'; 37''; 37''') étant fixés. 50
16. Appareil de décoration selon l'une quelconque des revendications précédentes, dans lequel ledit support rotatif (30) est agencé de manière à pouvoir être déplacé le long d'une surface de support (5) par un moyen d'entraînement (18) agencé de manière à entraîner ledit support rotatif (30) dans une direction sensiblement parallèle à ladite surface de support (5). 55

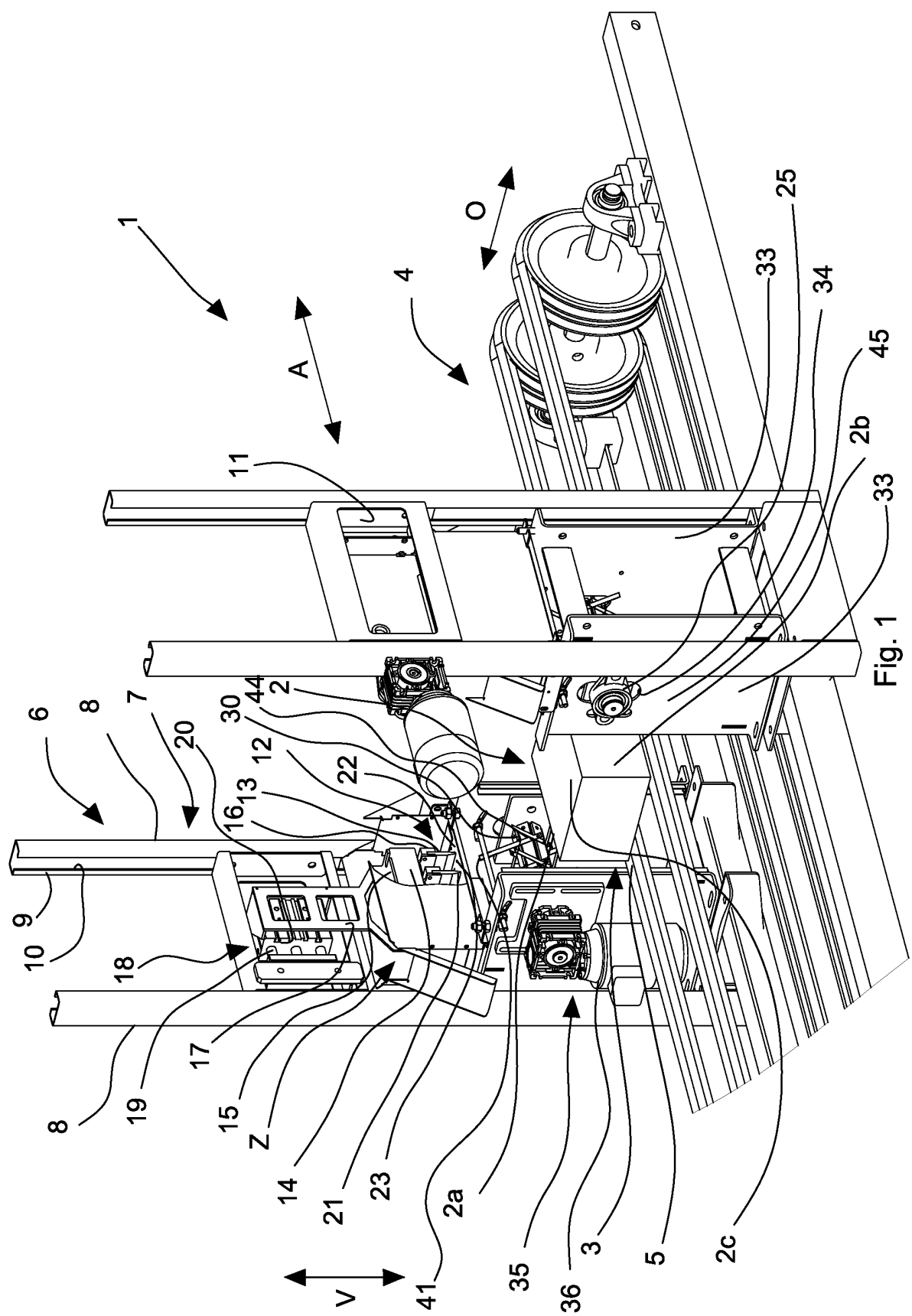
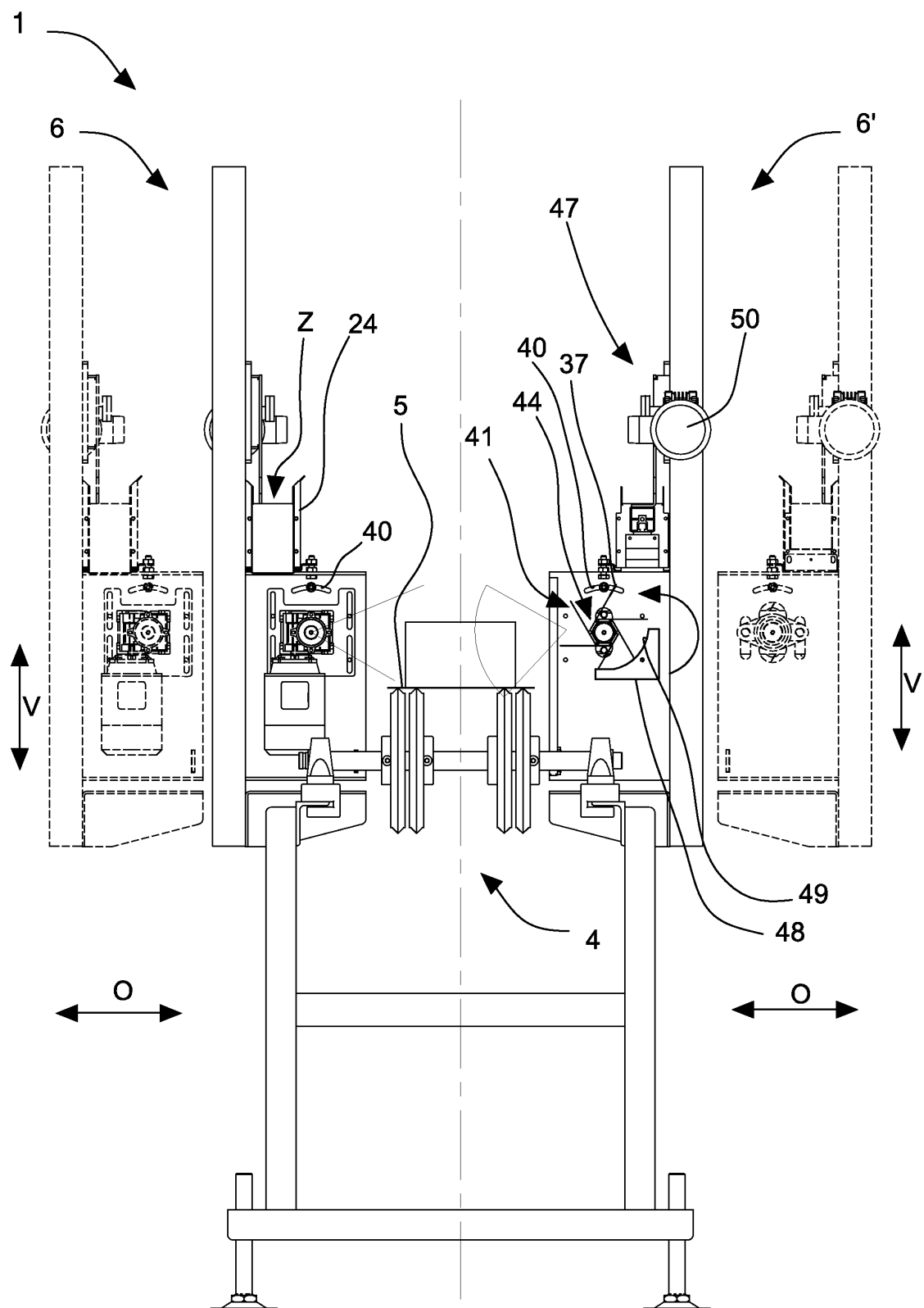
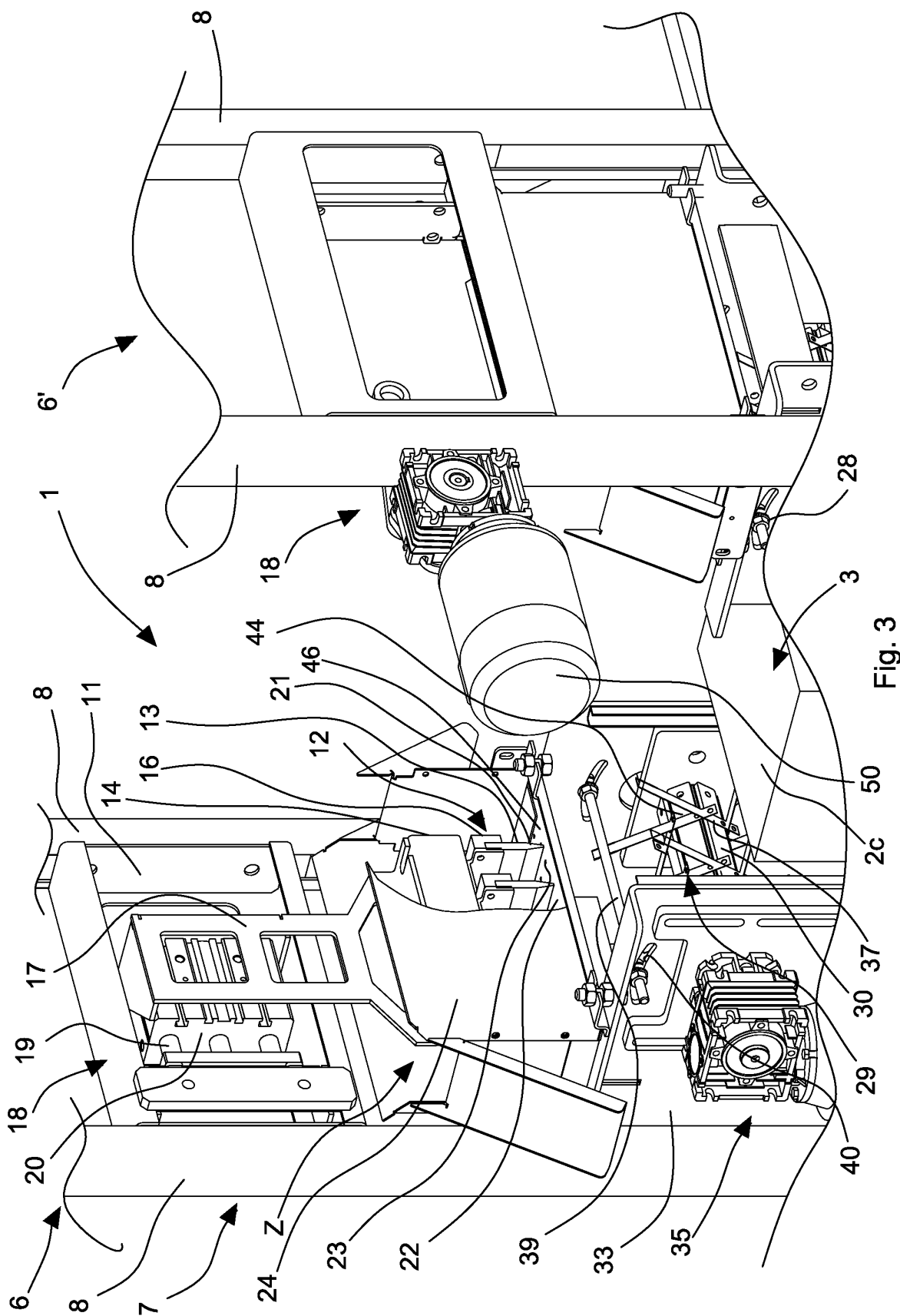
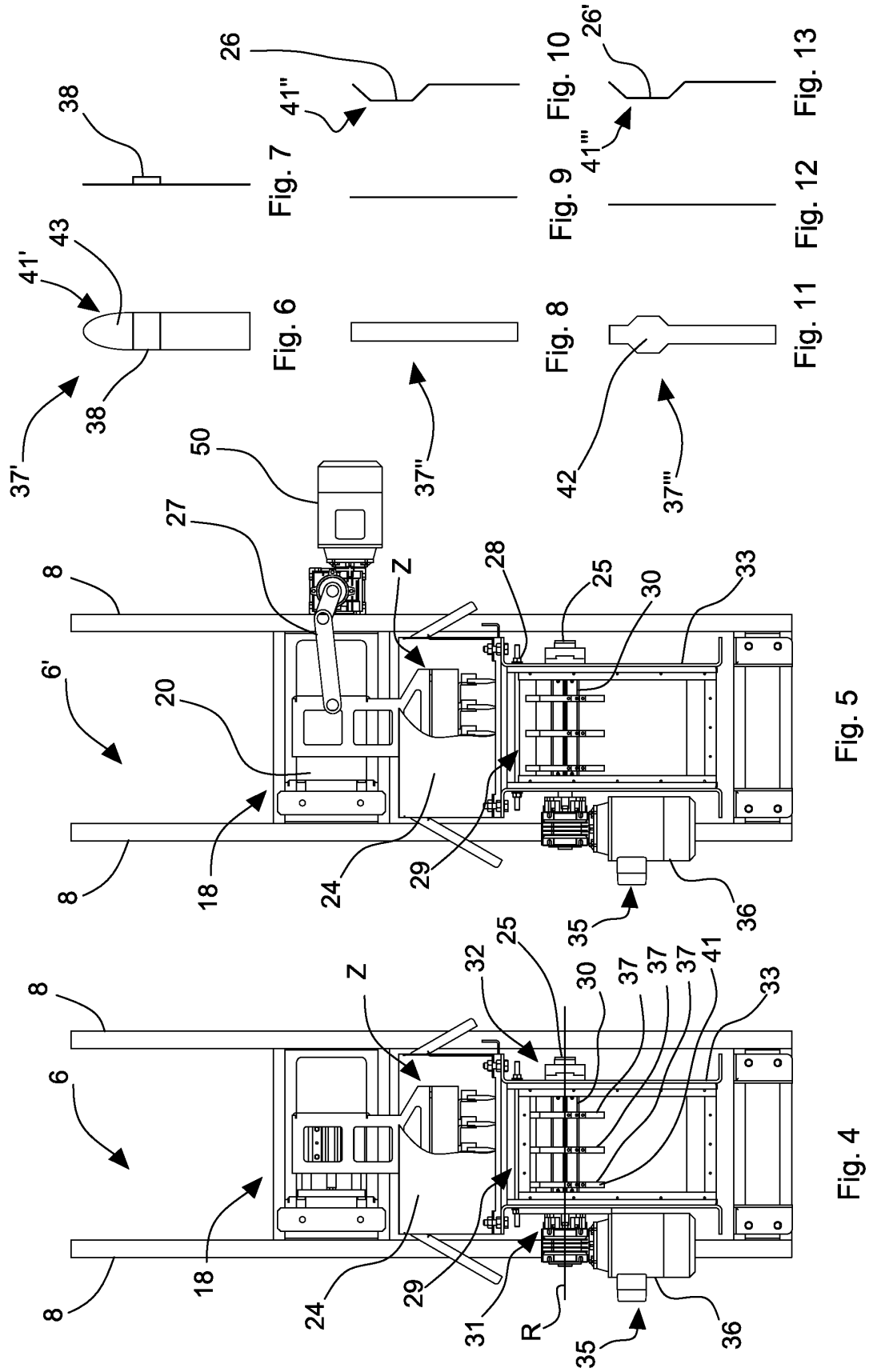


Fig. 1



**Fig. 2**





**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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