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WIRE HARNESS

Abstract

A wire harness includes a plurality of electric wires, and a resin member that has one main body covering the plurality of electric wires and is integrally molded with the plurality of electric wires; in which a cross-sectional shape of the main body in a plane orthogonal to an axial direction of the electric wire is a flat shape having a longitudinal direction and a lateral direction, and the main body has at least one of a first plane that is a plane extending in the longitudinal direction and a second plane that is a plane extending in the lateral direction.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION(S)
[0001] The present application claims priority to and incorporates by reference the entire contents of Japanese Patent Application No. 2024-020748 filed in Japan on Feb. 15, 2024.
BACKGROUND OF THE INVENTION
1. Field of the Invention
[0002] The present invention relates to a wire harness.
2. Description of the Related Art
[0003] Conventionally, there is a wire harness. Japanese Patent Application Laid-open No. 2023-066801 discloses a wire harness including a wire harness main body having an electric wire member and an exterior member surrounding an outer periphery of the electric wire member, a path regulating member attached to the outer periphery of the exterior member and configured to regulate a path of the wire harness main body, and an attachment member attached to an outer periphery of a part of the path regulating member in a length direction.
[0004] It is desired to be able to thin a routing space of a wire harness when the wire harness is routed. When an electric wire is inserted into a cylindrical exterior member, since the cross-sectional shape of the exterior member is circular, it is difficult to thin the routing space.
SUMMARY OF THE INVENTION
[0005] An object of the present invention is to provide a wire harness capable of thinning a routing space.
[0006] In order to achieve the above mentioned object, a wire harness according to one aspect of the present invention includes a plurality of electric wires; and a resin member that has one main body covering the plurality of electric wires and is integrally molded with the plurality of electric wires, wherein a cross-sectional shape of the main body in a plane orthogonal to an axial direction of the electric wire is a flat shape having a longitudinal direction and a lateral direction, and the main body has at least one of a first plane that is a plane extending in the longitudinal direction and a second plane that is a plane extending in the lateral direction.
[0007] The above and other objects, features, advantages and technical and industrial significance of this invention will be better understood by reading the following detailed description of presently preferred embodiments of the invention, when considered in connection with the accompanying drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0008] FIG. **1** is a plan view of a wire harness according to an embodiment;
[0009] FIG. **2** is a cross-sectional view of a resin member according to the embodiment;
[0010] FIG. **3** is a cross-sectional view of a routed resin member;
[0011] FIG. **4** is a cross-sectional view of the routed resin member;
[0012] FIG. **5** is a side view of the routed resin member;
[0013] FIG. **6** is a cross-sectional view of a groove portion and the resin member;
[0014] FIG. **7** is a plan view of the routed resin member;
[0015] FIG. **8** is a cross-sectional view of the groove portion and the resin member;
[0016] FIG. **9** is a plan view of the routed resin member;
[0017] FIG. **10** is a perspective view of the routed resin member;
[0018] FIG. **11** is a plan view of a wire harness according to the embodiment;
[0019] FIG. **12** is a plan view of a wire harness according to the embodiment;

[0020] FIG. **13** is a cross-sectional view of the groove portion and the resin member;
[0021] FIG. **14** is a cross-sectional view of the groove portion and the resin member;
[0022] FIG. **15** is a plan view of the wire harness according to the embodiment; and
[0023] FIG. **16** is a cross-sectional view of the resin member according to the embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0024] Hereinafter, a wire harness according to an embodiment of the present invention will be described in detail with reference to the drawings. Note that the present invention is not limited by the embodiment. In addition, constituent elements in the following embodiment include those that can be easily assumed by those skilled in the art or those that are substantially the same.

Embodiment

[0025] An embodiment will be described with reference to FIGS. **1** to **16**. The present embodiment relates to a wire harness. FIG. **1** is a plan view of a wire harness according to an embodiment, FIG. **2** is a cross-sectional view of a resin member according to the embodiment, FIGS. **3** and **4** are cross-sectional views of a routed resin member, FIG. **5** is a side view of the routed resin member, FIG. **6** is a cross-sectional view of a groove portion and the resin member, FIG. **7** is a plan view of the routed resin member, FIG. **8** is a cross-sectional view of the groove portion and the resin member, FIG. **9** is a plan view of the routed resin member, and FIG. **10** is a perspective view of the routed resin member.

[0026] FIGS. **11** and **12** are plan views of the wire harness according to the embodiment, FIGS. **13** and **14** are cross-sectional views of the groove portion and the resin member, FIG. **15** is a plan view of the wire harness according to the embodiment, and FIG. **16** is a cross-sectional view of the resin member according to the embodiment. FIG. **2** illustrates a cross-section taken along line II-II in FIG. **1**. FIG. **16** illustrates a cross-section taken along line XVI-XVI in FIG. **15**.

[0027] A wire harness **1** of the present embodiment includes a plurality of electric wires W and at least one resin member **2**. In the present specification, the axial direction of the electric wire W is simply referred to as an axial direction X. The wire harness **1** of FIG. **1** includes a plurality of resin members **2**. The plurality of resin members **2** are arranged side by side along the axial direction X. The plurality of resin members **2** are disposed at intervals. That is, the plurality of electric wires W are exposed between adjacent two of the resin members **2**. Each electric wire W includes a core wire and an insulating sheath.

[0028] In the illustrated wire harness **1**, the plurality of electric wires W are configured by bundling a plurality of sub harnesses. The wire harness **1** includes a first sub harness S**1** and a second sub harness S**2**. That is, the plurality of electric wires W include the electric wire W of the first sub harness S**1** and the electric wire W of the second sub harness S**2**.

[0029] The resin member **2** is a member integrally molded with respect to the plurality of electric wires W. The resin member **2** is formed so as to cover the sheath of the electric wire W. The resin member **2** is molded using, for example, an insulating synthetic resin. The resin member **2** is, for example, insert-molded with respect to the plurality of electric wires W. The resin member **2** of the present embodiment is elastically deformable. The resin member **2** may be a member having flexibility such as rubber.

[0030] FIG. **2** illustrates a cross-sectional shape of the resin member **2** in a plane orthogonal to the axial direction X. As illustrated in FIG. **2**, the resin member **2** has one main body **20** that covers the plurality of electric wires W. The cross-sectional shape of the main body **20** is a flat shape having a longitudinal direction D**1** and a lateral direction D**2**. The longitudinal direction D**1** and the lateral direction D**2** are, for example, orthogonal to each other.

[0031] The main body **20** of the resin member **2** has at least one plane of a first plane **21** and a second plane **22**. The first plane **21** is a plane along the longitudinal direction D**1**. The second plane **22** is a plane along the lateral direction D**2**.

[0032] The cross-sectional shape of the main body **20** illustrated in FIG. **2** is rectangular. That is, the main body **20** in FIG. **2** has a pair of first planes **21** and a pair of second planes **22**. When the

cross-sectional shape of the main body **20** is rectangular, the first plane **21** is orthogonal to the lateral direction D**2**. The two first planes **21** are parallel. The second plane **22** is orthogonal to the longitudinal direction D**1**. The two second planes **22** are parallel.

[0033] The main body **20** is formed so as to surround the plurality of electric wires W. In other words, in the cross-section orthogonal to the axial direction X, the plurality of electric wires W are located inside a region surrounded by the first planes **21** and the second planes **22**.

[0034] The plurality of electric wires W are disposed along the longitudinal direction D**1** inside the main body **20**. In the resin member **2** of FIG. **2**, the plurality of electric wires W have two rows WR of the electric wires W disposed in the longitudinal direction D**1**. A first sub harness S**1** and a second sub harness S**2** are arranged side by side, for example, in the longitudinal direction D**1**. In this case, the electric wire W of the first sub harness S**1** and the electric wire W of the second sub harness S**2** are disposed in the longitudinal direction D**1**. Note that the electric wire W of the first sub harness S**1** may constitute one row WR, and the electric wire W of the second sub harness S**2** may constitute another row WR. The wire harness **1** may have three or more sub harnesses.

[0035] The wire harness **1** is routed such that, for example, one first plane **21** faces a routing surface **110** of a vehicle **100**. FIG. **3** illustrates the wire harness **1** routed on the routing surface **110**. The routing surface **110** is, for example, a surface of a metal member configuring a body of the vehicle **100**. The routing surface **110** may be a surface of a locker portion of the vehicle **100**. The routing surface **110** may be an upper surface in a vehicle up-down direction Z.

[0036] Since the first plane **21** along the longitudinal direction D**1** faces the routing surface **110**, the thinning of the routing space for when the wire harness **1** is routed is realized. When the routing surface **110** is a surface facing the upper side in the vehicle up-down direction Z, it is possible to thin the routing space in the vehicle up-down direction Z.

[0037] Note that as illustrated in FIG. **4**, the routing surface **110** may be a surface along the vehicle up-down direction Z. The routing surface **110** may be a surface facing the vehicle width direction. In this case, it becomes possible to thin the routing space in the vehicle width direction. The routing surface **110** may be a surface facing the vehicle front-back direction. In this case, it becomes possible to thin the routing space in the vehicle front-back direction.

[0038] The direction in which the wire harness **1** extends may be the vehicle up-down direction Z, the vehicle front-back direction, the vehicle width direction, or other directions. The wire harness **1** may be linearly routed or may be routed so as to have a bent portion. The routing surface **110** is not limited to a plane.

[0039] The routing surface **110** may be, for example, a surface curved in an arc shape. FIG. **5** illustrates the routing surface **110** curved in an arc shape along the extending direction of the wire harness **1**. The routing surface **110** in FIG. **5** is, for example, a surface of a wheel house of the vehicle **100**. In the wire harness **1** of FIG. **5**, the electric wire W is exposed between adjacent two of the resin members **2**. Therefore, the exposed electric wire W can be easily deformed along the routing surface **110** extending while being curved. Furthermore, the resin member **2** can be elastically deformed along the shape of the routing surface **110**.

[0040] The wire harness **1** may be routed in a groove portion provided in the vehicle **100**. FIG. **6** illustrates a member **120** having the routing surface **110**. The member **120** is, for example, a metal member and configures a body of the vehicle **100**. The member **120** is manufactured by, for example, die casting or extrusion molding.

[0041] The member **120** includes a plate portion **130** and a pair of ribs **140**. The plate portion **130** is formed in a plate shape and has a routing surface **110**. The pair of ribs **140** are raised from the plate portion **130** and faces each other. The rib **140** protrudes out from the plate portion **130** in a direction orthogonal to the routing surface **110**. The rib **140** has a holding surface **140***a*. The illustrated holding surface **140***a* is a plane. The two holding surfaces **140***a* are, for example, parallel.

[0042] The member **120** has a groove portion **150** surrounded by the pair of ribs **140** and the plate

portion **130**. The cross-sectional shape of the groove portion **150** in a plane orthogonal to a routing path of the wire harness **1** is, for example, rectangular. The main body **20** of the resin member **2** is inserted into the groove portion **150**.

[0043] For example, the resin member **2** is inserted into the groove portion **150** with the first plane **21** facing the routing surface **110**. The value of the width Wd**1** of the first plane **21** is the same as the value of the width Wd**0** of the groove portion **150** or slightly larger than the value of the width Wd**0** of the groove portion **150**. Therefore, the holding surfaces **140***a* can come into contact with the second planes **22** of the main body **20** to sandwich the main body **20**. An operator who routes the wire harness **1** routes the wire harness **1** along the groove portion **150** while pushing the main body **20** of the resin member **2** into the groove portion **150**.

[0044] FIG. **7** illustrates the wire harness **1** routed in the groove portion **150**. When the wire harness **1** has the plurality of resin members **2**, each of the plurality of resin members **2** is pushed into the groove portion **150**. The wire harness **1** may be routed such that the entire resin member **2** is accommodated in the groove portion **150**. In other words, the wire harness **1** may be routed such that the two first planes **21** of the resin member **2** are accommodated between the holding surfaces **140***a*.

[0045] As illustrated in FIG. **8**, in the resin member **2**, the second plane **22** of the main body **20** may face the routing surface **110**. In this case, the main body **20** of the resin member **2** is held by the two holding surfaces **140***a* of the member **120** from both sides in the lateral direction D**2**. The value of the width Wd**2** of the second plane **22** is the same as the value of the width Wd**0** of the groove portion **150** or slightly larger than the value of the width Wd**0** of the groove portion **150**. Therefore, the holding surfaces **140***a* can come into contact with the first planes **21** of the main body **20** to sandwich the main body **20**.

[0046] In the routed wire harness **1**, the postures of the plurality of resin members **2** may be different. FIG. **9** illustrates the wire harness **1** in which the plurality of resin members **2** are accommodated in the groove portion **150** in different postures. The vehicle **100** of FIG. **9** has two members **120**. One of the two members **120** is referred to as a first member **120**A, and the other member **120** is referred to as a second member **120**B. The two members **120**A and **120**B may be disposed continuously or may be disposed at intervals.

[0047] The first member **120**A and the second member **120**B have a routing surface **110** and a groove portion **150**, respectively. A first groove portion **150**A which is the groove portion **150** of the first member **120**A has a wider width Wd**0** than a second groove portion **150**B which is the groove portion **150** of the second member **120**B.

[0048] The wire harness **1** is routed such that the first plane **21** faces the routing surface **110** of the first member **120**A and the second plane **22** faces the routing surface **110** of the second member **120**B. In the first member **120**A, the plurality of electric wires W are mainly arranged in the width direction of the first groove portion **150**A. In the second member **120**B, the plurality of electric wires W are mainly arranged in the depth direction of the second groove portion **150**B. The plurality of electric wires W change the arrangement direction between the first member **120**A and the second member **120**B. The plurality of electric wires W are routed so as to be twisted in a spiral shape in a space between the first groove portion **150**A and the second groove portion **150**B. Note that the first groove portion **150**A and the second groove portion **150**B may be the groove portions **150** provided in the same member **120**.

[0049] The wire harness **1** may be routed along a bent path or a curved path. FIG. **10** illustrates the wire harness **1** routed while being curved between two groove portions **150**C and **150**D. The routing path of the wire harness **1** includes a third groove portion **150**C and a fourth groove portion **150**D. The third groove portion **150**C is a groove portion **150** of a third member **120**C and extends in a first direction E**1**. The fourth groove portion **150**D is a groove portion **150** of a fourth member **120**D and extends in a second direction E**2**. The second direction E**2** intersects with the first direction E**1**, and is, for example, orthogonal to the first direction E**1**.

[0050] The plurality of resin members **2** included in the wire harness **1** include resin members **2**C, **2**D, and **2**E. The cross-sectional shapes of the resin members **2**C, **2**D, and **2**E are, for example, rectangular. In each of the resin members **2**C, **2**D, and **2**E, the plurality of electric wires W are arranged side by side in the longitudinal direction D**1**.

[0051] The resin member **2**C is disposed in the third groove portion **150**C and held by the third groove portion **150**C. The resin member **2**D is disposed in the fourth groove portion **150**D and held by the fourth groove portion **150**D. The resin member **2**E is disposed between the two resin members **2**C and **2**D. The resin member **2**C is inserted into the third groove portion **150**C such that the plurality of electric wires W are arranged in the width direction of the third groove portion **150**C. The resin member **2**D is inserted into the fourth groove portion **150**D such that the plurality of electric wires W are arranged in the width direction of the fourth groove portion **150**D. That is, the two resin members **2**C and **2**D are disposed with the first plane **21** facing the routing surface **110**.

[0052] The exemplified resin member **2**E is disposed in a curved portion **11** of the wire harness **1**. The curved portion **11** is a portion where the extending direction of the wire harness **1** changes from the first direction E**1** to the second direction E**2**, and is routed while curving the electric wire W. The resin member **2**E is disposed, for example, at an intermediate portion of a portion where the electric wire W is curved.

[0053] The resin member **2**E is disposed such that the plurality of electric wires W are arranged in a third direction E**3** inside the resin member **2**E. The third direction E**3** is a direction orthogonal to both the first direction E**1** and the second direction E**2**. The plurality of electric wires W include an inner electric wire W**1** and an outer electric wire W**2**. The inner electric wire W**1** is an electric wire W located on the innermost side in the curved portion **11**. That is, the inner electric wire W**1** is the electric wire W extending on the innermost peripheral side in the curved portion **11** among the plurality of electric wires W. The outer electric wire W**2** is an electric wire W located on the outermost side in the curved portion **11**.

[0054] The resin member **2**E is disposed so as to lift the electric wire W**1** on the inner side with respect to the third groove portion **150**C and the fourth groove portion **150**D. In the resin member **2**E of FIG. **10**, the outer electric wire W**2** is positioned at the same position as the two resin members **2**C and **2**D in the third direction E**3**. In addition, the resin member **2**E positions the inner electric wire W**1** at a position away from the two resin members **2**C and **2**D in the third direction E**3**. The other electric wires W are arranged in order in the third direction E**3** from the outer electric wire W**2** to the inner electric wire W**1**.

[0055] The resin member **2**E may be held by the third member **120**C, may be held by the fourth member **120**D, or may be held by another member **120**. The resin member **2**E may be disposed in the posture illustrated in FIG. **10** using the reaction force generated in the electric wire W.

[0056] The resin member **2**E can reduce the peripheral length difference generated in the plurality of electric wires W by disposing the plurality of electric wires W in the third direction E**3**. In other words, the resin member **2**E can absorb the extra length generated in the inner electric wire W**1** at the curved portion **11** using the space in the third direction E**3**.

[0057] The plurality of electric wires W may not be disposed uniformly inside the main body **20** of the resin member **2**. For example, the positions of the plurality of electric wires W may be positions close to one side in the longitudinal direction D**1** or the lateral direction D**2**. FIG. **11** illustrates the resin member **2**F in which the plurality of electric wires W are disposed to be close to one side in the longitudinal direction D**1**. The wire harness **1** having such a resin member **2**F may be used so as to avoid interference of a peripheral component **160** with the electric wire W.

[0058] In a case where the peripheral component **160** is located in the routing path of the wire harness **1** or in the vicinity of the routing path, the interference of the peripheral component **160** with the electric wire W is desirably suppressed in advance. In this case, the resin member **2**F is disposed in the routing path so that the distance between the peripheral component **160** and the

plurality of electric wires W can be appropriately secured. In the wire harness **1**, all the resin members **2** may be the resin member **2**F that holds the electric wire W in a manner shifted to one side, or some of the resin members **2** may be the resin member **2**F that holds the electric wire W in a manner shifted to one side.

[0059] Among the plurality of electric wires W, some electric wires W may be drawn out as branch wires from between the two resin members **2**. The wire harness **1** illustrated in FIG. **12** includes adjacent two resin members **2**G and **2**H. Among the plurality of electric wires W, some electric wires W**3** are held by both of the two resin members **2**G and **2**H. Some of the other electric wires W**4** are drawn out as branch wires from between the two resin members **2**G and **2**H. The electric wire W**4** is held by one resin member **2**G and is not held by the other resin member **2**H. The electric wire W**4**, which is a branch wire, is connected to, for example, a connector or the like.

[0060] For example, the resin members **2**G and **2**H are inserted into the groove portion **150** with the first plane **21** facing the routing surface **110**. In this case, the second plane **22** of the main body **20** is held by the holding surface **140***a*. In this case, the width Wd**1** of the first plane **21** of one resin member **2**G may be equal to the width Wd**1** of the first plane **21** of the other resin member **2**H. For example, when the two resin members **2**G and **2**H are inserted into the groove portion **150** having a constant width Wd**0**, the widths Wd**1** of the two resin members **2**G and **2**H are preferably equal to each other. In this case, regardless of the number of electric wires W to be held, the two resin members **2**G and **2**H are molded with the same width Wd**1**.

[0061] The resin members **2**G and **2**H may be inserted into the groove portion **150** with the second plane **22** facing the routing surface **110**. In this case, the width Wd**2** of the second plane **22** of one resin member **2**G may be equal to the width Wd**2** of the second plane **22** of the other resin member **2**H. The two resin members **2**G and **2**H between which the branch portion of the electric wire W is placed may have the same cross-sectional shape. That is, the two resin members **2**G and **2**H may have the width Wd**1** of the same value and the width Wd**2** of the same value. By making the cross-sectional shape of the resin member **2** common regardless of the number of electric wires W to be held, it is possible to make the molding die common.

[0062] The main body **20** of the resin member **2** may be provided with a chamfered portion. FIG. **13** illustrates a resin member **2**K having a chamfered portion **23**. The main body **20** of the resin member **2**K has a chamfered portion **23**. The chamfered portion **23** in FIG. **13** is provided at corner portions on both sides sandwiching one first plane **21**. In other words, in the main body **20**, the corner portions on both sides sandwiching one first plane **21** have a chamfered shape.

[0063] In the resin member **2**K having the chamfered portion **23**, the rigidity of the end portion having the chamfered portion **23** is smaller than the rigidity of the central portion. For this reason, the reaction force of the resin member **2**K when the resin member **2**K is inserted into the groove portion **150** is reduced, and the workability of the insertion work is improved. The illustrated chamfered portion **23** is formed such that the main body **20** can be guided between the pair of ribs **140**.

[0064] The chamfered portion **23** is an inclined surface inclined with respect to the longitudinal direction D**1**. The chamfered portion **23** is inclined toward the center in the longitudinal direction D**1** from the second plane **22** toward the first plane **21** along the lateral direction D**2**. The width Wd**3** of the first plane **21** sandwiched by the chamfered portion **23** is preferably shorter than the width Wd**0** of the groove portion **150**. Note that the chamfered portions **23** may be provided at corner portions on both sides sandwiching the second plane **22**.

[0065] The resin member **2** may have a protrusion to be inserted into the groove portion **150**. FIG. **14** illustrates a resin member **2**L having a protrusion **24**. The protrusion **24** protrudes from one first plane **21** of the main body **20**. The cross-sectional shape of the illustrated protrusion **24** is rectangular. The protrusion **24** protrudes from the first plane **21** in the lateral direction D**2**. The protrusion **24** protrudes, for example, from an end portion in the longitudinal direction D**1** in the first plane **21**. The protrusion **24** has two parallel surfaces **24**a along the protruding direction of the

protrusion **24**. The illustrated two surfaces **24***a* are parallel to the lateral direction D**2**. One surface **24***a* is continuous with the second plane **22**. The value of the width Wd**4** of the protrusion **24** is the same as the value of the width Wd**0** of the groove portion **150** or slightly larger than the value of the width Wd**0** of the groove portion **150**.

[0066] The wire harness **1** having the resin member **2**L is routed while inserting the protrusion **24** of the resin member **2**L into the groove portion **150**. The protrusion **24** is sandwiched and held by the pair of ribs **140**. The main body **20** is routed outside the groove portion **150** along the extending direction of the groove portion **150**.

[0067] The main body **20** of the resin member **2**L has a longitudinal direction D**1** and a lateral direction D**2**. As illustrated in FIG. **14**, the resin member **2**L is fixed to the groove portion **150** with one first plane **21** facing the routing surface **110**.

[0068] The width Wd**1** of the main body **20** of the resin member **2** is determined according to the number of the electric wires W held by the main body **20** and the diameter of the electric wire W. On the other hand, the value of the width Wd**0** of the groove portion **150** is determined by design requirements or the like on the vehicle **100** side. The resin member **2**L can be fixed to the member **120** even when the width Wd**0** of the groove portion **150** is small with respect to the width Wd**1** of the main body **20**.

[0069] In addition, according to the resin member **2**L having the protrusion **24**, it is possible to thin the routing space in the depth direction of the groove portion **150**. For example, when attempting to insert the main body **20** into the groove portion **150**, it is inserted into the groove portion **150** with the second plane **22** facing the routing surface **110**. In this case, the width Wd**2** of the main body **20** in the lateral direction D**2** is determined according to the width Wd**0** of the groove portion **150**. In addition, the width Wd**1** in the longitudinal direction D**1** is determined according to the width Wd**2**. As a result, the dimension of the resin member **2** in the depth direction of the groove portion **150** may increase. On the other hand, in the resin member **2**L having the protrusion **24**, the widths Wd**1** and Wd**2** of the main body **20** can be determined without being restricted by the width Wd**0** of the groove portion **150**.

[0070] The wire harness **1** may include a plurality of resin members having different cross-sectional shapes. The wire harness **1** illustrated in FIG. **15** includes three types of resin members **2**A, **2**M, and **200** having different cross-sectional shapes from each other.

[0071] The resin members **2**A and **2**M are the resin member **2** according to the present embodiment. The main body **20** of the resin member **2**A has a rectangular cross-sectional shape illustrated in FIG. **2**. As illustrated in FIG. **16**, the main body **20** of the resin member **2**M has a trapezoidal cross-sectional shape. The main body **20** has a longitudinal direction D**1** and a lateral direction D**2**. The main body **20** of the resin member **2**M has two first planes **21** and two side surfaces **25**.

[0072] The two first planes **21** correspond to bases of a trapezoid. In the exemplified resin member **2**M, the direction of the base is the longitudinal direction D**1**. The two side surfaces **25** correspond to oblique sides of the trapezoid. The two side surfaces **25** may have the same inclination angle θ with respect to the first plane **21**, or may have inclination angles θ different from each other.

[0073] The resin member **200** has a circular column shape along the axial direction X. That is, the shape of the resin member **200** in a plane orthogonal to the axial direction X is circular. The cross-sectional shape of the resin member **200** may be an ellipse. The shape of the resin members **2**A, **2**M, and **200** is selected according to the cross-sectional shape of the path at each position of the routing path.

[0074] As described above, the wire harness **1** of the present embodiment includes the plurality of electric wires W and the resin member **2**. The resin member **2** has one main body **20** covering the plurality of electric wires W, and is a member integrally molded with respect to the plurality of electric wires W. A cross-sectional shape of the main body **20** in a plane orthogonal to the axial direction X of the electric wire W is a flat shape having the longitudinal direction D**1** and the lateral

direction D**2**. The main body **20** has at least one of a first plane **21** that is a plane extending in the longitudinal direction D**1** and a second plane **22** that is a plane extending in the lateral direction D**2**.

[0075] When the main body **20** has the first plane **21**, the wire harness **1** can be routed with the first plane **21** of the main body **20** facing the routing surface **110**. As a result, the routing space of the wire harness **1** in the direction orthogonal to the routing surface **110** can be thinned. When the main body **20** has the second plane **22**, the wire harness **1** can be routed with the second plane **22** of the main body **20** facing the routing surface **110**. As a result, the routing space of the wire harness **1** in the direction along the routing surface **110** can be thinned. Therefore, according to the wire harness **1** of the present embodiment, the thinning of the routing space is realized.

[0076] The resin member **2** has a function as an exterior member that protects the plurality of electric wires W. When the resin member **2** is assembled to the groove portion **150** or the like, the resin member **2** functions as a fixing member that fixes the plurality of electric wires W to the routing surface **110**. Furthermore, the resin member **2** functions as a bundling member that bundles the plurality of electric wires W.

[0077] The cross-sectional shape of the main body **20** is, for example, rectangular. The plurality of electric wires W may be arranged along the longitudinal direction D**1** inside the main body **20**. It is possible to thin the resin member **2** by arranging the plurality of electric wires W along the longitudinal direction D**1**.

[0078] In the main body **20**, corner portions on both sides sandwiching one plane may have a chamfered shape. The main body **20** having a chamfered shape can facilitate insertion work of the main body **20** into the groove portion **150**.

[0079] The resin member **2** may have a protrusion **24** protruding from one plane of the main body **20**. For example, the protrusion **24** has two parallel surfaces **24***a* along the protruding direction of the protrusion **24**. According to the resin member **2** having the protrusion **24**, the dimension of the main body **20** can be set without being restricted by the width Wd**0** of the groove portion **150**.

[0080] The wire harness **1** includes, for example, a plurality of resin members **2**. In this case, the plurality of electric wires W are exposed between adjacent two of the resin members **2**. The wire harness **1** in which the electric wire W is exposed between the two resin members **2** can be easily deformed according to the routing path.

[0081] Some electric wires W**4** among the plurality of electric wires W may be drawn out as branch wires from between the adjacent two resin members **2**G and **2**H. Since the electric wires W on both sides of the branch portion are held by the resin member **2**, the shape of the wire harness **1** is easily stabilized.

[0082] The cross-sectional shapes of the plurality of resin members **2** in the plane orthogonal to the axial direction X of the electric wire W may be the same. As a result, the die for molding the resin member **2** is made common, whereby the cost can be reduced. For example, when some electric wires W**4** are drawn out as branch wires from between the two resin members **2**G and **2**H, the cross-sectional shapes of the two resin members **2**G and **2**H may be the same.

[0083] The plurality of electric wires W may include the electric wire W of the first sub harness S**1** and the electric wire W of the second sub harness S**2**. In this case, one resin member **2** is molded for both the first sub harness S**1** and the second sub harness S**2**. The resin member **2** functions as a bundling member that gathers the two sub harnesses S**1** and S**2**.

[0084] The number of resin members **2** included in the wire harness **1** may be one. For example, the wire harness **1** may have an elongated resin member **2** extending along the axial direction X of the electric wire W. In one resin member **2**, the width Wd**1** and the width Wd**2** may be different depending on the position in the axial direction X. For example, when the width Wd**0** of the groove portion **150** changes in the middle of the routing path, the main body **20** of the resin member **2** may have a wide-width portion and a narrow-width portion.

[0085] When the resin member **2** has the protrusions **24**, one resin member **2** may have a plurality

of protrusions **24**. For example, one resin member **2** may have a plurality of protrusions **24** arranged in the extending direction of the groove portion **150**.
[0086] The insertion target of the protrusion **24** may be a recess provided in the member **120**. For example, the member **120** may have a plurality of recesses arranged at intervals along the routing path of the wire harness **1**. In this case, the plurality of protrusions **24** may be inserted into the corresponding recesses.
[0087] When the main body **20** of the resin member **2** has two first planes **21**, the two first planes **21** may not be parallel. For example, when the resin member **2** is disposed with the first plane **21** facing the routing surface **110**, it is conceivable that there is a limitation on the routing space in a direction orthogonal to the routing surface **110**. In this case, one first plane **21** may be inclined with respect to the other first plane **21**. Similarly, when the main body **20** of the resin member **2** has two second planes **22**, the two second planes **22** may not be parallel.
[0088] The target into which the resin member **2** is inserted is not limited to the groove portion **150** formed between the ribs **140**. For example, a recess or a groove portion into which the resin member **2** can be inserted may be formed in the member **120**. Furthermore, the resin member **2** can be inserted between two opposing surfaces. For example, the resin member **2** may be inserted into a gap provided between two members.
[0089] In the wire harness **1** disclosed in the above embodiment, the wire harness **1** can be fixed to the vehicle **100** by inserting the resin member **2** into the recess or the opposing surface. Since it is not necessary to perform drilling or thread cutting for fixing in the vehicle **100**, the manufacturing cost on the vehicle side is reduced.
[0090] The contents disclosed in the above embodiment can be appropriately combined and executed.
[0091] In a wire harness according to the present embodiment, a main body of a resin member has at least one of a first plane that is a plane extending in a longitudinal direction and a second plane that is a plane extending in a lateral direction. According to the wire harness of the present embodiment, an effect is obtained in which a routing space can be thinned by making the first plane or the second plane face the routing surface.
[0092] Although the invention has been described with respect to specific embodiments for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the basic teaching herein set forth.

Claims

1. A wire harness comprising: a plurality of electric wires; and a resin member that has one main body covering the plurality of electric wires and is integrally molded with the plurality of electric wires, wherein a cross-sectional shape of the main body in a plane orthogonal to an axial direction of the electric wire is a flat shape having a longitudinal direction and a lateral direction, and the main body has at least one of a first plane that is a plane extending in the longitudinal direction and a second plane that is a plane extending in the lateral direction.
2. The wire harness according to claim 1, wherein the cross-sectional shape of the main body is rectangular, and the plurality of electric wires are disposed along the longitudinal direction inside the main body.
3. The wire harness according to claim 1, wherein in the main body, corner portions on both sides sandwiching one plane have a chamfered shape.
4. The wire harness according to claim 1, wherein the resin member has a protrusion protruding from one plane of the main body, and the protrusion has two parallel surfaces along a protruding direction of the protrusion.
5. The wire harness according to claim 1, comprising: a plurality of the resin members, wherein the

plurality of electric wires are exposed between adjacent two of the resin members.

6. The wire harness according to claim 5, wherein some electric wires of the plurality of electric wires are drawn out as branch wires from between the adjacent two of the resin members.

7. The wire harness according to claim 5, wherein cross-sectional shapes of the plurality of the resin members in a plane orthogonal to the axial direction of the electric wire are the same.

8. The wire harness according to claim 1, wherein the plurality of electric wires include an electric wire of a first sub harness and an electric wire of a second sub harness, and one resin member is molded to both the first sub harness and the second sub harness.