CLAIMS

1. A liquid material ejection device comprising:

a liquid chamber communicating with an ejection port and being supplied with a liquid material;

a plunger including a tip portion that has a smaller diameter than the liquid chamber and is moved back and forth in the liquid chamber;

an elastic member urging the plunger upward;

an arm disposed in a state extending in a substantially horizontal direction;

an arm driver serving as a driving source to operate the arm; and

a base member on which the arm driver is disposed,

wherein the liquid material ejection device further comprises a rocking mechanism unit connected to the arm driver and rockingly supporting the arm,

the arm driver includes a plurality of actuators disposed in a juxtaposed relation in a longitudinal direction of the arm, each of the actuators being extended and contracted in a direction perpendicular to the longitudinal direction of the arm,

the arm includes a pressing portion pressing the plunger downward,

the plunger includes a contact portion pressed by the pressing portion, and

the plunger is linearly reciprocated with rocking motion of the arm.

2. The liquid material ejection device according to claim 1,

wherein the plurality of actuators are each constituted by a

multilayered piezoelectric element,

the arm is moved upward when the actuator disposed on the side nearer to the pressing portion is brought into an extended state and the actuator disposed on the side farther away from the pressing portion is kept in a non-extended state or brought into a contracted state, and

the arm is moved downward when the actuator disposed on the side nearer to the pressing portion is kept in the non-extended state or brought into the contracted state and the actuator disposed on the side farther away from the pressing portion is brought into the extended state.

3. The liquid material ejection device according to claim 2, wherein the plurality of actuators are constituted by an even number of actuators.

4. The liquid material ejection device according to claim 3, wherein the even number of actuators are constituted by a first piezoelectric actuator and a second piezoelectric actuator.

5. The liquid material ejection device according to any one of claims 1 to 4, wherein the pressing portion or the contact portion has a curved surface allowing a contact state between the pressing portion and the contact portion to be maintained following the rocking motion of the arm.

6. The liquid material ejection device according to any one of claims 1 to 5, further comprising a fastener detachably supporting the arm to the base member.

7. The liquid material ejection device according to claim 6, wherein

the fastener is disposed between the plurality of actuators, and the plurality of actuators are tightly sandwiched between the arm and the base member by the fastener.

8. The liquid material ejection device according to any one of claims 1 to 7, further comprising a guide supporting the plunger movably in a vertical direction,

wherein the elastic member is a compressed coil spring urging the plunger upward at all times, and

the plunger is detachably inserted through the elastic member and the guide.

9. The liquid material ejection device according to any one of claims 1 to 8, wherein the rocking mechanism unit is connected to a lower end of the arm driver, or connected to an upper end of the arm driver.

10. The liquid material ejection device according to any one of claims 1 to 8, wherein the rocking mechanism unit includes a first rocking mechanism unit connected to a lower end of the arm driver and a second rocking mechanism unit connected to an upper end of the arm driver.

11. The liquid material ejection device according to claim 9 or 10, wherein the rocking mechanism unit includes a connection portion connected to one end of the arm driver, and a support portion rockingly supporting the connection portion.

12. The liquid material ejection device according to claim 11, wherein

the support portion has a convex or concave support surface that is formed by a smooth curved surface, and

the connection portion has a concave or convex sliding surface that slides along the support surface of the support portion.

13. The liquid material ejection device according to any one of claims 1 to 12, wherein the pressing portion is constituted by a pressing member detachably attached to the arm.

14. The liquid material ejection device according to any one of claims 1 to 13, wherein the plurality of actuators are all arranged under the arm.

15. The liquid material ejection device according to any one of claims 1 to 14, wherein the plunger and the pressing portion are not coupled to each other.

16. An application apparatus comprising the liquid material ejection device according to any one of claims 1 to 15, a worktable on which an application target is placed, a relatively moving device that moves the liquid droplet ejection device and the application target relatively to each other, and a liquid material supply source that supplies a liquid material to the liquid material ejection device.

17. The application apparatus according to claim 16, wherein the liquid material ejection device is constituted by a plurality of liquid material ejection devices.