United States Patent Application Publication	20250262865
Kind Code	A1
Publication Date	August 21, 2025
Inventor(s)	OKUI; Hiroaki et al.

Liquid Ejecting Head And Liquid Ejecting Apparatus

Abstract

A liquid ejecting head includes a head module configured to eject a liquid in a first direction, a supply channel member, and an elastic seal member that is arranged between the head module and the supply channel member in the first direction, thereby liquid-tightly connecting a first channel orifice of the first head module and a channel orifice of the supply channel member. The head module includes a channel orifice forming member in which the first channel orifice is formed, and a chip that is arranged in the first direction relative to the channel orifice forming member. A seal area of the seal member held between the channel orifice forming member and the supply channel member does not overlap the chip as viewed in the first direction.

Inventors: **OKUI; Hiroaki (Azumino, JP), KATSUIE; Shun (Matsumoto, JP), YANAGIHARA; Hirokazu (Chino, JP), YOKOO; Ayumi (Matsumoto, JP), HASEGAWA; Yu (Shiojiri, JP)**

Applicant: **SEIKO EPSON CORPORATION** (Tokyo, JP)

Family ID: **1000008467241**

Appl. No.: **19/053537**

Filed: **February 14, 2025**

Foreign Application Priority Data

JP	2024-022360	Feb. 16, 2024

Publication Classification

Int. Cl.: **B41J2/175** (20060101); **B41J3/54** (20060101); **B41J25/34** (20060101)

U.S. Cl.:

CPC **B41J2/175** (20130101); **B41J3/543** (20130101); **B41J25/34** (20130101);

Background/Summary

[0001] The present application is based on, and claims priority from JP Application Serial Number 2024-022360, filed Feb. 16, 2024, the disclosure of which is hereby incorporated by reference herein in its entirety.

BACKGROUND

1. Technical Field

[0002] The present disclosure relates to a liquid ejecting head and a liquid ejecting apparatus.

2. Related Art

[0003] Heretofore, there have been proposed liquid ejecting apparatuses each including a liquid ejecting head to eject liquids such as inks to media such as print sheets. A liquid ejecting head described in JP-A-2015-226988 includes a printing element unit (head module) including a printing element substrate having ejection orifices for ejecting a liquid and a support member to which the printing element substrate is fixed, and a channel unit (supply channel member) including a liquid supply channel for supplying the liquid to the printing element unit, in which the printing element unit and the channel unit are liquid-tightly connected together in a channel-forming manner with an elastic member (seal member) interposed in between.

[0004] In the liquid ejecting head in which the liquid-tight channel is formed with the elastic seal member interposed between the head module and the supply channel member, there is a risk of the reliability of the head module decreasing due to a reaction force of the elastic member.

SUMMARY

[0005] A liquid ejecting head according to an aspect of the present disclosure includes: a first head module that ejects a liquid in a first direction; a supply channel member that supplies the liquid to the first head module; and a first seal member that is arranged between the first head module and the supply channel member in the first direction, thereby liquid-tightly connecting a first channel orifice of the first head module and a channel orifice of the supply channel member. The first head module includes a channel orifice forming member in which the first channel orifice is formed, and a chip that is arranged in the first direction relative to the channel orifice forming member. A seal area of the first seal member held between the channel orifice forming member and the supply channel member does not overlap the chip as viewed in the first direction.

[0006] A liquid ejecting apparatus according to an aspect of the present disclosure includes a plurality of the liquid ejecting heads and a unit base to which the plurality of liquid ejecting heads are fixed.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. **1** is a schematic diagram illustrating a structural example of a liquid ejecting apparatus according to a first embodiment.

[0008] FIG. **2** is a plan view illustrating a liquid ejecting head illustrated in FIG. **1**.

[0009] FIG. **3** is a perspective cross-sectional view of the liquid ejecting head illustrated in FIG. **2**.

[0010] FIG. **4** is a cross-sectional view of the liquid ejecting head illustrated in FIG. **3** viewed in a direction along an X axis.

[0011] FIG. **5** is a cross-sectional view of the liquid ejecting head illustrated in FIG. **3** viewed in a direction along a Y axis.

[0012] FIG. **6** is an underside view of the liquid ejecting head illustrated in FIG. **3**.

[0013] FIG. **7** is a cross-sectional view of a chip included in a head module illustrated in FIG. **4**.

[0014] FIG. **8** is a topside view of channel orifice forming members included in the head modules

illustrated in FIG. **5**.
[0015] FIG. **9** is an underside view of supply channel members illustrated in FIG. **5**.
[0016] FIG. **10** is a topside view of the supply channel members illustrated in FIG. **5**.
[0017] FIG. **11** is a topside view of seal members illustrated in FIG. **5**.
[0018] FIG. **12** is a topside view of support members illustrated in FIG. **5**.
[0019] FIG. **13** is a topside view of an upper portion of a holder illustrated in FIG. **5**.
[0020] FIG. **14** is a view illustrating a lower portion of the holder illustrated in FIG. **5**.
[0021] FIG. **15** is a cross-sectional view of a part of a liquid ejecting head in a first modification.
[0022] FIG. **16** is a cross-sectional view of a part of the liquid ejecting head in the first modification.
[0023] FIG. **17** is a topside view of the liquid ejecting head in the first modification.
[0024] FIG. **18** is a cross-sectional view of a part of a liquid ejecting head in a second modification.
[0025] FIG. **19** is a cross-sectional view of a part of the liquid ejecting head in the second modification.
[0026] FIG. **20** is a cross-sectional view of a part of a liquid ejecting head in a third modification.
[0027] FIG. **21** is a cross-sectional view of a part of the liquid ejecting head in the third modification.
[0028] FIG. **22** is a view illustrating a second member included in a holder in the third modification.
[0029] FIG. **23** is a cross-sectional view of a part of a liquid ejecting head in a fifth modification.
[0030] FIG. **24** is a cross-sectional view illustrating a seal member and its surrounding area in a sixth modification.
[0031] FIG. **25** is a cross-sectional view of a part of a liquid ejecting head in the sixth modification.
[0032] FIG. **26** is a cross-sectional view illustrating a seal member and its surrounding area in a seventh modification.
[0033] FIG. **27** is a topside view of support members in an eighth modification.
[0034] FIG. **28** is a cross-sectional view of a liquid ejecting head according to a second embodiment viewed in the direction along the Y axis.
[0035] FIG. **29** is a cross-sectional view of the liquid ejecting head according to the second embodiment viewed in the direction along the X axis.
[0036] FIG. **30** is an underside view of the liquid ejecting head illustrated in FIG. **28**.
[0037] FIG. **31** is a topside view of channel orifice forming members included in a head module illustrated in FIG. **28**.
[0038] FIG. **32** is an underside view of a holder and a relay substrate illustrated in FIG. **28**.
[0039] FIG. **33** is a topside view of the holder illustrated in FIG. **28**.
[0040] FIG. **34** is a topside view of seal members illustrated in FIG. **28**.
[0041] FIG. **35** is a topside view of a support member illustrated in FIG. **28**.
[0042] FIG. **36** is a cross-sectional view of a part of a liquid ejecting head in a ninth modification.
[0043] FIG. **37** is a cross-sectional view of a part of a liquid ejecting head in a tenth modification.
[0044] FIG. **38** is a cross-sectional view of a part of a liquid ejecting head in an eleventh modification.
[0045] FIG. **39** is a cross-sectional view of a part of a liquid ejecting head in a twelfth modification.
[0046] FIG. **40** is a cross-sectional view of a part of a liquid ejecting head in a thirteenth modification.
[0047] FIG. **41** is a cross-sectional view of a part of a liquid ejecting head in a fifteenth modification.
[0048] FIG. **42** is a topside view of the liquid ejecting head in the fifteenth modification.
[0049] FIG. **43** is a cross-sectional view of a part of a liquid ejecting head in a sixteenth modification.

[0050] FIG. **44** is a topside view of the liquid ejecting head in the sixteenth modification.

DESCRIPTION OF EMBODIMENTS

[0051] Hereinafter, preferred embodiments of the present disclosure will be described with reference to the accompanying drawings. In the drawings, the dimensions and scale of each component are illustrated differently from actual ones as appropriate, and some parts of the drawings are schematically illustrated to facilitate understanding. The scope of the present disclosure is not limited to the following embodiments unless particularly limited in the following description. A phrase "an element β on an element γ" means not only a structure in which the element γ and the element β are in direct contact with each other, but also a structure in which the element γ and the element β are out of direct contact with each other. A phrase "an element Y and an element β are equal to each other" means that the element γ and the element β are substantially equal to each other, including a measurement error, a manufacturing error, or the like. A phrase "an element γ and an element β are the same as each other" means that the element γ and the element β are substantially the same as each other, including a measurement error, a manufacturing error, or the like.

1. First Embodiment

1-1. Overall Structure of Liquid Ejecting Apparatus **100**

[0052] FIG. **1** is a schematic diagram illustrating a structural example of a liquid ejecting apparatus **100** according to a first embodiment. The following description will be given by using an X axis, a Y axis, and a Z axis, which are orthogonal to each other, as needed for convenience of description. Moreover, one of directions along the X axis is referred to as an X**1** direction, and the direction opposite to the X**1** direction is referred to as an X**2** direction. Similarly, one of directions along the Y axis is referred to as a Y**1** direction, and the direction opposite to the Y**1** direction is referred to as a Y**2** direction. One of directions along the Z axis is referred to as a Z**1** direction, and the direction opposite to the Z**1** direction is referred to as a Z**2** direction. The Z**1** direction is equivalent to a "first direction". The Z**2** direction is equivalent to "a second direction opposite to the first direction". A side in the Z**1** direction relative to a certain point in is referred to as a "lower side or underside", whereas a side in the Z**2** direction relative to the certain point is referred to as an "upper side or topside". A view seen in the Z**1** direction or the Z**2** direction is referred to as a "plan view".

[0053] As illustrated in FIG. **1**, the liquid ejecting apparatus **100** includes a liquid reservoir section **9**, a control unit **91**, a transport section **92**, a head unit **10**, and a movement mechanism **40**.

[0054] The liquid reservoir section **9** is a container for storing the ink. Examples of specific modes of the liquid reservoir section **9** include a cartridge removably mounted on the liquid ejecting apparatus **100**, a bag-shaped ink pack formed of a flexible film, an ink tank refillable with the ink, and so on. The type of the ink stored in the liquid reservoir section **9** is not particularly limited and may be any type of ink.

[0055] The control unit **91** controls operations of elements in the liquid ejecting apparatus **100**. The control unit **91** includes, for example, a processor circuit such as a central processing unit (CPU) or a field programmable gate array (FPGA) and a storage circuit such as a semiconductor memory, and controls the operations of the elements in the liquid ejecting apparatus **100**.

[0056] The transport section **92** transports a medium **90** in a direction DM under the control of the control unit **91**. In the present embodiment, the direction DM is the Y**1** direction. In the example illustrated in FIG. **1**, the transport section **92** includes a transport roller that is long along the X axis, and a motor that rotates the transport roller. The transport section **92** is not limited to a structure using the transport roller, and may have a structure using, for example, a drum or an endless belt that transports the medium **90** while adsorbing the medium **90** on its outer circumferential surface by electrostatic force or the like.

[0057] The movement mechanism **40** includes a transport belt to which a unit base **11** of the head unit **10** is fixed, and reciprocates the head unit **10** in the X**1** and X**2** directions under the control of

the control unit **91**. The head unit **10** ejects the ink supplied from the liquid reservoir section **9** to the medium **90** in the Z**1** direction from each of multiple nozzles N under the control of the control unit **91**. As a result of concurrent operations of the head unit **10** ejecting the ink and the movement mechanism **40** moving the head unit **10**, an image is formed with the ink on a surface of the medium **90**.

[0058] The number and layout of the multiple liquid ejecting heads **1** included in the head unit **10** are not limited to those in the example illustrated in FIG. **1** and may be determined as needed. In a case where the head unit **10** is configured to be able to circulate the ink, the head unit **10** may be connected to the liquid reservoir section **9** via a circulation mechanism for circulating the ink in the head unit **10**.

1-2. Head Unit **10**

[0059] FIG. **2** is a plan view illustrating the head unit **10** illustrated in FIG. **1**. As illustrated in FIG. **2**, the head unit **10** includes the unit base **11** and the multiple liquid ejecting heads **1**. The multiple liquid ejecting heads **1** are fixed to the unit base **11**. The unit base **11** is a member that holds the multiple liquid ejecting heads **1**. In the example illustrated, the number of liquid ejecting heads **1** for the unit base **11** is not particularly limited and may be any number equal to or more than 1.

[0060] The unit base **11** is, for example, a plate-shaped member whose thickness direction is a direction along the Z axis. The unit base **11** is provided with a dented portion **111**. The dented portion **111** is a recess provided in the unit base **11**. The bottom surface of the dented portion **111** is provided with multiple through holes **11**H. The planar shape of each through hole **11**H is, for example, a rectangular shape. The through hole **11**H is provided for each liquid ejecting head **1**. A part of the liquid ejecting head **1** is inserted into each through hole **11**H. In FIG. **2**, one of the liquid ejecting heads **1** arranged in the unit base **11** is omitted from the illustration for the purpose of presenting the through hole **11**H.

[0061] The unit base **11** is also provided with four mounting holes **101** and two third alignment portions **102** for each through hole **11**H. The four mounting holes **101** and the two third alignment portions **102** are provided outside the through hole **11**H in the plan view. Here, the numbers and the layout of the mounting holes **101** and the third alignment portions **102** are not limited to those illustrated in FIG. **2**, but may be determined as needed.

[0062] The mounting holes **101** are provided, for example, near four corners of the through hole **11**H in the plan view. The mounting holes **101** are used to mount the liquid ejecting head **1** on the unit base **11**. For example, the mounting holes **101** pass through the unit base **11** along the thickness direction.

[0063] For example, each of the third alignment portions **102** is provided between the two mounting holes **101** arranged in the direction along the X axis while being apart from these mounting holes **101**. The third alignment portions **102** are used to position each liquid ejecting head **1** in mounting the liquid ejecting head **1** onto the unit base **11**. Each third alignment portion **102** is, for example, a bottomed slot opened in a surface of the unit base **11** facing in the Z**1** direction. Each third alignment portion **102** may be regarded as a dented portion formed in the surface of the unit base **11** facing in the Z**1** direction.

[0064] Here, the mounting holes **101** do not have to pass through the unit base **11** in the thickness direction. Likewise, the third alignment portions **102** may pass through the unit base **11** in the thickness direction. The shape of the unit base **11** is not limited to the plate shape, and may be a box shape.

[0065] As described above, the liquid ejecting apparatus **100** includes the multiple liquid ejecting heads **1** and the unit base **11** to which the multiple liquid ejecting heads **1** are fixed. Such liquid ejecting apparatus **100** includes the liquid ejecting heads **1** to be described later. As will be described later, the multiple liquid ejecting heads **1** can be each detachably mounted on the unit base **11**, and are configured such that alignment of the multiple liquid ejecting heads **1** with high precision can be achieved. For this reason, even if any of the multiple liquid ejecting heads **1** is

replaced, the liquid ejecting apparatus **100** is capable of keeping the print quality from deteriorating.

1-3. Liquid Ejecting Head **1**

[0066] FIG. **3** is a perspective cross-sectional view of the liquid ejecting head **1** illustrated in FIG. **2**. FIG. **4** is a cross-sectional view of the liquid ejecting head **1** illustrated in FIG. **3** viewed in the direction along the X axis. FIG. **5** is a cross-sectional view of the liquid ejecting head **1** illustrated in FIG. **3** viewed in the direction along the Y axis. As illustrated in FIG. **5**, in the present embodiment, the liquid ejecting head **1** has a structure approximately symmetrical about a central imaginary plane A**10** along an X-Z plane. However, the liquid ejecting head **1** may have a structure other than the structure symmetrical about the central imaginary plane A**10**. In FIG. **3**, partition walls **63** of a holder **6** to be described later are omitted from the illustration.

[0067] As illustrated in any of FIGS. **3** to **5**, the liquid ejecting head **1** includes multiple head modules **2**, two supply channel members **3**, seal members **4**, multiple support members **5**, the holder **6**, multiple wiring substrates **7**, and a relay substrate **70**. In the present embodiment, one support member **5** is provided for each head module **2**. As illustrated in FIG. **4**, each head module **2** and the corresponding support member **5** form a sub-unit **15**.

1-3A. Head Module **2**

[0068] In the example in FIG. **4**, the multiple head modules **2** are six head modules **2**. The number of head modules **2** is not limited to six, but may be any number of one to five or seven or more. Accordingly, the liquid ejecting head **1** may have a structure including only one head module **2**.

[0069] In the present embodiment, the multiple head modules **2** are next to each other along the X axis. As illustrated in FIGS. **3** and **5**, each head module **2** is long along the Y axis. Each head module **2** ejects the ink in the Z**1** direction. Each head module **2** includes a chip **20** and a channel orifice forming member **25**. The chip **20** is arranged in the Z**1** direction relative to the channel orifice forming member **25**.

[0070] FIG. **6** is an underside view of the liquid ejecting head **1** illustrated in FIG. **3**. As illustrated in FIG. **6**, each head module **2** includes multiple nozzles N to eject the ink. The multiple nozzles N are arrayed along the Y axis. The multiple nozzles N are divided into a nozzle array La and a nozzle array Lb arranged side by side while being spaced out along the X axis. Each of the nozzle array La and the nozzle array Lb is a set of multiple nozzles N arrayed linearly along the Y axis. A surface of the head module **2** in which the orifices of the multiples nozzles N are formed is referred to as a nozzle surface SN. The nozzle surface SN is a surface of the chip **20** of the head module **2** facing in the Z**1** direction. Alternatively, for example, the multiple nozzles N may be arrayed in a direction crossing the X axis and the Y axis as viewed in the Z**1** direction.

1-3Aa. Chip **20**

[0071] FIG. **7** is a cross-sectional view of the chip **20** included in the head module **2** illustrated in FIG. **4**. The chip **20** has a structure in which elements related to the nozzles N of the nozzle array La are arranged in plane symmetry with elements related to the nozzles N of the nozzle array Lb. In the following description, the elements for the nozzle array La will be mainly described and description of the elements for the nozzle array Lb will be omitted if unnecessary. In addition, the nozzle array La and the nozzle array Lb will be referred to as a nozzle array L below if there is no need to distinguish between them.

[0072] As illustrated in FIG. **7**, the chip **20** of each head module **2** includes, for example, a communication plate **202**, a pressure chamber substrate **203**, a vibration plate **204**, a nozzle plate **201**, a cover **206**, multiple driver elements E, and a sealing substrate **205**.

[0073] Each of the communication plate **202**, the pressure chamber substrate **203**, the vibration plate **204**, the nozzle plate **201**, and the cover **206** is a plate-shaped member that is long along the Y axis. The pressure chamber substrate **203** is provided on a surface of the communication plate **202** facing in the Z**2** direction. The nozzle plate **201** and the cover **206** are provided on a surface of the communication plate **202** facing in the Z**1** direction. For example, these members are fixed to each

other with an adhesive.
[0074] The nozzle plate **201** is a plate-shaped member in which the multiple nozzles N are formed. The nozzle plate **201** is the outermost member in the Z**1** direction in the head module **2**. A surface of the nozzle plate **201** facing in the Z**1** direction serves as the nozzle surface SN. Each of the multiple nozzles N is a circular through hole to eject the ink. For example, the nozzle plate **201** is produced by processing a single crystal substrate of silicon (Si) with semiconductor manufacturing techniques such as photolithography and etching.
[0075] In the communication plate **202**, multiple narrowed portions R**1**, multiple communication channels R**2**, a communication space Ra, and a common channel Rb are formed. Each of the narrowed portions R**1** and the communication channels R**2** is a through hole extended in the Z**1** direction and formed for each nozzle N. The communication channels R**2** coincide with the respective nozzles N in the plan view. The communication space Ra is a cavity formed in a shape long along the Y axis. The communication space Ra extends along the Y axis. The common channel Rb communicates with the communication space Ra and overlaps the communication space Ra in the plan view. The common channel Rb extends along the Y axis. The common channel Rb communicates with the multiple narrowed portions R**1**. The communication space Ra communicates with a space Rc included in the channel orifice forming member **25**.
[0076] The communication space Ra, the common channel Rb, and the space Rc form a common space R provided in common to the multiple nozzles N. The common space R functions as a reservoir of the ink. The ink stored in the common space R is distributed to the narrowed portions R**1** and is supplied to and filled in multiple pressure chambers C concurrently.
[0077] In the pressure chamber substrate **203**, the multiple pressure chambers C are formed. Each of the pressure chambers C is a space located between the communication plate **202** and the vibration plate **204** and formed by wall surfaces of the pressure chamber substrate **203**. One pressure chamber C is formed for each nozzle N. The pressure chamber C is a long space extended along the X axis. The multiple pressure chambers C are arrayed along the Y axis.
[0078] The communication plate **202** and the pressure chamber substrate **203** are each produced by, for example, processing a semiconductor substrate such as a single crystal substrate of silicon.
[0079] The vibration plate **204** elastically deformable is mounted on top of the pressure chamber C. The vibration plate **204** is stacked on the pressure chamber substrate **203** and is in contact with a surface of the pressure chamber substrate **203** opposite to the communication plate **202**. The vibration plate **204** is a rectangular plate-shaped member that is long along the Y axis in the plan view. The pressure chamber C communicates with the nozzle N through the communication channel R**2** and communicates with the communication space Ra through the narrowed portion R**1**. Therefore, the pressure chamber C communicates with the nozzle N via the communication channel R**2** and communicates with the communication space Ra via the narrowed portion R**1**. A channel dedicated to each nozzle N is formed by the nozzle N, the communication channel R**2**, the pressure chamber C, and the narrowed portion R**1**. For convenience of description, the pressure chamber substrate **203** and the vibration plate **204** are drawn as separate substrates in FIG. **7**, but are actually stacked in a single silicon substrate.
[0080] The driver element E for each pressure chamber C is formed on a surface of the vibration plate **204** opposite to the pressure chamber C. The driver element E is a piezoelectric element in a shape long along the X axis in the plan view. The driver element E includes, for example, a pair of electrodes and a piezoelectric body provided between the pair of electrodes. Instead, the driver element E may be an electrothermal transducer element to generate thermal energy.
[0081] The sealing substrate **205** is a structural body to protect the multiple driver elements E. The sealing substrate **205** is fixed to a surface of the vibration plate **204** with, for example, an adhesive. The multiple driver elements E are stored inside a dented portion formed in a surface of the sealing substrate **205** facing the vibration plate **204**. Moreover, a through hole **20**H into which the wiring substrate **7** to be described later is to be inserted is provided in the sealing substrate **205**.

[0082] The cover **206** is a thin metallic plate forming a wall surface of the common channel Rb. The cover **206** has a thickness approximately equal to the thickness of the nozzle plate **201**. The planar shape of the cover **206** is, for example, a frame shape surrounding the nozzle plate **201**. A mold **207** made of a resin is provided between the cover **206** and the nozzle plate **201**. The surface of the cover **206** facing in the Z**1** direction constitutes a part of the nozzle surface SN.
[0083] In this chip **20**, when the driver element E contracts due to energization, the vibration plate **204** is bent and deflected in the direction that reduces the volume of the pressure chamber C, and the pressure in the pressure chamber C increases, causing an ink droplet to be ejected from the nozzle N. In this process, the pressure is also transmitted toward the narrowed portion R**1** from the pressure chamber C, and the ink also flows into the common channel Rb through the narrowed portion R**1**. After ink ejection, the driver element E returns to its original position. At this time, the ink in the region from the nozzle N to the common channel Rb also vibrates. Then, as soon as the meniscus of the nozzle N is restored, the ink is supplied from the narrowed portion R**1**. Through the above series of operations, the ink is ejected from the nozzle N.
[0084] Although the chip **20** in the present embodiment includes all the elements illustrated in FIG. **3**, the chip **20** may include only some of the elements or may include additional elements.
[0085] The chip **20** has, for example, a monolithic structure, is a member thinner than the channel orifice forming member **25**, and is, for example, a component having a thickness of smaller than 3000 μm. The chip **20** may be a component having a thickness of 1500 μm or smaller or 1000 μm or smaller. The thickness of the chip **20** may be ⅕ or smaller of the length of the short side of the chip **20** as viewed in the direction along the Z axis, which is the thickness direction of the chip **20**. The chip **20** may include only at least one component among from the nozzle plate **201**, the pressure chamber substrate **203**, the communication plate **202** or the driver elements E, and the sealing substrate **205**. The chip **20** preferably includes at least the nozzle plate **201**, more preferably further includes the pressure chamber substrate **203**, and particularly preferably further includes the communication plate **202**. Furthermore, at least one component among from the nozzle plate **201**, the pressure chamber substrate **203**, the communication plate **202** or the pressure chamber substrate **203** on which the driver elements E are stacked, and the sealing substrate **205** may be regarded as the chip **20**. The chip **20** may be not only a stack of silicon substrates manufactured by MEMS, but also a stack of ceramic sheets or thin plates made of metals or the like, or a stack in which thin plate-shaped members made of the aforementioned materials are stacked.
1-3Ab. Channel Orifice Forming Member **25**
[0086] As illustrated in FIGS. **5** and **7**, the channel orifice forming member **25** is arranged in the Z**2** direction relative to the chip **20**. The channel orifice forming member **25** and the chip **20** are fixed to each other with, for example, an adhesive. The channel orifice forming member **25** and the chip **20** are aligned with each other with high precision in advance. The channel orifice forming member **25** includes, for example, a channel for supplying the ink to the chip **20**.
[0087] For example, the channel orifice forming member **25** is preferably a member having a thickness of 3000 μm or greater, more preferably a member having a thickness of 5000 μm or greater, and even more preferably a member having a thickness of 8000 μm or greater. The channel orifice forming member **25** may be formed of a single member or a stack of multiple members. The channel orifice forming member **25** may contain a resin or a metal.
[0088] As illustrated in FIG. **5**, a length of the channel orifice forming member **25** in the direction along the Z axis, that is, the thickness of the channel orifice forming member **25**, is greater than a thickness D**2** of the chip **20**. The thickness of the channel orifice forming member **25** mentioned herein is a thickness at a position coinciding with a seal area **4**S to be described later, as viewed in the Z**1** direction. In other words, the chip **20** is thinner than the channel orifice forming member **25**. The channel orifice forming member **25** includes a surface **251** facing in the Z**1** direction and a surface **252** facing in the Z**2** direction.
[0089] FIG. **8** is a topside view of the channel orifice forming members **25** of the head modules **2**

illustrated in FIG. **5**. As illustrated in FIG. **8**, the planar shape of the channel orifice forming member **25** is larger than the planar shape of the chip **20**. In other words, as viewed in the Z**1** direction, the chip **20** is smaller in outer profile than the channel orifice forming member **25**. As viewed in the Z**1** direction, the channel orifice forming member **25** is arranged so as to overlap the chip **20** and cover the chip **20**.

[0090] As illustrated in FIGS. **5** and **8**, the channel orifice forming member **25** includes a flange portion **250** to be fixed to the support member **5** to be described later. The planar shape of the flange portion **250** is a rectangular frame shape surrounding an opening **5**H of the support member **5** to be described later. As illustrated in FIG. **5**, a surface of the flange portion **250** facing in the Z**1** direction is a supported surface **2511** supported by the support member **5** to be described later. Since the planar shape of the flange portion **250** is the rectangular frame shape surrounding the opening **5**H, the planar shape of the supported surface **2511** is similarly a rectangular frame shape surrounding the opening **5**H. The supported surface **2511** is located in the Z**2** direction relative to the chip **20**. Accordingly, the supported surface **2511** is located in the Z**2** direction relative to the nozzle plate **201**.

[0091] In addition, as illustrated in FIG. **8**, a through hole **25**H is provided to the channel orifice forming member **25**. The wiring substrate **7** to be described later is to be inserted into the through hole **25**H. The through hole **25**H is provided at a central portion of the channel orifice forming member **25** in the plan view. In reference to FIG. **7**, the through hole **25**H coincides with the through hole **20**H of the sealing substrate **205** in the plan view.

[0092] As illustrated in FIGS. **5** and **7**, a channel **25**R is formed inside the channel orifice forming member **25**. The channel **25**R is provided to supply the ink to the chip **20**. As illustrated in FIG. **7**, the space Rc is formed on the chip **20** side of the channel **25**R, that is, downstream of the channel **25**R. The channel **25**R and the space Rc communicate with each other.

[0093] As illustrated in FIG. **5**, multiple channel orifices **251**H are provided on the side of the channel **25**R of the channel orifice forming member **25**, the side opposite to the chip **20**, that is, the upstream side of the channel **25**R. Each of the channel orifices **251**H is a cavity end of the channel **25**R in the Z**2** direction. The channel orifice **251**H is an orifice for a channel-forming connection between the channel **25**R of the channel orifice forming member **25** of the head module **2** and a channel **3**R of the supply channel member **3** to be described later. As illustrated in FIGS. **5** and **8**, the multiple channel orifices **251**H are provided in the flange portion **250** of the channel orifice forming member **25**. The channel orifices **251**H are arranged outside the chip **20** as viewed in the Z**1** direction. In the present embodiment, two channel orifices **251**H are provided for each nozzle array L.

1-3B. Supply Channel Member **3**

[0094] As illustrated in FIGS. **3** to **5**, the supply channel members **3** are arranged in the Z**2** direction relative to the multiple head modules **2**. Each supply channel member **3** is provided in common to the multiple head modules **2**. As illustrated in FIG. **5**, the supply channel member **3** includes a single channel **3**R. The channel **3**R supplies the ink to the head modules **2** and distributes the ink to the head modules **2**. The channel **3**R is a common channel provided in common to the multiple head modules **2**, and includes a common portion **3**RA extended along the X axis and multiple branched portions **3**RB branched off from the common portion **3**RA and extended in the Z**1** direction. Although not illustrated, the supply channel member **3** is provided with a channel joint for connecting to a supply channel outside the liquid ejecting head **1** in order that the supply channel member **3** can communicate with the liquid reservoir section **9**. This channel joint not illustrated is exposed to outside of the liquid ejecting head **1** through, for example, a not-illustrated opening formed in the holder **6**.

[0095] Instead, the supply channel member **3** may include multiple channels **3**R communicating with the multiple head modules **2**. Specifically, instead of the channel **3**R including the common portion **3**RA communicating with the multiple head modules **2**, the supply channel member **3** may

include the multiple channels **3**R communicating with the respective multiple head modules **2**.
[0096] As illustrated in FIG. **5**, channel orifices **31**H are provided on the head module **2** side of each channel **3**R, that is, the downstream side of the channel **3**R. Each channel orifice **31**H is a cavity end of the channel **3**R in the Z**1** direction. The channel orifices **31**H are provided corresponding to the foregoing channel orifices **251**H.
[0097] FIG. **9** is an underside view of the supply channel members **3** illustrated in FIG. **5**. FIG. **10** is a topside view of the supply channel members **3** illustrated in FIG. **5**. As illustrated in FIGS. **9** and **10**, each supply channel member **3** is a long member extended in the X axis direction. As illustrated in FIG. **9**, the two supply channel members **3** are arranged inside the dented portion **610** of the holder **6** to be described later. The two supply channel members **3** are arranged so as to sandwich the relay substrate **70** to be described later as viewed in the Z**2** direction. The multiple channel orifices **31**H included in each of the supply channel members **3** are spaced out from each other and arrayed along the X axis.
[0098] As illustrated in FIG. **10**, each supply channel member **3** overlaps the multiple head modules **2** as viewed in the Z**1** direction. Each supply channel member **3** is provided in common to the multiple head modules **2**. Specifically, as viewed in the Z**1** direction, each supply channel member **3** overlaps the flange portions **250** of the multiple channel orifice forming members **25**. As viewed in the Z**1** direction, the multiple channel orifices **31**H coincide with the foregoing multiple channel orifices **251**H on a one-to-one basis. In addition, as viewed in the Z**1** direction, each supply channel member **3** is arranged at a position different from the multiple chips **20** so as not to overlap the chips **20**. As viewed in the Z**1** direction, each supply channel member **3** overlaps some of the multiple seal members **4** to be described below.

1-3C. Seal Member **4**

[0099] As illustrated in FIGS. **3** to **5**, the seal members **4** are provided between the head modules **2** and the supply channel members **3** in the Z**1** direction. The seal members **4** are provided for each head module **2**. The seal members **4** are elastic. The seal members **4** are made of an elastic material such as elastomer, for example. In the present embodiment, the length of the seal member **4** along the Z axis, that is, the thickness of the seal member **4**, is constant. The thickness of the seal member **4** is smaller than the thicknesses of the channel orifice forming member **25** and the supply channel member **3**. The seal member **4** is squeezed between the head module **2** and the supply channel member **3**.
[0100] FIG. **11** is a topside view of the seal members **4** illustrated in FIG. **5**. In the example illustrated in FIG. **11**, two seal members **4** are provided for each head module **2**. The two seal members **4** are provided at both longitudinal ends of one head module **2**. Each seal member **4** has a rectangular shape as viewed in the Z**1** direction. Each seal member **4** overlaps the flange portion **250** included in the channel orifice forming member **25** of the head module **2** as viewed in the Z**1** direction. On the other hand, in the present embodiment, the seal members **4** are provided at positions different from the chips **20** as viewed in the Z**1** direction. In other words, the seal members **4** do not overlap the chips **20** as viewed in the Z**1** direction.
[0101] As illustrated in FIGS. **5** and **11**, each seal member **4** includes two communication orifices **4**H. As illustrated in FIG. **5**, each communication orifice **4**H is provided corresponding to one of the channel orifices **251**H of the channel orifice forming members **25** and one of the channel orifices **31**H of the supply channel members **3**. As illustrated in FIG. **10**, the communication orifice **4**H coincides with both the channel orifice **31**H and the channel orifice **251**H as viewed in the Z**1** direction. As illustrated in FIG. **5**, the communication orifice **4**H is connected to the channel **25**R via the channel orifice **251**H. The communication orifice **4**H is connected to the channel **3**R via the channel orifice **31**H. Thus, the channel **25**R and the channel **3**R communicate with each other through the communication orifice **4**H. Specifically, the channel **25**R and the channel **3**R communicate with each other through the communication orifice **4**H with the seal member **4** squeezed between the channel orifice forming member **25** and the supply channel member **3**.

[0102] The seal member **4** including such communication orifices **4**H is a member for liquid-tightly connecting the channel orifices **251**H of the head module **2** and the channel orifices **31**H of the supply channel member **3**. The ink flowing in the channels **3**R of the supply channel members **3** flows into the channels **25**R of the channel orifice forming members **25** via the communication orifices **4**H and is supplied to the dedicated channels included in the chips **20** via the common spaces R.

[0103] As illustrated in FIG. **11**, the seal member **4** has a seal area **4**S. In the present embodiment, the entire area of the seal member **4** serves as the seal area **4**S. The seal area **4**S is an area of the seal member **4** that is in contact with both the channel orifice forming member **25** and the supply channel member **3** and held between the channel orifice forming member **25** and the supply channel member **3**. The seal area **4**S is an area squeezed with application of a load from the channel orifice forming member **25** and the supply channel member **3** so as to liquid-tightly connect the channel orifices **251**H and the channel orifices **31**H. In other words, even an area of the seal member **4** located between the channel orifice forming member **25** and the supply channel member **3** is not included in the seal area **4**S if the area is not squeezed with application of the load from both members, and does not actually contribute to the liquid-tight connection between the channel orifice **251**H and the channel orifice **31**H.

[0104] As illustrated in FIG. **11**, the seal members **4** are provided at the positions different from the chips **20** as viewed in the Z**1** direction, and accordingly the seal areas **4**S are provided at the positions different the chips **20** as viewed in the Z**1** direction. In other words, the seal areas **4**S do not overlap the chip **20** as viewed in the Z**1** direction. Since the seal areas **4**S do not overlap the chips **20** as viewed in the Z**1** direction, the reaction force of the seal members **4** is less likely to act on the chips **20** than if they overlap the chips **20**. As a result, the reliability of the head modules **2** can be improved.

[0105] As described above, the channel **25**R and the channel **3**R communicate with each other through the communication orifice **4**H with the seal member **4** squeezed between the channel orifice forming member **25** and the supply channel member **3**. The reaction force of the squeezed seal member **4** may apply stress to the chip **20**, and cause warping or the like of the chip **20**. In this way, if the reaction force of the seal member **4** acts on the chip **20**, the reliability of the head module **2** may deteriorate due to the occurrence of an undesirable phenomenon such, for example, as displacement of the nozzles N as a result of deformation of the nozzle plate **201**, a change in ejection characteristics as a result of deformation of the pressure chamber substrate **203** and the communication plate **202**, or a breakage of any of members constituting the chip **20** if the members include a silicon substrate or ceramic sheet.

[0106] In the present embodiment, the seal areas **4**S of the seal members **4** do not overlap the chips **20** as viewed in the Z**1** direction. For this reason, it is possible to keep the reaction force of the seal members **4** from acting on the chips **20** while keeping the sealing performance of the seal members **4** from decreasing. Thus, the reliability of the head modules **2** can be improved.

[0107] As described above, the liquid ejecting head **1** includes the multiple head modules **2**. For example, the leftmost head module **2** in FIG. **11** is referred to as a “first head module **2***a*”. The next head module **2** to the right of the first head module **2***a* is referred to as a “second head module **2***b*”. In this case, the channel orifices **251**H of the first head module **2***a* are referred to as “first channel orifices **251**Ha” and the channel orifices **251**H of the second head module **2***b* are referred to as “second channel orifices **251**Hb”. The seal members **4** corresponding to the first head module **2***a* are referred to as “first seal members **4***a*” and the seal members **4** corresponding to the second head module **2***b* are referred to as “second seal members **4***b*”. The first seal members **4***a* are held between the first head module **2***a* and the supply channel members **3**, thereby liquid-tightly connecting the first channel orifices **251**Ha of the first head module **2***a* and the channel orifices **31**H of the supply channel members **3**. Similarly, the second seal members **4***b* are held between the second head module **2***b* and the supply channel members **3**, thereby liquid-tightly connecting the

second channel orifices **251**Hb of the second head module **2***b* and the channel orifices **31**H of the supply channel members **3**. Both the first head module **2***a* and the second head module **2***b* eject the ink supplied from the supply channel members **3**.

[0108] The seal areas **4**S of the first seal members **4***a* do not overlap the chip **20** included in the first head module **2***a* as viewed in the Z**1** direction. Similarly, the seal areas **4**S of the second seal members **4***b* do not overlap the chip **20** included in the second head module **2***b* as viewed in the Z**1** direction. Further, the seal members **4** corresponding to the multiple head modules **2** included in the liquid ejecting head **1** do not overlap the chips **20** as viewed in the Z**1** direction. As a result, in the multiple head modules **2**, it is possible to keep the reaction force of the seal members **4** from acting on the chips **20** while keeping the sealing performance of the seal members **4** from decreasing. Thus, the reliability of the liquid ejecting head **1** can be improved.

[0109] As illustrated in FIG. **10**, none of the communication orifices **4**H, the channel orifices **251**H, and the channel orifices **31**H overlaps the chips **20** as viewed in the Z**1** direction. All of the communication orifices **4**H, the channel orifices **251**H, and the channel orifices **31**H are arranged outside the chips **20** as viewed in the Z**1** direction. Specifically, the communication orifices **4**H and the channel orifices **251**H and **31**H are arranged on both longitudinal sides of each chip **20** as viewed in the Z**1** direction. For this reason, the seal areas **4**S of the seal members **4** which liquid-tightly seal the channels **25**R and **3**R as described above can be arranged outside the chips **20**. Accordingly, as described above, the reaction force of the seal members **4** can be kept from affecting the chips **20**.

[0110] In addition, each of the seal areas **4**S is arranged in the Y**1** direction or the Y**2** direction, which is a longitudinal direction of the head module **2**, relative to the chip **20** as viewed in the Z**1** direction. Since the seal areas **4**S are arranged in the longitudinal directions relative to the chips **20**, none of the seal areas **4**S is arranged between the adjacent chips **20**. This can avoid an increase in the distance between the adjacent chips **20** due to the seal area **4**S if provided. For this reason, the print quality is less likely to be affected.

[0111] However, the seal areas **4**S may be arranged, relative to the chips **20**, in directions in which the multiple head modules **2** are arrayed, that is, the short side directions of the head modules **2**. The seal members **4** may be provided, relative to the chips **20**, in the directions in which the multiple head modules **2** are arrayed, that is, the short-side directions of the head modules **2**.

1-3D. Support Member **5**

[0112] The support member **5** illustrated in FIGS. **4** to **6** is a member that supports the head module **2**. The support members **5** are provided for the head modules **2** on a one-to-one basis. The support member **5** is a plate-shaped member that is long along the Y axis while a thickness direction thereof is a direction along the Z axis. The support member **5** is arranged in the Z**1** direction relative to the channel orifice forming member **25**. The support member **5** is a member that sandwiches the seal members **4** and the channel orifice forming member **25** between itself and the supply channel members **3**. As illustrated in FIG. **5**, the support member **5** includes a surface **511** facing in the Z**1** direction and a surface **512** facing in the Z**2** direction. The support member **5** is a member that does not include any channel through which the ink flows.

[0113] Each support member **5** and the corresponding head module **2** are fixed to each other with an adhesive. The sub-unit **15** including each support member **5** is fixed to the holder **6** to be described later in a detachably-attached manner. Specifically, the support member **5** is not bonded with an adhesive or the like. For this reason, the sub-units **15** are replaceable on a per-sub-unit **15** basis. The support member **5** and the head module **2** are fixed to each other with an adhesive.

[0114] For this reason, for example, in the case where one or some of the multiple head modules **2** included in the head unit **10** are broken, the sub-units **15** including the broken head modules **2** are replaced with other sub-units **15** including unbroken head modules **2**, so that the liquid ejecting head **1** can be recycled.

[0115] Further, the channel-forming connections between the head module **2** and the supply

channel members **3** are not made with an adhesive, but are made with the seal members **4**. For this reason, in the above-described replacement of the head module **2**, the channel-forming connections between the head module **2** and the supply channel members **3** can be disconnected easily. This facilitates the replacement of the head module **2**.

[0116] Here, it is preferable to fix each support member **5** and the corresponding head module **2** to each other with an adhesive, but the head module **2** may be configured to be detachable from the support member **5** with decomposition of the adhesive.

[0117] The support member **5** is made of, for example, a metal. The support member **5** is made of a metal such, for example, as aluminum or stainless steel. The support member **5** has stiffness sufficient to support the head module **2**.

[0118] The support member **5** is provided with the opening **5**H. The opening **5**H is a hole passing through the support member **5** in the thickness direction. The opening **5**H is provided for exposing a part of the head module **2** to the outside. Specifically, as illustrated in FIG. **6**, the chip **20** is exposed from the opening **5**H. Accordingly, the multiple nozzles N are exposed from the opening **5**H.

[0119] FIG. **12** is a topside view of the support members **5** illustrated in FIG. **5**. As illustrated in FIGS. **5** and **12**, the support member **5** includes a support area **5**S. The support area **5**S is a part of the surface **512** of the support member **5** facing in the Z**2** direction. In FIG. **12**, the support areas **5**S are hatched for facilitating understanding. In the example of FIG. **12**, each support area **5**S has a rectangular frame shape as viewed in the Z**1** direction.

[0120] As illustrated in FIG. **5**, the support area **5**S is an area that is in contact with the channel orifice forming member **25** and directly supports the channel orifice forming member **25**. The support area **5**S is in contact with the supported surface **2511** of the channel orifice forming member **25**. As illustrated in FIG. **12**, the support area **5**S includes areas S**50** coinciding with the seal areas **4**S as viewed in the Z**1** direction. In FIG. **12**, the areas S**50** are dotted.

[0121] Since the support area **5**S includes the areas S**50** coinciding with the seal areas **4**S as viewed in the Z**1** direction, the support member **5** vertically receives the reaction force of the seal members **4**. Therefore, the support member **5** can firmly support the seal areas **4**S of the seal members **4** between itself and the supply channel members **3**. Accordingly, the support member **5** can particularly effectively alleviate the reaction force of the seal members **4**.

[0122] Moreover, a part of the above-described surface **251** of the channel orifice forming member **25** facing in the z**1** direction includes the supported surface **2511**. The supported surface **2511** is supported by being in contact with the support member **5** while surrounding the opening **5**H of the support member **5** as viewed in the Z**1** direction. Specifically, as described above, the flange portion **250** of the channel orifice forming member **25** includes the supported surface **2511**, and the head module **2** is held by the support member **5** with the supported surface **2511** put in contact with the support area **5**S of the support member **5**. When the channel orifice forming member **25** is supported by the support member **5** as described above, the load of the seal members **4** can be distributed. As a result, the channel orifice forming member **25** can be made less likely to be broken.

[0123] Here, the contact between the supported surface **2511** and the support area **5**S means not only a direct contact between them and but also a connection between them via an adhesive, an elastic bushing, or the like. Accordingly, the channel orifice forming member **25** may be in direct contact with the support member **5** or may be in indirect contact with the support member **5** via another member such as an adhesive or a bushing. The flange portion **250** may have a shape other than the rectangular frame shape in the plan view. For example, the flange portions **250** in rectangular shapes may be provided in both of the Y**1** and Y**2** directions relative to the opening **5**H in the plan view.

[0124] The thickness of the flange portion **250**, that is, the length along the Z**1** direction, is preferably greater than the thickness of the part of the channel orifice forming member **25** arranged

inside the opening **5**H. In addition, the thickness of the flange portion **250** is preferably ½ or greater of the maximum thickness of the channel orifice forming member **25**. Such a thickness relationship keeps the strength of the flange portion **250** from decreasing, and makes it easier for the flange portion **250** to ensure the strength in receiving the reaction force of the seal members **4**.
[0125] Moreover, as illustrated in FIG. **5**, the thickness D**5** of the support member **5** in the Z**1** direction is greater than the thickness D**2** of the chip **20** in the Z**1** direction. This can reduce a risk of the support member **5** being deformed due to the reaction force of the seal members **4**.
[0126] The thickness D**5** of the support member **5** is preferably two or more times and more preferably three or more times greater than the thickness D**2** of the chip **20**. This can further reduce the risk of the support member **5** being deformed due to the reaction force of the seal members **4**. However, the thickness D**5** may be equal to or smaller than the thickness D**2**.
[0127] From the same viewpoint, the thickness D**5** of the support member **5** is preferably 1 mm or greater and more preferably 2 mm or greater. In order to further enhance the strength of the support member **5**, the thickness D**5** may be 3 mm or greater, 5 mm or greater, or 6 mm or greater. On the other hand, from the viewpoint of an increase in the distance between the medium **90** and the nozzle surface SN, that is, a paper gap, the thickness D**5** of the support member **5** is preferably 10 mm or smaller, and more preferably 7 mm or smaller.
[0128] As illustrated in FIG. **5**, in addition to the chip **20**, the part of the channel orifice forming member **25** is arranged in the opening **5**H of the support member **5**. In other words, the part of the channel orifice forming member **25** is inserted in the opening **5**H of the support member **5**. In the case where the support member **5** exists, the paper gap may increase depending on how great the thickness D**5** of the support member **5** is. Specifically, if the thickness D**5** of the support member **5** is excessively great, the surface of the chip **20** facing in the Z**1** direction may be retracted in the Z**2** direction from the surface of the support member **5** facing in the Z**1** direction. The increase in the above distance may result in a decrease in the accuracy of ink impact positions on the medium **90**.
[0129] In the present embodiment, as described above, in addition to the chip **20**, the part of the channel orifice forming member **25** is arranged in the opening **5**H. Thus, even if the thickness D**5** of the support member **5** is increased in order to further enhance the strength of the support member **5**, the paper gap may be prevented from increasing.
[0130] Further, the surface of the nozzle plate **201** facing in the Z**1** direction, namely, the nozzle surface SN, in the chip **20** is approximately flush with the surface **511** of the support member **5** facing in the Z**1** direction. In other words, the nozzle surface SN and the surface **511** of the support member **5** facing in the Z**1** direction are located at the same Z-axial position. In this case, the paper gap can be kept from increasing as compared with the case where the nozzle surface SN is retracted in the Z**2** direction from the surface **511** of the support member **5** facing in the Z**1** direction. Moreover, it is easy to collectively wipe the surface **511** of the support member **5** facing in the Z**1** direction and the nozzle surface SN.
[0131] The nozzle surface SN and the surface **511** of the support member **5** facing in the Z**1** direction being approximately flush with each other means not only a case where they are completely flush with each other, but also a case where they have a step formed in between to the extent including a manufacturing error or the like.
[0132] Instead, the nozzle surface SN and the surface **511** of the support member **5** facing in the Z**1** direction do not have to be approximately flush with each other. The nozzle surface SN and the surface **511** of the support member **5** facing in the Z**1** direction may be located at different Z-axial positions or may have a step formed in between. In this case, from the viewpoint of ease of wiping, the distance between the nozzle surface SN and the surface **511** of the support member **5** facing in the Z**1** direction is preferably 100 μm or smaller and more preferably 50 μm or smaller.
[0133] The support member **5** described above is fixed to the holder **6** to be described later in a detachably-attached manner. For example, when the support member **5** is detached from the holder **6**, the head module **2** and the wiring substrate **7** to be described later are detached together with the

support member **5** from the holder **6**. The liquid ejecting head **1** in the present embodiment is configured such that the precision of alignment of the multiple head modules **2** may not decrease in the case where each head module **2** is detached from and reattached to the holder **6**.

[0134] As illustrated in FIGS. **5** and **12**, each support member **5** has two first alignment portions **502** and two fixing slots **501**. The first alignment portions **502** are used for the purpose of positioning the support member **5** with respect to the holder **6** or other purposes. The fixing slots **501** are used for fixing the support member **5** to the holder **6**.

[0135] The first alignment portions **502** are provided on the surface **512** of the support member **5** facing in the Z**2** direction. In the present embodiment, the first alignment portions **502** are bottomed slots opened in the surface **512** of the support member **5** facing in the Z**2** direction. Each first alignment portion **502** is a dented portion provided in the surface **512** of the support member **5** facing in the Z**2** direction and may be regarded as a recess formed in the surface **512**. The two first alignment portions **502** are provided on both sides of the opening **5**H in the longitudinal direction of the support member **5**. One of the two first alignment portions **502** is located in the Y**1** direction relative to the opening **5**H, whereas the other is located in the Y**2** direction relative to the opening **5**H.

[0136] The fixing slots **501** are provided in the surface **512** of the support member **5** facing in the Z**2** direction. The fixing slots **501** are bottomed slots provided in the surface **512** of the support member **5** facing in the Z**2** direction. Each fixing slot **501** is a dented portion provided in the surface **512** of the support member **5** facing in the Z**2** direction and may be regarded as a recess formed in the surface **512**. The two fixing slots **501** are provided on both sides of the opening **5**H in the longitudinal direction of the support member **5**. One of the two fixing slots **501** is located in the Y**1** direction relative to the opening **5**H, whereas the other is located in the Y**2** direction relative to the opening **5**H.

[0137] Each of the fixing slots **501** is provided away from the corresponding first alignment portion **502** and the opening **5**H. Each fixing slot **501** located in the Y**1** direction relative to the opening **5**H is closer to the opening **5**H than the first alignment portion **502** located in the Y**1** direction relative to the opening **5**H is. Similarly, each fixing slot **501** located in the Y**2** direction relative to the opening **5**H is closer to the opening **5**H than the first alignment portion **502** located in the Y**2** direction relative to the opening **5**H is. The first alignment portions **502**, the fixing slots **501**, and the opening **5**H are arranged along the longitudinal direction of the support member **5**.

[0138] The minimum distance between the fixing slot **501** and the opening **5**H is shorter than the minimum distance between the first alignment portion **502** and the opening **5**H, but may be longer than the latter distance. Further, the first alignment portions **502**, the fixing slots **501**, and the opening **5**H do not have to be arranged along the longitudinal direction of the support member **5**. For example, the first alignment portions **502** may be provided on both sides of the opening **5**H along the X axis.

1-3E. Holder **6**

[0139] As illustrated in FIGS. **3** to **5**, the holder **6** is a case where to store the multiple head modules **2** and the supply channel members **3**. The holder **6** has a box shape having a dented portion **610** opened in the Z**1** direction. The multiple head modules **2** and the supply channel members **3** are arranged in a storage space in the dented portion **610** of the holder **6**. In other words, the storage space for storing the module head modules **2** and the supply channel members **3** may be regarded as a space formed by the holder **6** and the multiple support members **5**.

[0140] The relay substrate **70** is arranged on a bottom surface of the dented portion **610** of the holder **6**. The bottom surface is a surface of the dented portion **610** of the holder **6** facing in the Z**1** direction. The holder **6** is made of a metal such, for example, as aluminum or stainless steel. Although not illustrated in detail, the holder **6** is provided with an opening to which a wiring member outside the liquid ejecting head **1** for electrically connecting the relay substrate **70** to the control unit **91** is to be inserted.

[0141] The holder **6** includes a flat plate portion **61**, a sidewall **62**, multiple partition walls **63**, and two flange portions **64**. The flat plate portion **61**, the sidewall **62**, the multiple partition walls **63**, and the two flange portions **64** are formed integrally. The flat plate portion **61** is a portion in a flat plate shape along an X-Y plane, and is located in the Z**2** direction relative to the supply channel members **3**. The sidewall **62** is a portion extended in the Z**1** direction from an outer edge of the flat plate portion **61**. A planar shape of the sidewall **62** is a rectangular frame shape. As illustrated in FIG. **4**, the multiple partition walls **63** are arranged between the multiple head modules **2**. Each partition wall **63** extends along the Y axis. The partition walls **63** and the head modules **2** are alternately arranged along the X axis.

[0142] FIG. **13** is a topside view of an upper portion of the holder **6** illustrated in FIG. **5**. FIG. **14** is a view illustrating a lower portion of the holder **6** illustrated in FIG. **5**. As illustrated in FIGS. **4** and **13**, the multiple partition walls **63** are not provided in the upper portion of the holder **6**. In contrast, as illustrated in FIGS. **4** and **14**, the multiple partition walls **63** are provided in the lower portion of the holder **6**. A portion of the holder **6** provided with the multiple partition walls **63** may be regarded as the lower portion of the holder **6**, whereas a portion of the holder **6** not provided with the multiple partition walls **63** may be regarded as the upper portion of the holder **6**.

[0143] As illustrated in FIG. **4**, the multiple partition walls **63** exist in an area where the multiple head modules **2** are provided. The multiple partition walls **63** are located in the Z**1** direction relative to the Z-axial center of the holder **6**. A portion of the holder **6** extended in the Z**2** direction from the Z-axial center is not provided with the multiple partition walls **63** so as to allow the supply channel members **3** arranged therein.

[0144] As illustrated in FIGS. **5** and **14**, for each support member **5**, the holder **6** includes two second alignment portions **602** and two first fixing holes **61**H. As described above, the support member **5** can be detachably attached to the holder **6**. The second alignment portions **602** are used for the purpose of positioning the support member **5** with respect to the holder **6** or other purposes. The first fixing holes **61**H are used to fix the support member **5** to the holder **6**.

[0145] The second alignment portions **602** are provided in a surface **605** of the holder **6** facing in the Z**1** direction. In the present embodiment, the second alignment portions **602** are protrusions protruding in the Z**1** direction from the surface **605** of the holder **6** facing in the Z**1** direction. As illustrated in FIG. **13**, each second alignment portions **602** is provided in the Y**1** direction or the Y**2** direction relative to the dented portion **610** as viewed in the Z**1** direction. The two second alignment portions **602** are provided corresponding to the foregoing two first alignment portions **502** and coincide with the two first alignment portions **502** as viewed in the Z**1** direction. Accordingly, the multiple second alignment portions **602** are provided for the multiple first alignment portions **502** on a one-to-one basis.

[0146] Each first fixing hole **61**H is a hole passing through the holder **6** in the Z**1** direction. Each first fixing hole **61**H is provided in the Y**1** direction or the Y**2** direction relative to the dented portion **610** as viewed in the Z**1** direction. The two first fixing holes **61**H are provided corresponding to the foregoing two fixing slots **501** and coincide with the two fixing slots **501** as viewed in the Z**1** direction.

[0147] Each first fixing hole **61**H located in the Y**1** direction relative to the dented portion **610** is closer to the dented portion **610** than the second alignment portion **602** located in the Y**1** direction relative to the dented portion **610** is. Similarly, each first fixing hole **61**H located in the Y**2** direction relative to the dented portion **610** is closer to the dented portion **610** than the second alignment portion **602** located in the Y**2** direction relative to the dented portion **610** is. Each first fixing hole **61**H and its adjacent second alignment portion **602** are spaced out and arranged along the Y axis.

[0148] The minimum distance between the first fixing hole **61**H and the dented portion **610** is shorter than the minimum distance between the second alignment portion **602** and the dented portion **610**, but may be longer than the latter distance. Further, the second alignment portion **602**

and the first fixing hole **61**H do not have to be arranged along the longitudinal direction of the support member **5**.

[0149] The second alignment portions **602** are press-fitted into the foregoing first alignment portions **502** to position the support member **5** with respect to the holder **6**. The first alignment portions **502** and the second alignment portions **602** are provided on a per-support member **5** basis, in other words, for each head module **2** held by the support member **5**.

[0150] The provision of the first alignment portions **502** and the second alignment portions **602** described above enables easy positioning for attaching each support member **5** to the holder **6**. Moreover, since the first alignment portions **502** and the second alignment portions **602** are provided on the per-support member **5** basis, the alignment of the multiple support members **5** with the holder **6** can be made with high precision.

[0151] As described above, each support member **5** holds the head module **2**. Accordingly, the provision of the first alignment portions **502** and the second alignment portions **602** enables each head module **2** fixed to the support member **5** to be positioned with respect to the holder **6**. Further, since the first alignment portions **502** and the second alignment portions **602** are provided on the per-support member **5** basis, the alignment of the multiple head modules **2** with the holder **6** can be made with high precision. That is, the multiple head modules **2** can be aligned with each other on the per-support member **5** with respect to the holder **6**. For this reason, in order to replace only some of the multiple head modules **2**, there is no need to realign all the head modules **2**.

[0152] Moreover, the multiple head modules **2** can be aligned with each other with high precision in the simple method including press-fitting the second alignment portions **602** into the first alignment portions **502**. This allows only a desired head module **2** to be replaced easily among the multiple head module **2**. This makes it easy to recycle the liquid ejecting head **1** by replacing the head module **2**.

[0153] The multiple second alignment portions **602** are arranged on the surface **605** of the holder **6** facing in the Z**1** direction. As described above, the first alignment portions **502** are arranged in the surface **512** of the support member **5** facing in the Z**2** direction opposite to the Z**1** direction. Then, each head module **2** is supported by the surface **512** of the support member **5** facing in the Z**2** direction. The arrangement of the first alignment portions **502**, the second alignment portions **602**, and the head module **2** as described above enables easy attachment and detachment from below the holder **6** for replacing only the sub-unit **15** including the support member **5** and the head module **2** as a replacement target. In order to attach a sub-unit **15** including an unbroken head module **2** to the holder **6** again as a replacement for a sub-unit **15** of a replacement target, it is only necessary to make the channel-forming connections between the head module **2** as the replacement and the supply channel members **3**, and to electrically connect the wiring substrate **7** attached to the head module **2** as the replacement to the relay substrate **70**. Therefore, there is no need to make the channel-forming connections between the head modules **2** other than the replacement target and the supply channel members **3**, and to electrically connect their wiring substrates **7** to the relay substrate **70**. Thus, the attachment and detachment work for repairing the liquid ejecting head **1** can be simplified.

[0154] Moreover, the supply channel members **3** and the wiring substrates **7** are arranged on the bottom surface of the dented portion **610** of the holder **6** and the support members **5** holding the head modules **2** are arranged so as to cover the opening of the dented portion **610**. This makes it easy to shorten the distance between the head modules **2** and the supply channel members **3**, and also makes it easy to shorten the length of the wiring substrates **7**.

[0155] In the present embodiment, the first alignment portions **502** are the bottomed slots provided in the surface of the support member **5** facing in the Z**2** direction and recessed in the Z**1** direction as described above. For this reason, the first alignment portions **502** are not exposed to the outside of the support member **5**. The first alignment portions **502** are not provided in the surface of the support member **5** facing in the Z**1** direction. Therefore, it is possible to prevent mist or the like of

the ink ejected from the nozzles N from adhering to the first alignment portions **502**.
[0156] The above-described supply channel members **3** are arranged in the Z**2** direction relative to the multiple head modules **2**, and overlap the multiple head modules **2** as viewed in the Z**1** direction. In the structure in which the multiple head modules **2** are arranged below the supply channel members **3**, the first alignment portions **502** are provided in the surface of the support member **5** facing in the Z**2** direction. This structure enables easy attachment and detachment for only a sub-unit **15** of a replacement target from below the holder **6** and the supply channel member **3**. Therefore, there is no need to disconnect the channel-forming connections between the sub-units **15** other than the replacement target and the supply channel members **3**, which simplifies the attachment and detachment work.
[0157] Here, the holder **6** and the supply channel member **3** are separate members but may be integrated. Instead, a part of the supply channel member **3** may be a part of the holder **6**.
[0158] A fixing member **151** is inserted into the first fixing hole **61**H and the fixing slot **501**. The support member **5** is fixed to the holder **6** with the fixing members **151**. As illustrated in FIGS. **3**, **4**, and **13**, the fixing members **151** are provided on a per-support member **5** basis. In the present embodiment, two fixing members **151** are provided for one support member **5**.
[0159] The multiple fixing members **151** fix each of the multiple support members **5** to the holder **6** in a detachably-attached manner. Thus, the fixing members **151** can be considered to fix the head modules **2** to the supply channel members **3** by fixing the support members **5** to the holder **6**.
[0160] Each fixing member **151** is inserted in the Z**1** direction into the first fixing hole **61**H as a through hole and the fixing slot **501** as a recess in this order. Thus, a part of the fixing member **151** is exposed from a surface **606** of the holder **6** facing in the Z**2** direction, but the fixing member **151** is not exposed from the surface **511** of the support member **5** facing in the Z**1** direction. Thus, the fixing member **151** is protected from adhesion and solidification of ink mist. This makes it possible to prevent the fixing member **151** from becoming difficult to remove from the holder **6** and the support member **5** due to the adhesion of the mist.
[0161] The depth D**61** of the first fixing hole **61**H is greater than the depth D**51** of the fixing slot **501**. Each of the first fixing hole **61**H and the fixing slot **501** is formed along the Z**1** direction. The depths D**61** and D**51** are defined as depths along the Z**1** direction.
[0162] The sub-unit **15** is small in size and difficult for a user to grasp. The depth D**61** of the first fixing hole **61**H is greater than the depth D**51** of the fixing slot **501**, in other words, the depth D**51** of the fixing slot **501** is smaller than the depth D**61** of the first fixing hole **61**H, so that even if the sub-unit **15** is difficult to grasp, the press-fit of the sub-unit **15** in the holder **6** can be easily released.
[0163] For example, after the fixing members **151** are removed from the first fixing holes **61**H, long rod-shaped members are inserted into the first fixing holes **61**H and the support member **5** is pressed in the Z**1** direction by these members. As a result, the press-fit of the support member **5** in the holder **6** can be released easily. The use of the first fixing holes **61**H as holes for releasing the press-fit makes it possible to easily release the press-fit of the support member **5** in the holder **6**. In the case where the depth D**6** of the holder **6** is greater than the depth D**5** of the support member **5**, the support member **5** can be more easily detached from the holder **6** than in the case where the depth D**6** is smaller than the depth D**5**.
[0164] The distance L**51** from the bottom surface of the fixing slot **501** to the surface **511** of the support member **5** facing in the Z**1** direction is greater than the depth D**51** of the fixing slot **501**. In the case where the distance L**51** is greater than the depth D**51**, the support member **5** is less likely to be deformed in the process of releasing the press-fit of the support member **5** in the holder **6** than in the case where the distance L**51** is smaller than the depth D**5**.
[0165] However, the distance L**51** may be smaller than the depth D**51**. In this case, the distance L**51** is made as small as possible while the depth D**51** necessary for positioning is reserved, so that the thickness D**5** of the support member **5** can be easily reduced. When the thickness D**5** is

reduced, an increase in the paper gap can be suppressed.
[0166] In the present embodiment, the fixing members **151** are screws. Accordingly, female threads are formed on inner circumferential wall surfaces forming the fixing slots **501**. When the fixing members **151** are the screws, the fixing of the support member **5** to the holder **6** can be easily released by rotating and unscrewing the screws. When the fixing members **151** are the screws, the support member **5** can be fixed to the holder **6** in the detachably-attached manner without using an adhesive.
[0167] However, the fixing member **151** may be a member other than the screw. For example, the fixing member **151** may include an L-shaped or T-shaped pin with its tip end in the Z**1** direction bent at a right angle and an elastic member such as a leaf spring or coil spring, and be configured to fix the support member **5** to the holder **6** by using the elastic force of the elastic member.
[0168] As described above, the fixing member **151** may have any structure as long as the fixing member **151** can fix the holder **6** and the support member **5** to each other.
[0169] Moreover, as illustrated in FIGS. **5** and **13**, for example, the two fixing members **151** are provided for each support member **5**. As viewed in the Z**1** direction, the fixing members **151** are arranged so as not to overlap the chip **20** and so as to sandwich the seal areas **4**S between the chip **20** and the fixing members **151**.
[0170] In the case where the fixing members **151** do not overlap the chip **20** as viewed in the Z**1** direction, the load generated for fixing with the fixing members **151** is less likely to be applied to the chip **20** than in the case where the fixing members **151** overlap the chip **20**. Moreover, as viewed in the Z**1** direction, the seal member **4** is arranged between the fixing member **151** and the chip **20**, so that the distance of the chip **20** from the fixing member **151** can be increased by the dimension of the seal member **4**. This also makes the load generated for fixing with the fixing members **151** unlikely to be applied to the chip **20**.
[0171] As illustrated in FIG. **13**, the holder **6** includes multiple fourth alignment portions **642**. The multiple fourth alignment portions **642** are provided in the flange portions **64**. As illustrated in FIG. **5**, the fourth alignment portions **642** are protrusions protruding in the Z**2** direction from surfaces of the flange portions **64** facing in the Z**2** direction. The multiple fourth alignment portions **642** are provided corresponding to the multiple third alignment portions **102** included in the unit base **11** illustrated in FIG. **2** on a one-to-one basis.
[0172] Each of the fourth alignment portions **642** is press-fitted into one of the multiple third alignment portions **102** provided to the unit base **11**, thereby positioning the liquid ejecting head **1** with respect to the unit base **11**. This makes it possible to improve the precision of alignment of the multiple liquid ejecting heads **1** with the unit base **11**.
[0173] In addition, the flange portions **64** are provided with mounting slots **64**H. The mounting slots **64**H correspond to the mounting holes **101** of the unit base **11**. Each of the mounting slots **64**H is a bottomed slot opened in the surface of the flange portion **64** facing in the Z**2** direction and is, for example, a screw slot for mounting the liquid ejecting head **1** to the unit base **11** with a member such as a screw. The flange portions **64** are fixed to the unit base **11** with not-illustrated members such as screws inserted into the mounting holes **101** and the mounting slots **64**H in this order and then tightened. As a result, the liquid ejecting head **1** is fixed to the unit base **11**.
1-3F. Wiring Substrate **7**, Relay Substrate **70**, and Connector **71**
[0174] As illustrated in FIG. **4**, the wiring substrate **7** is provided for each head module **2**. The wiring substrate **7** is inserted into the through hole **20**H of the chip **20** and the through hole **25**H of the channel orifice forming member **25**. The wiring substrate **7** is joined to the vibration plate **204**. The wiring substrate **7** protrudes from the vibration plate **204** in the Z**2** direction. The wiring substrate **7** is a mounting component in which multiple wiring lines for electrically connecting the chip **20** and the relay substrate **70** are formed. The wiring substrate **7** is, for example, a flexible substrate such as a flexible printed circuit (FPC) or a chip on film (COF), or a rigid substrate. From the wiring substrate **7**, each driver element E is supplied with a driving signal and a reference

voltage for driving the driver element E.

[0175] The relay substrate **70** is fixed to the bottom surface of the dented portion **610** in the surface **605** facing in the Z**1** direction of the flat plate portion **61** of the holder **6**. The relay substrate **70** has a flat plate shape, and is fixed to the holder **6** with an adhesive or the like. The relay substrate **70** is electrically connected to the control unit **91**. Multiple connectors **71** are equipped in the relay substrate **70**. The multiple connectors **71** are provided for the multiple wiring substrates **7** on a one-to-one basis. An end portion of the wiring substrate **7** provided with multiple terminals is inserted into each connector **71** in a removably-inserted manner. In other words, it is preferable that wiring substrate **7** be formed of a rigid body in order to facilitate insertion and removal of the end portion of the wiring substrate **7** into and from the connector **71**. In the case where the wiring substrate **7** is formed of a flexible substrate, it is desirable to bond a rigid body to the flexible substrate to support the flexible substrate. When the end portion of the wiring substrate **7** is inserted into the connector **71**, the wiring substrate **7** is electrically connected to the control unit **91** via the relay substrate **70**.

[0176] The relay substrate **70** is electrically connected to the multiple head modules **2**. The relay substrate **70** is arranged in the Z**2** direction, which is opposite to the Z**1** direction, relative to the multiple head modules **2**, and overlaps the multiple head modules **2** as viewed in the Z**1** direction. The first alignment portions **502** are provided on the surface of the support member **5** facing in the Z**2** direction. This arrangement enables easy attachment and detachment for only the sub-unit **15** of the replacement target from below the holder **6** and the relay substrate **70**. Therefore, there is no need to disconnect the electric connections of the sub-units **15** other than the replacement target, which simplifies the attachment and detachment work.

[0177] In the process of attaching only the sub-unit **15** as a replacement to the holder **6** from below the holder **6** as described above, the wiring substrate **7** is moved in the Z**2** direction from below the connector **71** to the connector **71**. Then, the wiring substrate **7** is inserted into the connector **71**. As a result, the wiring substrate **7** is electrically connected to the relay substrate **70**.

1-3G. Bushing

[0178] As illustrated in FIG. **4**, bushings **521** are provided between the multiple support members **5**. Each bushing **521** fills a gap formed between the adjacent support members **5**. For example, as viewed in the Z**1** direction, the bushing **521** has a shape long along the Y axis between the adjacent support members **5**. As illustrated in FIG. **5**, bushings **522** are arranged between the holder **6** and the support member **5**. Specifically, the bushings **522** are arranged between the holder **6** and both longitudinal ends of the support member **5**. Each of the bushings **521** and **522** is made of, for example, an elastic resin material.

[0179] The provision of the bushings **521** and **522** makes it possible to reduce a risk of ink mist or the like entering the storage space inside the dented portion **610** of the holder **6** from the outside of the liquid ejecting head **1**.

2. Modifications

[0180] The first embodiment described above as the example may be modified in various manners. Examples of specific modifications applicable to the above-described first embodiment will be described below. Any two or more modifications selected from the following examples may be combined as appropriate unless they are mutually inconsistent.

2-1. First Modification

[0181] FIGS. **15** and **16** are cross-sectional views of parts of a liquid ejecting head **1** in a first modification. FIG. **17** is a topside view of the liquid ejecting head **1** in the first modification.

[0182] In the first modification illustrated in FIG. **15**, bushings **523** are provided. Although not illustrated in details, each bushing **523** has a rectangular frame shape along an outer periphery of the support member **5** as viewed in the Z**1** direction. These bushings **523** can prevent ink mist or the like from entering the space in the dented portion **610** of the holder **6**. Here, the multiple bushings **523** may be integrally formed as a common member provided in common to the multiple support members **5**.

[0183] As illustrated in FIG. **16**, in the first modification, the support member **5** and the head module **2** are sealed with molds formed of adhesives **531** and **532**. The adhesive **531** forms the mold that seals the channel orifice forming member **25** and the support member **5**. The adhesive **531** overlaps the seal member **4** as viewed in the Z**1** direction. The adhesive **532** forms the mold that seals the chip **20** and the support member **5**. Although not illustrated in details, the adhesive **531** is provided in a rectangular frame shape surrounding the opening **5**H as viewed in the Z**1** direction. The adhesive **532** is provided along an inner peripheral wall of the opening **5**H. These adhesives **531** and **532** can prevent ink mist or the like from entering the space in the dented portion **610** of the holder **6**.

[0184] The holder **6** of the liquid ejecting head **1** in the first modification includes a first member **691** and a second member **692**. The first member **691** and the second member **692** are formed as separate members. The first member **691** is equivalent to the upper portion of the holder **6** in the first embodiment described above. Accordingly, the first member **691** includes the flat plate portion **61** and a part of the sidewall **62**. The second member **692** is equivalent to the lower portion of the holder **6** in the first embodiment described above. The second member **692** includes a part of the sidewall **62** and the multiple partition walls **63**.

[0185] The first member **691** is provided with multiple fixing holes **611**H and **612**H. The second member **692** is provided with multiple fixing slots **613** and fixing holes **614**H. The multiple fixing slots **613** correspond to the multiple fixing holes **611**H on a one-to-one basis, and coincide with the multiple fixing holes **611**H as viewed in the Z**1** direction. The fixing holes **611**H and **612**H are holes passing through the first member **691** in the thickness direction. The fixing holes **611**H do not overlap the dented portion **610** as viewed in the Z**1** direction. The fixing holes **612**H overlap the dented portion **610** as viewed in the Z**1** direction. The fixing holes **614**H pass through the second member **692** in the thickness direction. The fixing holes **614**H do not overlap the dented portion **610** as viewed in the Z**1** direction. The fixing holes **614**H are provided for each support member **5**. The fixing slots **613** are bottomed slots opened on a surface of the second member **692** facing in the Z**2** direction.

[0186] In the first modification, each supply channel member **3** is provided with fixing slots **321**. The fixing slots **321** are bottomed slots opened on a surface of the supply channel member **3** facing in the Z**2** direction. The fixing slot **321** is provided for each fixing hole **612**H and coincides with the fixing hole **612**H as viewed in the Z**1** direction.

[0187] In the first modification, the support member **5** is provided with fixing slots **504**. The fixing slots **504** are bottomed slots opened in the surface **512** of the support member **5** facing in the Z**2** direction. The fixing slot **504** is provided for each fixing hole **614**H and coincides with the fixing hole **614**H as viewed in the Z**1** direction.

[0188] The liquid ejecting head **1** in the first modification includes a fixing member group **150**. The fixing member group **150** includes multiple fixing members **152**, **153**, and **154**.

[0189] The fixing member **152** is inserted into the fixing hole **611**H and the fixing slot **613** in this order. The fixing member **152** fixes the first member **691** and the second member **692** to each other. The fixing member **153** is inserted into the fixing hole **612**H and the fixing slot **321** in this order. The fixing member **153** fixes the first member **691** and the supply channel member **3** to each other. The fixing member **154** is inserted into the fixing hole **614**H and the fixing slot **504** in this order. The fixing member **154** fixes the second member **692** and the support member **5** to each other.

[0190] As illustrated in FIG. **17**, for example, the multiple fixing members **152** are provided near the corners of the holder **6** having a rectangular shape as viewed in the Z**1** direction. For example, the multiple fixing members **153** are provided near the corners of the holder **6** having the rectangular shape as viewed in the Z**1** direction. The fixing members **154** are provided on a per-support member **5** basis.

[0191] The fixing member group **150** fixes the support members **5** to the holder **6**, and indirectly fixes the multiple head modules **2** to the holder **6**. With the multiple fixing members **153** provided,

the supply channel members **3** are not bonded to the holder **6** but are fixed to the holder **6** in a detachably-attached manner. Thus, in addition to the sub-units **15**, the supply channel members **3** are also replaceable.

[0192] The fixing members **152**, **153**, and **154** are, for example, screws, but may be other members such as L-shaped or T-shaped pins described above.

[0193] It is preferable that the fixing member **152** be longer than the fixing member **154** and that the fixing member **152** and the fixing member **154** have male threads with the same outer profile and the same pitch. First, the fixing members **152** are removed from the fixing slots **613**, and thereby the first member **691** is detached from the second member **692**. Next, the fixing members **154** are removed from the fixing slots **504**. After that, the fixing members **152**, which are longer than the fixing members **154**, are fastened to the fixing slots **504**, so that the support member **5** can be moved in the Z**1** direction relative to the second member **692**. Therefore, the press-fit of the second alignment portions **602** in the first alignment portions **502** can be easily released.

2-2. Second Modification

[0194] FIGS. **18** and **19** are cross-sectional views of parts of a liquid ejecting head **1** in a second modification. The liquid ejecting head **1** in the second modification in FIGS. **18** and **19** includes a cover **85**. The cover **85** is fixed to the flange portions **64** of the holder **6**.

[0195] The cover **85** is provided in common to the multiple support members **5**, and covers parts of the multiple support members **5** except for the openings **5**H. The cover **85** is a plate-shaped member and is made of, for example, a metal. The cover **85** is located in the Z**1** direction relative to the multiple support members **5**, and is in contact with the multiple support members **5**. The cover **85** includes multiple opening portions **85**H. The multiple opening portions **85**H are provided for the nozzle surfaces SN of the multiple head modules **2** on a one-to-one basis, and expose the nozzle surfaces SN.

[0196] Moreover, the cover **85** covers sidewall surfaces of the multiple support members **5**. A part of the cover **85** includes a flange **851** in contact with a surface of each flange portion **64** facing in the Z**2** direction. In the flange **851**, a through hole to which a mounting screw **156** is to be inserted is formed. In the flange portion **64**, a thread slot **643** is formed which coincides with the above through hole as viewed in the Z**1** direction. The thread slot **643** is a bottomed slot opened in the surface of the flange portion **64** facing in the Z**1** direction. The cover **85** is fixed to the flange portions **64** with the mounting screws **156** inserted and tightened in the thread slots **643** in a state where the cover **85** is in contact with the multiple support member **5**.

[0197] The cover **85** thus provided reduces the entry of ink mist into the dented portion **610** of the holder **6**.

2-3. Third Modification

[0198] FIGS. **20** and **21** are cross-sectional views of parts of a liquid ejecting head **1** in a third modification. FIG. **22** is a view illustrating the second member **692** included in the holder **6** in the third modification. Hereinafter, mainly different points from those in the first modification will be described.

[0199] In the third modification illustrated in FIG. **20**, bushings **524** are provided. Although not illustrated in details, each bushing **524** has a rectangular frame shape surrounding the opening **5**H of the support member **5** as viewed in the Z**1** direction. These bushings **524** can prevent ink mist or the like from entering the space in the dented portion **610** of the holder **6**.

[0200] As illustrated in FIGS. **21** and **22**, each channel orifice forming member **25** in the third modification includes flanges **209**. The flanges **209** are provided in the Y**1** direction and the Y**2** direction relative to the chip **20** as viewed in the Z**1** direction. As illustrated in FIG. **21**, each flange **209** is provided with a fixing hole **211**H. The support member **5** is provided with a fixing slot **505** corresponding to the fixing hole **211**H. The fixing slot **505** is a bottomed slot opened in the surface of the support member **5** facing in the Z**2** direction. The fixing slot **505** is provided corresponding to the fixing hole **211**H and coincides with the fixing hole **211**H as viewed in the Z**1** direction.

[0201] The fixing member group **150** in the third modification includes multiple fixing members **155**, **152**, and **154**. The fixing member **155** is inserted into the fixing hole **211**H and the fixing slot **505** in this order. The fixing member **155** fixes the channel orifice forming member **25** and the support member **5** to each other. The fixing members **155** are provided on a per-support member **5** basis.

[0202] The fixing member group **150** fixes the support members **5** to the holder **6** and the head modules **2** to the support members **5**, and thus indirectly fixes the multiple head modules **2** to the holder **6**. Since the multiple fixing members **155** are provided, each head module **2** is fixed to the support member **5** without using an adhesive or the like. For this reason, the head module **2** can be easily attached to and detached from the support member **5**. If the fixing members **155** are screws in particular, the head module **2** can be particularly easily attached to and detached from the support member **5**. However, the fixing members **155** may be, for example, L-shaped or T-shaped pins or the like. In the case where the head module **2** is fixed to the support member **5** with the fixing members **155**, misalignment of the multiple head modules **2** can be reduced as compared to the case of the fixing with an adhesive.

[0203] The bushing **524**, the support member **5**, the head module **2**, and the seal member **4** described above overlap each other as viewed in the Z**1** direction. This structure reduces the risk of the flange **209** being deformed due to the reaction force of the seal member **4** as compared with the case where they do not overlap each other.

2-5. Fifth Modification

[0204] FIG. **23** is a cross-sectional view of a part of a liquid ejecting head **1** in a fifth modification. In the liquid ejecting head **1** in the fifth modification illustrated in FIG. **23**, a first alignment portion **502***a* is a pin protruding in the Z**2** direction from the surface of the support member **5** facing in the Z**2** direction. A second alignment portion **602***a* is a bottomed slot opened in the surface of the holder **6** facing in the Z**1** direction. The second alignment portion **602***a* is a dented portion, in other words, a recess, formed in the holder **6** in the Z**2** direction. In the second alignment portion **602***a*, the first alignment portion **502***a* is press-fitted to position the support member **5** with respect to the holder **6**.

[0205] Even such first alignment portion **502***a* and second alignment portion **602***a* also enable easy positioning for attaching each support member **5** to the holder **6** as in the first embodiment. Moreover, the alignment of the multiple support members **5** with the holder **6** can be made with high precision. Thus, the alignment of the multiple head modules **2** with the holder **6** can be made with high precision. In addition, in order to replace only some of the multiple head modules **2**, there is no need to realign all the head modules **2**.

[0206] As described in the first embodiment and the fifth modification, the multiple head modules **2** can be aligned with each other with high precision in the simple method including press-fitting either the second alignment portions **602** or the first alignment portions **502** into the other alignment portions.

[0207] The fourth alignment portion **642***a* is a bottomed slot opened in the surface of the flange portion **64** facing in the Z**2** direction. The fourth alignment portion **642***a* is a dented portion, in other words, a recess, formed in the flange portion **64** in the Z**1** direction. Although not illustrated, a third alignment portion **102** in this case is formed as a protrusion provided to the unit base **11**. In the fourth alignment portion **642***a*, the above third alignment portion **102** is press-fitted to position the liquid ejecting head **1** with respect to the unit base **11**. Therefore, it is possible to improve the precision of alignment of the multiple liquid ejecting heads **1** with the unit base **11**.

2-6. Sixth Modification

[0208] FIG. **24** is a cross-sectional view of a seal member **4** and its surrounding area in a sixth modification. FIG. **25** is a cross-sectional view of a part of a liquid ejecting head **1** in the sixth modification. In the sixth modification illustrated in FIG. **24**, the thickness of the seal member **4** is not constant. The seal member **4** in the sixth modification includes a thick portion **41** and a thin

portion **42**. The thick portion **41** is located near an inner wall surface forming the communication orifice **4**H and is thicker than the thin portion **42**. The thin portion **42** is located outside the thick portion **41**.

[0209] In the case of the sixth modification, the thick portion **41** in the seal member **4** has the seal area **4**S. The thick portion **41** is in contact with the channel orifice forming member **25** and the supply channel member **3**, and is held between the channel orifice forming member **25** and the supply channel member **3**.

[0210] As illustrated in FIG. **25**, the fixing member **151** for fixing the head module **2** and the supply channel member **3** is arranged so as not to overlap the chip **20** and so as to sandwich the seal area **4**S between the fixing member **151** and the chip **20** as viewed in the Z**1** direction. Moreover, the support area **5**S includes an area S**55** arranged between the seal area **4**S and the chip **20** as viewed in the Z**1** direction. This structure can reduce the influence of the reaction force of the seal member **4** on the chip **20** as compared with the case where the support area **5**S does not include the area S**55**.

2-7. Seventh Modification

[0211] FIG. **26** is a cross-sectional view of a seal member **4** and its surrounding area in a seventh modification. In the seventh modification illustrated in FIG. **26**, the seal member **4** includes a portion out of contact with both the supply channel member **3** and the channel orifice forming member **25**. In the seventh modification, a portion of the seal member **4** near the communication orifice **4**H serves as the seal area **4**S. As described above, depending on the shapes of the supply channel member **3** and the channel orifice forming member **25**, the seal member **4** may include a portion that is out of contact with both the supply channel member **3** and the channel orifice forming member **25** and that is not held between the supply channel member **3** and the channel orifice forming member **25**. In the seal member **4**, the portion held between the supply channel member **3** and the channel orifice forming member **25** serves as the seal area **4**S.

2-8. Eighth Modification

[0212] FIG. **27** is a topside view of support members **5***a* in an eighth modification. In the eighth modification illustrated in FIG. **27**, one support member **5***a* holds multiple head modules **2**. In this way, one support member **5***a* does not necessarily have to hold one head module **2**. In this case, one support member **5***a* includes multiple openings **5**H corresponding to the multiple head modules **2**. In this case, the support member **5***a* serves as a reference for positioning the multiple head modules **2**. In the example illustrated, one support member **5***a* supports three head modules **2**. In other words, the support member **5***a* is provided for every three head modules **2**. Two first alignment portions **502** are provided for each support member **5***a*. Thus, the two first alignment portions **502** are provided in common to the three head modules **2**. The support member **5***a* serves as the reference for positioning the three head modules **2**. Two fixing slots **501** are also provided for each support member **5***a*. Thus, the two fixing slots **501** are provided in common to the three head modules **2**.

[0213] In the eighth modification, one support member **5***a* holds multiple head modules **2**. In other words, one support member **5***a* holds two or more head modules **2**. For example, two or more head modules **2** to be replaced at similar timings are held by one support member **5***a*. Thus, the two or more head modules **2** to be replaced at the similar timings may be collectively replaced, which facilitates the replacement work.

[0214] In the eighth modification, for example, the support member **5***a* preferably holds multiple head modules **2** to eject the same type of liquid among the multiple head modules **2**. This makes it possible to collectively replace head modules **2** having similar life spans, such as head modules **2** to eject a type of liquid whose ejection frequency is high (for example, a black ink, a white ink, a pre-treatment liquid such as a reaction liquid to coagulate pigments contained in an ink, a post-treatment liquid such as an overcoat liquid, or the like). As a result, the workability for replacement is improved. However, the two or more head modules **2** held by one support member **5***a* may eject

different types of inks. One head module **2** may be capable of ejecting one type of ink or two or more types of inks.

3. Second Embodiment

[0215] Hereinafter, a second embodiment of the present disclosure will be described. In the embodiment to be described below as an example, the same elements as those in the first embodiment in terms of actions or functions will be designated with the reference signs used for the description of the first embodiment, and detailed description thereof will be omitted if unnecessary.

3-1. Liquid Ejecting Head **1**A

[0216] FIG. **28** is a cross-sectional view of a liquid ejecting head **1**A in a second embodiment viewed in the direction along the Y axis. FIG. **29** is a cross-sectional view of the liquid ejecting head **1**A in the second embodiment viewed in the direction along the X axis.

[0217] As illustrated in FIGS. **28** and **29**, the liquid ejecting head **1**A includes multiple head modules **2**A, seal members **4**, a support member **5**A, a holder **6**A, multiple wiring substrates **7**, a relay substrate **70**, and a fixing member group **150**A.

[0218] In the second embodiment, the two supply channel members **3** in the first embodiment are not provided and the holder **6**A has the function of the two supply channel members **3** in the first embodiment, that is, the function of the common channel member. In other words, the holder **6**A is an example of the "supply channel member". In addition, one support member **5**A holds the multiple head module **2**A. In the second embodiment, the head modules **2**A and the support member **5**A are not fixed to the holder **6**A with an adhesive but are detachably attached to the holder **6**A.

3-1A. Head Module **2**A

[0219] In the second embodiment, the multiple head modules **2**A are provided in the same manner as in the first embodiment. Each head module **2**A in the second embodiment includes a chip **20** and a channel orifice forming member **25**A.

[0220] FIG. **30** is an underside view of the liquid ejecting head **1**A illustrated in FIG. **28**. As illustrated in FIG. **30**, each head module **2**A includes multiple nozzles N to eject the ink as in the first embodiment. The nozzles N are exposed from the opening **5**H of the support member **5**A to be described later.

[0221] FIG. **31** is a topside view of the channel orifice forming members **25**A included in the head module **2**A illustrated in FIG. **28**. As illustrated in FIG. **31**, also in the present embodiment, the planar shape of the channel orifice forming member **25**A is larger than the planar shape of the chip **20** as in the first embodiment. In other words, as viewed in the Z**1** direction, the chip **20** is smaller in outer profile than the channel orifice forming member **25**A.

[0222] As illustrated in FIGS. **29** and **31**, the channel orifice forming member **25**A in the present embodiment includes a flange portion **250** to be fixed to the support member **5**A as in the first embodiment. Then, a surface of the flange portion **250** facing in the Z**1** direction is a supported surface **2511** supported by the support member **5**A. The planar shape of the flange portion **250** and the planar shape of the supported surface **2511** are rectangular frame shapes surrounding the opening **5**H. The channel orifice forming member **25**A in the present embodiment includes a channel **25**R therein as in the first embodiment. A cavity end of the channel **25**R in the Z**1** direction serves as each channel orifice **251**H.

[0223] As illustrated in FIGS. **29** and **31**, each channel orifice forming member **25**A includes two fixing slots **215** and two first alignment portions **216**. The head module **2**A including the channel orifice forming member **25**A can be detachably attached to the holder **6**A. The first alignment portions **216** are used for the purpose of positioning the head module **2**A with respect to the holder **6**A or other purposes. The fixing slots **215** are used to fix the head module **2**A to the holder **6**A.

[0224] The first alignment portions **216** are provided on a surface **252** of the channel orifice forming member **25**A facing in the Z**2** direction. The surface **252** is also a surface of the head

module **2**A facing in the Z**2** direction. In the present embodiment, the first alignment portions **216** are protrusions protruding in the Z**2** direction from the surface **252** of the channel orifice forming member **25**A facing in the Z**2** direction. The two first alignment portions **216** are provided on both longitudinal sides of the channel orifice forming member **25**A across the opening **5**H of the support member **5**A. One of the two first alignment portions **216** is located in the Y**1** direction relative to the opening **5**H, whereas the other is located in the Y**2** direction relative to the opening **5**H.

[0225] The fixing slots **215** are provided in the surface **252** of the channel orifice forming member **25**A facing in the Z**2** direction. The fixing slots **215** are bottomed slots opened in the surface **252** of the channel orifice forming member **25**A facing in the Z**2** direction. Each fixing slot **215** is a dented portion provided in the surface **252** of the channel orifice forming member **25**A facing in the Z**2** direction and may be regarded as a recess formed in the surface **252**. The two fixing slots **215** are provided on both longitudinal sides of the channel orifice forming member **25**A across the through hole **25**H, that is, both longitudinal sides thereof across the opening **5**H of the support member **5**A. One of the two fixing slots **215** is located in the Y**1** direction relative to the opening **5**H, whereas the other is located in the Y**2** direction relative to the opening **5**H.

[0226] Each fixing slot **215** located in the Y**1** direction relative to the opening **5**H is closer to the opening **5**H than the first alignment portion **216** located in the Y**1** direction relative to the opening **5**H is. Similarly, each fixing slot **215** located in the Y**2** direction relative to the opening **5**H is closer to the opening **5**H than the first alignment portion **216** located in the Y**2** direction relative to the opening **5**H is. The first alignment portions **216** and the fixing slots **215** do not overlap the opening **5**H as viewed in the Z**1** direction. The distance from the opening **5**H increases in the order of the two channel orifices **251**H, the fixing slot **215**, and the first alignment portion **216**. Among them, the two channel orifices **251**H are located closest to the opening **5**H.

[0227] The minimum distance between the fixing slot **215** and the opening **5**H is shorter than the minimum distance between the first alignment portion **216** and the opening **5**H, but may be longer than the latter distance. Further, the first alignment portions **216**, the fixing slots **215**, and the opening **5**H are arranged along the longitudinal direction of the support member **5**A, but do not have to be arranged along the longitudinal direction. For example, the first alignment portions **216** may be provided on both sides of the opening **5**H along the X axis.

3-1B. Holder **6**A

[0228] The holder **6**A illustrated in FIGS. **28** and **29** holds and stores the multiple head modules **2**A and includes a common channel to supply and distribute the ink to the multiple head modules **2**A. The holder **6**A is provided in common to the multiple head module **2**A.

[0229] As illustrated in FIG. **29**, the holder **6**A includes channels **6**R. Each channel **6**R supplies the ink to each of the head modules **2**A and distributes the ink to the head modules **2**A. The channel **6**R is a common channel provided in common to the multiple head modules **2**A. Accordingly, the holder **6**A includes supply channel members including the channels **6**R serving as the common channels. Each channel **6**R is the common channel provided in common to the multiple head modules **2** and includes a common portion **6**RA extended along the X axis and multiple branched portions **6**RB branched off from the common portion **6**RA and extended in the Z**1** direction. Although not illustrated, the holder **6**A is provided with a channel joint for connecting to a supply channel outside the liquid ejecting head **1** so as to communicate with the liquid reservoir section **9**. This channel joint not illustrated is exposed to outside of the liquid ejecting head **1** through, for example, a not-illustrated opening formed in the holder **6**A.

[0230] The holder **6**A may include multiple channels **6**R communicating with the multiple head modules **2**. Specifically, instead of the channel **6**R including the common portion **6**RA communicating with the multiple head modules **2**, the holder **6**A may include the multiple channels **6**R communicating with the respective multiple head modules **2**.

[0231] A head module **2**A side, in other words, a downstream side of the channel **6**R is provided with channel orifices **650**H. Each channel orifice **650**H is a cavity end of the channel **6**R in the Z**1**

direction. The channel orifices **650**H are provided corresponding to the channel orifices **251**H of the head module **2**A. Each channel orifice **650**H is an orifice for a channel-forming connection between the channel **25**R of the head module **2**A and the channel **6**R of the holder **6**A.
[0232] FIG. **32** is an underside view of the holder **6**A and the relay substrate **70** illustrated in FIG. **28**. FIG. **33** is a topside view of the holder **6**A illustrated in FIG. **28**. As illustrated in FIGS. **29** and **32**, a dented portion **610**A of the holder **6**A includes a first dented portion **611** and a second dented portion **612**. As illustrated in FIG. **29**, the second dented portion **612** is formed in a bottom surface of the first dented portion **611**. The opening area of the second dented portion **612** is smaller than the opening area of the first dented portion **611**. Accordingly, the dented portion **610**A includes a step surface. The relay substrate **70** is arranged on the bottom surface of the dented portion **610**A, more specifically, on the bottom surface of the second dented portion **612**.
[0233] As illustrated in FIG. **29**, the holder **6**A includes two fixing holes **651**H, two fixing holes **652**H, and two second alignment portions **653**. The fixing holes **651**H are used to fix the head module **2**A to the holder **6**A. The fixing holes **652**H are used to fix the support member **5**A to the holder **6**A. The second alignment portions **653** are used to position the head module **2**A with respect to the holder **6**A.
[0234] Each fixing hole **651**H is a hole passing through the holder **6**A in the Z**1** direction. The two fixing holes **651**H are provided for each head module **2**A. Each fixing hole **651**H is provided in the Y**1** direction or the Y**2** direction relative to the second dented portion **612** as viewed in the Z**1** direction. The two fixing holes **651**H are provided corresponding to the above-described two fixing slots **215** and coincide with the two fixing slots **215** as viewed in the Z**1** direction. The fixing holes **651**H do not overlap the chip **20** but overlap the channel orifice forming member **25**A as viewed in the Z**1** direction. An opening end of each fixing hole **651**H in the Z**1** direction is opened on the bottom surface of the first dented portion **611** as viewed in the Z**1** direction.
[0235] Each fixing hole **652**H is a hole passing through the holder **6**A in the Z**1** direction. The multiple fixing holes **652**H are, for example, four fixing holes **652**H, and are respectively provided at four corners of the rectangular holder **6**A as viewed in the Z**1** direction. The fixing holes **652**H are provided corresponding to fixing slots **503** of the support member **5**A and coincide with the fixing slots **503** as viewed in the Z**1** direction.
[0236] The second alignment portions **653** are provided in a surface **605** of the holder **6**A facing in the Z**1** direction. The two second alignment portions **653** are provided for each head module **2**A. In the present embodiment, the second alignment portions **653** are bottomed slots opened in the surface **605** of the holder **6**A facing in the Z**1** direction, specifically, the bottom surface of the first dented portion **611**. In other words, the second alignment portions **653** are dented portions formed in the bottom surface of the first dented portion **611**. Each second alignment portion **653** is provided in the Y**1** direction or the Y**2** direction relative to the second dented portion **612** as viewed in the Z**1** direction. The two second alignment portions **653** are provided corresponding to the above-described two first alignment portions **216** and coincide with the first alignment portions **216** as viewed in the Z**1** direction. Accordingly, the multiple second alignment portions **653** are provided for the multiple first alignment portions **216** on a one-to-one basis.
[0237] As viewed in the Z**1** direction, the fixing holes **651**H are closest to the opening **5**H and the fixing holes **652**H are farthest from the opening **5**H among the fixing holes **651**H, the second alignment portions **653**, and the fixing holes **652**H. The distances from the opening **5**H to the fixing holes **651**H, the second alignment portions **653**, and the fixing holes **652**H may be equal to or different from each other.
3-1C. Seal Member **4**
[0238] As illustrated in FIGS. **28** and **29**, the seal members **4** are provided between each head module **2**A and the holder **6**A in the Z**1** direction. The seal members **4** are squeezed by the head module **2**A and the holder **6**A.
[0239] FIG. **34** is a topside view of the seal members **4** illustrated in FIG. **28**. In the present

embodiment, two seal members **4** are provided for each head module **2**A as in the first embodiment. The two seal members **4** overlap the flange portion **250** of the channel orifice forming member **25**A. The seal members **4** are provided at positions different from the chip **20** as viewed in the Z**1** direction. In other words, the seal members **4** do not overlap the chip **20** as viewed in the Z**1** direction.

[0240] Each of communication orifices **4**H of each seal member **4** is provided corresponding to one of the channel orifices **251**H of the channel orifice forming member **25**A and one of the channel orifices **650**H of the holder **6**A. The communication orifice **4**H coincides with both the channel orifice **650**H and the channel orifice **251**H as viewed in the Z**1** direction. The seal member **4** is squeezed between the channel orifice forming member **25**A and the holder **6**A to allow the channel **25**R and the channel **6**R to communicate with each other via the communication orifices **4**H. The seal member **4** is a member for liquid-tightly connecting the channel orifices **251**H of the head module **2**A and the channel orifices **650**H of the holder **6**A.

[0241] As illustrated in FIG. **33**, in the present embodiment, the seal member **4** has a seal area **4**S as in the first embodiment. The entire area of the seal member **4** serves as the seal area **4**S. The seal area **4**S is an area of the seal member **4** that is in contact with both the channel orifice forming member **25**A and the holder **6**A and is held between the channel orifice forming member **25**A and the holder **6**A. The seal area **4**S is an area that receives a load from the channel orifice forming member **25**A and the holder **6**A so as to liquid-tightly connect the channel orifices **251**H and the channel orifices **650**H.

[0242] In the present embodiment, the seal members **4** are provided at the positions different from the chip **20** as viewed in the Z**1** direction, and accordingly the seal areas **4**S are provided at the positions different from the chip **20** as viewed in the Z**1** direction as in the first embodiment. In other words, the seal areas **4**S do not overlap the chip **20** as viewed in the Z**1** direction. Thus, it is possible to produce the same effects as in the first embodiment.

[0243] In the present embodiment, for example, the leftmost head module **2**A in FIG. **34** is referred to as a "first head module **2***a*". The next head module **2**A to the right of the first head module **2***a* is referred to as a "second head module **2***b*". In this case, the seal members **4** corresponding to the first head module **2***a* are referred to as "first seal members **4***a*" and the seal members **4** corresponding to the second head module **2***b* are referred to as "second seal members **4***b*". The first seal members **4***a* are held between the first head module **2***a* and the holder **6**A, thereby liquid-tightly connecting the first channel orifices **251**Ha of the first head module **2***a* and the corresponding channel orifices **650**H. Similarly, the second seal members **4***b* are held between the second head module **2***b* and the holder **6**A, thereby liquid-tightly connecting the second channel orifices **251**Hb of the second head module **2***b* and the corresponding channel orifices **650**H. Both the first head module **2***a* and the second head module **2***b* eject the ink supplied from the holder **6**A including the supply channel members.

[0244] Then, none of the communication orifices **4**H, the channel orifices **251**H, and the channel orifices **650**H overlaps the chip **20** as viewed in the Z**1** direction. The communication orifices **4**H, the channel orifices **251**H, and the channel orifices **650**H are arranged outside the chip **20** as viewed in the Z**1** direction. For this reason, the seal areas **4**S of the seal members **4** which liquid-tightly seal the channels **25**R and **6**R as described above may be arranged outside the chip **20**. Thus, it is possible to produce the same effects as in the first embodiment.

[0245] In addition, each of the seal areas **4**S is arranged in the Y**1** direction or the Y**2** direction, which is the longitudinal direction of the head module **2**A, relative to the chip **20** as viewed in the Z**1** direction. Thus, it is possible to produce the same effects as in the first embodiment.

3-1D. Support Member **5**A

[0246] The support member **5**A illustrated in FIGS. **28** and **29** is a member that supports the multiple head modules **2**A. The support member **5**A is provided in common to the multiple head modules **2**A but may be provided individually for the respective head modules **2**A. The support

member **5**A is a plate-shaped member that is long along the Y axis while a thickness direction thereof is a direction along the Z axis. The support member **5**A is arranged in the Z**1** direction relative to the multiple channel orifice forming members **25**A. The support member **5**A is a member that does not include any channel through which the ink flows. The support member **5**A is fixed to the holder **6**A in a detachably-attached manner.

[0247] FIG. **35** is a topside view of the support member **5**A illustrated in FIG. **28**. As illustrated in FIGS. **29** and **35**, the support member **5**A includes multiple support areas **5**S. In FIG. **35**, the support areas **5**S are hatched and areas S**50** are dotted for facilitating understanding. As illustrated in FIG. **29**, the support area **5**S is in contact with the supported surface **2511** of the channel orifice forming member **25**A. As illustrated in FIG. **35**, each support area **5**S includes the areas S**50** overlapping the seal areas **4**S as viewed in the Z**1** direction. Thus, it is possible to produce the same effects as in the first embodiment.

[0248] As in the first embodiment, the supported surface **2511** of the channel orifice forming member **25**A is supported by being in contact with the support member **5**A while surrounding the opening **5**H of the support member **5**A as viewed in the Z**1** direction. Specifically, the head module **2**A is held by the support member **5**A with the supported surface **2511** put in contact with the support area **5**S of the support member **5**A. Thus, it is possible to produce the same effects as in the first embodiment.

[0249] Moreover, also in the present embodiment, the thickness D**5** of the support member **5**A in the Z**1** direction is larger than the thickness D**2** of the chip **20** in the Z**1** direction as in the first embodiment. Thus, it is possible to produce the same effects as in the first embodiment.

[0250] The relationship between the thickness D**5** and the thickness D**2** and the specific numeric value of the thickness D**5** are the same as in the first embodiment.

[0251] In addition, also in the present embodiment, as illustrated in FIG. **29**, in addition to the chip **20**, a part of the channel orifice forming member **25**A is arranged in the opening **5**H of the support member **5**A as in the first embodiment. Thus, it is possible to produce the same effects as in the first embodiment.

[0252] Also in the present embodiment, the nozzle surface SN of the chip **20** is approximately flush with the surface **511** of the support member **5**A facing in the Z**1** direction as in the first embodiment.

[0253] As illustrated in FIGS. **29** and **35**, the support member **5**A includes the multiple fixing slots **503**. The fixing slots **503** are used to fix the support member **5**A to the holder **6**A. As illustrated in FIG. **29**, the fixing slots **503** are provided in the surface **512** of the support member **5**A facing in the Z**2** direction. Each fixing slot **503** is a bottomed slot provided in the surface **512** of the support member **5**A facing in the Z**2** direction. Each fixing slot **503** is a dented portion provided in the surface **512** of the support member **5**A facing in the Z**2** direction and may be regarded as a recess formed in the surface **512**.

[0254] The support member **5**A, the above-described holder **6**A, and the multiple head modules **2**A can be detachably attached to each other. It is possible to detach the support member **5**A from the holder **6**A and individually detach each of the head modules **2** from the holder **6**A. In the process of detaching each of the head modules **2**A from the holder **6**A, the wiring substrate **7** attached to the head module **2**A is detached from the connector **71**. Thus, each of the head modules **2**A can be detached individually from the holder **6**A. Therefore, it is possible to recycle the liquid ejecting head **1** by replacing each of the head modules **2**A.

[0255] The first alignment portions **216** of the above-described channel orifice forming member **25**A are press-fitted into the above-described second alignment portions **653** to position the head module **2**A with respect to the holder **6**A. The first alignment portions **216** and the second alignment portions **653** are provided on a per-holder **6**A basis, in other words, for each of the head modules **2**A held by the support member **5**A.

[0256] The provision of the first alignment portions **216** and the second alignment portions **653**

described above enables easy positioning for attaching each head module **2**A to the holder **6**A. Moreover, since the first alignment portions **216** and the second alignment portions **653** are provided for each head module **2**A, it is possible to align the multiple head modules **2**A with each other with high precision. For this reason, in order to replace only some of the multiple head modules **2**A, there is no need to realign all the head modules **2**A.

[0257] Moreover, the multiple head modules **2**A can be aligned with each other with high precision in the simple method including press-fitting the first alignment portions **216** into the second alignment portions **653**. This allows only a desired head module **2**A to be replaced easily among the multiple head module **2**A. This makes it easy to repair the liquid ejecting head **1**A.

[0258] Moreover, since each head module **2**A is provided with the alignment portions, the support member **5**A can be formed of a single member common to the multiple head modules **2**A unlike the first embodiment. Accordingly, the number of components can be reduced as compared with the first embodiment.

[0259] The channel orifices **650**H and the channel orifices **251**H correspond to each other as descried above. Specifically, the channel orifices **650**H and the channel orifices **251**H coincide with each other in the direction in which the first alignment portions **216** or the second alignment portions **653** are press-fitted into the other alignment portions, namely, in the direction along the Z axis. In other words, the direction in which the channel orifices **650**H and the channel orifices **251**H coincide with each other is the same as the direction in which the first alignment portions **216** are press-fitted into the second alignment portions **653**. For this reason, in the process of attaching the head module **2**A to the holder **6**A, the channel-forming connections between the channels **6**R and the channels **25**R can be easily made with high precision. In the positioning of the head module **2**A with respect to the holder **6**A, the highly-precise positioning for the channel-forming connections can be performed simultaneously and easily.

[0260] Moreover, the multiple second alignment portions **653** are arranged in the surface **605** of the holder **6**A facing in the Z**1** direction, specifically, the bottom surface of the first dented portion **611**. The first alignment portions **216** are arranged on the surface **252** of the support member **5**A facing in the Z**2** direction opposite to the Z**1** direction.

[0261] This arrangement of the first alignment portions **216** and the second alignment portions **653** makes it possible to easily attach or detach only a head module **2**A of a replacement target from below the holder **6**A. For this reason, when a new head module **2**A as a replacement for a head module **2**A to be replaced is attached to the holder **6**A again, it is only necessary to make channel-forming connections of the new head module **2**A to the holder **6**A. Therefore, there is no need to make channel-forming connections of the head modules **2**A other than the replacement target to the holder **6**A. Thus, the attachment and detachment work for repairing the liquid ejecting head **1**A can be simplified.

[0262] The relay substrate **70** is arranged in the Z**2** direction relative to the multiple head modules **2**A, and overlaps the multiple head modules **2**A as viewed in the Z**1** direction. The first alignment portions **216** are provided on the surface **252** of the channel orifice forming member **25**A facing in the Z**2** direction. This structure enables easy attachment and detachment for only the head module **2**A of the replacement target from below. Therefore, there is no need to disconnect the electric connections of the head modules **2**A other than the replacement target, which simplifies the attachment and detachment work.

[0263] The wiring substrate **7** is arranged on the bottom surface of the dented portion **610**A of the holder **6**A. In this case, a length of the head module **2**A and the wiring substrate **7** can be more easily reduced than in the case where the wiring substrate **7** is arranged on the surface **606** of the holder **6**A facing in the Z**2** direction. In the present embodiment, the first alignment portions **216** are the protrusions provided on the surface **252** as described above. For this reason, the first alignment portions **216** are not exposed to the nozzle surface SN side. This makes it possible to prevent ink mist or the like from adhering to the first alignment portions **216**.

[0264] The holder **6**A is regarded as including the common channel member including one or more channels **6**R communicating with the multiple head modules **2**A as described above. The holder **6**A including the common channel member is arranged in the Z**2** direction relative to the multiple head modules **2**A and overlaps the multiple head modules **2**A as viewed in the Z**1** direction. The first alignment portions **216** are provided on the surface **252** of the channel orifice forming member **25**A facing in the Z**2** direction. This structure enables easy attachment and detachment for only the head module **2**A of the replacement target from below. Therefore, there is no need to disconnect the channel-forming connections between the holder **6**A and the head modules **2**A other than the replacement target, which simplifies the attachment and detachment work.
[0265] In addition, as described above, the first alignment portions **216** are provided on the surface of the channel orifice forming member **25**A opposite to the surface provided with the chip **20**, that is, the surface **252** facing in the Z**2** direction. The first alignment portions **216** do not overlap the chip **20** as viewed in the Z**1** direction. This arrangement of the first alignment portions **216** makes it possible to, in the process of press-fitting the first alignment portions **216** into the second alignment portions **653** of the holder **6**A, prevent the load due to the press-fit from acting on the chip **20**.
[0266] Moreover, the holder **6**A includes the first dented portion **611** whose bottom surface is the surface in which the multiple second alignment portions **653** are arranged as described above. Here, the bottom surface of the dented portion **610**A includes the bottom surface of the first dented portion **611** and the bottom surface of the second dented portion **612**. The support member **5**A is fixed in contact with an outer peripheral wall of the dented portion **610**A, that is, the surface **605** of the holder **6**A facing in the Z**1** direction. Then, the support member **5**A includes the multiple openings **5**H for exposing the respective multiple head modules **2**A to the outside as described above.
[0267] When the support member **5**A is thus provided, the support member **5**A allows the nozzle surface SN serving as the ink ejection surface to be exposed and prevents ink mist from entering the inside of the dented portion **610**A of the holder **6**A.
3-1E. Fixing Member Group **150**A
[0268] As illustrated in FIG. **29**, the fixing member group **150**A includes multiple fixing members **155** and multiple fixing members **157**.
[0269] The fixing members **155** fix the support member **5**A to the holder **6**A. Each fixing member **155** is inserted into the fixing hole **652**H as the through hole and the fixing slot **503** as the dented portion in this order. For this reason, the fixing member **155** is not exposed to the nozzle surface SN side. Meanwhile, a part of the fixing member **155** is exposed from the surface **606** of the holder **6**A facing in the Z**2** direction.
[0270] For example, after the fixing members **155** are removed from the fixing holes **652**H, long rod-shaped members are inserted into the fixing holes **652**H and the support member **5**A is pressed in the Z**1** direction by these members. In this way, the press-fit of the support member **5**A in the holder **6**A can be released easily. More specifically, the press-fit of the support member **5**A in the holder **6**A can be easily released by using the fixing holes **652**H as holes for releasing the press-fit.
[0271] The fixing members **157** directly fix the head module **2**A to the holder **6**A. Each fixing member **157** is inserted into the fixing hole **651**H as the through hole and the fixing slot **215** as the dented portion in this order. For this reason, the fixing member **157** is not exposed to the surface of the liquid ejecting head **1**A facing in the Z**1** direction, specifically, the nozzle surface SN side. Meanwhile, a part of the fixing member **157** is exposed from the surface **606** of the holder **6**A facing in the Z**2** direction. Since the fixing members **157** are not exposed on the nozzle surface SN side, the fixed members **157** are protected from adhesion and solidification of ink mist. This makes it possible to prevent the fixing members **157** from becoming difficult to remove from the holder **6**A and the head module **2**A due to the adhesion of the mist.
[0272] For example, after the fixing members **157** are removed from the fixing holes **651**H, long rod-shaped members are inserted into the fixing holes **651**H, and the head module **2**A is pressed in

the Z**1** direction by these members. In this way, the press-fit of the head module **2**A in the holder **6**A can be released easily. More specifically, the press-fit of the head module **2**A in the holder **6**A can be easily released by using the fixing holes **651**H as holes for releasing the press-fit.
[0273] A depth D**66** of the fixing hole **651**H is greater than a depth D**26** of the fixing slot **215**. In the case where the depth D**66** is greater than the depth D**26**, the channel orifice forming member **25**A is detached from the holder **6**A more easily than in the case where the depth D**66** is smaller than the depth D**26**.
[0274] As illustrated in FIG. **33**, for example, the multiple fixing members **155** are provided near the corners of the rectangular holder **6**A as viewed in the Z**1** direction. The multiple fixing members **157** are provided on the per-head module **2**A basis. Specifically, two fixing members **157** are provided for each head module **2**A. One of the two fixing members **157** is located in the Y**1** direction relative to the head module **2**A, whereas the other is located in the Y**2** direction relative to the head module **2**A as viewed in the Z**1** direction.
[0275] Both the fixing members **155** and **157** are preferably screws. Accordingly, for example, female threads are formed on wall surfaces forming the fixing holes **651**H, the fixing holes **652**H, the fixing slots **215**, and the fixing slots **503**. When the fixing members **155** and **157** are the screws, the fixing of the support member **5**A and the multiple head modules **2**A to the holder **6**A can be easily released by rotating and unscrewing the screws. When the fixing members **155** and **157** are the screws, the multiple head modules **2**A and the support member **5**A can be attached to and detached from the holder **6**A as needed without using an adhesive.
[0276] The fixing members **155** and **157** may be members other than the screws, and may be L-shaped or T-shaped pins as in the first embodiment.
[0277] As viewed in the Z**1** direction, the fixing members **155** and **157** are arranged so as not to overlap the chip **20** and so as to sandwich the seal areas **4**S between the chip **20** and the fixing members **155** and **157**.
[0278] In the case where the fixing members **155** and **157** do not overlap the chip **20** as viewed in the Z**1** direction, the load generated for fixing with the fixing members **155** and **157** is less likely to be applied to the chip **20** than in the case where the fixing members **155** and **157** overlap the chip **20**. Moreover, as viewed in the Z**1** direction, the seal member **4** is arranged between the fixing members **155** and **157** and the chip **20**, so that the distances of the chip **20** from the fixing members **155** and **157** can be made longer by the dimension of the seal member **4**. This also makes the load generated for fixing with the fixing members **155** and **157** unlikely to be applied to the chip **20**.
3-1F. Bushing
[0279] As illustrated in FIG. **29**, a bushing **526** is arranged between each channel orifice forming member **25**A and the support member **5**A. Although not illustrated in details, the bushing **526** has a rectangular frame shape along an outer periphery of the channel orifice forming member **25**A as viewed in the Z**1** direction. The bushing **526** is made of, for example, an elastic elastomer. The provision of the bushing **526** makes it possible to reduce a risk of ink mist or the like entering the storage space inside the dented portion **610**A of the holder **6**A from the outside of the liquid ejecting head **1**A.
4. Modifications
[0280] The second embodiment described above as the example may be modified in various manners. Examples of specific modifications applicable to the above-described second embodiment will be described below. Any two or more modifications selected from the following examples may be combined as appropriate unless they are mutually inconsistent.
4-1. Ninth Modification
[0281] FIG. **36** is a cross-sectional view of a part of a liquid ejecting head **1**A in a ninth modification. The fixing member **157** in the ninth modification illustrated in FIG. **36** fixes the support member **5**A in addition to the holder **6**A and the head module **2**A. In the ninth modification, the fixing members **155** are omitted. According to the ninth modification, the number

of fixing members can be reduced as compared with the second embodiment. Thus, according to the ninth modification, the head module **2**A can be attached to and detached from the holder **6**A by using a smaller number of fixing members than in the first embodiment.

4-2. Tenth Modification

[0282] FIG. **37** is a cross-sectional view of a part of a liquid ejecting head **1**A in a tenth modification. In the tenth modification illustrated in FIG. **37**, the holder **6**A does not include the second dented portion **612**. The dented portion **610**A of the holder **6**A in the tenth modification does not have the step surface. The dented portion **610**A is a storage space for storing the relay substrate **70**.

[0283] The support member **5**A in the tenth modification includes a bottom plate portion **51** and a sidewall **52**. The bottom plate portion **51** has a plate shape and has the same structure as the support member **5**A in the first embodiment. The sidewall **52** is a frame-shaped portion protruding from an outer edge of the bottom plate portion **51** in the Z**2** direction. The support member **5**A has a dented portion **510**. An inside of the dented portion **510** forms a storage space for storing the multiple head modules **2**A.

[0284] The shapes of the holder **6**A and the support member **5**A are not particularly limited as described above, but may be any shapes as appropriate. One or both of the holder **6**A and the support member **5**A form the space for storing the head modules **2**A.

[0285] The holder **6**A in the tenth modification is provided with a fourth alignment portion **642**. The fourth alignment portion **642** is provided on the surface **606** of the holder **6**A facing in Z**2** direction.

[0286] In the tenth modification, for example, each head module **2**A is fixed to the support member **5**A with an adhesive or the like. For this reason, the head module **2**A can be detached from the holder **6**A by removing the fixing members **155** and then melting the adhesive with heat. In other words, even when the head module **2**A is fixed to the support member **5**A with the adhesive, the head module **2**A can be considered to be fixed to the support member **5**A in the detachably-attached manner if the head module **2**A can be separated from the support member **5**A by melting the adhesive with heat or doing the like.

4-3. Eleventh Modification

[0287] FIG. **38** is a cross-sectional view of a part of a liquid ejecting head **1**A in an eleventh modification. In the eleventh modification illustrated in FIG. **38**, the support member **5**A is omitted. According to the eleventh modification, the number of components can be reduced as compared with the second embodiment. Since the support member **5**A is omitted, the head module **2**A can be attached to and detached from the holder **6**A more easily than in the second embodiment.

[0288] The fixing members **157** directly fix the head module **2**A to the holder **6**A. The fixing members **157** do not overlap the chip **20** as viewed in the Z**1** direction. Even when the liquid ejecting head **1**A does not include the support member **5**A, the above arrangement makes it possible to make the reaction force of the seal member **4** unlikely to be transmitted to the chip **20**.

4-4. Twelfth Modification

[0289] FIG. **39** is a cross-sectional view of a part of a liquid ejecting head **1**A in a twelfth modification. The liquid ejecting head **1**A in the twelfth modification illustrated in FIG. **39** includes a holder **8**. The holder **8** includes a first holder **81** and a second holder **82**. The first holder **81** is the same as the holder **6**A in the second embodiment except that the flange portions **64** are omitted.

[0290] The second holder **82** is the same as the support member **5**A in the second embodiment except for the following elements. As viewed in the Z**1** direction, the second holder **82** includes portions extended more in the Y**1** direction and the Y**2** direction than the first holder **81**. The extended portions are provided with fourth alignment portions **824**. The fourth alignment portion **824** has the same structure as the fourth alignment portion **642** in the second embodiment, and is press-fitted into the third alignment portion **102** of the unit base **11**.

[0291] The second holder **82** also includes multiple fixing slots **821** and multiple second alignment

portions **822**. Two fixing slots **821** are provided for each head module **2**A. One of the two fixing slots **821** is located in the Y**1** direction relative the chip **20**, whereas the other is located in the Y**2** direction relative to the chip **20** as viewed in the Z**1** direction. Each fixing slot **821** is a slot opened in a surface **512** of the second holder **82** facing in the Z**2** direction. The fixing slot **821** may be referred to as a dented portion formed in the surface **512** of the second holder **82** facing in the **22** direction. The head module **2**A includes fixing holes **218**H corresponding to the fixing slots **821**. Each fixing hole **218**H is a hole passing through the channel orifice forming member **25**A of the head module **2**A.

[0292] Two second alignment portions **822** are provided for each head module **2**A. One of the two second alignment portions **822** is located in the Y**1** direction relative to the chip **20**, whereas the other is located in the Y**2** direction relative to the chip **20** as viewed in the Z**1** direction. Each second alignment portion **822** is a slot opened in the surface **512** of the second holder **82** facing in the Z**2** direction. The second alignment portion **822** is a dented portion formed in the surface **512** of the second holder **82** facing in the Z**2** direction and may be regarded as a recess formed in the surface **512**.

[0293] In addition, the head module **2**A includes first alignment portions **217** corresponding to the second alignment portions **822**. The first alignment portions **217** are protrusions protruding in the Z**1** direction from the surface **251** of the channel orifice forming member **25**A facing in the Z**1** direction. The first alignment portions **217** are press-fitted into the second alignment portions **822**. Thus, the head module **2**A is positioned with respect to the holder **8** including the second holder **82**.

[0294] A fixing member **158** is inserted into the fixing hole **218**H and the fixing slot **821** in this order. The fixing member **158** is, for example, a screw, and female threads are formed on inner wall surfaces forming the fixing hole **218**H and the fixing slot **821**. The head module **2**A is fixed to the second holder **82** with the fixing members **158** inserted and screwed in the fixing holes **218**H and the fixing slots **821**. The first holder **81** and the second holder **82** are fixed to each other with the fixing members **155** as in the case of the support member **5**A and the holder **6**A in the second embodiment.

[0295] The second holder **82** of the holder **8** includes multiple openings **5**H as in the support member **5**A. From the multiple openings **5**H, the respective multiple head modules **2**A are exposed to the outside. Then, a part of the channel orifice forming member **25**A is inserted into each of the openings **5**H. For this reason, with the second holder **82** including the multiple openings **5**H, an increase in the paper gap can be suppressed as in the case of the support member **5**A in the second embodiment. In addition, there is no need to reduce the thickness of the second holder **82** in order to suppress the increase in the paper gap. Accordingly, the stiffness of the second holder **82** can be kept from decreasing.

4-6. Thirteenth Modification

[0296] FIG. **40** is a cross-sectional view of a part of a liquid ejecting head **1**A in a thirteenth modification. In the thirteenth modification illustrated in FIG. **40**, the fixing holes **218**H, the fixing slots **821**, and the fixing members **158** are omitted as compared with the twelfth modification. In the thirteenth modification, the support member **5**A and the holder **6**A may be fixed to each other with the fixing members **155** so as to sandwich the seal members **4** and the head modules **2**A in between.

[0297] The second holder **82** and the head modules **2**A may be fixed with an adhesive or the like. In the case where the second holder **82** and the head modules **2**A are fixed with the adhesive, the second holder **82** and the head modules **2**A can be considered to be fixed in the detachably-attached manner if each of the head modules **2**A can be separated from the second holder **82** by, for example, melting the adhesive with heat.

4-7. Fifteenth Modification

[0298] FIG. **41** is a cross-sectional view of a part of a liquid ejecting head **1**A in a fifteenth modification. FIG. **42** is a topside view of the liquid ejecting head **1**A in the fifteenth modification.

In the fifteenth modification illustrated in FIG. **41**, a positional relationship of the fixing members **157** and the seal members **4** with the chip **20** is different. The minimum distance between the fixing member **157** and the chip **20** is shorter than the minimum distance between the seal member **4** and the chip **20**.

[0299] As illustrated in FIG. **42**, the fixing members **157** are arranged between the chips **20** and the seal areas **4**S so as not to overlap the chips **20** as viewed in the Z**1** direction. This arrangement is likely to generate the reaction force outside the fixing members **157** as viewed from the chips **20**. Therefore, the reaction force of the seal members **4** can be made particularly unlikely to be transmitted to the chips **20**.

4-8. Sixteenth Modification

[0300] FIG. **43** is a cross-sectional view of a part of a liquid ejecting head **1**A in a sixteenth modification. FIG. **44** is a topside view of the liquid ejecting head **1**A in the sixteenth modification. In the sixteenth modification illustrated in FIGS. **43** and **44**, the fixing members **157** overlap the chips **20** as viewed in the Z**1** direction. Even when the fixing members **157** overlap the chips **20** as viewed in the Z**1** direction, the presence of the support member **5**A may reduce the influence of the reaction force of the seal members **4** on the chips **20** as compared with the case where the support member **5**A is absent.

5. Other Modifications

[0301] The embodiments and the modifications described above as the examples may be modified in various manners. Examples of specific modifications applicable to the above-described embodiments and modifications will be described below. Any two or more modifications selected from the following examples may be combined as appropriate unless they are mutually inconsistent.

[0302] In the above description, the seal members **4** are provided for each head module **2**, but a single seal member **4** may be provided in common to the multiple head modules **2**.

[0303] The “first alignment portion” and the “second alignment portion” are not limited to the structures described in the above embodiments and modifications, as long as one of these portions is press-fitted into the other.

[0304] In the above embodiments, the serial type of liquid ejecting apparatus **100** is described as the example, but the liquid ejecting apparatus may be of a line type in which the multiple nozzles N in the head unit **10** are distributed across the entire width of the medium **90**.

[0305] The “liquid ejecting apparatus” may be used in a variety of apparatuses, including facsimile machines and copy machines, in addition to apparatuses dedicated to printing. The use of the liquid ejecting apparatus is not limited to printing. For example, a liquid ejecting apparatus to eject a solution of a pigment may be used as a manufacturing apparatus to form color filters of display devices such as liquid display panels. Instead, a liquid ejecting apparatus to eject a solution of a conductive material may be used as a manufacturing apparatus to form wiring and electrodes for relay substrates. Alternatively, a liquid ejecting apparatus to eject a solution of an organic substance related to living organisms may be used as a manufacturing apparatus to produce, for example, bio chips.

[0306] The present disclosure is described above based on the preferred embodiments, but should not be limited to the above embodiments. The structure of each component of the present disclosure may be replaced with any structure having the same function as in the above embodiments, or any structure may be added as needed.

Claims

1. A liquid ejecting head comprising: a first head module configured to eject a liquid in a first direction; a supply channel member for suppling the liquid to the first head module; and a first seal member that is arranged between the first head module and the supply channel member in the first

direction, thereby liquid-tightly connecting a first channel orifice of the first head module and a channel orifice of the supply channel member, wherein the first head module includes a channel orifice forming member in which the first channel orifice is formed, and a chip that is arranged in the first direction relative to the channel orifice forming member, and a seal area of the first seal member held between the channel orifice forming member and the supply channel member does not overlap the chip as viewed in the first direction.

2. The liquid ejecting head according to claim 1, wherein the chip is thinner than the channel orifice forming member and is smaller in outer profile than the channel orifice forming member as viewed in the first direction, and the first channel orifice is arranged outside the chip as viewed in the first direction.

3. The liquid ejecting head according to claim 1, further comprising a metallic support member that is arranged in the first direction relative to the channel orifice forming member, and that sandwiches the first seal member and the channel orifice forming member between the supply channel member and the support member, wherein the support member supports the channel orifice forming member with a support area of the support member including an area that overlaps the seal area as viewed in the first direction.

4. The liquid ejecting head according to claim 3, wherein a thickness of the support member in the first direction is greater than a thickness of the chip in the first direction.

5. The liquid ejecting head according to claim 3, wherein the support member includes an opening from which the first head module is exposed to outside, and a part of the channel orifice forming member is arranged in the opening of the support member.

6. The liquid ejecting head according to claim 3, further comprising a fixing member that fixes the first head module and the supply channel member to each other, wherein the fixing member is arranged so as not to overlap the chip as viewed in the first direction and so as to sandwich the seal area between the chip and the fixing member, and the support area includes an area arranged between the seal area and the chip as viewed in the first direction.

7. The liquid ejecting head according to claim 1, further comprising a fixing member that fixes the first head module and the supply channel member to each other, wherein the fixing member is arranged between the chip and the seal area so as not to overlap the chip as viewed in the first direction.

8. The liquid ejecting head according to claim 3, wherein the support member includes an opening from which the first head module is exposed to outside, and a part of a surface of the channel orifice forming member facing in the first direction is supported by being in contact with the support member so as to surround the opening of the support member.

9. The liquid ejecting head according to claim 3, further comprising a fixing member that fixes the first head module and the supply channel member to each other, wherein the fixing member overlaps the chip as viewed in the first direction.

10. The liquid ejecting head according to claim 1, further comprising a fixing member that directly fixes the first head module and the supply channel member in a detachably-attached manner, wherein the fixing member does not overlap the chip as viewed in the first direction.

11. The liquid ejecting head according to claim 1, wherein the seal area is arranged in a longitudinal direction of the first head module relative to the chip as viewed in the first direction.

12. The liquid ejecting head according to claim 1, further comprising: a second head module configured to eject the liquid supplied from the supply channel member; and an elastic second seal member that is arranged between the second head module and the supply channel member, thereby liquid-tightly connecting a second channel orifice of the second head module and a channel orifice of the supply channel member, wherein the second head module includes a channel orifice forming member in which the second channel orifice is formed, and a chip that is arranged in the first direction relative to the channel orifice forming member of the second head module, and a seal area of the second seal member held between the channel orifice forming member and the supply

channel member does not overlap the chip of the second head module as viewed in the first direction.

13. A liquid ejecting apparatus comprising: a plurality of the liquid ejecting heads according to claim 1; and a unit base to which the plurality of liquid ejecting heads are fixed.