[CLAIMS]

[Claim 1]

A liquid cartridge comprising:

a housing defining a liquid storage chamber therein;

a circuit board including an electrode; and

a liquid supply portion including a liquid passage opening frontward and configured to supply liquid in the liquid storage chamber to an outside through the liquid passage,

wherein the housing comprises:

a top wall positioned upward of the liquid supply portion and supporting the circuit board directly or indirectly;

a first protrusion positioned rearward of the circuit board and protruding upward from the top wall; and

a second protrusion positioned frontward of the circuit board and protruding upward from the top wall,

wherein an upper surface of the first protrusion is positioned upward of an upper surface of the second protrusion,

wherein an outer surface of the liquid cartridge is positioned below an imaginary plane between the upper surface of the first protrusion and the upper surface of the second protrusion, the imaginary plane being in contact with each of the upper surface of the first protrusion and the upper surface of the second protrusion and extending in a left-right direction,

wherein a front edge of the electrode is positioned rearward of a center in a front-rear direction between a point of contact between the upper surface of the first protrusion and the imaginary plane and a point of contact between the upper surface of the second protrusion and the imaginary plane, and

wherein the first protrusion comprises:

a first protruding portion;

a second protruding portion positioned to be spaced away from the first protruding portion in the left-right direction; and

a third protruding portion connecting a rear end of the first protruding portion and a rear end of the second protruding portion and extending in the left-right direction.

[Claim 2]

A liquid cartridge comprising:

a housing defining a liquid storage chamber therein;

a circuit board including an electrode; and

a liquid supply portion including a liquid passage opening frontward and configured to supply liquid in the liquid storage chamber to an outside through the liquid passage,

wherein the housing comprises:

a top wall positioned upward of the liquid supply portion and supporting the circuit board directly or indirectly;

a first protrusion positioned rearward of the circuit board and protruding upward from the top wall; and

a second protrusion positioned frontward of the circuit board and protruding upward from the top wall,

wherein an upper surface of the first protrusion is positioned upward of an upper surface of the second protrusion,

wherein an outer surface of the liquid cartridge is positioned below an imaginary plane between the upper surface of the first protrusion and the upper surface of the second protrusion, the imaginary plane being in contact with each of the upper surface of the first protrusion and the upper surface of the second protrusion and extending in a left-right direction,

wherein a distance in a front-rear direction between a front edge of the electrode and a point of contact between the first protrusion and the imaginary plane is smaller than a distance in the front-rear direction between the front edge of the electrode and a point of contact between the second protrusion and the imaginary plane, and

wherein the first protrusion comprises:

a first protruding portion;

a second protruding portion positioned to be spaced away from the first protruding portion in the left-right direction; and

a third protruding portion connecting a rear end of the first protruding portion and a rear end of the second protruding portion and extending in the left-right direction.

[Claim 3]

The liquid cartridge according to claim 1 or 2, wherein the upper surface of the first protrusion is positioned rearward of a center in the front-rear direction of the housing, and

wherein the upper surface of the second protrusion is positioned frontward of the center in the front-rear direction of the housing.

[Claim 4]

The liquid cartridge according to any one of claims 1 to 3, wherein the second protrusion has a dimension in the front-rear direction that is longer than dimensions in a vertical direction and the left-right direction, and

wherein the upper surface of the second protrusion is an upper edge of a front end of the second protrusion.

[Claim 5]

The liquid cartridge according to any one of claims 1 to 4, wherein the third protruding portion has an engaging surface configured to engage a part of a cartridge case in a state where the liquid cartridge is attached to the cartridge case.

[Claim 6]

The liquid cartridge according to any one of claims 1 to 5, wherein the top wall of the housing has a first upper surface and a second upper surface positioned lower than the first upper surface,

wherein the first protrusion is positioned on the first upper surface, and

wherein the front end the second protrusion is positioned on the second upper surface.

[Claim 7]

The liquid cartridge according to claim 6, wherein the first upper surface is a flat plane,

wherein the second upper surface is a flat plane extending from the first upper surface and sloping downward and frontward, and

wherein the second protrusion extends across the first upper surface and the second upper surface.

[Claim 8]

The liquid cartridge according to claim 7, wherein a boundary between the first upper surface and the second upper surface is positioned below the imaginary plane.

[Claim 9]

The liquid cartridge according to any one of claims 6 to 8, wherein the second protrusion extends to span more than a half of a sum of front-rear dimensions of a portion of the first upper surface and the second upper surface, the portion of the first upper surface being positioned frontward of the circuit board.

[Claim 10]

The liquid cartridge according to any one of claims 6 to 9, wherein the second protrusion has:

a third upper surface which is a flat plane extending in the front-rear direction and the left-right direction; and

a fourth upper surface positioned frontward of the third upper surface and extending from the third upper surface, the fourth upper surface being a flat plane sloping downward and frontward.

[Claim 11]

The liquid cartridge according to any one of claims 1 to 10, wherein the front end in the front-rear direction of the second protrusion is positioned frontward of an opening of the liquid supply portion.

[Claim 12]

The liquid cartridge according to any one of claims 1 to 11, wherein the housing comprises a base defining the liquid storage chamber and a cover engaged with an upper end portion of the base, and

wherein the cover includes the first protrusion and the second protrusion, and supports the circuit board directly or indirectly.

[Claim 13]

The liquid cartridge according to claim 12, wherein the base comprises a plurality of engaging pawls for engagement with the cover,

wherein the cover includes the top wall and a peripheral wall extending downward from a periphery of the top wall, the cover comprising a plurality of engaging holes formed in the peripheral wall for receiving the engaging pawls, and

wherein the front end of the second protrusion is positioned further frontward than any one of the engaging holes in engagement with the engaging pawls.

[Claim 14]

The liquid cartridge according to claim 13, wherein a rear end of the second protrusion is positioned further rearward than one of the engaging holes that is positioned frontmost thereamong.

[Claim 15]

The liquid cartridge according to any one of claims 1 to 14, wherein the second protrusion is plate-shaped and has a front surface extending from the top wall, a main upper surface facing upward, and a sub upper surface sloping downward relative to the main upper surface, and

wherein an upper edge of a front end of the second protrusion is defined by the front surface and the sub upper surface.

[Claim 16]

A liquid cartridge comprising:

a housing defining a liquid storage chamber therein;

a circuit board including an electrode; and

a liquid supply portion including a liquid passage opening frontward and configured to supply liquid in the liquid storage chamber to an outside through the liquid passage,

wherein the housing comprises:

a top wall positioned upward of the liquid supply portion and supporting the circuit board directly or indirectly;

a first protrusion positioned rearward of the circuit board and protruding upward from the top wall; and

a second protrusion positioned frontward of the circuit board and protruding upward from the top wall,

wherein an upper surface of the first protrusion is positioned upward of an upper surface of the second protrusion,

wherein, when the liquid cartridge is viewed in a left-right direction perpendicular a front-rear direction and a vertical direction, a contour of the liquid cartridge is positioned below an imaginary line in an entire region that is rearward of a front end of the housing and frontward of a rear end of the housing, the imaginary line including at least an upper end of the first protrusion and an upper end of the second protrusion,

wherein a distance in the front-rear direction between a front edge of the electrode and the upper end of the first protrusion included in the imaginary line is smaller than a distance in the front-rear direction between the front edge of the electrode and the upper end of the second protrusion included in the imaginary line, and

wherein the first protrusion comprises:

a first protruding portion;

a second protruding portion positioned to be spaced away from the first protruding portion in the left-right direction; and

a third protruding portion connecting a rear end of the first protruding portion and a rear end of the second protruding portion and extending in the left-right direction.

[Claim 17]

The liquid cartridge according to claim 16, wherein the upper surface of the first protrusion is positioned closer to the rear end of the housing than to the front end of the housing in the front-rear direction, and

wherein the upper surface of the second protrusion is positioned closer to the front end of the housing than to the rear end of the housing in the front-rear direction.

[Claim 18]

The liquid cartridge according to claim 16 or 17, wherein the second protrusion has a dimension in the front-rear direction that is longer than dimensions in the vertical

direction and the left-right direction, and

wherein the upper surface of the second protrusion is an upper edge of a front end of the second protrusion.

[Claim 19]

The liquid cartridge according to any one of claims 16 to 18, wherein the third protruding portion has an engaging surface configured to engage a part of a cartridge case in a state where the liquid cartridge is attached to the cartridge case.

[Claim 20]

The liquid cartridge according to any one of claims 16 to 19, wherein the top wall of the housing has a first upper surface and a second upper surface positioned lower than the first upper surface,

wherein the first protrusion is positioned on the first upper surface, and

wherein the front end the second protrusion is positioned on the second upper surface.

[Claim 21]

The liquid cartridge according to claim 20, wherein the first upper surface is a flat plane,

wherein the second upper surface is a flat plane extending from the first upper surface and sloping downward and frontward, and

wherein the second protrusion extends across the first upper surface and the second upper surface.

[Claim 22]

The liquid cartridge according to claim 20 or 21, wherein the second protrusion extends to span more than a half of a sum of front-rear dimensions of a portion of the first upper surface and the second upper surface, the portion of the first upper surface being positioned frontward of the circuit board.

[Claim 23]

The liquid cartridge according to claim 21 or 22, wherein the second protrusion

has:

a third upper surface which is a flat plane extending in the front-rear direction and the left-right direction; and

a fourth upper surface positioned frontward of the third upper surface and extending from the third upper surface, the fourth upper surface being a flat plane sloping downward and frontward.

[Claim 24]

The liquid cartridge according to any one of claims 16 to 23, wherein the front end in the front-rear direction of the second protrusion is positioned frontward of an opening of the liquid supply portion.

[Claim 25]

The liquid cartridge according to any one of claims 16 to 24, wherein the housing comprises a base defining the liquid storage chamber and a cover engaged with an upper end portion of the base, and

wherein the cover includes the first protrusion and the second protrusion, and supports the circuit board directly or indirectly.

[Claim 26]

The liquid cartridge according to claim 25, wherein the base comprises a plurality of engaging pawls for engagement with the cover,

wherein the cover includes the top wall and a peripheral wall extending downward from a periphery of the top wall, the cover comprising a plurality of engaging holes formed in the peripheral wall for receiving the engaging pawls, and

wherein the front end of the second protrusion is positioned further frontward than any one of the engaging holes in engagement with the engaging pawls.

[Claim 27]

The liquid cartridge according to claim 26, wherein a rear end of the second protrusion is positioned further rearward than one of the engaging holes that is positioned frontmost thereamong.

[Claim 28]

The liquid cartridge according to any one of claims 16 to 27, wherein the second protrusion is plate-shaped and has a front surface extending from the top wall, a main upper surface facing upward, and a sub upper surface sloping downward relative to the main upper surface, and

wherein the upper edge of the front end of the second protrusion is defined by the front surface and the sub upper surface.

[Claim 29]

A liquid cartridge comprising:

a housing defining a liquid storage chamber therein;

a circuit board including an electrode; and

a liquid supply portion including a liquid passage opening frontward and configured to supply liquid in the liquid storage chamber to an outside through the liquid passage,

wherein the housing comprises:

a top wall positioned upward of the liquid supply portion and supporting the circuit board directly or indirectly;

a first protrusion positioned rearward of the circuit board and protruding upward from the top wall; and

a second protrusion positioned frontward of the circuit board and protruding upward from the top wall,

wherein a front end in a front-rear direction of the second protrusion is positioned frontward of an opening of the liquid supply portion,

wherein, when the first protrusion and the second protrusion is in contact with a single flat plane, a gap is formed between the flat plane and the circuit board,

wherein a distance in the front-rear direction between a front edge of the electrode and a point of contact between the first protrusion and the flat plane is smaller than a distance in the front-rear direction between the front edge of the electrode and a point of contact between the second protrusion and the flat plane, and

wherein the first protrusion comprises:

a first protruding portion;

a second protruding portion positioned to be spaced away from the first

protruding portion in the left-right direction; and

a third protruding portion connecting a rear end of the first protruding portion and a rear end of the second protruding portion and extending in the left-right direction.

[Claim 30]

The liquid cartridge according to claim 29, wherein an upper surface of the first protrusion is positioned closer to a rear end of the housing than to a front end of the housing in the front-rear direction, and

wherein an upper surface of the second protrusion is positioned closer to the front end of the housing than to the rear end of the housing in the front-rear direction.

[Claim 31]

The liquid cartridge according to claim 29 or 30, wherein the second protrusion has a dimension in the front-rear direction that is longer than dimensions in a vertical direction and the left-right direction, and

wherein the upper surface of the second protrusion is an upper edge of the front end of the second protrusion.

[Claim 32]

The liquid cartridge according to any one of claims 29 to 31, wherein the third protruding portion has an engaging surface configured to engage a part of a cartridge case in a state where the liquid cartridge is attached to the cartridge case.

[Claim 33]

The liquid cartridge according to any one of claims 29 to 32, wherein the top wall of the housing has a first upper surface and a second upper surface positioned lower than the first upper surface,

wherein the first protrusion is positioned on the first upper surface, and

wherein the front end the second protrusion is positioned on the second upper surface.

[Claim 34]

The liquid cartridge according to claim 33, wherein the first upper surface is a flat plane,

wherein the second upper surface is a flat plane extending from the first upper surface and sloping downward and frontward, and

wherein the second protrusion extends across the first upper surface and the second upper surface.

[Claim 35]

The liquid cartridge according to claim 33 or 34, wherein the second protrusion extends to span more than a half of a sum of front-rear dimensions of a portion of the first upper surface and the second upper surface, the portion of the first upper surface being positioned frontward of the circuit board.

[Claim 36]

The liquid cartridge according to claim 33 or 34, wherein the second protrusion has:

a third upper surface which is a flat plane extending in the front-rear direction and the left-right direction; and

a fourth upper surface positioned frontward of the third upper surface and extending from the third upper surface, the fourth upper surface being a flat plane sloping downward and frontward.

[Claim 37]

The liquid cartridge according to any one of claims 29 to 36, wherein the housing comprises a base defining the liquid storage chamber and a cover engaged with an upper end portion of the base, and

wherein the cover includes the first protrusion and the second protrusion, and supports the circuit board directly or indirectly.

[Claim 38]

The liquid cartridge according to claim 37, wherein the base comprises a plurality of engaging pawls for engagement with the cover,

wherein the cover includes the top wall and a peripheral wall extending downward

from a periphery of the top wall, the cover comprising a plurality of engaging holes formed in the peripheral wall for receiving the engaging pawls, and

wherein the front end of the second protrusion is positioned further frontward than any one of the engaging holes in engagement with the engaging pawls.

[Claim 39]

The liquid cartridge according to claim 38, wherein a rear end of the second protrusion is positioned further rearward than one of the engaging holes that is positioned frontmost thereamong.

[Claim 40]

The liquid cartridge according to any one of claims 29 to 39, wherein the second protrusion is plate-shaped and has a front surface extending from the top wall, a main upper surface facing upward, and a sub upper surface sloping downward relative to the main upper surface, and

wherein the upper edge of the front end of the second protrusion is defined by the front surface and the sub upper surface.

[Claim 41]

A cartridge set comprising a plurality of the liquid cartridges according to any one of claims 1 to 40,

wherein the plurality of the liquid cartridges is configured to be accommodated in positions different from one another in a cartridge case, and the second protrusions of the plurality of the liquid cartridges are at positions different from one another in the left-right direction.