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(54) A pavement marking tape applicator and a method of lifting such a device

(57) A pavement marking tape applicator device is adapted for applying pavement marking tape on a surface. The tape applicator device comprises first and second rollers for supporting the tape device on the surface, and a lifting arrangement which is adapted for lifting the tape applicator device from the surface. The invention helps facilitating the handling of the device and helps minimizing costs for tape application.

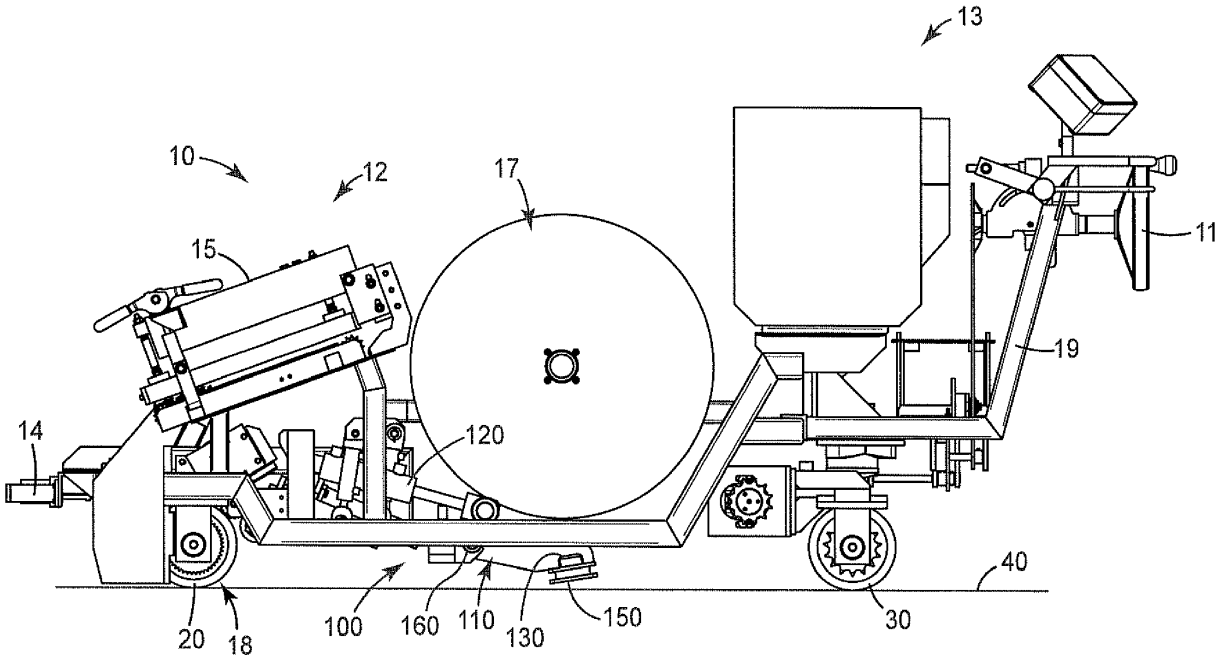


FIG. 1a

EP 2 366 833 A1

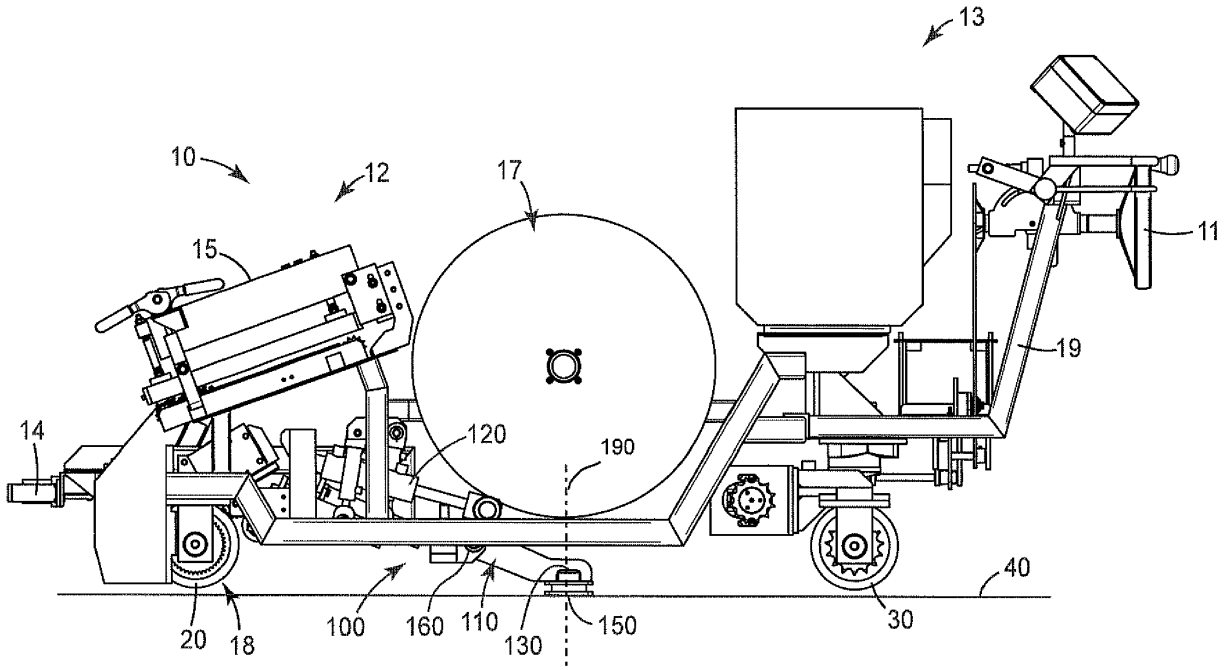


FIG. 1b

Description

Field of the Invention

[0001] The invention relates to a tape applicator for applying a road marking tape on pavement, and in particular to a tape applicator having a lifting arrangement. Furthermore, the invention relates a method of using a tape applicator device and a method of lifting a tape applicator device.

Background Art

[0002] Pavement marking is often made by application of a pre-fabricated adhesive coated marking tape to the pavement of a road, for example. Such a marking tape is typically applied by use of mechanical devices which position the tape on the pavement. Some of those devices are designed for not only positioning the tape but also for pressing the tape with the adhesive side down on the pavement to establish a sufficient adhesion of the tape on the pavement.

[0003] For marking of relatively long distances self-propelled devices are often used. Such devices are typically motorized and relatively robust in design so that they can carry relatively heavy rolls holding a maximized length of tape, and to provide the required directional stability for accurately positioning the tape.

[0004] For example US 6,413,013 B1 (Requena) discloses an autonomous strip laying device for marking ground. The device includes a rolling frame which supports a reel of strip to be unwound, a strip unwinding assembly, elements for applying the strip on the ground including an applicator roll, a device for sectioning the strip and an assembly driving the frame and actuating the different devices and the unwinding elements.

[0005] US 4,030,958 (Stenemann) discloses a pavement-striping apparatus for automatically feeding tape from a roll and pressing it into contact with a paved surface in continuous stripes or intermittent stripes of variable spacing, width, and length. The apparatus has an engagement roller for bringing the tape in engagement with the paved surface, and a pressure roller to more firmly adhere the tape to the roadway. The apparatus further has a front wheel which can be engaged against the surface for storage or other kinds of handling of the stripping apparatus.

[0006] Although motorized devices for applying self-adhesive tapes overcome some difficulties associated with propelling the device over long distances and up hills, there is still a desire to provide a device which is easy to handle, but which further is relatively inexpensive.

Summary of the Invention

[0007] In a one aspect the invention relates to a pavement marking tape applicator device. The device is adapted for applying pavement marking tape on a surface along a longitudinal dimension. The device comprises:

- a first roller and a second roller for supporting the tape applicator device on the surface; and
- a lifting arrangement which is adapted for lifting the tape applicator device from the surface such that at least one of the rollers is disengaged from the surface.

[0008] The term "longitudinal dimension of the tape applicator device" for the purpose of this specification generally refers to a dimension that is oriented generally parallel to the direction in which the device is moved for applying tape on a road surface.

[0009] The invention is advantageous in that it preferably provides a tape applicator device which is movable at a maximized directional stability, but which can be turned or otherwise moved away from the location of tape application in an easy way. The invention further preferably provides for a device which can easily be moved and relocated when the tape application operation is interrupted. Therefore, the invention makes a steering roller having a large steering angle, which may reduce the directional stability, unnecessary. Also, the invention makes a separate additional device such as a crane, which would lift the device for turning or relocation on the surface, unnecessary. The invention may be advantageous in that it may provide a device that can be used with various methods of applying marking tape on a road. Further a device of the invention may be relatively inexpensive and robust. The invention may be advantageous in that it provides for a smaller turning circle compared to the turning radius of a tape applicator device having a steerable roller with a limited steering angle. Further a device of the invention may be advantageous as the turning operation may only require a short interruption of tape application.

[0010] In one embodiment the lifting arrangement comprises a support member. The support member is preferably movable for positioning the lifting arrangement between a first position, in which the lifting arrangement is spaced from the surface, and a second position, in which the lifting arrangement engages the surface such that at least one of the rollers is disengaged from the surface. In the first position of the lifting arrangement the tape applicator device may be supported on the surface by the first and second rollers only. In the second position of the lifting arrangement, the tape applicator device may be supported by either the support member only, or by the support member and one of the first and second rollers.

[0011] In one embodiment the lifting of the tape applicator device generally allows for turning the tape applicator device about a turning axis. In particular the lifting arrangement in the second position may enable a rotation of the tape applicator device about the turning axis. The turning axis is preferably oriented generally perpendicu-

lar to the surface, and further preferably, the turning axis is additionally oriented generally perpendicular to the longitudinal dimension of the tape applicator device. Further the turning axis is preferably positioned within a perpendicular projection of the outer shape of the tape applicator device onto the surface. The tape applicator device may for example be turned by applying a manual force to the device in a direction into which the device should be turned.

[0012] In another embodiment the tape applicator device comprises at least one of:

- a drive unit for automatically advancing the device;
- a tape supply unit adapted to hold a tape supply roll;
- a tape advancing unit comprising at least one of a guiding appliance, a splicing appliance and a cutting appliances; and
- a chassis.

[0013] Certain components of the tape applicator device may be arranged or fixed at the chassis. For example, at least one of the first and second rollers, the lifting arrangement, a tape supply roll, a tape guiding and advancing mechanism, and a motor for advancing the device may be arranged or fixed at the chassis.

[0014] In one embodiment the support member has a first end which is fixed at the tape applicator device and a free second end which is movable for positioning the lifting arrangement in the first and/or the second position (s).

[0015] In a preferred embodiment, the lifting arrangement further comprises a support plate. The support plate is preferably arranged at the second end of the support member. Further the support plate may have a contact surface for contacting the surface onto which tape is to be applied. The contact surface may be generally planar and may have a generally rectangular, generally circular or any other suitable shape. Preferably, the contact surface is generally circular, and may have in a preferred embodiment a diameter of about 180 mm. The support plate may be made of metal, for example, or of any other material having appropriate mechanical stability.

[0016] In a further embodiment the lifting arrangement comprises a swivel-joint providing for rotatability of the support plate (150) and the support member (110) relative to one another about the turning axis. The support plate thus may be arranged rotatably at the lifting arrangement about the turning axis. Therefore the tape applicator device in the second position of the lifting arrangement may be enabled to be turned about the turning axis while the support plate is substantially positionally fixed relative to the surface.

[0017] In one embodiment, the contact surface comprises silicone rubber. Thereby a relatively reliable contact between support plate and surface may be provided. The contact surface of the support plate thus may prevent or at least minimize the support plate from slipping or sliding on the surface.

[0018] In a further embodiment, the lifting arrangement comprises a support wheel. The support wheel is preferably arranged at the second end of the support member. The support wheel is preferably adapted for rolling on the surface. Therefore the support wheel preferably has a rotation axis that is oriented generally parallel to the surface. Further the support wheel is preferably further arranged rotatably at the lifting arrangement about the turning axis. Therefore the support wheel and the support member may be rotatable relative to each other in two different dimensions. Thus the tape applicator device may be enabled to be turned about the turning axis with the support wheel further allowing the device to be moved laterally to the turning axis.

[0019] The support wheel may be made out of metal or any other sufficiently stable material. Preferably, the support wheel has a diameter of at least 150 mm. In one embodiment, the support wheel comprises an outer peripheral contact surface for contacting the surface. The contact surface preferably comprises silicone rubber. Thereby, a more reliable contact between support wheel and the surface may be provided. The contact surface of the support wheel thus may prevent or at least minimize the support wheel from slipping or sliding on the surface.

[0020] In a further embodiment the lifting arrangement comprises a swivel-joint providing for rotatability of the support wheel (140) and the support member (110) relative to one another about the turning axis.

[0021] In one embodiment the support member comprises a lever extending between the first end and the second end. Therefore the support member is preferably pivotally suspended at the tape applicator device. Preferably the support member is pivotable about a pivot axis that is oriented substantially parallel to the surface. The first end of the lever may be pivotally fixed at the tape applicator device so that the second end by rotation of the lever can be moved toward or away from the surface. Thus the support member is enabled for positioning the lifting arrangement between the first and second positions.

[0022] In another embodiment, the lifting arrangement may have a support member which is variable in length, for example may comprise telescopically cooperating members. Thus the first end of the support member may be fixed at the device and the second end may be movable linearly towards or away from the surface. Thereby, the support member may position the lifting arrangement between the first and second positions.

[0023] In one embodiment the lifting arrangement further comprises an actuation member. Preferably, the actuation member is provided for moving the support member to position the lifting arrangement between the first and the second position. The actuation member is preferably adapted to bias the support member towards the surface. Biasing the support member towards the surface may allow for lifting of the tape applicator device so that at least one of the rollers is disengaged from the surface.

Further this may enable the device to be turned, for example manually turned. The actuation member may be powered or driven by the drive unit of the tape application device or a separate source of energy. Preferably the actuation member has a first and a second end, wherein the first end is coupled with the support member and the second end is coupled to a further part of the tape applicator device.

[0024] In one embodiment, the actuation member may be operable by at least one of spring load, gas pressure, liquid pressure, magnetic force and hand operation of an operator. In a preferred embodiment the actuation member is a pneumatic cylinder. In case of operating the actuation member by spring load, the tape applicator device may further have a control element which may be operable by a user for user-selective loading and unloading the actuation member from the spring. Thus the device may be lifted by spring load and lowered by releasing the spring load.

[0025] The support member is preferably arranged between the first and second rollers. Preferably, the support member is particularly arranged with its second end between the rollers at least in the second position of the lifting arrangement. Because the first roller and the second roller are typically arranged at the device such that the center of gravity is between the applicator and the support rollers, the lifting arrangement may thus enable for lifting at least part of the device including the first and second rollers.

[0026] In one embodiment, the entire lifting arrangement may be arranged between the rollers. This may allow for a relatively compact, simple and robust design of the device.

[0027] In a further embodiment the support member is arranged at the device such that in the second position of the lifting arrangement the device is supported in the center of gravity of the tape applicator device. Thereby, the device may be supported by the support member at minimized risk of tilting.

[0028] In a preferred embodiment the tape applicator device comprises an applicator roller for positioning tape on the surface and a support roller for supporting the device on the surface. The first roller may comprise or form the applicator roller, and the second roller may comprise or form the support roller. The applicator and support rollers preferably have a width (which is the dimension of the roller along its cylinder or rotation axis) allowing for application of differently wide tapes, or for application of two or more tapes side by side.

[0029] Preferably the applicator and support rollers have an outer peripheral surface provided by a silicone rubber material. Thus the rollers may deform when pressed on the tape or surface for providing a certain surface pressure rather than a narrow line contact pressure. The applicator roller is preferably of the same diameter and width as the support roller. The applicator roller and the support roller may together carry the entire weight on the device, in the second position of the lifting arrangement.

[0030] In one embodiment the support roller is rotatable about a steering axis which is oriented generally perpendicular to a rotation axis of the support roller and to the longitudinal dimension. Thus the device may be easily maneuverable straight and along curves, and may allow for applying tape in a straight or curved manner.

[0031] In one embodiment the tape applicator device is motorized for automatic advancing the tape applicator at least during tape application. This preferably facilitates an operation of the device over long distances. The tape applicator device may for example have a combustion engine, or an electric engine. Further the tape applicator device may comprise at least one of an electric generator, a pneumatic compressor, and a hydraulic pump. Therefore the tape applicator device may operate entirely independent over a relative long time period. This may make the device advantageous particularly for long distance road marking.

[0032] It is to be understood, that alternatively to the embodiments as described above, instead of the lifting arrangement being adapted to move the support plate or support wheel relative to the surface, the lifting arrangement may be adapted to move one or both of the rollers relative to the surface. In this embodiment the lifting arrangement may have at least one or two support members which carry/carries the first and/or the second rollers. The support member(s) thus may instead of the support plate or support wheel carry the first and/or second roller(s), but may otherwise correspond to embodiments as defined above. In this embodiment the first and/or second rollers are preferably movable away from and/or toward the surface.

[0033] It is also to be understood, that a combination of moving the rollers and moving the support plate/wheel may be possible.

[0034] In one aspect the invention relates to a method of lifting a tape applicator device. The method comprises the steps of:

- providing a tape applicator device having a first roller, a second roller, and a lifting arrangement that can be positioned between a first and a second position, wherein in a first position of the lifting arrangement the first and second rollers support the tape applicator device on a surface on which tape is to be applied; and
- lifting the tape applicator device by positioning the lifting arrangement to a second position in which the at least one of the first and the second rollers is disengaged from the surface.

[0035] In one embodiment the method comprises the step of lifting the tape applicator device by positioning the lifting arrangement in the second position such that the first and the second rollers are disengaged from the surface.

[0036] In one embodiment the method comprises the

step of turning the tape applicator device in the second position of the lifting arrangement about a turning axis that is oriented generally perpendicular to the surface.

[0037] In another embodiment the method comprises the step of lowering the tape applicator device by positioning the lifting arrangement to the first position such that the first and the second rollers are engaged with the surface.

[0038] In another embodiment the method may comprise one or more of the steps of:

- providing a supply roll of pavement marking tape;
- unwinding said tape from said roll ;
- guiding said tape at the tape applicator device;
- applying said tape onto a surface;
- pressing said tape onto a surface.

Brief Description of the Figures

[0039]

Fig. 1a is a side view of a tape applicator device according to one embodiment of the invention, whereby the lifting arrangement in a first position;

Fig. 1b is a side view of a tape applicator device as shown in Fig. 1, whereby the lifting arrangement is shown in a second position;

Fig. 2 is a perspective view illustrating details of the tape applicator device shown in Fig. 1 b;

Fig. 3 is a side view of showing a lifting arrangement of a tape applicator device as shown in Fig. 1 b;

Fig. 4 is a schematic side view illustrating details of the tape applicator shown in Fig. 1 b;

Fig. 5 is a schematic side view illustrating details of the tape applicator according to another embodiment of the invention;

Fig. 6 is a schematic side view illustrating details of the lifting arrangement of the tape applicator according to a further embodiment of the invention;

Fig. 7 is a schematic top view of the tape applicator device as shown in Fig. 4 during a turning operation; and

Fig. 8 is a schematic top view of the tape applicator device as shown in Fig. 5 during turning.

Detailed Description of the Invention

[0040] Fig. 1 a shows a tape applicator device 10 according to an embodiment of the invention. The tape applicator device 10 is adapted to place a pre-manufactured, preferably self-adhesive, marking tape on a surface, for example a paved road surface. The tape applicator device has a tape feeding unit 12, a drive unit 13, and an application unit 18. The tape feeding unit 12 basically provides for conveying tape from a supply toward the application unit 18 where it can be applied to the surface. In the example the feeding unit 12 further comprises a cutter 14 and a splicing table 15. Thus the tape feeding unit 13 allows for cutting individual stripes of a certain length from a longer tape, for example, for applying intermittent segments of marking tape. Further the feeding unit 13 via the splicing table 15 allows for splicing of the ends of two tapes, for example when the tape applicator device 10 has to be provided with a new supply of tape during application of a continuous marking.

[0041] The drive unit 13 preferably enables the tape applicator device 10 to be automatically advanced, for example for applying tape, in a direction (indicated by the arrow in the Figure) parallel to a longitudinal dimension of the device. Further the drive unit 13 may provide for driving further items in the tape applicator device 10, for example the cutter and/or other items of the feeding unit 12. The drive unit 13 may comprise a combustion engine or electric motor. The drive unit 13 may also power or drive the actuation member 120 of the lifting arrangement 100.

[0042] The device shown has a chassis 19 which carries the feeding unit 12 and the drive unit 13, and at which the application unit is arranged. The chassis 19 further provides a roll mounting for receiving a tape supply roll 17. Typically such a tape supply roll holds a maximized length of tape, for example several hundred meters, to enable long time periods of continuous tape application. Therefore the tape supply roll 17 may weigh approximately 30 kg or more. Accordingly the tape applicator device 10 is sufficiently stable to carry at least one of such a tape supply roll. The tape applicator device 10 preferably is adapted to receive two or more tape supply rolls side by side. Thus once a roll is empty further tape may be supplied from another roll present in the device without the need to exchange the empty roll. Therefore the operation of the device may only be discontinued over a short time period required to feed the new tape toward the application unit 18. Further a side by side arrangement of the supply rolls preferable allows for application of two or more markings side by side on the surface. The position(s) of the tape supply roll(s) are preferably laterally adjustable so that, for example, two or more side by side markings spaced by a defined distance from each other may be created on the surface.

[0043] The tape applicator device has an applicator roller 20 and a support roller 30 which together support the tape applicator device 10 on the surface 40. The ap-

plicator roller 20 and the support roller 30 are preferably fixed at the device in a height dimension (which is a dimension generally perpendicular to the surface 40 to which tape may be applied). Thus the applicator roller 20 and the support roller 30 preferably have a fixed position in a height dimension relative to each other. This preferably prevents skewing of the rollers 20, 30 relative to one another which may result in directional variations when the tape applicator device is moved. The applicator roller 20 and the support roller 30 in cooperation may thus provide for a relatively precise directional stability during advancement of the tape applicator device.

[0044] Further at least one of the support roller 30 and the applicator roller 20 may be steerable about a steering axis that is oriented generally parallel to the height dimension of the device 10. This preferably allows rotating of one or both of the applicator and the support rollers 20, 30 about the steering axis for moving the device along a curve. Therefore the device 10 can preferably also be maneuvered during operation, for example for creating curved markings. In the example only the support roller 30 is steerable. Preferably the support roller 30 is steerable by a steering wheel 11. The steering wheel 11 preferably cooperates with the support roller 30 via a transmission to rotate the support roller 30 at a fixed transmission ratio about the steering axis. The transmission preferably provides for a reduction between a rotation of the steering wheel 11 and the support roller 30. Therefore a rotation of the steering wheel 11 by a first angle may provide for the support roller 30 to rotate about the steering axis by a second angle which is smaller than the first angle. Thus the direction in which the tape applicator device 10 can be advanced may be controlled relatively precisely. Therefore the device 10 may allow the application of relatively precise curved markings.

[0045] The tape applicator device 10 further has a lifting arrangement 100. The lifting arrangement 100 in the example shown comprises a lever 110, which is arranged at the chassis 19. The lever 110 is pivotable at the device about a pivot axis 160, which is oriented generally perpendicular to the surface 40. The lever 110 is adapted to contact the surface 40 for supporting the device 10 on the surface 40. In Fig. 1a, the lever 110 is in a first position. In the first position the lever 110 is spaced from the surface 40.

[0046] The tape applicator device 10 further has an actuation member 120 for moving the lever to position the lifting arrangement between the first position and a second position (illustrated in Fig. 1b).

[0047] Fig. 1b shows the tape applicator device 10 with the lifting arrangement 100 in the second position. In the second position of the lifting arrangement in this example the lever 110 contacts the surface 40, and the tape applicator device is lifted from the surface 40 such that the applicator roller 20 as well as the support roller 30 are spaced from the surface 40. Thus in the situation shown the tape applicator device 10 is supported only by the lever 110 of the lifting arrangement 100.

[0048] The lever 110 carries a support plate 150. The lever 110 and the support plate 150 are rotatable relative to each other about a turning axis 190 which is oriented generally perpendicular to the surface 40. Thus the lifting arrangement 100 enables the tape applicator to be turned on the support plate 150 about the turning axis in the second position lifting arrangement 100. The tape applicator device 10 may for example be turned manually by an operator.

[0049] Fig. 2 illustrates details of the lifting arrangement 100 of the tape applicator 10. The lever 110 has a first end at which the lever 110 is pivotally fixed at the device and a free second end carrying the support plate 150. The support plate 150 and the second end of the lever are connected via a swivel-joint 130 which enables for the rotation between the lever 110 and the support plate.

[0050] The lever 110 of the lifting arrangement 100 is movable by the actuation member 120. In the example the actuation member 120 is coupled with a first end to the lever 110 and with an opposite second end to the chassis of the tape applicator device 10. The actuation member 120 may comprise for example a pneumatic cylinder. The pneumatic cylinder thus preferably allows for moving the lever of the lifting arrangement such that it pivots about axis 160. The skilled person will recognize other actuating members providing a similar or an equivalent effect, like for example a hydraulic cylinder, a magnetic actuator, or a combination of two or more actuation members including springs and other resilient elements.

[0051] In the example shown, the lifting arrangement 100 is in the second position, in which the rollers 20, 30 are lifted relative to the surface.

[0052] Fig. 3 is a further side view illustrating the details of the lifting arrangement 100 described under Figure 2.

[0053] Fig. 4 schematically shows certain details of the tape applicator 10 placed on a surface 40. In the embodiment shown in Fig. 4, the lifting arrangement 100 with the lever 110 and the actuation member 120 is arranged between the applicator roller 20 and the support roller 30. The lever 110 is illustrated in the second position of the lifting arrangement by solid lines. Further the lever 110 in the first position of the lifting arrangement is indicated by dashed lines.

[0054] Fig. 5 shows an example of a tape applicator device 10 having an alternative lifting arrangement 100. In the example shown, the lever 110 of the lifting arrangement 100 comprises a support wheel 140. The support wheel 140 has a rotation axis 180, which is oriented parallel to the surface 40. Furthermore, the support wheel 140 is attached to the lever by the swivel-joint 130 which further enables the support wheel to rotate about the turning axis (not shown in this Figure).

[0055] The lever 110 in the second position of the lifting arrangement (shown by solid lines), lifts at least part of the tape applicator device such that the applicator roller 20 and the support roller 30 are spaced from the surface 40. Alternatively (not shown in this Figure), the tape ap-

plicator device 10 may be supported by one of the rollers 20, 30 and the support wheel 140. In such a case, the support wheel 140 may, by angularly aligning the support wheel about the turning axis, provide for steering the tape applicator 10. Thus a smaller turning radius of the device may be achieved compared to the turning radius achieved through steering via the support roller 30.

[0056] Fig. 6 schematically shows a further embodiment of the lifting arrangement 100 of the tape applicator device 10. In the example shown, a leg 110 is arranged for telescopically cooperating with a collet 115. The leg 110 thus is linearly movable towards or away from the surface 40. The leg 110 of the lifting arrangement 100 is shown in solid lines in the first position, in which it is disengaged from the surface 40. The second position of the lifting arrangement 100 in which the tape applicator device is lifted (as shown) is indicated by dotted lines.

[0057] The tape applicator device 10 further has an actuation member 120, for example a pneumatic cylinder, by which the leg 110 may be moved to position the lifting arrangement 100 between the first and second positions. The actuation member 120 is coupled at a first end to the leg 110 and with an opposite second end to the device 10.

[0058] Fig. 7 is a schematic top view on the tape applicator and illustrates turning of the tape applicator device 10. The support plate 150 is arranged underneath the device and therefore, because it is not visible in the top view, only indicated by dotted lines. When the lifting arrangement 100 is in the second position, the tape applicator device 10 is lifted and may therefore be turned. An operator may apply a force to the tape applicator device 10, to turn the device into a desired direction (indicated by arrow A). This may facilitate the handling of the tape applicator device 10 particularly for maneuvering the device around sharp curves or to position the device for tape application into opposite directions. The position of the tape applicator device 10 in an initial situation is shown by solid lines, whereas the position of the turned device 10 is indicated by dashed lines.

[0059] Fig. 8 schematically illustrates turning of the tape applicator device 10 by use of the support wheel 140. The tape applicator device 10 in the example shown is lifted such that the applicator roller is in contact with the surface on which tape is to be applied, whereas the support roller 30 is spaced from the surface (not shown in detail). The support wheel 140 supports the lifted device so that the device can roll on the surface via the applicator roller 20 and the support wheel 140. The support wheel 140 is aligned with its direction of rotation to a tangent of the arrow illustrated in dashed lines. Therefore the tape applicator device may be turned in a direction A. The position of the tape applicator device 10 in an initial situation is shown by solid lines, whereas the position of the turned device 10 is indicated by dashed lines.

Claims

1. A pavement marking tape applicator device (10) adapted for applying pavement marking tape on a surface (40) along a longitudinal dimension, the tape applicator device (10) comprising:

   - a first roller (20) and a second roller (30) for supporting the tape applicator device (10) on the surface (40); and
   - a lifting arrangement (100) which is adapted for lifting the tape applicator device (10) from the surface (40) such that at least one of the rollers (20, 30) is disengaged from the surface (40).

2. The tape applicator device (10) according to claim 1, wherein the lifting arrangement (100) further comprises a support member (110) which is movable to position the lifting arrangement (100) between a first position, in which the lifting arrangement (100) is spaced from the surface (40) and a second position, in which the lifting arrangement (100) engages the surface (40) such that at least one of the rollers (20, 30) is disengaged from the surface (40).

3. The tape applicator device (10) of claim 2, wherein the lifting arrangement (100) in the second position enables a rotation of the tape applicator device about a turning axis which is oriented generally perpendicular to the surface.

4. The tape applicator device (10) according to claim 2 or 3, wherein the lifting arrangement (100) comprises a support plate (150), or a support wheel (140).

5. The tape applicator device (10) according to claim 4, wherein the lifting arrangement (100) comprises a swivel-joint providing for rotatability of the support plate (150) and the support member (110) relative to one another about the turning axis, or providing for rotatability of the support wheel (140) and the support member (110) relative to one another about the turning axis.

6. The tape applicator device (10) according to claim 4 or 5, wherein the support plate (150) or the support wheel (140) has a contact surface (170) for contacting the surface (40), wherein the contact surface (170) comprises silicone rubber.

7. The tape applicator device (10) according to any of the claims 2 to 6, wherein the lifting arrangement (100) further comprises an actuation member (120) for moving the support member (110) to position the lifting arrangement between the first and second positions.

8. The tape applicator device (10) according to claim

7, wherein the actuation member (120) is operable by at least one of spring load, gas pressure, liquid pressure, magnetic force and hand operation.

9. The tape applicator device (10) according to any of the claims 2 to 8, wherein the support member (110) of the lifting arrangement (100) is pivotally suspended at the tape applicator device (10) about a pivot axis (160) which is oriented substantially parallel to the surface (40).

10. The tape applicator device (10) according to any of the preceding claims, wherein the lifting arrangement (100) is arranged at least partially between the rollers (20, 30).

11. The tape applicator device (10) according to any of the preceding claims, wherein the first roller (20) comprises an applicator roller for positioning tape on the surface (40) and the second roller comprises a support roller (30) for supporting the device (10) on the surface (40).

12. The tape applicator device (10) according to any of the preceding claims, wherein the first and second rollers (20, 30) have an outer peripheral surface provided by a silicone rubber material.

13. The tape applicator device (10) according to claim 11 or 12, wherein the support roller (30) is rotatable about a steering axis which is oriented generally perpendicular to a rotation axis of the support roller (30) and to the longitudinal direction.

14. The tape applicator device (10) according to any of the preceding claims, being motorized for automatic advancing the tape applicator device (10) at least during application of tape.

15. A method of lifting a tape applicator device comprising the steps of:

- providing a tape applicator device having a first roller, a second roller, and a lifting arrangement that can be positioned between a first and second position, wherein in a first position of the lifting arrangement the first and second rollers support the tape applicator device on a surface on which tape is to be applied; and
- lifting the tape applicator device by moving the lifting arrangement to a second position in which the at least one of the first and the second rollers is disengaged from the surface.

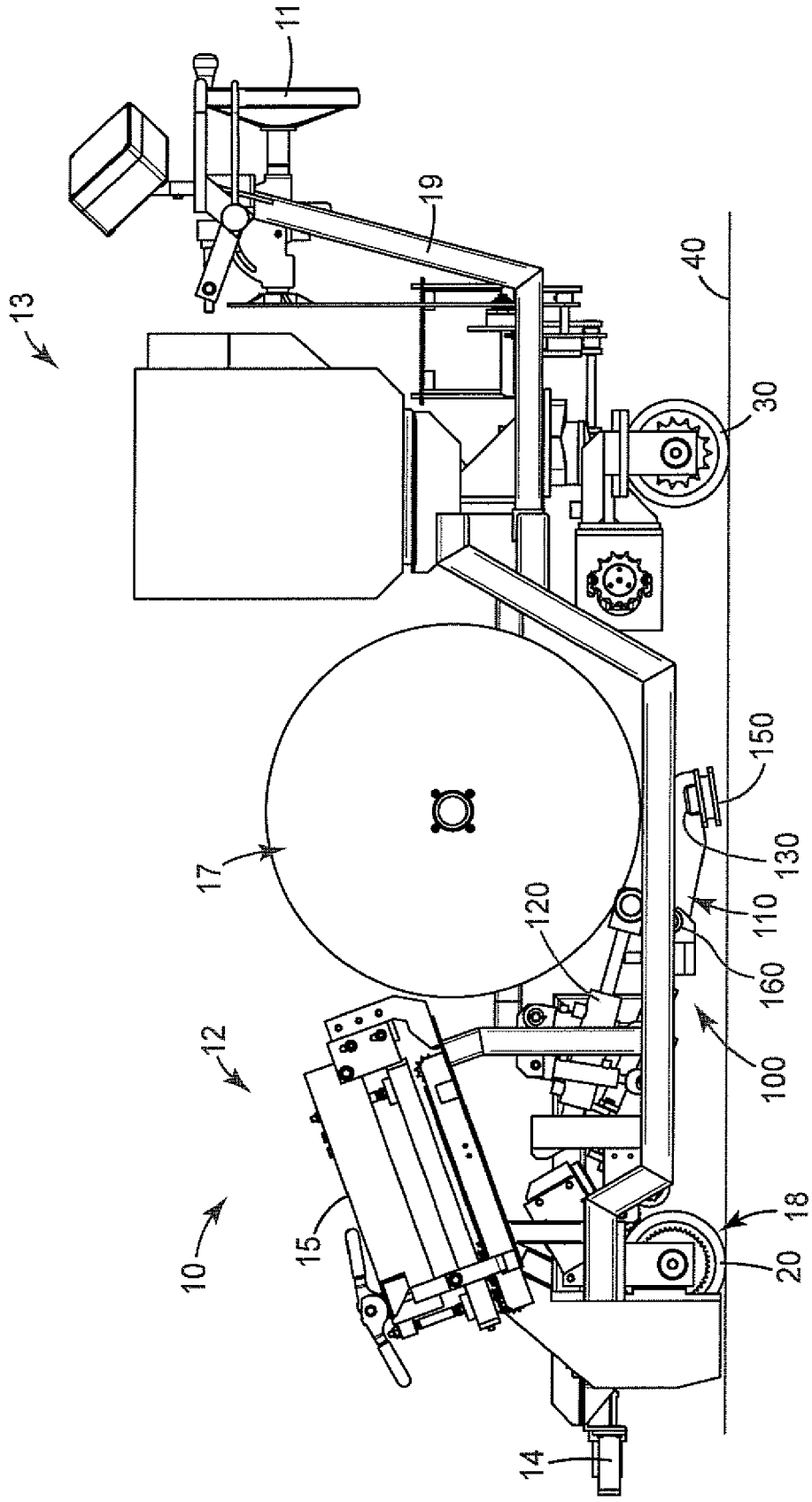


FIG. 1a

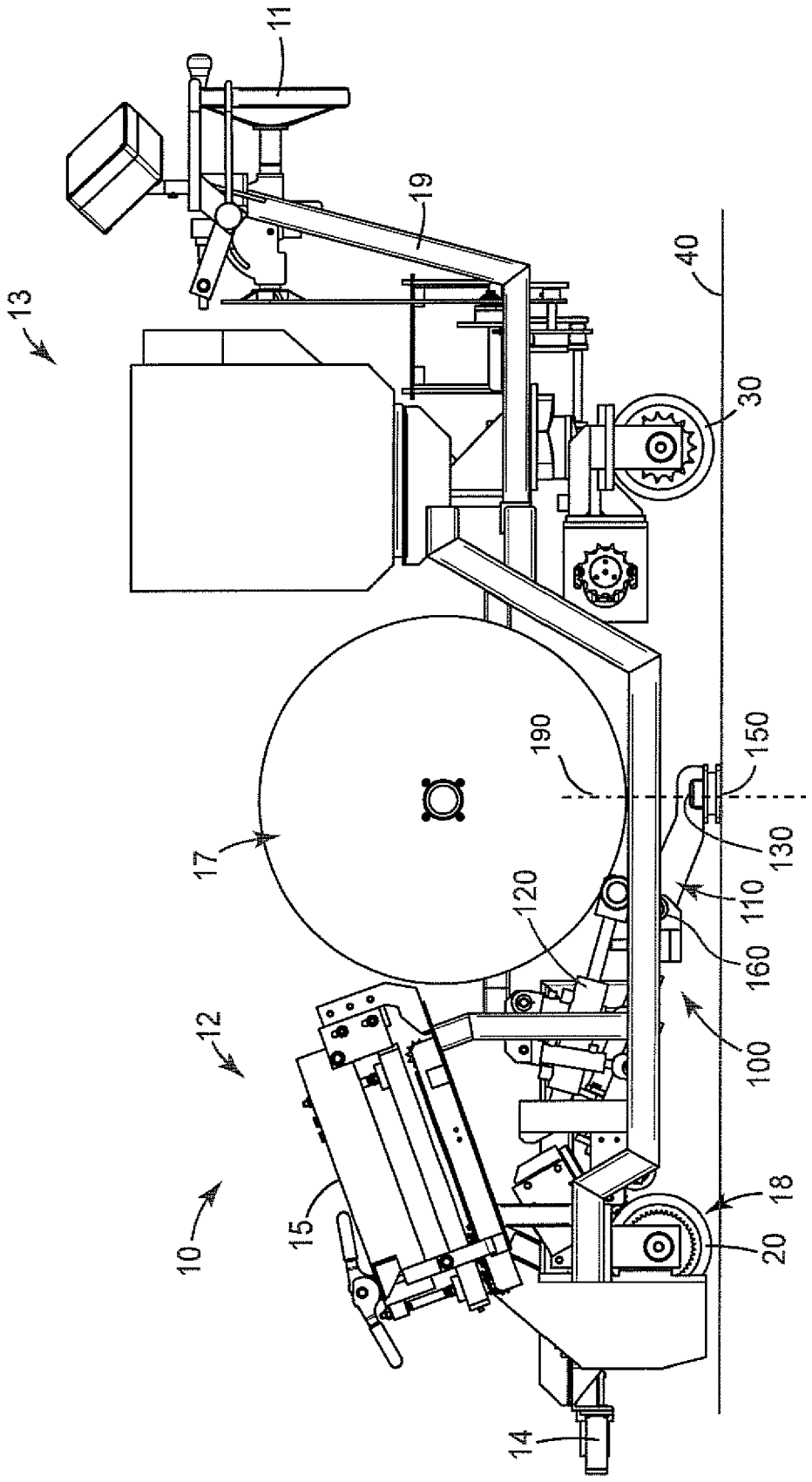


FIG. 16

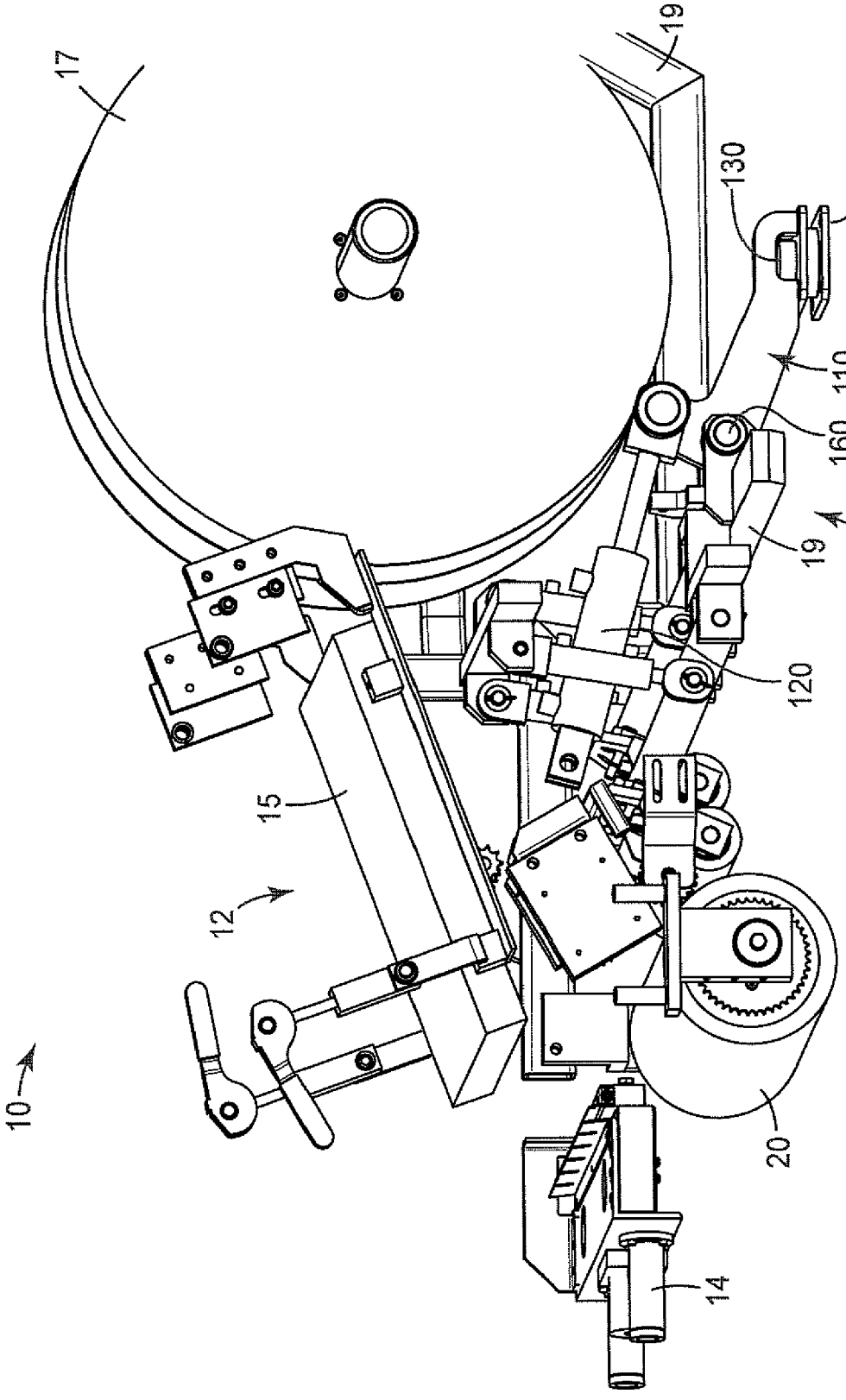


FIG. 2

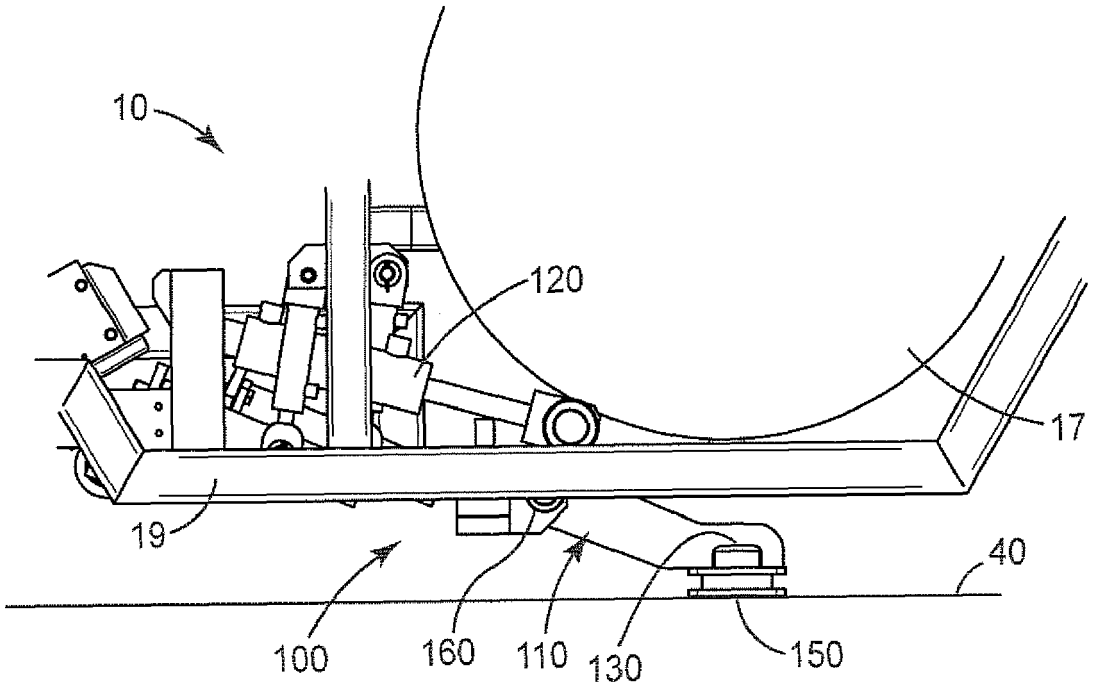
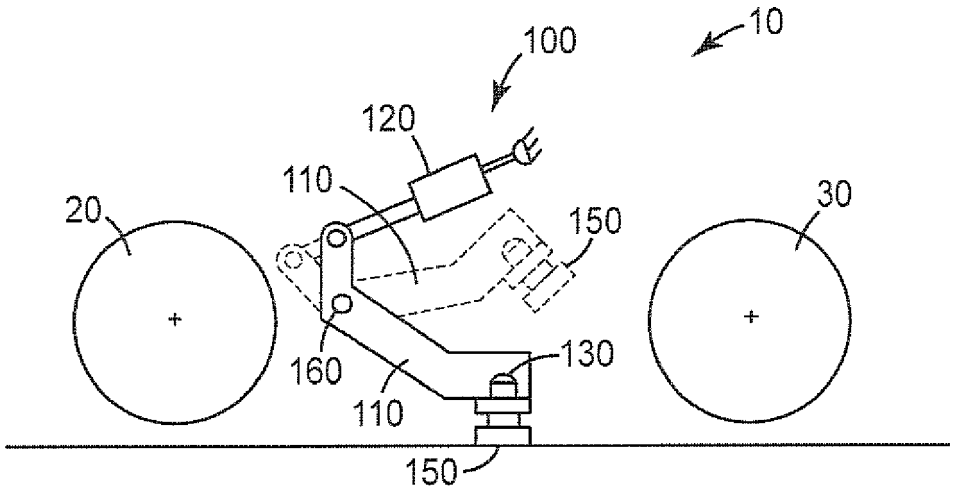


FIG. 3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110
150

FIG. 4

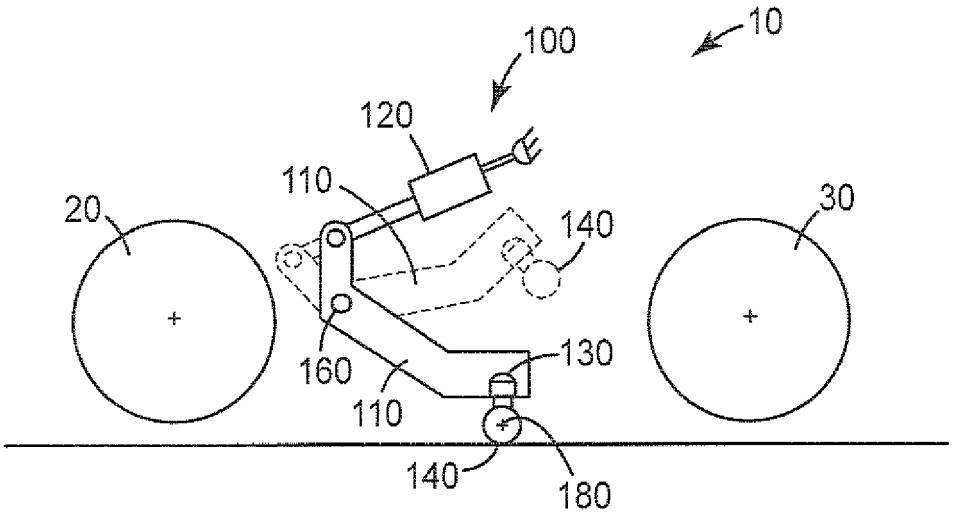
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FIG. 5

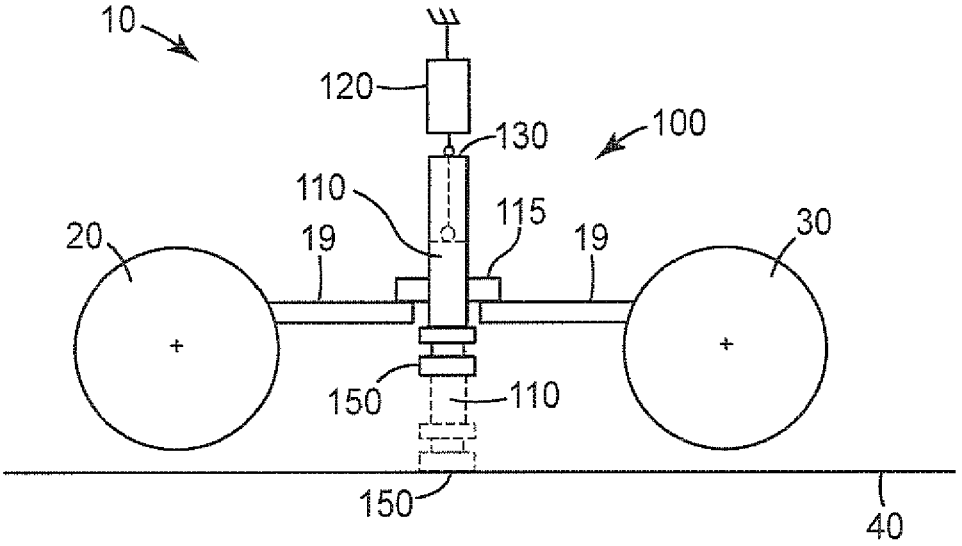
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FIG. 6

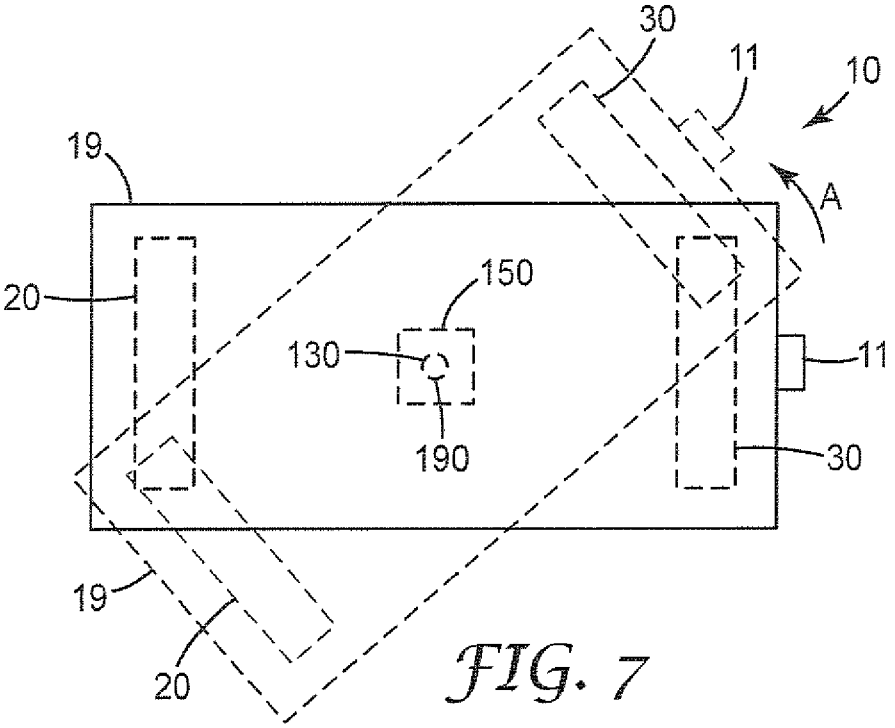
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FIG. 7

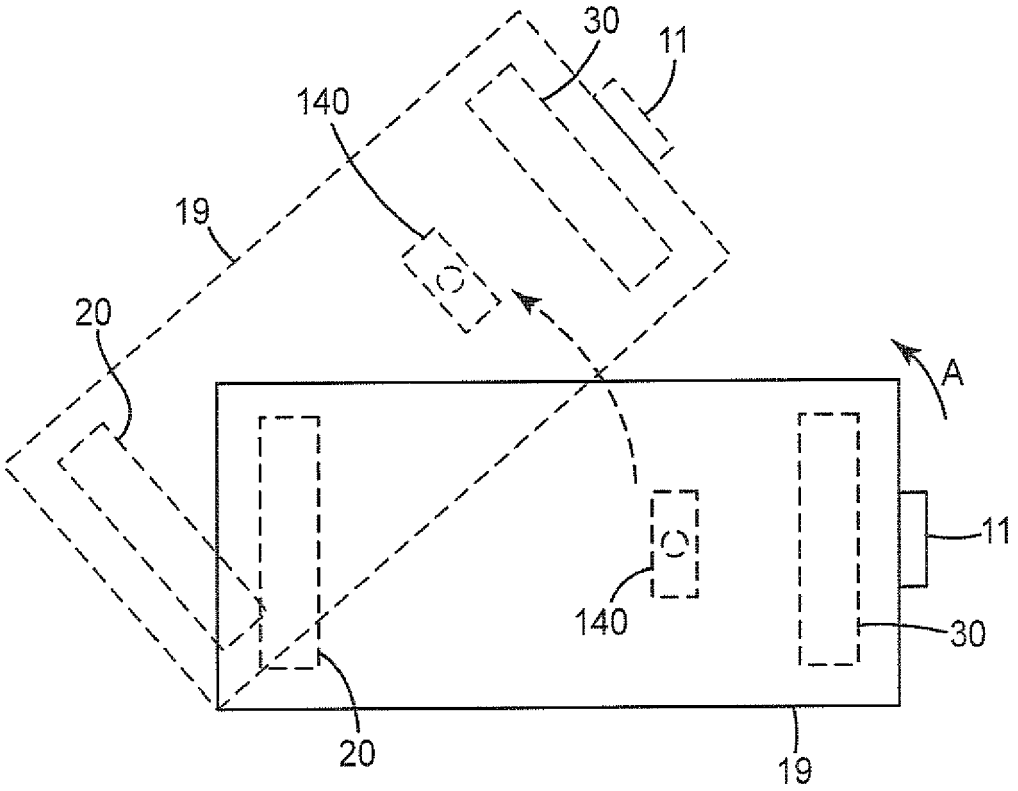

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 August 2010	Movadat, Robin

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