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Inventor(s)	YAMADA; Yukie

DISK DRIVE SUSPENSION

Abstract

A slider arrangement portion on which a slider is arranged is formed on a flexure of a suspension. The slider arrangement portion includes an aperture portion. The aperture portion is formed on a metal base of the flexure. The aperture portion is provided at a position on which the slider is provided. The aperture portion is open in a thickness direction of the metal base. A conductor portion is embedded in a resin member filling the aperture portion. A slider support portion is formed on a first surface of the resin member. An abutting portion is formed on a second surface of the resin member. The abutting portion contacts a protrusion portion of a dimple portion.

Inventors: **YAMADA; Yukie (Yokohama-shi, JP)**

Applicant: **NHK SPRING CO., LTD.** (Yokohama-shi, JP)

Family ID: **1000008466580**

Assignee: **NHK SPRING CO., LTD. (Yokohama-shi, JP)**

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is based upon and claims the benefit of priority from prior Japanese Patent Application No. 2024-021017, filed Feb. 15, 2024, the entire contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to a disk drive suspension comprising a load beam, a flexure, and the like.

2. Description of the Related Art

[0003] A disk drive is used in an information processing apparatus such as a personal computer. A disk drive includes a magnetic disk rotating around a spindle, a carriage pivoting about a pivot, and the like. A disk drive suspension is provided on an arm of the carriage.

[0004] The disk drive suspension comprises a baseplate, a load beam, a flexure arranged along the load beam, and the like. The flexure includes a metal base composed of a thin stainless steel plate and a circuit portion provided along the metal base. The disk drive suspension is simply called a suspension hereinafter.

[0005] A swingable gimbal structure is formed near the tip of the flexure. The gimbal structure includes a slider arrangement portion on which the slider is arranged. A part of the flexure constituting the slider arrangement portion is called a tongue as well. The tongue is formed on a portion of the metal base. The gimbal structure is supported by a protrusion portion formed on the load beam. The protrusion portion is called a dimple as well in the industry. The apex of the protrusion portion (the apex of the dimple) supports the tongue in a swingable manner.

[0006] A slider functioning as a magnetic head is attached to the slider arrangement portion. The slider includes elements for accessing data such as reading or writing of data stored in a disk. The disk rotates, producing an air bearing between the slider and the disk. The distance between an air bearing formation surface of the slider and the disk surface (Head Media Spacing) is, for example, 10 nm or less. That is, the distance is significantly small.

[0007] JP 4993524 B (Patent Literature 1) discloses an example of the slider and the circuit portion. The circuit portion is connected to the slider. The circuit portion of Patent Literature 1 extends in the length direction of the flexure along a side surface and the other side surface of the slider. The slider is secured to a metal base of the flexure by bonding and the like. In this case, both sides of the slider necessitate space for the circuit portion. This configuration is disadvantageous for achieving more compact suspensions.

[0008] JP 5931624 B (Patent Literature 2) discloses another example of the suspension. The suspension includes a circuit portion between the rear surface of a slider and a metal base. That is, the metal base, the circuit portion, and the slider overlap in the thickness direction. In this case, an adhesive secures the rear surface of the slider to the circuit portion. This configuration can reduce the width of the slider arrangement portion and thus is advantageous for achieving more compact suspensions.

[0009] In the suspension of Patent Literature 2, the circuit portion and the slider overlap in the thickness direction. The circuit portion includes a plurality of independent conductors each covered by a cover resin. Thus, when these conductors and the cover resin are not flush with one another, the slider is inaccurately oriented, which is disadvantageous. Further, the metal base, the circuit portion, and the slider overlap in the thickness direction. This configuration further disadvantageously increases the distance between the apex of the dimple and the air bearing formation surface of the slider by the thickness of the circuit portion.

[0010] The present invention aims to provide a suspension capable of stabling an orientation of a slider provided on the slider arrangement portion.

BRIEF SUMMARY OF THE INVENTION

[0011] An embodiment is a disk drive suspension comprising a load beam and a flexure. The flexure includes a metal base, a slider arrangement portion on which a slider is arranged, and a circuit portion electrically connected to the slider. The slider arrangement portion includes an aperture portion formed in the metal base and a resin member filling the aperture portion, and a conductor portion. The aperture portion is formed in a position on which the slider is arranged and is open toward a thickness direction of the metal base. The conductor portion is a part of the circuit portion and is embedded in the resin member. A slider support portion on which the slider is arranged is formed on a first surface of the resin member in the thickness direction. An abutting portion abutting a protrusion portion (the apex of a dimple portion) of the load beam is formed on a second surface of the resin member in the thickness direction.

[0012] An embodiment of the present invention can stable the orientation of the slider provided on the slider arrangement portion, in the disk drive suspension comprising the slider, the circuit portion, and the like.

[0013] In the suspension of the present embodiment, the resin member may include a base resin layer and an embedding resin. The base resin layer is formed inside the aperture portion. The embedding resin fills the aperture portion. The embedding resin overlaps the base resin layer with the conductor portion being embedded. An auxiliary member contacting the protrusion portion may be provided on the abutting portion. The resin member may have a thickness smaller than that of the metal base.

[0014] The resin member may include: a base resin layer formed inside the aperture portion; an embedding resin; and a foundation resin. The embedding resin overlaps a surface of the base resin layer with the conductor portion being embedded. The foundation resin overlaps an opposite surface of the base resin layer. The resin member may be composed of an embedding resin alone. The resin member may include an embedding resin and a foundation resin overlapping the embedding resin.

[0015] The base resin layer of the resin member may include a first portion and a second portion thinner than the first portion. The conductor portion may include a first conductor provided on the first portion and a second conductor provided on the second portion. A part of the first conductor may be exposed to the first surface of the resin member. A part of the second conductor may be exposed to the second surface of the resin member.

[0016] A connection conductor for electrically connecting the first conductor and the second conductor may be provided. A ground conductor for electrically connecting the metal base and the conductor portion may be provided. A pedestal member may be provided on the slider support portion. The slider is provided on the pedestal member. A pedestal member integral with the resin member may be provided on the resin member. The slider is provided on the pedestal member.

[0017] Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out hereinafter.

Description

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0018] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention, and together with the general description given above and the detailed description of the embodiments given below, serve to explain the

principles of the invention.
[0019] FIG. **1** is a perspective view of a suspension of the first embodiment.
[0020] FIG. **2** is a plan view showing a part of this suspension.
[0021] FIG. **3** is a cross-sectional view showing an example of a disk drive.
[0022] FIG. **4** is a cross-sectional view of a slider arrangement portion along F**4**-F**4** line in FIG. **2**.
[0023] FIG. **5** is a cross-sectional view of the slider arrangement portion along F**5**-F**5** line in FIG. **4**.
[0024] FIG. **6** is a cross-sectional view of a slider arrangement portion of the second embodiment.
[0025] FIG. **7** is a cross-sectional view of a slider arrangement portion of the third embodiment.
[0026] FIG. **8** is a cross-sectional view of a slider arrangement portion of the fourth embodiment.
[0027] FIG. **9** is a cross-sectional view of a slider arrangement portion of the fifth embodiment.
[0028] FIG. **10** is a cross-sectional view of a slider arrangement portion of the sixth embodiment.
[0029] FIG. **11** is a cross-sectional view of a slider arrangement portion of the seventh embodiment.
[0030] FIG. **12** is a cross-sectional view of a slider arrangement portion of the eighth embodiment.
[0031] FIG. **13** is a cross-sectional view of a slider arrangement portion of the ninth embodiment.
[0032] FIG. **14** is a cross-sectional view of a slider arrangement portion of the tenth embodiment.
[0033] FIG. **15** is a cross-sectional view of a slider arrangement portion of the eleventh embodiment.
[0034] FIG. **16** is a cross-sectional view of a slider arrangement portion of the twelfth embodiment.
[0035] FIG. **17** is a cross-sectional view of a slider arrangement portion of the thirteenth embodiment.
[0036] FIG. **18** is a cross-sectional view of a slider arrangement portion of the fourteenth embodiment.
[0037] FIG. **19** is a cross-sectional view of a slider arrangement portion of the fifteenth embodiment.
[0038] FIG. **20** is a cross-sectional view of a slider arrangement portion of the sixteenth embodiment.

DETAILED DESCRIPTION OF THE INVENTION

First Embodiment

[0039] The following describes a suspension comprising a slider arrangement portion of the first embodiment with reference to FIG. **1** to FIG. **5**.
[0040] FIG. **1** is a perspective view of a suspension **1**. FIG. **2** is a plan view of a part of the suspension **1**. Double-headed arrow X**1** in FIG. **1** indicates the length direction of the suspension **1**. Double-headed arrow Y**1** in FIG. **1** indicates the width direction of the suspension **1**.
[0041] FIG. **3** is a cross-sectional view schematically showing an example of a disk drive **10**. The disk drive **10** comprises a casing **11** (partially shown), a disk **12** rotating around a spindle, a carriage **14**, a positioning motor **15**, and the like. The carriage **14** pivots around a pivot **13**. The motor **15** drives the carriage **14**. A lid hermetically seals the casing **11**. The suspension **1** is attached to the tip portion of an arm **16** of the carriage **14**.
[0042] As shown in FIG. **1** and FIG. **2**, the suspension **1** includes a baseplate **20**, a load beam **21**, and a flexure **22**. The baseplate **20** is formed of, for example, a plate of stainless steel. A boss portion **23** of the baseplate **20** is secured to the carriage **14** (shown in FIG. **3**). For example, the baseplate **20** has a thickness of 100 to 300 μm. The thickness is not limited to these values.
[0043] The load beam **21** extends in the length direction of the suspension **1**. For example, the load beam **21** has a thickness of 20 to 40 μm. The thickness is not limited to these values. The load beam **21** has a first face **21***a* on which the flexure **22** is provided, and a second face **21***b* opposite to the first face **21***a*.
[0044] A dimple portion **30** is formed near the tip of the load beam **21**. The dimple portion **30** includes a protrusion portion **30***a*. The protrusion portion **30***a* protrudes from the first face **21***a* of

the load beam **21** to the flexure **22**. The dimple portion **30** is inwardly bent from the second face **21***b* of the load beam **21**. Thus, the protrusion portion **30***a* is called a dimple as well in the industry. The protrusion portion **30***a* protrudes toward the flexure **22**.

[0045] The flexure **22** is secured to the load beam **21** by welding portions **35** and **36** (partially shown in FIG. **1** and FIG. **2**). The flexure **22** extends along the load beam **21** in the length direction of the suspension **1**. The flexure **22** includes a metal base **40** and a circuit portion **41**. The metal base **40** is formed of a stainless-steel plate thinner than the load beam **21**. The circuit portion **41** is arranged on the surface of the metal base **40**. The metal base **40** has a thickness of, for example, 20 μm (12 to 25 μm). The thickness is not limited to these values.

[0046] A slider arrangement portion **50** is formed near the tip of the flexure **22**. A slider **51** functioning as a magnetic head is provided on the slider arrangement portion **50**. The slider **51** is provided with elements for magnetically recording data on the disk **12**, elements for reading data recorded on the disk **12**, and the like.

[0047] The slider arrangement portion **50** includes a plate portion **55** composed of a part of the metal base **40**. The plate portion **55** is called a tongue as well in the industry. The plate portion **55** of the present embodiment is supported by arm portions **56** and **57**, limiter portions **58** and **59**, and the like such that the plate portion **55** is swingable with respect to the load beam **21**. The plate portion **55** includes a first plate **55***a* and a second plate **55***b*. The first plate **55***a* and the second plate **55***b* each can slightly move in the width direction of the suspension **1** with respect to a slit **55***c*.

[0048] Actuator elements **61** and **62** are provided on respective sides of the slider **51**. Each of the actuator elements **61** and **62** is formed of a piezoelectric body such as zirconate titanate (PTZ). When a voltage is applied to the actuator elements **61** and **62**, a piezoelectric body extends and contracts in accordance with the applied voltage. Thus, the tip side of the slider **51** can be slightly moved in the width direction (direction indicated by the Double-headed arrow Y**1** in FIG. **1**) of the suspension **1**. Elements for reading and writing of data are provided on the tip side of the slider **51**.

[0049] FIG. **4** is a cross-sectional view of the slider arrangement portion **50** along F**4**-F**4** line in FIG. **2**. FIG. **5** is a cross-sectional view of the slider arrangement portion **50** along F**5**-F**5** line in FIG. **4**. The slider arrangement portion **50** includes an aperture portion **70** formed in the metal base **40**. The aperture portion **70** is formed in a position on which the slider **51** is provided and is open toward the thickness direction of the metal base **40**. A width W**1** (shown in FIG. **4**) of the aperture portion **70** is greater than the width of the slider **51**. A length L**1** (shown in FIG. **5**) of the aperture portion **70** is longer than the length of the slider **51**.

[0050] A resin member **71** formed of an electrically insulating resin is formed inside the aperture portion **70**. The resin member **71** of the present embodiment includes a base resin layer **72** and an embedding resin **73**. The base resin layer **72** is formed inside the aperture portion **70**. The embedding resin **73** overlaps the base resin layer **72** inside the aperture portion **70**. Each of the base resin layer **72** and the embedding resin **73** is formed of an electrically insulating resin such as polyimide.

[0051] As shown in FIG. **4** and FIG. **5**, a conductor portion **80** is provided in the aperture portion **70**. The conductor portion **80** includes a plurality of conductors (for example, a first conductor **81** and a second conductor **82**). The first conductor **81** and the second conductor **82** are described as examples in the present embodiment. The number of the conductors and the shape are not limited to the examples to be described in the present embodiment. The conductor portion **80** is formed on the base resin layer **72** inside the aperture portion **70**. The conductor portion **80** is embedded in the embedding resin **73**.

[0052] The conductor portion **80** constitutes a part of the circuit portion **41** in the length direction. A terminal portion **85** (shown in FIG. **2** and FIG. **5**) and an electrically conductive member **86** electrically connect the conductor portion **80** to a terminal of the slider **51**. The conductors **81** and **82** are mainly formed of copper. A plated layer of gold and the like is provided outside copper as necessary. To simplify the figures, the illustration of the plated layer is omitted in the figures. The

plated layer may not be provided on the conductor. The conductors **81** and **82** are embedded in the embedding resin **73**, which fills the aperture portion **70**.

[0053] As an example, the resin member **71** is composed of the base resin layer **72** and the embedding resin **73**. Double-headed arrow X**2** in FIG. **4** indicates the thickness direction of the resin member **71**. The resin member **71** has a first surface **71***a* in the thickness direction and a second surface **71***b* in the thickness direction. A slider support portion **90** is formed on the first surface **71***a*. The slider support portion **90** is substantially flat. The slider **51** is secured to the slider support portion **90** by bonding.

[0054] An abutting portion **91** is formed on the second surface **71***b* of the resin member **71**. The protrusion portion **30***a* (substantially the apex of the dimple portion **30**) contacts the abutting portion **91**. The protrusion portion **30***a* is formed on the load beam **21** and protrudes toward the slider arrangement portion **50**. The slider arrangement portion **50** can swing around the protrusion portion **30***a* in the thickness direction of the metal base **40**.

[0055] The slider arrangement portion **50** of the present embodiment has the slider support portion **90** formed on the first surface **71***a* of the resin member **71**. The resin member **71** fills the aperture portion **70**. The first surface **71***a* is substantially flat. In formation of the embedding resin **73**, an uncured embedding resin **73** is supplied to the aperture portion **70**. The surface of the embedding resin **73** supplied to the aperture portion **70** is flatten by jigs such as a squeegee. This can form the slider support portion **90** that is flat and has no irregularities.

[0056] The slider **51** is arranged on the slider support portion **90**. This arrangement stables the orientation of the slider **51**. Thus, the distance between the disk **12** and an air bearing formation surface **51***a* (flying height of the slider) can be accurately controlled. The flying height of the slider is extremely small. Thus, accurate control of the orientation of the slider **51** is crucial.

[0057] According to the slider arrangement portion **50** of the present embodiment, the conductor portion **80** is embedded in the resin member **71** filling the aperture portion **70**. Further, the slider **51** is provided on the first surface **71***a* of the resin member **71**. The protrusion portion **30***a* (the apex of the dimple) contacts the second surface **71***b* of the resin member **71**. Thus, the distance between the apex of the dimple and the air bearing formation surface **51***a* can be reduced. This contributes to providing a slider arrangement portion **50** that is low profile. Further, the slider **51** and the conductor portion **80** overlap in the thickness direction. Thus, the width of the slider arrangement portion **50** can be reduced.

[0058] The rotation of the disk **12** produces an air bearing between the disk **12** and the slider **51**. Pivoting of the carriage **14** caused by the positioning motor **15** (shown in FIG. **3**) moves the suspension **1** in the radial direction of the disk **12**. The slider **51** is thereby moved to a desired position on the disk **12**. When a voltage is applied to the actuator elements **61** and **62**, the actuator elements **61** and **62** extend and contract. Thus, the tip side of the slider **51** can be moved in the width direction (direction indicated by the Double-headed arrow Y**1** in FIG. **1**) accurately and rapidly.

[0059] The following describes slider arrangement portions of the second embodiment to the sixteenth embodiment with reference to FIG. **6** to FIG. **20**. In these embodiments, the same reference numerals are added to the constituent elements that the slider arrangement portion **50** of the first embodiment and those of these embodiments have in common. Explanations of these elements are omitted.

Second Embodiment

[0060] FIG. **6** is a cross-sectional view of a slider arrangement portion **50**A of the second embodiment. The slider arrangement portion **50**A has an auxiliary member **91***a* provided on an abutting portion **91** of a resin member **71**. The auxiliary member **91***a* is formed of a material (such as a metal) more rigid than the resin member **71**. A protrusion portion **30***a* of a dimple portion **30** contacts the auxiliary member **91***a*.

Third Embodiment

[0061] FIG. **7** is a cross-sectional view of a slider arrangement portion **50**B of the third embodiment. A thickness Tl of a resin member **71** is smaller than the thickness of a metal base **40**. In this case, a base resin layer **72** may be thinner, or an embedding resin **73** may be thinner. The reduction in the thickness Tl of the resin member **71** can further shorten the distance between the apex of the dimple and the air bearing formation surface of the slider.

Fourth Embodiment

[0062] FIG. **8** is a cross-sectional view of a slider arrangement portion **50**C of the fourth embodiment. A resin member **71** of the slider arrangement portion **50**C includes a foundation resin **100**. The foundation resin**100** is formed of an electrically insulating resin such as polyimide. An abutting portion **91** is formed on the foundation resin **100**. An embedding resin **73** overlaps a surface of a base resin layer **72** (the upper side surface in FIG. **8**). A conductor portion **80** is embedded in the embedding resin **73**. The foundation resin **100** overlaps the other surface of the base resin layer **72** (the lower side surface in FIG. **8**).

Fifth Embodiment

[0063] FIG. **9** is a cross-sectional view of a slider arrangement portion **50**D of the fifth embodiment. The slider arrangement portion **50**D does not include the base resin layer **72** described in the first embodiment. As shown in FIG. **9**, the slider arrangement portion **50**D includes a foundation resin **100**. A conductor portion **80** is provided on the foundation resin **100**. The conductor portion **80** is embedded in an embedding resin **73**. An abutting portion **91** is formed on the foundation resin **100**.

Sixth Embodiment

[0064] FIG. **10** is a cross-sectional view of a slider arrangement portion **50**E of the sixth embodiment. The slider arrangement portion **50**E is different from that of the first embodiment in not including the base resin layer **72** described in the first embodiment. As shown in FIG. **10**, a slider support portion **90** is formed on a first surface **71***a* of a resin member **71** composed of an embedding resin **73**. An abutting portion **91** is formed on a second surface **71***b* of the resin member **71**.

Seventh Embodiment

[0065] FIG. **11** is a cross-sectional view of a slider arrangement portion **50**F of the seventh embodiment. The slider arrangement portion **50**F has a distance W**2** between the first conductor **81** and the second conductor **82**. The distance W**2** is larger than distances between other conductors. This configuration enables broadening electrically insulation distances between a dimple portion **30** and conductors **81** and **82**.

Eighth Embodiment

[0066] FIG. **12** is a plan view showing a part of a slider arrangement portion **50**G of the eighth embodiment. A conductor portion **80** of the slider arrangement portion **50**G is bent around the dimple portion **30** to bypass the dimple portion **30**. This enables broadening the electrically insulation distance between the dimple portion **30** and the conductor portion **80**.

Ninth Embodiment

[0067] FIG. **13** is a cross-sectional view of a slider arrangement portion **50**H of the ninth embodiment. As shown in FIG. **13**, the base resin layer **72** has a first portion **72***a* and a second portion **72***b* thinner than the first portion **72***a*. A first conductor **81** is provided on the first portion **72***a*. A second conductor **82** is provided on the second portion **72***b*. A part of the first conductor **81** is exposed to a first surface **71***a* of a resin member **71**. A rear surface side terminal (a top-bond pad) **51***b* of the slider **51** and the first conductor **81** are electrically connected to each other.

Tenth Embodiment

[0068] FIG. **14** is a cross-sectional view of a slider arrangement portion **50**J of the tenth embodiment. A base resin layer **72** has a first portion **72***a* and a second portion **72***b*, the second portion **72***b* being thinner than the first portion **72***a*. A first conductor **81** is provided on the first portion **72***a*. A second conductor **82** is provided on the second portion **72***b*. A part of the first

conductor **81** is exposed to a first surface **71***a* of a resin member **71**. A part of the second conductor **82** is exposed to a second surface **71***b* of the resin member **71**. Thus, the second conductor **82** can be electrically connected to a terminal **110** of a flexure **22**.

Eleventh Embodiment

[0069] FIG. **15** is a cross-sectional view of a slider arrangement portion **50**K of the eleventh embodiment. This slider arrangement portion **50**K also includes a first portion **72***a* and a second portion **72***b* thinner than the first portion **72***a*. A first conductor **81** is provided on the first portion **72***a*. A second conductor **82** is provided on the second portion **72***b*. A connection conductor **120** electrically connects the first conductor **81** and the second conductor **82** adjacent to each other.

Twelfth Embodiment

[0070] FIG. **16** is a cross-sectional view of a slider arrangement part **50**L of the twelfth embodiment. As shown in FIG. **16**, a ground conductor **130** is provided on a metal base **40**. A connection conductor **131** electrically connects a second conductor **82** and the ground conductor **130**.

Thirteenth Embodiment

[0071] FIG. **17** is a cross-sectional view of a slider arrangement portion **50**M of the thirteenth embodiment. The slider arrangement portion **50**M includes a pedestal member **140**. The pedestal member **140** is provided on a flat slider support portion **90**. An embedding resin **73** and a foundation resin **100** constitute a resin member **71**. Uncured liquid adhesive fills a gap **141** between a slider **51** and the embedding resin **73**. This adhesive cures, fixing the slider **51**. The foundation resin **100** may not be provided.

Fourteenth Embodiment

[0072] FIG. **18** is a cross-sectional view of a slider arrangement portion **50**N of the fourteenth embodiment. A slider **51** is provided on a flat surface **100***a* of a foundation resin **100**. A resin member **71** fills an aperture portion **70**. The resin member **71** is composed of a base resin layer **72** and an embedding resin **73**. A conductor portion **80** is embedded in the resin member **71**. A slider **51** is provided on the flat surface **100***a* of the foundation resin **100**. This configuration stables the orientation of the slider **51**.

Fifteen Embodiment

[0073] FIG. **19** is a cross-sectional view of a slider arrangement portion **50**P of the fifteenth embodiment. As shown in FIG. **19**, a base resin layer **72** and an embedding resin **73** constitute a resin member **71**. A slider support portion **90** is formed on the base resin layer **72**. An abutting portion **91** is formed on the embedding resin **73**. A pedestal member **140** shown in FIG. **17** is provided between the base resin layer **72** and a slider **51**.

Sixteenth Embodiment Embodiment

[0074] FIG. **20** is a cross-sectional view of a slider arrangement portion **500** of the sixteenth embodiment. The slider arrangement portion **500** includes a pedestal portion **150** integrally formed with a foundation resin **100**. A gap **151** is formed between a slider **51** and the foundation resin **100**. Uncured liquid adhesive fills the gap **151**. This adhesive cures, fixing a slider **51**.

[0075] Each of the above-described slider arrangement portions **50**, **50**A to **50**H, and **50**J to **50**Q includes the aperture portion **70**, the resin member **71**, and the conductor portion **80**. The aperture portion **70** is open in the thickness direction of the metal base **40**. The resin member **71** fills the aperture portion **70**. The conductor portion **80** is embedded in the resin member **71**. The flat slider support portion **90** is formed on the resin member **71**. This configuration enables stable orientation of the slider **51**. Further, no metal base **40** is provided between the abutting portion **91** and the slider **51**. This configuration shortens the distance between the apex of the dimple and the air bearing formation surface.

[0076] Needless to say, when implementing the present invention, the configuration of each element, such as the metal base and circuit portion constituting the flexure can be modified variously. In addition, the aperture portion formed in the slider arrangement portion, the resin

member, the slider support portion, and the abutting portion can also be implemented in various forms, as long as they do not deviate from the present invention.
[0077] Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

Claims

1. A disk drive suspension comprising: a load beam; and a flexure, wherein the flexure includes: a metal base; a slider arrangement portion on which a slider is arranged; and a circuit portion electrically connected to the slider, the slider arrangement portion includes: an aperture portion formed in a position on which the slider is arranged and open in a thickness direction of the metal base; a resin member filing the aperture portion; a conductor portion embedded in the resin member in a part of the circuit portion; a slider support portion, which is formed on a first surface of a thickness direction of the resin member and on which the slider is arranged; and an abutting portion formed on a second surface of the thickness direction of the resin member and contacting a protrusion portion of a dimple portion of the load beam.
2. The suspension of claim 1, wherein the resin member includes: a base resin layer formed inside the aperture portion; and an embedding resin embedding the conductor portion with overlapping the base resin layer.
3. The suspension of claim 1, wherein an auxiliary member contacting the protrusion portion is provided on the abutting portion.
4. The suspension of claim 1, wherein the resin member is thinner than the metal base.
5. The suspension of claim 1, wherein the resin member includes: a base resin layer formed inside the aperture portion; an embedding resin embedding the conductor portion with overlapping a surface of the base resin layer; and a foundation resin overlapping an opposite surface of the base resin layer.
6. The suspension of claim 1, wherein the resin member is composed of an embedding resin filling the aperture portion and embedding the conductor portion.
7. The suspension of claim 1, wherein the resin member includes: the embedding resin filling the aperture portion and embedding the conductor portion; and a foundation resin overlapping the embedding resin.
8. The suspension of claim 2, wherein the base resin layer of the resin member includes: a first portion; and a second portion thinner than the first portion, and the conductor portion includes: a first conductor provided on the first portion; and a second conductor provided on the second portion.
9. The suspension of claim 8, wherein a part of the first conductor is exposed to the first surface of the resin member.
10. The suspension of claim 8, wherein a part of the second conductor is exposed to the second surface of the resin member.
11. The suspension of claim 8, further comprising: a connection conductor electrically connecting the first conductor and the second conductor.
12. The suspension of claim 1, further comprising: a ground conductor electrically connecting the metal base and the conductor portion.
13. The suspension of claim 1, wherein a pedestal member is provided on the slider support portion, and the slider is provided on the slider support portion with the pedestal member sandwiched between the slider and the slider support portion.
14. The suspension of claim 1, wherein a pedestal member integrally formed with the resin member

is provided on the resin member, and the slider is provided on the slider support portion with the pedestal member sandwiched between the slider and the slider support portion.