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Inventor(s)	Yamamoto; Takatatsu et al.

PROTECTOR

Abstract

A protector includes an assembly that forms a groove section in which a wire harness is routed or an assembly that covers the groove section, in which the assembly includes a first engaging body and a second engaging body, the first engaging body includes first engaging sections, the second engaging body is an engaging body disposed side by side with the first engaging body along a width direction of the groove section and includes second engaging section engageable with the first engaging section along an extending direction of the groove section, and the first engaging sections and the second engaging sections are configured to be engageable at different relative positions in the width direction such that the assembly having a different dimension in the width direction can be selectively formed.

Inventors: **Yamamoto; Takatatsu (Makinohara-shi, JP), Kobayashi; Shigehiko (Makinohara-shi, JP)**

Applicant: **YAZAKI CORPORATION** (Tokyo, JP)

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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. 2024-020958 filed in Japan on Feb. 15, 2024.
BACKGROUND OF THE INVENTION
1. Field of the Invention
[0002] The present invention relates to a protector.
2. Description of the Related Art
[0003] There has been a protector that houses a wire harness. Japanese Patent Application Laid-open No. 2022-128265 discloses a protector including a base section in which a housing recess for allowing a wire harness to pass is formed and a lid section capable of closing the housing recess of the base section.
[0004] If dedicated protectors of different sizes are prepared according to the thicknesses of wire harnesses to be housed, an increase in the number of product numbers is caused. It is desirable to be able to implement protectors of different sizes while suppressing an increase in the number of product numbers.
SUMMARY OF THE INVENTION
[0005] An object of the present invention is to provide a protector, the size of which can be adjusted according to the thickness of a wire harness to be housed while suppressing an increase in the number of product numbers.
[0006] A protector according to one aspect of the invention includes an assembly that forms a groove section in which a wire harness is routed or an assembly that covers the groove section, wherein the assembly includes a first engaging body and a second engaging body, the first engaging body includes a first engaging section, the second engaging body is an engaging body disposed side by side along a width direction of the groove section with respect to the first engaging body and includes a second engaging section engageable with the first engaging section along an extending direction of the groove section, and the first engaging section and the second engaging section are configured to be engageable at different relative positions in the width direction such that the assembly having a different dimension in the width direction can be selectively formed.
[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 perspective view of a protector according to an embodiment;
[0009] FIG. **2** is a side view of the protector according to the embodiment;
[0010] FIG. **3** is a perspective view of a main body according to the embodiment;
[0011] FIG. **4** is an exploded perspective view of the main body according to the embodiment;
[0012] FIG. **5** is a plan view of the main body according to the embodiment;
[0013] FIG. **6** is a perspective view of the main body according to the embodiment;
[0014] FIG. **7** is a plan view of the main body according to the embodiment;
[0015] FIG. **8** is a sectional view of the main body according to the embodiment;
[0016] FIG. **9** is a perspective view of the protector according to the embodiment;

[0017] FIG. **10** is a perspective view of the protector according to the embodiment;
[0018] FIG. **11** is a plan view of a wire harness routed in the main body;
[0019] FIG. **12** is an exploded view of the main body according to the embodiment;
[0020] FIG. **13** is an exploded view of a cover according to the embodiment;
[0021] FIG. **14** is a perspective view of the protector according to the embodiment;
[0022] FIG. **15** is an exploded perspective view of the main body according to the embodiment; and
[0023] FIG. **16** is an exploded perspective view of the cover according to the embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] A protector according to an embodiment of the present invention is explained in detail below with reference to the drawings. Note that the present invention is not limited by the embodiment. Components in the embodiment explained below include components that can be easily assumed by those skilled in the art or components that are substantially the same.

Embodiment

[0025] An embodiment is explained with reference to FIG. **1** to FIG. **16**. The present embodiment relates to a protector. FIG. **1** is a perspective view of the protector according to the embodiment, FIG. **2** is a side view of the protector according to the embodiment, FIG. **3** is a perspective view of a main body according to the embodiment, FIG. **4** is an exploded perspective view of the main body according to the embodiment, FIG. **5** is a plan view of the main body according to the embodiment, FIG. **6** is a perspective view of the main body according to the embodiment, FIG. **7** is a plan view of the main body according to the embodiment, FIG. **8** is a sectional view of the main body according to the embodiment, and FIG. **9** and FIG. **10** are perspective views of the protector according to the embodiment.
[0026] FIG. **11** is a plan view of the wire harness routed in the main body, FIG. **12** is an exploded view of the main body according to the embodiment, FIG. **13** is an exploded view of the cover according to the embodiment, FIG. **14** is a perspective view of the protector according to the embodiment, FIG. **15** is an exploded perspective view of the main body according to the embodiment, and FIG. **16** is an exploded perspective view of the cover according to the embodiment. FIG. **8** illustrates a VIII-VIII cross section taken of FIG. **7**.
[0027] As illustrated in FIG. **1** and FIG. **2**, a protector **1** in the present embodiment includes at least one main body **2** and at least one cover **3**. The main body **2** and the cover **3** are formed of, for example, insulative synthetic resin. The main body **2** is a member including a groove section **2***a* in which a wire harness W is routed. The cover **3** is a member that engages with the main body **2** and covers the groove section **2***a*. The main body **2** and the cover **3** configure a cylinder section **4** through which the wire harness W is inserted.
[0028] As explained below, in the protector **1** in the present embodiment, an assembly **2***e* or an assembly **3***e* having different widths can be formed from the same combination of members. The assembly **2***e* is an assembly that serves as the main body **2** to form the groove section **2***a*. The assembly **3***e* is an assembly that serves as the cover **3** to cover the groove section **2***a*. The protector **1** in the present embodiment is capable of adjusting a size according to the thickness of the wire harness W to be housed while suppressing an increase in the number of product numbers.
[0029] As illustrated in FIG. **3** and FIG. **4**, the main body **2** includes a first engaging body **10** and a second engaging body **20**. The first engaging body **10** and the second engaging body **20** are configured to be engageable with each other. An intermediate engaging body **40** (see FIG. **12**) can also be interposed between the first engaging body **10** and the second engaging body **20**.
[0030] In the main body **2**, the first engaging body **10** and the second engaging body **20** are disposed side by side along the width direction Y of the groove section **2***a*. The first engaging body **10** and the second engaging body **20** may be arranged side by side to partially overlap each other.
[0031] In the main body **2** in FIG. **3**, the first engaging body **10** is disposed on a first side Y**1** in the width direction Y. In the main body **2** in FIG. **3**, the second engaging body **20** is disposed on a

second side Y**2** in the width direction Y. That is, the first engaging body **10** is disposed on the first side Y**1** relatively to the second engaging body **20**. The second engaging body **20** is disposed on the second side Y**2** relatively to the first engaging body **10**.

[0032] The first engaging body **10** includes a main wall **11**, a first side wall **12**, and two first engaging sections **13**. The main wall **11** is a wall section configuring a bottom wall of the groove section **2***a*. The shape of the main wall **11** is a substantially flat plate shape. The shape of the main wall **11** in plan view is a rectangular shape. In the main wall **11**, an insertion hole **11***a* into which a clip **6** is inserted is provided. In the main wall **11**, a through-hole **11***b* into which a band member **5** such as a binding band is inserted is provided.

[0033] The first side wall **12** is erected from the edge on the first side Y**1** in the main wall **11**. The first side wall **12** is a side wall forming the groove section **2***a* and is located at the end portion on the first side Y**1** in the main body **2**. In the first side wall **12**, an engaging section **12***a* corresponding to an engaging section **33** of the cover **3** and engaging sections **12***b* and **12***c* for coupling are provided. In the first side wall **12** in the present embodiment, two engaging sections **12***a* arranged side by side in an extending direction X of the groove section **2***a* are provided.

[0034] The engaging sections **12***b* and **12***c* for coupling are engageable with each other. One engaging section **12***b* is disposed at an end portion on a first side X**1** in the first side wall **12**. The other engaging section **12***c* is disposed at an end portion on a second side X**2** in the first side wall **12**. The two engaging sections **12***b* and **12***c* engage along a height direction Z of the cylinder section **4**. The height direction Z is a direction in which the first side wall **12** is erected with respect to the main wall **11** and is a depth direction of the groove section **2***a*.

[0035] The illustrated first engaging sections **13** include a plurality of hole sections **14** opened in an extending direction X. The plurality of hole sections **14** include a first hole section **14***a*, a second hole section **14***b*, and a third hole section **14***c*. The plurality of hole sections **14** are disposed side by side in the width direction Y. The first hole section **14***a* is located closest to the first side wall **12** among the plurality of hole sections **14**. The third hole section **14***c* is located farthest from the first side wall **12** among the plurality of hole sections **14**.

[0036] In the following explanation, one of the two first engaging sections **13** is referred to as first engaging section **13**A and the other of the two first engaging sections **13** is referred to as first engaging section **13**B. The first engaging section **13**A is disposed on the first side X**1** in the extending direction X. The first engaging section **13**B is disposed on the second side X**2** in the extending direction X.

[0037] The two first engaging sections **13**A and **13**B are configured such that the hole sections **14** face one another. That is, the hole sections **14** of the first engaging section **13**A are opened toward the other first engaging section **13**B. The hole sections **14** of the first engaging section **13**B are opened toward the other first engaging section **13**A.

[0038] The second engaging body **20** includes a main wall **21**, a second side wall **22**, and two second engaging sections **23**. The main wall **21** is a wall section configuring the bottom wall of the groove section **2***a*. The shape of the main wall **21** is a substantially flat plate shape. The shape of the main wall **21** in plan view is a rectangular shape. A part of the main wall **21** of the second engaging body **20** can be superimposed on the main wall **11** of the first engaging body **10**. For example, the main wall **21** is superimposed on the main wall **11** to cover the clip **6** disposed in the insertion hole **11***a*. A through-hole **21***b* into which the band member **5** is inserted is provided in the main wall **21**. The through-hole **21***b* of the second engaging body **20** is disposed at a position corresponding to the through-hole **11***b* of the first engaging body **10**.

[0039] A plurality of through-holes **11***b* arranged side by side in the width direction Y may be provided in the main wall **11** of the first engaging body **10**. For example, in the protector **1** of the present embodiment, the first engaging body **10** and the second engaging body **20** are capable of changing the width of the groove section **2***a* in three stages. In this case, three through-holes **11***b* may be provided in the main wall **11**. The three through-holes **11***b* are disposed to face the through-

holes **21***b* in each of the three stages of the width of the groove section **2***a*.
[0040] The second side wall **22** is erected from an edge on the second side Y**2** in the main wall **21**. The second side wall **22** is a side wall forming the groove section **2***a* and is located at an end portion on the second side Y**2** in the main body **2**. When the first engaging sections **13** and the second engaging sections **23** engage, the second side wall **22** faces the first side wall **12** in the width direction Y. An engaging section **22***a* corresponding to the engaging section **33** of the cover **3** and engaging sections **22***b* and **22***c* for coupling are provided in the second side wall **22**.
[0041] The engaging sections **22***b* and **22***c* for coupling are engageable with each other. One engaging section **22***b* is disposed at an end portion on the first side X**1** in the second side wall **22**. The other engaging section **22***c* is disposed at an end portion on the second side X**2** in the second side wall **22**. The two engaging sections **22***b* and **22***c* engage along the height direction Z.
[0042] The exemplified second engaging sections **23** include a plurality of protrusions **24** protruding in the extending direction X. The plurality of protrusions **24** include a first protrusion **24***a*, a second protrusion **24***b*, and a third protrusion **24***c*. The plurality of protrusions **24** are disposed side by side in the width direction Y. The first protrusion **24***a* is located farthest from the second side wall **22** among the plurality of protrusions **24**. The third protrusion **24***c* is located closest to the second side wall **22** among the plurality of protrusions **24**.
[0043] In the following explanation, one of the two second engaging sections **23** is referred to as second engaging section **23**A and the other of the two second engaging sections **23** is referred to as second engaging section **23**B. The second engaging section **23**A is disposed on the first side X**1** in the extending direction X. The second engaging section **23**B is disposed on the second side X**2** in the extending direction X.
[0044] One second engaging section **23** is configured such that the protrusions **24** protrude to the side opposite to the side of the other one second engaging section **23**. That is, the protrusions **24** of the second engaging section **23**A protrude in a direction away from the other second engaging section **23**B. The protrusions **24** of the second engaging section **23**B protrude in a direction away from the other second engaging section **23**A.
[0045] The protrusions **24** of the second engaging sections **23** can be inserted into the hole sections **14** of the first engaging sections **13** along the extending direction X. More specifically, one protrusion **24** of the second engaging sections **23** is engageable with one hole section **14** of the first engaging sections **13**. For example, the first protrusion **24***a* is engageable with any one hole section **14** among the first hole section **14***a*, the second hole section **14***b*, and the third hole section **14***c*. The second protrusion **24***b* is engageable with the second hole section **14***b* or the third hole section **14***c*. The third protrusion **24***c* is engageable with the third hole section **14***c*.
[0046] The second engaging body **20** includes a flexible section **25** disposed between the two second engaging sections **23**A and **23**B. The flexible section **25** is provided on the main wall **21** and has flexibility. The exemplified flexible section **25** is molded in a hinge shape having a thin portion. The flexible section **25** may be a groove extending in the width direction Y.
[0047] The main wall **21** includes a first region **211** and a second region **212**. The first region **211** is disposed on the first side X**1** in the extending direction X with respect to the flexible section **25**. The second region **212** is disposed on the second side X**2** in the extending direction X with respect to the flexible section **25**. The flexible section **25** has high flexibility with respect to the first region **211** and the second region **212**. Therefore, the second engaging body **20** is capable of bending in a substantially V-shape by deforming the flexible section **25**. The protrusions **24** of the second engaging sections **23** are inserted into the hole sections **14** of the first engaging sections **13** in a state in which the second engaging body **20** is bent. When the shape of the second engaging body **20** is restored to the flat plate shape, the engagement of the protrusions **24** with the hole sections **14** is completed.
[0048] The second side wall **22** of the second engaging body **20** is divided into two regions **221** and **222** with the flexible section **25** placed therebetween. The first region **221** is disposed on the first

side X**1** in the extending direction X with respect to the flexible section **25**. The second region **222** is disposed on the second side X**2** in the extending direction X with respect to the flexible section **25**. A gap **22***s* is provided between the two regions **221** and **222**. Since the second side wall **22** is divided into the two regions **221** and **222**, the second engaging body **20** is easily deformed.
[0049] In the protector **1** in the present embodiment, width Wd**1** of the main body **2** changes according to with which of the plurality of hole sections **14** the first protrusion **24***a* engages. The first protrusion **24***a* may be engaged with the first hole section **14***a* as indicated by an alternate long and short dash line in FIG. **4**. In this case, the second protrusion **24***b* engages with the second hole section **14***b* and the third protrusion **24***c* engages with the third hole section **14***c*. FIG. **3** illustrates the main body **2** formed when the first protrusion **24***a* engages with the first hole section **14***a*. In this case, a width Wd**1** of the main body **2** is the smallest among selectable widths Wd**1**.
[0050] FIG. **5** illustrates the main body **2** in the case in which the first protrusion **24***a* is engaged with the third hole section **14***c*. In this case, the second protrusion **24***b* and the third protrusion **24***c* are exposed without being inserted into the hole section **14**. The width Wd**1** of the main body **2** illustrated in FIG. **5** is the largest among the selectable widths Wd**1**.
[0051] The two engaging bodies **10** and **20** may engage with the second protrusion **24***b* inserted into the third hole section **14***c*. In this case, the first protrusion **24***a* is inserted into the second hole section **14***b* and the third protrusion **24***c* is exposed without being inserted into the hole section **14**. The width Wd**1** of the main body **2** in the case in which the second protrusion **24***b* is engaged with the third hole section **14***c* is an intermediate size among the selectable widths Wd**1**.
[0052] As illustrated in FIG. **6**, the first engaging body **10** and the second engaging body **20** engage with each other to configure the assembly **2***e*. The assembly **2***e* is a member in which one first engaging body **10** and one second engaging body **20** are engaged. The assembly **2***e* forms the groove section **2***a*. The main body **2** may be configured by coupling a plurality of assemblies **2***e*. As illustrated in FIG. **6**, the two assemblies **2***e* are coupled by engaging the engaging section **12***c* included in the other assembly **2***e* with the engaging section **12***b* included in one assembly **2***e*.
[0053] As illustrated in FIG. **7**, adjacent two assemblies **2***e* may be fixed by the band member **5**. The band member **5** is, for example, a binding band. The band member **5** is inserted into the through-holes **11***b* and **21***b* of one assembly **2***e* and is further inserted into the through-holes **11***b* and **21***b* of the other assembly **2***e* to be bound. The band member **5** can restrict relative displacement of the two assemblies **2***e* and reinforce the coupling of the two assemblies **2***e*. The band member **5** can suppress rattling of the first engaging body **10** and the second engaging body **20** in one assembly **2***e* and firmly couple the two engaging bodies **10** and **20**.
[0054] As illustrated in FIG. **8**, the clip **6** is disposed in the main body **2**. The main body **2** is fixed to a metal panel or the like by the clip **6**. The clip **6** is inserted into a hole provided in a fixing target wall section and is locked by the wall section. The clip **6** includes an engaging section **61** and a flange section **62**. The engaging section **61** is inserted into the hole of the wall section and held by the wall section. The flange section **62** is disposed at a proximal end portion of the engaging section **61**. The engaging section **61** of the clip **6** is inserted into the insertion hole **11***a* of the first engaging body **10**. The flange section **62** is locked by the main wall **11** of the first engaging body **10**. The flange section **62** is sandwiched between the main wall **11** of the first engaging body **10** and the main wall **21** of the second engaging body **20**. The main wall **21** can cover the flange section **62** and suppress interference between the wire harness W and the flange section **62**.
[0055] As illustrated in FIG. **9**, the cover **3** is assembled to the main body **2** along the height direction Z. The cover **3** includes a cover body **31**, a pair of side walls **32**, and a plurality of engaging sections **33**. The cover body **31**, the pair of side walls **32**, and the engaging sections **33** are, for example, integrally molded. The cover body **31** is a portion covering the groove section **2***a* of the main body **2** and has a substantially flat plate shape. The side walls **32** are erected from the end portion in the width direction Y in the cover body **31**. The side walls **32** of the cover **3** face the first side wall **12** and the second side wall **22** of the main body **2** from the outside. The engaging

sections **33** of the cover **3** engage with the engaging sections **12***a* and **22***a* of the main body **2** to fix the cover **3** to the main body **2**.

[0056] In the protector **1** in the present embodiment, one cover **3** is assembled to one assembly **2***e*. The cover body **31** extends from one end portion to the other end portion in the extending direction X in the assembly **2***e* and can cover the entire groove section **2***a*. The cover **3** is assembled to the main body **2** after the wire harness W is routed in the groove section **2***a* of the main body **2**.

[0057] The protector **1** may include the cover **3** having a different width corresponding to the width Wd**1** of the main body **2**. In FIG. **10**, a wide cover **3** assembled to a wide main body **2** is illustrated. Since the integrally formed cover **3** is assembled to the main body **2**, the formed cylinder section **4** can have appropriate rigidity.

[0058] As illustrated in FIG. **11**, the wire harness W is routed in the groove section **2***a* of the main body **2**. In the protector **1** in the present embodiment, at least a part of the wire harness W can be drawn out from the gap **22***s* of the second engaging body **20**. For example, as illustrated in FIG. **11**, a part of a plurality of electric wires included in the wire harness W is drawn out to the outside from the gap **22***s* as a branch line WB. When the main body **2** is configured by a plurality of assemblies **2***e*, the wire harness W can be divided in the assemblies **2***e*.

[0059] As illustrated in FIG. **12**, the main body **2** may include an intermediate engaging body **40** interposed between the first engaging body **10** and the second engaging body **20**. The intermediate engaging body **40** is a plate-like member and includes both of the first engaging sections **13** and the second engaging sections **23**. The intermediate engaging body **40** is a member having a flat plate shape and is formed of, for example, insulative synthetic resin.

[0060] The intermediate engaging body **40** includes the first engaging sections **13** and the second engaging sections **23**. In the intermediate engaging body **40**, the first engaging sections **13** include the plurality of hole sections **14** opened in the extending direction X. The plurality of hole sections **14** include a first hole section **14***a*, a second hole section **14***b*, and a third hole section **14***c*. The plurality of hole sections **14** are disposed side by side in the width direction Y. Like the first engaging body **10**, the intermediate engaging body **40** includes the two first engaging sections **13**A and **13**B. The second engaging section **23**A of the second engaging body **20** is engageable with the first engaging section **13**A of the intermediate engaging body **40**. The second engaging section **23**B of the second engaging body **20** is engageable with the first engaging section **13**B of the intermediate engaging body **40**.

[0061] In the intermediate engaging body **40**, the second engaging sections **23** include the plurality of protrusions **24** protruding in the extending direction X. The plurality of protrusions **24** include a first protrusion **24***a*, a second protrusion **24***b*, and a third protrusion **24***c*. The plurality of protrusions **24** are disposed side by side in the width direction Y. Like the second engaging body **20**, the intermediate engaging body **40** includes the two second engaging sections **23**A and **23**B. The second engaging section **23**A of the intermediate engaging body **40** is engageable with the first engaging section **13**A of the first engaging body **10**. The second engaging section **23**B of the intermediate engaging body **40** is engageable with the first engaging section **13**B of the first engaging body **10**.

[0062] In the main body **2** illustrated in FIG. **12**, the intermediate engaging body **40** is interposed between the first engaging body **10** and the second engaging body **20**. Accordingly, a maximum value of the width Wd**1** selectable in the main body **2** is increased. The width Wd**1** can be adjusted in three stages at an engaging part of the first engaging body **10** and the intermediate engaging body **40**. Further, the width Wd**1** can be adjusted in three stages at an engaging part of the second engaging body **20** and the intermediate engaging body **40**. The intermediate engaging body **40** may include the same flexible section as the flexible section of the second engaging body **20**. In this case, the flexible section of the intermediate engaging body **40** may be disposed to overlap the flexible section **25** of the second engaging body **20**.

[0063] Like the main body **2**, the cover **3** may be configured to be adjustable in width. For

example, as illustrated in FIG. **13**, the cover **3** may include a first engaging body **50** and a second engaging body **60**. The first engaging body **50** includes a part **31**A of the cover body **31**, the side wall **32**, and two engaging sections **33**. The first engaging body **50** includes, for example, the same first engaging sections **13** as the first engaging sections **13** of the main body **2**. The first engaging sections **13** include the plurality of hole sections **14** arranged side by side in the width direction Y. The exemplified first engaging body **50** includes the two first engaging sections **13**A and **13**B.

[0064] The second engaging body **60** includes another part **31**B of the cover body **31**, the side wall **32**, and the two engaging sections **33**. The second engaging body **60** includes, for example, the same second engaging sections **23** as the second engaging sections **23** of the main body **2**. The second engaging sections **23** include the plurality of protrusions **24** arranged side by side in the width direction Y. The exemplified second engaging body **60** includes the two second engaging sections **23**A and **23**B. The one second engaging section **23**A engages with the first engaging section **13**A of the first engaging body **50**. The other second engaging section **23**B engages with the first engaging section **13**B of the first engaging body **50**.

[0065] The second engaging body **60** includes the same flexible section **65** as the flexible section **25** of the second engaging body **20** of the main body **2**. The flexible section **65** of the second engaging body **60** is disposed between the two second engaging sections **23**A and **23**B. The flexible section **65** of the second engaging body **60** is, for example, a groove extending in the width direction Y. A gap corresponding to the flexible section **65** may be provided in the side wall **32** of the second engaging body **60** like the gap **22***s* of the second engaging body **20**.

[0066] In the cover **3** illustrated in FIG. **13**, the width can be adjusted in a plurality of stages. The first engaging body **50** and the second engaging body **60** engage with each other to configure the assembly **3***e*. The assembly **3***e* is an assembly that covers the groove section **2***a* of the main body **2**. Any one of the first engaging body **50** and the second engaging body **60** may be formed not to form a gap in the cover body **31** regardless of the size of the width of the assembly **3***e*. For example, the part **31**A of the cover body **31** in the first engaging body **50** may include an extending section protruding in the width direction Y to always have an overlap with the other part **31**B of the cover body **31**.

[0067] In the protector **1**, both of the main body **2** and the cover **3** may be configured such that the widths thereof can be adjusted. In the protector **1** illustrated in FIG. **14**, the width of each of the main body **2** and the cover **3** can be adjusted in a plurality of stages. That is, the main body **2** is the assembly **2***e* forming the groove section **2***a* and the cover **3** is the assembly **3***e* covering the groove section **2***a*.

[0068] As illustrated in FIG. **15**, the main body **2** includes two first engaging bodies **70** and one second engaging body **80**. The two first engaging bodies **70** have the same shape. The first engaging body **70** includes a main wall **71** and a side wall **72**. The main wall **71** is a wall section configuring the bottom wall of the groove section **2***a*. The shape of the main wall **71** is a substantially flat plate shape. The shape of the main wall **71** in plan view is a rectangular shape.

[0069] The side wall **72** is erected from an edge in the width direction Y in the main wall **71**. The side wall **72** is a side wall forming the groove section **2***a*. An engaging section **72***a* that engages with an engaging section **92***a* of the cover **3** is provided in the side wall **72**. The first engaging body **70** include the same first engaging sections **13** as the first engaging sections **13** of the first engaging body **10**. The first engaging sections **13** include the plurality of hole sections **14** arranged side by side in the width direction Y. The exemplified first engaging body **70** includes two first engaging sections **13**A and **13**B.

[0070] The second engaging body **80** includes a flat main wall **81**. The main wall **81** is a wall section configuring the bottom wall of the groove section **2***a*. The shape of the main wall **81** in plan view is a rectangular shape. The second engaging body **80** includes the same second engaging sections **23** as the second engaging sections **23** of the second engaging body **20**. The second engaging sections **23** include the plurality of protrusions **24** arranged side by side in the width

direction Y. Four second engaging sections **23** are provided in the exemplified second engaging body **80**.

[0071] Among the four second engaging sections **23**, the two second engaging sections **23**A and **23**B are disposed at the end portion on the first side Y**1** in the width direction Y. Among the four second engaging sections **23**, the other two second engaging sections **23**A and **23**B are disposed at end portions on the second side Y**2** in the width direction Y. A flexible section **85** is provided in the second engaging body **80**. The flexible section **85** is disposed between the two second engaging sections **23**A and the two second engaging sections **23**B and extends in the width direction Y. The second engaging body **80** is capable of bending in a substantially V shape by deforming the flexible section **85**. The protrusions **24** of the second engaging body **80** are inserted into the hole sections **14** of the first engaging body **90** in a state in which the second engaging body **80** is bent.

[0072] The second engaging section **23**A of the second engaging body **80** is engageable with the first engaging section **13**A of the first engaging body **70**. The second engaging section **23**B of the second engaging body **80** is engageable with the first engaging section **13**B of the first engaging body **70**. The width of the main body **2** can be adjusted in a plurality of stages at an engaging part of the first engaging body **70** and the second engaging body **80**. The two first engaging bodies **70** engage with the one second engaging body **80** to configure the assembly **2***e*.

[0073] The cover **3** includes two first engaging bodies **90** and one second engaging body **100**. The first engaging body **90** includes a main wall **91** and a side wall **92**. The main wall **91** is a wall section covering the groove section **2***a*. The main wall **91** has a substantially flat plate shape. Main wall **91** has a rectangular shape in plan view. The main wall **91** of the first engaging body **90** faces the main wall **71** of the first engaging body **70**.

[0074] The side wall **92** is erected from the end portion in the width direction Y in the main wall **91**. An engaging section **92***a* that engages with the engaging section **72***a* of the main body **2** is provided in the side wall **92**. The main wall **91** includes the same first engaging sections **13** as the first engaging sections **13** of the first engaging body **10**. The first engaging sections **13** include the plurality of hole sections **14** arranged side by side in the width direction Y. The exemplified first engaging body **90** includes the two first engaging sections **13**A and **13**B.

[0075] The second engaging body **100** includes a flat main wall **101**. The second engaging body **100** may have the same shape as the shape of the second engaging body **80** of the main body **2**. In this case, components of the main body **2** and the cover **3** can be shared. The main wall **101** configures a wall section covering the groove section **2***a*. The shape of the main wall **101** in plan view is a rectangular shape. The second engaging body **100** includes the same second engaging sections **23** as the second engaging sections **23** of the second engaging body **20**. The second engaging sections **23** include the plurality of protrusions **24** arranged side by side in the width direction Y. Four second engaging sections **23** are provided in the exemplified second engaging body **100**.

[0076] Among the four second engaging sections **23**, the two second engaging sections **23**A and **23**B are disposed at the end portion on the first side Y**1** in the width direction Y. Among the four second engaging sections **23**, the other two second engaging sections **23**A and **23**B are disposed at end portions on the second side Y**2** in the width direction Y. A flexible section **105** is provided in the second engaging body **100**. The flexible section **105** is disposed between the two second engaging sections **23**A and the two second engaging sections **23**B and extends in the width direction Y. The second engaging body **100** can be bent in a substantially V shape by deforming the flexible section **105**. The protrusions **24** of the second engaging body **100** are inserted into the hole sections **14** of the first engaging body **90** in a state in which the second engaging body **100** is bent.

[0077] The second engaging section **23**A of the second engaging body **100** is engageable with the first engaging section **13**A of the first engaging body **90**. The second engaging section **23**B of the second engaging body **100** is engageable with the first engaging section **13**B of the first engaging body **90**. The width of the cover **3** can be adjusted in a plurality of stages at an engaging part of the

first engaging body **90** and the second engaging body **100**. The two first engaging bodies **90** engages with the one second engaging body **100** to configure the assembly **3***e*.

[0078] As explained above, the protector **1** in the present embodiment includes the assembly **2***e* forming the groove section **2***a* in which the wire harness W is routed or the assembly **3***e* covering the groove section **2***a*. The assembly **2***e* includes the first engaging body **10** and the second engaging body **20** or includes the first engaging body **70** and the second engaging body **80**. The first engaging bodies **10** and **70** include the first engaging sections **13**. The second engaging bodies **20** and **80** are engaging bodies disposed side by side along the width direction Y of the groove section **2***a* with respect to the first engaging bodies **10** and **70**. The second engaging bodies **20** and **80** include the second engaging sections **23** engageable with the first engaging sections **13** along the extending direction X of the groove section **2***a*.

[0079] The first engaging sections **13** and the second engaging sections **23** are configured to be engageable at different relative positions in the width direction Y such that the assembly **2***e* having a different dimension in the width direction Y can be selectively formed. The first engaging bodies **10** and **70** and the second engaging bodies **20** and **80** can selectively form the assembly **2***e* having a different dimension in the width direction Y. This makes it possible to manufacture the protector **1** having a different dimension in the width direction Y while achieving sharing of the components.

[0080] The assembly **3***e* includes the first engaging body **50** and the second engaging body **60** or includes the first engaging body **90** and the second engaging body **100**. The first engaging bodies **50** and **90** include the first engaging sections **13**. The second engaging bodies **60** and **100** are engaging bodies disposed side by side along the width direction Y of the groove section **2***a* with respect to the first engaging bodies **50** and **90**. The second engaging bodies **60** and **100** include the second engaging sections **23** engageable with the first engaging sections **13** along the extending direction X of the groove section **2***a*.

[0081] The first engaging sections **13** and the second engaging sections **23** are configured to be engageable at different relative positions in the width direction Y such that the assembly **3***e* having a different dimension in the width direction Y can be selectively formed.

[0082] The first engaging bodies **50** and **90** and the second engaging bodies **60** and **100** can selectively form the assembly **3***e* having a different dimension in the width direction Y. This makes it possible to manufacture the protector **1** having a different dimension in the width direction Y while achieving sharing of the components.

[0083] In the protector **1** of the present embodiment, the first engaging sections **13** include the hole sections **14** opened in the extending direction X. The second engaging sections **23** include the plurality of protrusions **24** engageable with the hole sections **14**. The plurality of protrusions **24** are arranged side by side in the width direction Y. Different protrusions **24** are engageable with the hole sections **14**.

[0084] For example, in the second engaging sections **23** of the main body **2** illustrated in FIG. **4**, the plurality of protrusions **24** are arranged side by side in the width direction Y. Different protrusions **24** are engageable with one hole section **14** of the first engaging sections **13**. As an example, any one of the first protrusion **24***a*, the second protrusion **24***b*, and the third protrusion **24***c* is engageable with the third hole section **14***c*. That is, the first engaging sections **13** and the second engaging sections **23** are engageable at different relative positions in the width direction Y. With such a configuration, the dimension in the width direction Y in the assembly **2***e* can be adjusted.

[0085] In the second engaging sections **23** of the cover **3** illustrated in FIG. **13**, the plurality of protrusions **24** are arranged side by side in the width direction Y. Different protrusions **24** are engageable with one hole section **14** of the first engaging sections **13**. That is, the first engaging sections **13** and the second engaging sections **23** are engageable at different relative positions in the width direction Y. With such a configuration, the dimension in the width direction Y in the assembly **3***e* can be adjusted.

[0086] In the protector **1** of the present embodiment, the first engaging sections **13** include the plurality of hole sections **14** opened in the extending direction X. The plurality of hole sections **14** are arranged side by side in the width direction Y. The second engaging sections **23** include the protrusions **24** engageable with the hole sections **14**. The protrusions **24** are engageable with different hole sections **14**.

[0087] For example, the first engaging sections **13** of the main body **2** illustrated in FIG. **4** include the plurality of hole sections **14** opened in the extending direction X. The plurality of hole sections **14** are arranged side by side in the width direction Y. The second engaging sections **23** include the protrusions **24** engageable with the hole sections **14**. The protrusions **24** are engageable with different hole sections **14**. As an example, the first protrusion **24***a* is engageable with any one of the first hole section **14***a*, the second hole section **14***b*, and the third hole section **14***c*. That is, the first engaging sections **13** and the second engaging sections **23** are engageable at different relative positions in the width direction Y. With such a configuration, the dimension in the width direction Y in the assembly **2***e* can be adjusted.

[0088] The first engaging sections **13** of the cover **3** illustrated in FIG. **13** include the plurality of hole sections **14** opened in the extending direction X. The second engaging sections **23** include the protrusions **24** engageable with the hole sections **14**. The protrusions **24** are engageable with different hole sections **14**. That is, the first engaging sections **13** and the second engaging sections **23** are engageable at different relative positions in the width direction Y. With such a configuration, the dimension in the width direction Y in the assembly **3***e* can be adjusted.

[0089] The first engaging bodies **10**, **50**, **70**, and **90** in the present embodiment include the two first engaging sections **13**A and **13**B disposed at different positions in the extending direction X. The second engaging bodies **20**, **60**, **80**, and **100** include two second engaging sections **23**A and **23**B corresponding to the two first engaging sections **13**A and **13**B. The first engaging bodies **10**, **50**, **70**, and **90** and the second engaging bodies **20**, **60**, **80**, and **100** are firmly engaged by including two sets of engaging parts.

[0090] The second engaging bodies **20**, **60**, **80**, and **100** in the present embodiment include the flexible sections **25**, **65**, **85**, and **105** between the two second engaging sections **23**A and **23**B. The second engaging bodies **20**, **60**, **80**, and **100** can be bent or curved in the flexible sections **25**, **65**, **85**, and **105**. This facilitates work for inserting the protrusions **24** into the hole sections **14**.

[0091] The protector **1** may include the intermediate engaging body **40** interposed between the first engaging body **10** and the second engaging body **20**. The intermediate engaging body **40** includes the second engaging sections **23** engageable with the first engaging sections **13** of the first engaging body **10** and the first engaging sections **13** engageable with the second engaging sections **23** of the second engaging body **20**. The protector **1** including the intermediate engaging body **40** can expand a range of selectable widths in the main body **2**. The intermediate engaging body **40** may be provided in the cover **3** including the first engaging body **50** and the second engaging body **60**. In this case, the intermediate engaging body **40** is interposed between the first engaging body **50** and the second engaging body **60**.

[0092] The protector **1** includes the main body **2** that is the assembly **2***e* forming the groove section **2***a* and the cover **3** that engages with the main body **2** and covers the groove section **2***a*. The cylinder section **4** through which the wire harness W is inserted is formed by the main body **2** and the cover **3**. The cylinder section **4** formed by the main body **2** and the cover **3** is capable of improving the rigidity of the protector **1** and suppressing interference of peripheral components with the wire harness W.

[0093] The protector **1** may include the main body **2** that is the assembly **2***e* forming the groove section **2***a* and a cover that is the assembly **3***e* covering the groove section **2***a*. Since the dimensions of both of the main body **2** and the cover **3** are adjustable, an increase in the number of product numbers is effectively suppressed.

[0094] The protector **1** may include assemblies **2***e* having different lengths. For example, in the

main body **2** illustrated in FIG. **6**, the length in the extending direction X in one assembly **2***e* may be larger than the length in the extending direction X in another assembly **2***e*. In this case, the cover **3** corresponding to the length of the assemblies **2***e* is assembled to the assemblies **2***e*.

[0095] The number of the hole sections **14** included in the first engaging sections **13** and the shape of the hole sections **14** are not limited to the number and the shape exemplified in the above explanation. For example, the number of the hole sections **14** included in the first engaging sections **13** may be one. In this case, the second engaging sections **23** may include the plurality of protrusions **24** arranged side by side in the width direction Y and any one protrusion **24** among the plurality of protrusions **24** may be engaged with the hole section **14**.

[0096] The number of the protrusions **24** and the shape of the protrusions **24** included in the second engaging sections **23** are not limited to the number and the shape exemplified in the above explanation. For example, the number of the protrusions **24** included in the second engaging sections **23** may be one. In this case, the first engaging sections **13** may include the plurality of hole sections **14** arranged side by side in the width direction Y and the protrusions **24** may be engaged with any one hole section **14** among the plurality of hole sections **14**.

[0097] The number of the first engaging sections **13** provided in the first engaging body **10** is not limited to two. For example, the number of the first engaging sections **13** provided in the first engaging body **10** may be one. As an example, the first engaging section **13**A may be provided and the first engaging section **13**B may not be provided in the first engaging body **10**. In this case, the second engaging section **23**A may be provided and the second engaging section **23**B may not be provided in the second engaging body **20**.

[0098] When the first engaging body **10** does not include the first engaging section **13**B, a positioning structure and a locking structure for the second engaging body **20** may be provided instead of the first engaging section **13**B. Examples of the positioning structure and the locking structure include a guide groove and a rail extending in the width direction. In this case, structures corresponding to the guide groove and the rail are provided in the second engaging body **20**. With these structures, the two engaging bodies **10** and **20** are positioned and locked in the extending direction X and the height direction Z.

[0099] The contents disclosed in the embodiment and the modifications explained above can be appropriately combined and executed as appropriate.

[0100] In the protector according to the present embodiment, the first engaging section and the second engaging section are configured to be engageable at different relative positions in the width direction such that the assembly having a different dimension in the width direction can be selectively formed. According to the protector of the present embodiment, it is possible to adjust the size according to the thickness of the wire harness to be accommodated while suppressing an increase in the number of product numbers.

[0101] 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 protector comprising: an assembly that forms a groove section in which a wire harness is routed or an assembly that covers the groove section, wherein the assembly includes a first engaging body and a second engaging body, the first engaging body includes a first engaging section, the second engaging body is an engaging body disposed side by side along a width direction of the groove section with respect to the first engaging body and includes a second engaging section engageable with the first engaging section along an extending direction of the groove section, and the first engaging section and the second engaging section are configured to be

engageable at different relative positions in the width direction such that the assembly having a different dimension in the width direction can be selectively formed.

2. The protector according to claim 1, wherein the first engaging section includes a hole section opened in the extending direction, the second engaging section includes a plurality of protrusions engageable with the hole section, the plurality of protrusions being arranged side by side in the width direction, and the different protrusions are engageable with the hole section.

3. The protector according to claim 1, wherein the first engaging section includes a plurality of hole sections opened in the extending direction, the plurality of hole sections being arranged side by side in the width direction, the second engaging section includes a protrusion engageable with the hole sections, and the protrusion is engageable with the different hole sections.

4. The protector according to claim 1, wherein the first engaging body includes a pair of the first engaging sections disposed at different positions in the extending direction, and the second engaging body includes a pair of the second engaging sections corresponding to the two first engaging sections.

5. The protector according to claim 4, wherein the second engaging body includes a flexible section between the two second engaging sections.

6. The protector according to claim 1, further comprising: an intermediate engaging body interposed between the first engaging body and the second engaging body in the width direction, wherein the intermediate engaging body includes the second engaging section engageable with the first engaging section of the first engaging body and the first engaging section engageable with the second engaging section of the second engaging body.

7. The protector according to claim 1, further comprising: a main body that is the assembly forming the groove section; and a cover that engages with the main body to cover the groove section, wherein a cylinder section through which the wire harness is inserted is formed by the main body and the cover.

8. The protector according to claim 1, further comprising: a main body that is the assembly forming the groove section; and a cover that is the assembly covering the groove section.