Claims

1. An apparatus for the manipulation of articles, in which a multi-axial industrial robot (1) is arranged on a travel unit (2) and the industrial robot (1) and the travel unit (2) can be supplied with electrical energy via an energy storage unit (4), characterized in that the travel unit (2) has a control unit (23) and at least three wheels (5) having at least one drive unit (6), with the control unit (23) being configured to rotate at least one of the wheels (5) by the drive unit (6) about an axis of rotation standing perpendicular to a symmetrical axis of rotation (7) of the wheel (6) and to rotate it about the symmetrical axis of rotation (7) by the respective drive unit (6) so that the apparatus is travelable wirelessly in any direction by the travel unit (2), wherein
a respective area monitoring sensor (11) is arranged at at least two sides of the travel unit (2) and each of the area monitoring sensors (11) is configured to monitor a virtual surface (12) located at a predefined spacing next to the travel unit (2) and not intersecting the travel unit (2) with respect to an intrusion of persons or articles and/or to check a floor.

2. An apparatus in accordance with claim 1, characterized in that a respective drive unit (6) for rotation about the axis of rotation and about the symmetrical axis of rotation (7) is arranged at each of the wheels (5).

3. An apparatus in accordance with claim 1 or claim 2, characterized in that the drive unit (6) has a first motor for rotating the wheel (5) about the symmetrical axis of rotation (7) of the wheel and has a second motor for rotating the wheel (5) about the axis of rotation, with the first motor and/or the second motor preferably being an electric motor.

4. An apparatus in accordance with one of the preceding claims, characterized in that the area monitoring sensors (11) are formed as laser scanners.

5. An apparatus in accordance with one of the preceding claims, characterized in that an identification unit (9) for identifying the apparatus and/or further articles (13) present in the surroundings of the apparatus is arranged at the travel unit (2), with the identification unit (9) preferably being formed as an electromagnetic sensor and particularly preferably being configured to recognize reference marks (16) in a non-contact manner.

6. An apparatus in accordance with one of the preceding claims, characterized in that at least two space monitoring sensors (17) are arranged at the travel unit (2) which monitor a surface disposed in parallel to the floor on which the travel unit (2) moves for obstacles.

7. An apparatus in accordance with one of the preceding claims, characterized in that at least two floor monitoring sensors (8) are arranged at the travel unit (2) which monitor a floor on which the travel unit (2) moves by monitoring a floor contour with respect to obstacles or holes.

8. An apparatus in accordance with the preceding claim, characterized in that the floor monitoring sensors (8) are formed as laser distance sensors.

9. An apparatus in accordance with one of the preceding claims, characterized in that protective rails (14) having a contact sensor are arranged at at least two sides of the travel unit (2).

10. An apparatus in accordance with one of the preceding claims, characterized in that the energy storage unit (4) is arranged in a hermetically sealed housing.

Claims

1. An apparatus for the manipulation of articles, in which a multi-axial industrial robot (1) is arranged on a travel unit (2) and the industrial robot (1) and the travel unit (2) can be supplied with electrical energy via an energy storage unit (4), characterized in that the travel unit (2) has a control unit (23) and at least three wheels (5) having at least one drive unit (6), with the control unit (23) being configured to rotate at least one of the wheels (5) by the drive unit (6) about an axis of rotation standing perpendicular to a symmetrical axis of rotation (7) of the wheel (6) and to rotate it about the symmetrical axis of rotation (7) by the respective drive unit (6) so that the apparatus is travelable wirelessly in any direction by the travel unit (2), wherein a respective area monitoring sensor (11) is arranged at at least two sides of the travel unit (2) and each of the area monitoring sensors (11) is configured to monitor a virtual surface (12) around a working zone of the industrial robot (1) located at a predefined spacing next to the travel unit (2) and not intersecting the travel unit (2) with respect to an intrusion of persons or articles and/or to check a floor.

2. An apparatus in accordance with claim 1, characterized in that a respective drive unit (6) for rotation about the axis of rotation and about the symmetrical axis of rotation (7) is arranged at each of the wheels (5).

3. An apparatus in accordance with claim 1 or claim 2, characterized in that the drive unit (6) has a first motor for rotating the wheel (5) about the symmetrical axis of rotation (7) of the wheel and has a second motor for rotating the wheel (5) about the axis of rotation, with the first motor and/or the second motor being an electric motor.

4. An apparatus in accordance with one of the preceding claims, characterized in that the area monitoring sensors (11) are formed as laser scanners.

5. An apparatus in accordance with one of the preceding claims, characterized in that an identification unit (9) for identifying the apparatus and/or further articles (13) present in the surroundings of the apparatus is arranged at the travel unit (2).

6. An apparatus in accordance with the preceding claim, characterized in that the identification unit (9) is formed as an electromagnetic sensor.

7. An apparatus in accordance with the preceding claim, characterized in that the electromagnetic sensor is configured to recognize reference marks (16) in a non-contact manner.

8. An apparatus in accordance with one of the preceding claims, characterized in that at least two space monitoring sensors (17) are arranged at the travel unit (2) which monitor a surface disposed in parallel to the floor on which the travel unit (2) moves for obstacles.

9. An apparatus in accordance with one of the preceding claims, characterized in that at least two floor monitoring sensors (8) are arranged at the travel unit (2) which monitor a floor on which the travel unit (2) moves by monitoring a floor contour with respect to obstacles or holes.

10. An apparatus in accordance with the preceding claim, characterized in that the floor monitoring sensors (8) are formed as laser distance sensors.

11. An apparatus in accordance with one of the preceding claims, characterized in that protective rails (14) having a contact sensor are arranged at at least two sides of the travel unit (2).

12. An apparatus in accordance with one of the preceding claims, characterized in that the energy storage unit (4) is arranged in a hermetically sealed housing.