WHAT IS CLAIMED IS:

1. A stage driving apparatus for driving a stage, comprising:

a linear motor including a stator which includes a coil array obtained by alternately arraying first phase coils and second phase coils, and a movable element formed for the stage; and

a control unit configured to control the linear motor by controlling an energization state of the coil array,

wherein in a stopping period during which the stage is stopped in a predetermined position, the control unit holds a position of the stage in the predetermined position by turning on the first phase coil among the coil array, and generates heat by turning on the second phase coil arranged in a position far from the movable element among the coil array.

2. The apparatus according to claim 1, wherein the predetermined position is a position where the position of the stage can be held by only the first phase coil, without using any second phase coil.

3. The apparatus according to claim 2, wherein the predetermined position is a position where the position of the stage can be held by only one first phase coil among the coil array.

4. The apparatus according to claim 1, wherein the predetermined position includes at least one of a position where an object is conveyed onto the stage, and a position where an object is recovered from the stage.

5. The apparatus according to claim 1, wherein in the stopping period, the control unit determines a second phase coil farthest from the movable element among the coil array, as a second phase coil to be turned on.

6. The apparatus according to claim 1, wherein in the stopping period, in a case where a plurality of second phase coils arranged in positions far from the movable element exist, the control unit temporally switches a second phase coil to

be turned on among the plurality of second phase coils.

7. The apparatus according to claim 1, wherein the control unit determines a current value to be supplied to the second phase coil in the stopping period such that heat generation of the second phase coil approaches heat generation of the stator in a moving period during which the stage is moved.

8. The apparatus according to claim 1, wherein

the control unit includes a first mode and a second mode as control modes of the linear motor,

the first mode is a mode for holding the position of the stage by turning on the first phase coil, and generating heat by turning on the second phase coil arranged in a position far from the movable element, and

the second mode is a mode for controlling the position of the stage by switching, among the coil array, pairs of the first phase coils and the second phase coils to be turned on to give thrust to the movable element.

9. The apparatus according to claim 8, wherein the control unit switches the first mode and the second mode in a state in which current supply to the second phase coil is interrupted.

10. The apparatus according to claim 1, wherein an electric current to be supplied to the first phase coil and an electric current to be supplied to the second phase coil have a phase angle difference of 90°.

11. A lithography apparatus for forming a pattern on a substrate, comprising:

a stage configured to hold the substrate; and

a stage driving apparatus configured to drive the stage,

wherein the stage driving apparatus includes:

a linear motor including a stator which includes a coil array obtained by alternately arraying first phase coils and second phase coils, and a movable element formed for the stage; and

a control unit configured to control the linear motor by controlling an energization state of the coil array, and

wherein in a stopping period during which the stage is stopped in a predetermined position, the control unit holds a position of the stage in the predetermined position by turning on the first phase coil among the coil array, and generates heat by turning on the second phase coil arranged in a position far from the movable element among the coil array.

12. A method of manufacturing an article, the method comprising:

forming a pattern on a substrate using a lithography apparatus;

processing the substrate, on which the pattern has been formed, to manufacture the article,

wherein the lithography apparatus includes:

a stage configured to hold the substrate; and

a stage driving apparatus configured to drive the stage,

wherein the stage driving apparatus includes:

a linear motor including a stator which includes a coil array obtained by alternately arraying first phase coils and second phase coils, and a movable element formed for the stage; and

a control unit configured to control the linear motor by controlling an energization state of the coil array, and

wherein in a stopping period during which the stage is stopped in a predetermined position, the control unit holds a position of the stage in the predetermined position by turning on the first phase coil among the coil array, and generates heat by turning on the second phase coil arranged in a position far from the movable element among the coil array.