CLAIMS

1. A robotic manipulator for handling a cassette, comprising a mechanical arm, an end actuator at an end of the mechanical arm and a vision-based locating assembly on the end actuator,

wherein the vision-based locating assembly is configured to obtain a position of a flange on a top of the cassette, and

wherein the end actuator comprises a recessed surface complementary to the flange on the top of the cassette, and the end actuator is configured to hold the flange on the top of the cassette by the recessed surface based on the position of the flange,

wherein at least two locating pins are arranged on the recessed surface, each being configured to mate with a corresponding one of notches of the flange.

2. The robotic manipulator for handling a cassette of claim 1, wherein the vision-based locating assembly comprises a horizontal locating member and a vertical locating member, the horizontal locating member being configured for capturing a horizontal feature of a surface of the cassette, the vertical locating member being configured for capturing a vertical feature of the surface of the cassette, and wherein the position of the flange is determined based on the horizontal and vertical features of the surface of the cassette.

3. The robotic manipulator for handling a cassette of claim 2, wherein the horizontal locating member comprise a first camera facing toward either lateral side of the end actuator.

4. The robotic manipulator for handling a cassette of claim 2, wherein the vertical locating member comprise a second camera and a reflector, both disposed on a lateral side of the end actuator.

5. The robotic manipulator for handling a cassette of claim 1, wherein the end actuator is a C-shaped semi-closed structure with support plates arranged on two lateral sides of the semi-closed structure.

6. The robotic manipulator for handling a cassette of claim 1, wherein the end actuator further comprises shoulders that are provided along a front side of the

recessed surface to prevent accidental drop-off of the cassette.

7. The robotic manipulator for handling a cassette of claim 1, wherein at least one presence sensor is provided on the recessed surface to sense whether the cassette is held by the recessed surface.

8. The robotic manipulator for handling a cassette of claim 1, further comprising a sonar sensor that is disposed on the end actuator to ensure safety during transportation of the cassette.

9. The robotic manipulator for handling a cassette of claim 1, wherein the end actuator defines an inverted-L shape together with the end of the mechanical arm.

10. The robotic manipulator for handling a cassette of claim 1, wherein the end actuator is 360-degree rotatable at the end of the mechanical arm.

11. The robotic manipulator for handling a cassette of claim 1, wherein the mechanical arm is movable in six degrees of freedom.

12. An automated cassette transport device, comprising an automatic guided vehicle; a carrier frame mounted on the automatic guided vehicle; and the robotic manipulator for handling a cassette of any one of claims 1 to 11, which is disposed on the carrier frame.

13. The automated cassette transport device of claim 12, further comprising cassette carriers disposed on the carrier frame, wherein the robotic manipulator is located at a corner of the carrier frame relative to the cassette carriers.