US 20250263130A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0263130 A1**

**HIRAKAWA** (43) **Pub. Date: Aug. 21, 2025**

(54) **VEHICLE LOWER PART STRUCTURE**

(71) Applicant: **TOYOTA JIDOSHA KABUSHIKI KAISHA**, Toyota-shi (JP)

(72) Inventor: **Katsuichiro HIRAKAWA**, Toyota-shi (JP)

(73) Assignee: **TOYOTA JIDOSHA KABUSHIKI KAISHA**, Toyota-shi (JP)

(21) Appl. No.: **18/959,658**

(22) Filed: **Nov. 26, 2024**

(30) **Foreign Application Priority Data**

Feb. 20, 2024 (JP) ..... 2024-023743

**Publication Classification**

(51) **Int. Cl.**
***B62D 25/20*** (2006.01)
***B60R 19/24*** (2006.01)

(52) **U.S. Cl.**
CPC ..... ***B62D 25/2027*** (2013.01); ***B60R 19/24*** (2013.01)

(57) **ABSTRACT**

A vehicle lower part structure includes a resin rear floor portion provided in a rear part of the vehicle and having a floor pan forming portion, and a resin undercover portion that forms a lower surface of the rear part of the vehicle and is molded integrally with a lower end of the rear floor portion.

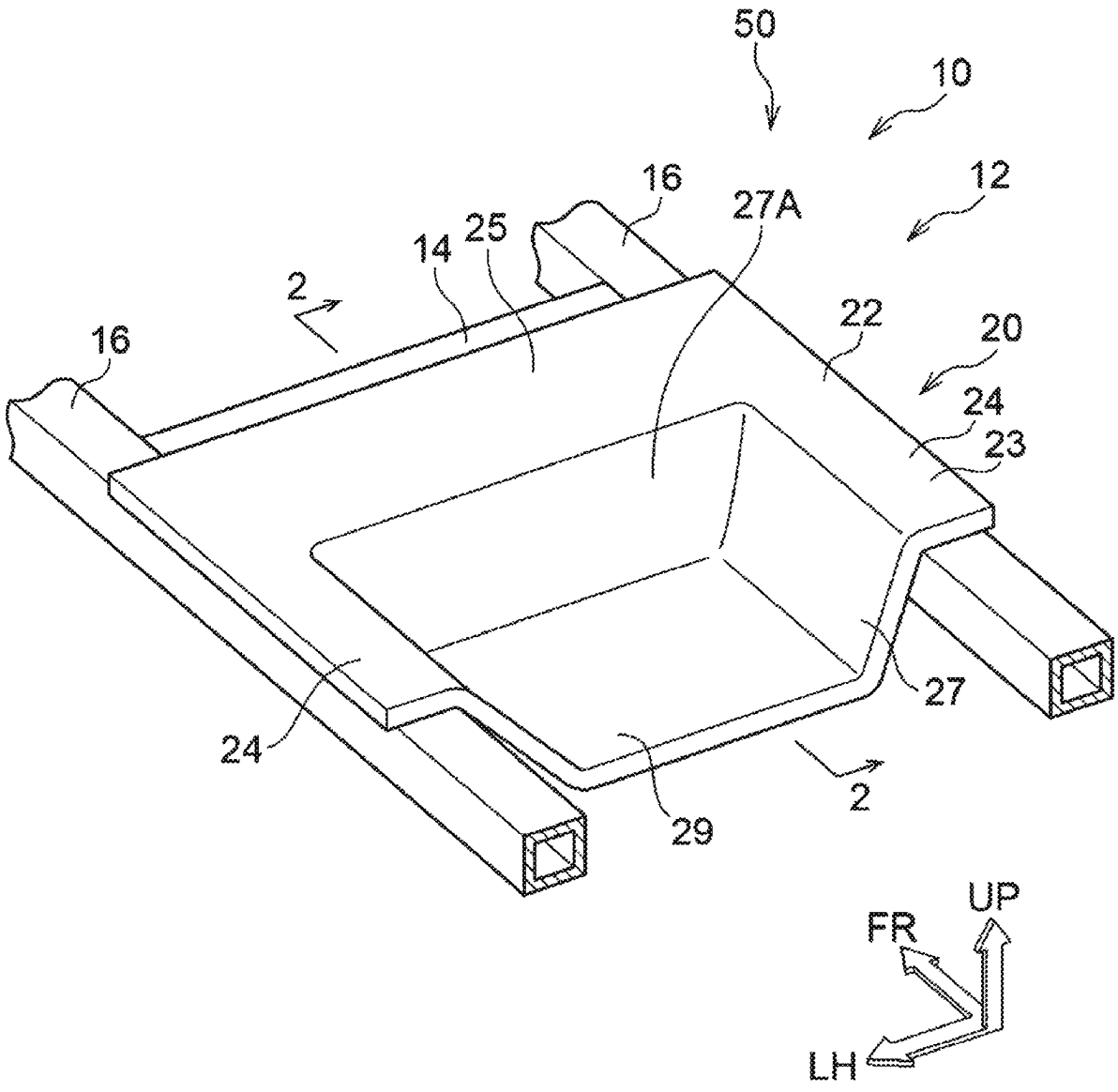


FIG. 1

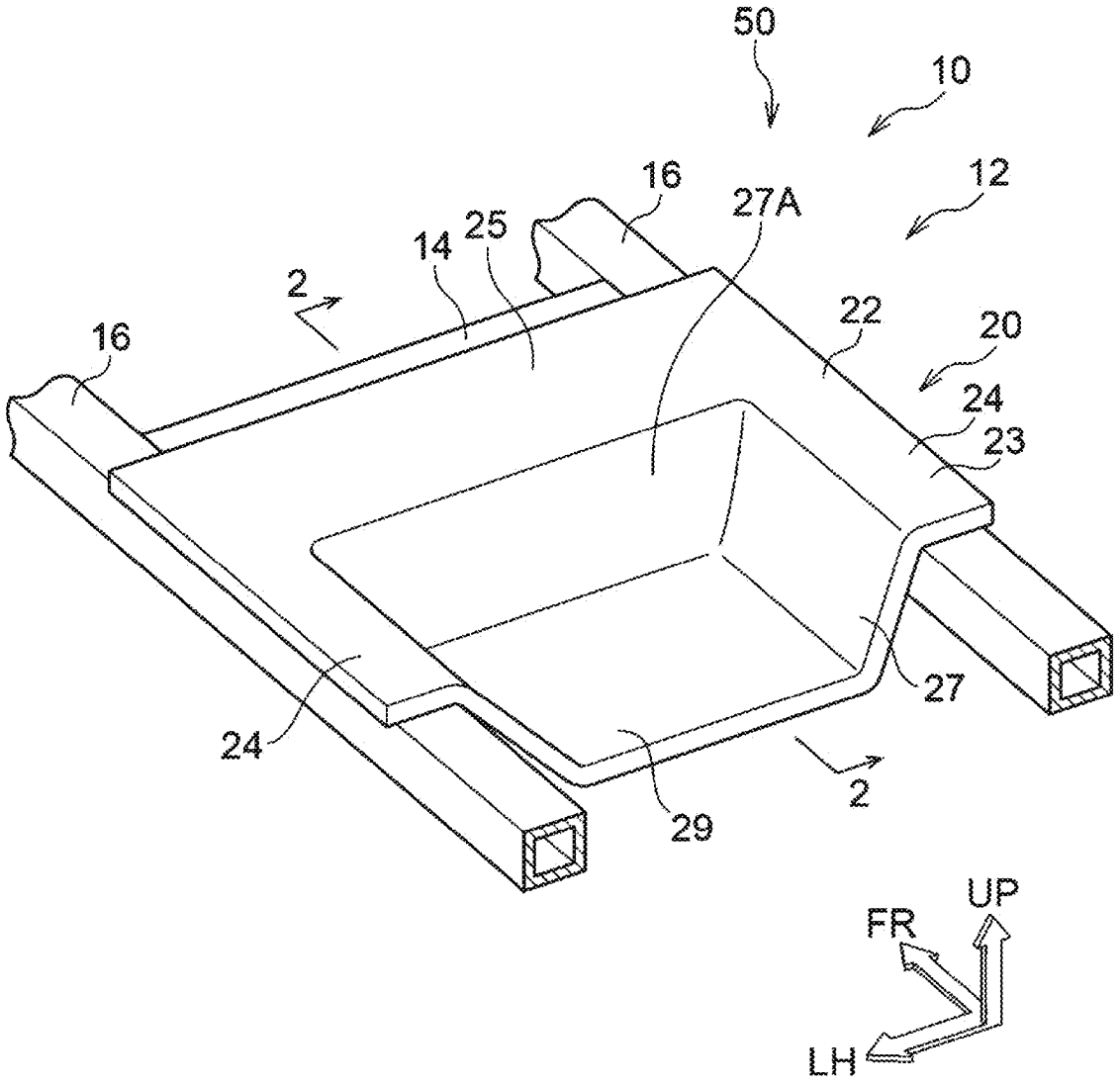


FIG. 2

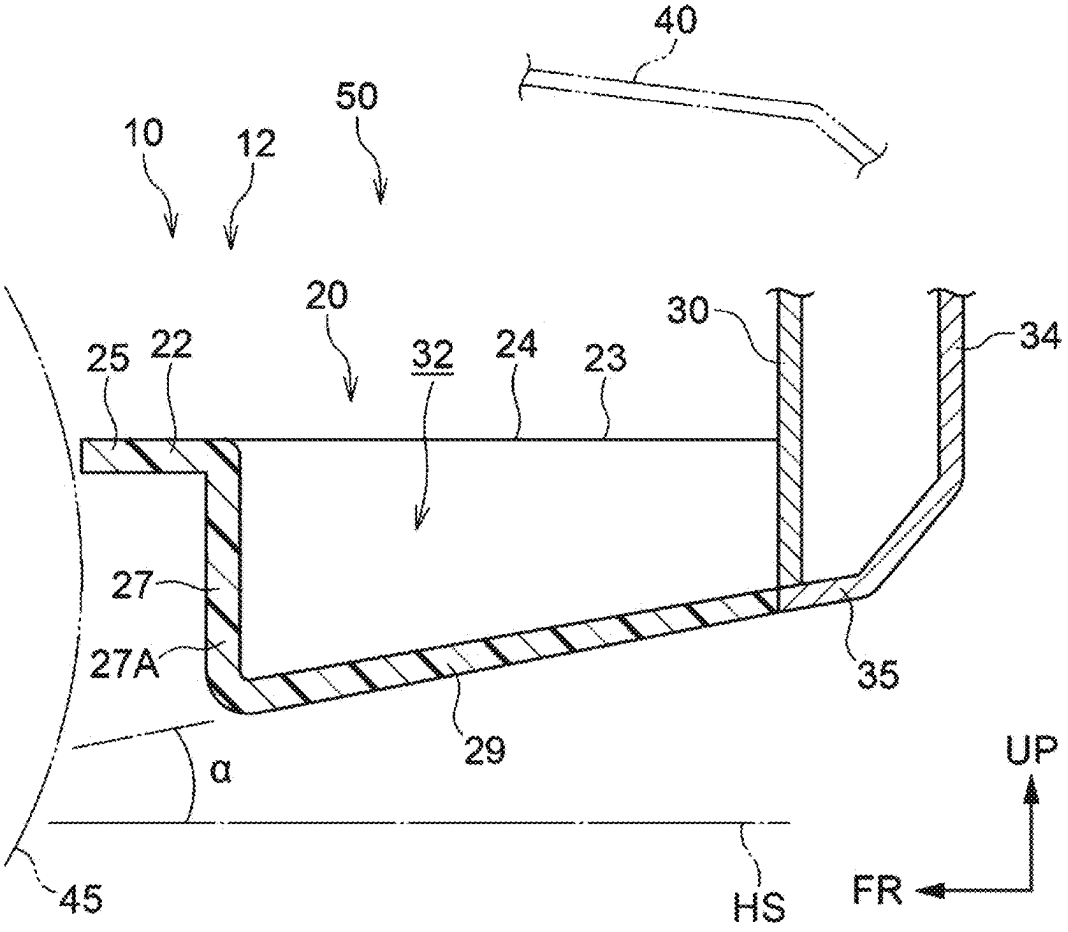
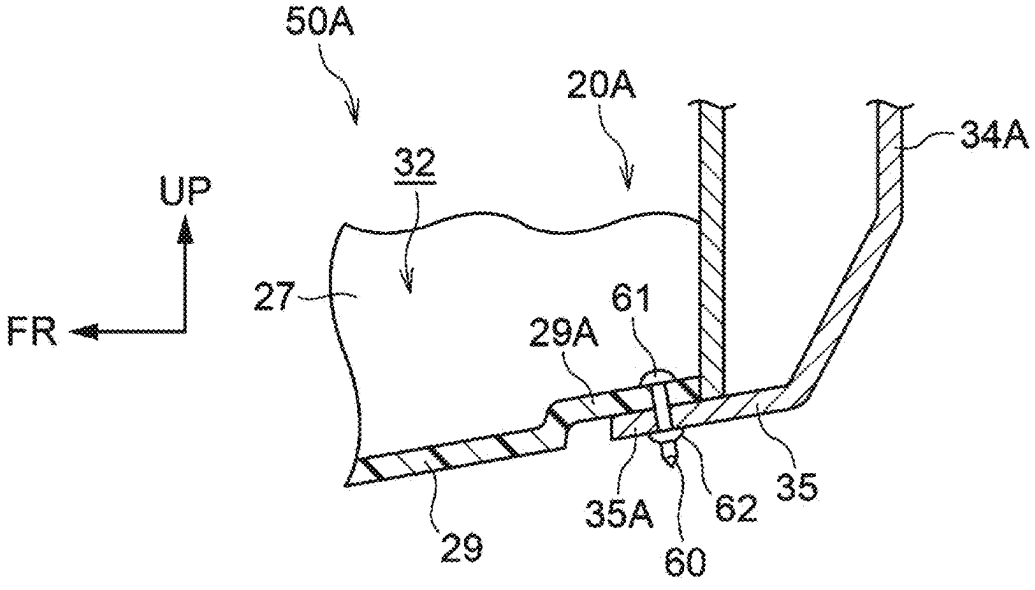

40
50
10
12
20
30
34
25
22
32
24
23
27
27A
35
29
α
UP
FR
45
HS

FIG. 3


50A
20A
34A
32
UP
FR
27
61
29A
35
35A
62
29
60

# VEHICLE LOWER PART STRUCTURE

## CROSS-REFERENCE TO RELATED APPLICATION

**[0001]** This application claims priority to Japanese Patent Application No. 2024-023743 filed on Feb. 20, 2024, incorporated herein by reference in its entirety.

## BACKGROUND

### 1. Technical Field

**[0002]** The present disclosure relates to vehicle lower part structures.

### 2. Description of Related Art

**[0003]** Japanese Unexamined Patent Application Publication No. 2018-122774 (JP 2018-122774 A) discloses a vehicle lower part structure intended to improve aerodynamic characteristics by an undercover.

## SUMMARY

**[0004]** A rear floor that is provided in the rear part of a vehicle has been manufactured as an iron component, while an undercover that forms the lower surface of the rear part of a vehicle is a resin product. That is, the rear floor and the undercover are manufactured as separate members. Therefore, conventional vehicle lower part structures have room for improvement in terms of reducing the number of parts.

**[0005]** The present disclosure provides a vehicle lower part structure that can reduce the number of parts.

**[0006]** A vehicle lower part structure of a first aspect includes:

**[0007]** a resin rear floor portion provided in a rear part of a vehicle and including a floor pan forming portion; and

**[0008]** a resin undercover portion that forms a lower surface of the rear part and that is molded integrally with the rear floor portion.

**[0009]** The vehicle lower part structure of the first aspect includes:

**[0010]** the resin rear floor portion provided in the rear part of the vehicle and including the floor pan forming portion; and

**[0011]** the resin undercover portion that forms the lower surface of the rear part of the vehicle and that is molded integrally with the rear floor portion.

Therefore, the vehicle lower part structure of the first aspect can reduce the number of parts compared to a case where a member corresponding to the rear floor portion and a member corresponding to the undercover portion are configured as separate members. Since the resin rear floor portion has high design and manufacturing flexibility, it is easy to form the floor pan forming portion in such a shape that the floor pan forming portion is connected to the undercover portion.

**[0012]** According to a second aspect, in the vehicle lower part structure of the first aspect,

**[0013]** the floor pan forming portion may include a vertical wall portion that extends downward and whose lower end is connected to the undercover portion.

**[0014]** The floor pan forming portion of the vehicle lower part structure of the second aspect includes the vertical wall portion that extends downward and whose lower end is connected to the undercover portion. This allows the floor pan forming portion to be formed in a deep shape such that the floor pan forming portion is connected to the undercover portion.

**[0015]** According to a third aspect, the vehicle lower part structure of the first or second aspect may further include

**[0016]** a bumper cover that is provided in the rear part and whose front end is connected to a rear end of the undercover portion, and

**[0017]** a lower surface of the rear end of the undercover portion and a lower surface of the front end of the bumper cover may be flush with each other.

**[0018]** In the vehicle lower part structure of the third aspect, the lower surface of the rear end of the undercover portion and the lower surface of the front end of the bumper cover are flush with each other. The undercover portion and the bumper cover can therefore provide good aerodynamic characteristics.

**[0019]** As described above, the vehicle lower part structure according to the present disclosure is advantageous in that it can reduce the number of parts.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0020]** Features, advantages, and technical and industrial significance of exemplary embodiments of the disclosure will be described below with reference to the accompanying drawings, in which like signs denote like elements, and wherein:

**[0021]** FIG. **1** is a schematic perspective view of a resin unit, a cross member, and a rear side member of a vehicle lower part structure according to an embodiment;

**[0022]** FIG. **2** is a schematic cross-sectional view taken along line **2-2** of FIG. **1**; and

**[0023]** FIG. **3** is a cross-sectional view similar to FIG. **2** of a variant.

## DETAILED DESCRIPTION OF EMBODIMENTS

**[0024]** Hereinafter, a vehicle lower part structure according to an embodiment will be described with reference to the accompanying drawings. The arrow UP, the arrow FR, and the arrow LH shown in the drawings respectively indicate an upper side in the vehicle up-down direction, a front side in the vehicle front-rear direction, and a left side in the vehicle left-right direction.

**[0025]** FIG. **1** and FIG. **2** show a rear part of a vehicle **10** to which the vehicle lower part structure of the present embodiment is applied. At the rear part of the vehicle body **12** of the vehicle **10**, a cross member **14** which is a vehicle body skeleton member and extends in the vehicle width direction (left-right direction) and a pair of left-right rear side members **16** which are a vehicle body skeleton member and extend in the front-rear direction are provided. The left and right ends of the cross member **14** are connected to the left and right rear side members **16**, respectively.

**[0026]** In a space located between the cross member **14** and the left and right rear side members **16**, a resin unit **20** which is an integrally molded product made of resin is provided. The resin unit **20** includes a rear floor portion **22** and an undercover portion **29**. The rear floor portion **22** includes a floor forming portion **23** having a flat plate shape and having a substantially U-shaped planar shape, and a floor pan forming portion **27** extending downward from an inner peripheral edge portion of the floor forming portion **23**.

The sectional shape of the floor pan forming portion **27** when cut in the horizontal plane is substantially U-shaped. The front wall portion (vertical wall portion) **27**A of the floor pan forming portion **27** is a plate-shaped portion extending substantially vertically downward from the floor forming portion **23**. Further, an outer peripheral portion of a flat plate-shaped undercover portion **29** having a substantially rectangular planar shape is connected to a peripheral edge portion of a lower end of the floor pan forming portion **27**. As shown in FIG. **2**, in a side view, the lower surface of the undercover portion **29** is inclined at an angle $\alpha°$ with respect to the horizontal plane HS. For example, $\alpha=8$. As shown in FIG. **2**, the undercover portion **29** constitutes the lower surface of the rear part of the vehicle body **12**.

**[0027]** The left and right side portions **24** of the floor forming portion **23** are mounted on the upper surfaces of the left and right rear side members **16** and are fixed to the respective rear side members **16**. Further, a front portion **25** of the floor forming portion **23** is mounted on the upper surface of the cross member **14** and fixed to each cross member **14**.

**[0028]** As shown in FIG. **2**, a rear back **30** is fixed to a rear end of the floor pan forming portion **27** and a rear end of the undercover portion **29**. Further, the floor pan forming portion **27**, the undercover portion **29**, and the rear back **30** form a space **32** with an open top surface. A bumper (not shown) is fixed to a rear surface of the rear back **30**. Further, a bumper cover **34** constituting a part of the rear end of the vehicle body **12** is fixed to a bracket (not shown) fixed to the rear back **30**. As shown in FIG. **2**, the front end (lower end) of the bumper cover **34** is constituted by an inclined portion **35** inclined with respect to the horizontal plane HS in a side view. Further, the front end of the inclined portion **35** is connected to the rear end of the undercover portion **29**, and the front end of the inclined portion **35** and the rear end of the undercover portion **29** are fixed to each other. Further, the lower surface of the inclined portion **35** and the lower surface of the rear end of the undercover portion **29** are flush with each other.

**[0029]** As shown in FIG. **2**, a back door **40** positioned directly above the resin unit **20** is provided in the rear part of the vehicle body **12** in such a manner that the back door **40** can be opened and closed. Therefore, when the back door **40** is in the open position, the resin unit **20** can be exposed to the outside of the vehicle. Further, when the vehicle **10** is viewed from the side, the left and right rear wheels **45** are positioned immediately in front of the resin unit **20**.

**[0030]** In the above-described configuration, the resin unit **20**, the rear back **30**, and the bumper cover **34** are components of the vehicle lower part structure **50**.

## Action and Effect

**[0031]** Next, operations and effects of the present embodiment will be described.

**[0032]** The vehicle lower part structure **50** described above includes the resin unit **20** having the rear floor portion **22** and the undercover portion **29**. The rear floor portion **22** is supported by a rear side member **16** provided in the rear part of the vehicle body **12** of the vehicle **10**. The undercover portion **29** constitutes the lower surface of the rear part of the vehicle body **12**, and is molded integrally with the rear floor portion **22**. Therefore, in the vehicle lower part structure **50**, the number of parts can be reduced as compared with a case where a member corresponding to the rear floor portion **22** and a member corresponding to the undercover portion **29** are configured as separate members.

**[0033]** Furthermore, a space **32** is formed by the floor pan forming portion **27**, the undercover portion **29**, and the rear back **30**. For example, a spare tire can be accommodated in the space **32**. Since the bottom portion of the space **32** is configured by using the undercover portion **29** as described above, the structure of the vehicle lower part structure **50** is simpler than in the case where the space having the bottom portion is configured only by the rear floor portion that is configured separately from the undercover.

**[0034]** Further, the floor pan forming portion **27** includes a front wall portion (vertical wall portion) **27**A that is a plate-like portion extending substantially vertically downward from the floor forming portion **23**. Therefore, the floor pan forming portion **27** can be deeply formed so as to be connected to the undercover portion **29**.

**[0035]** Further, in the vehicle lower part structure **50**, the lower surface of the inclined portion **35** and the lower surface of the rear end of the undercover portion **29** are flush with each other. Therefore, when the vehicle **10** travels, the undercover portion **29** and the bumper cover **34** can provide good aerodynamic characteristics.

**[0036]** Although the vehicle lower part structure **50** according to the embodiment has been described above, these can be appropriately changed in design without departing from the gist of the present disclosure.

**[0037]** For example, as in the vehicle lower part structure **50**A of the modification shown in FIG. **3**, the rear edge portion **29**A of the undercover portion **29** of the resinous unit **20**A may be formed so as to be positioned one step upward as compared to the other portions. The front edge portion **35**A of the inclined portion **35** of the bumper cover **34**A may be located immediately below the rear edge portion **29**A, and the portion located forward of the rear edge portion **29**A of the lower surface of the undercover portion **29** and the lower surface of the inclined portion **35** may be located on the same plane. That is, the undercover portion **29** and the inclined portion **35** may be connected such that the portion located in front of the rear edge portion **29**A of the lower surface of the undercover portion **29** and the lower surface of the inclined portion **35** are flush with each other. For example, the rear edge portion **29**A and the front edge portion **35**A may be fixed by the head portion **61** and the retaining portion **62** of the resin-made clip member **60** which form through holes communicating with each other in the rear edge portion **29**A and the front edge portion **35**A and vertically penetrate these through holes.

**[0038]** A rib (not shown) extending along the front-rear direction in a plan view may be provided on the lower surface of the undercover portion **29**. In this way, the mechanical strength of the undercover portion **29** (resin unit **20**, **20**A) can be improved without deteriorating the aerodynamic performance of the undercover portion **29** (resin unit **20**, **20**A). Further, the bumper cover **34** and the lower surface of the inclined portion **35** of **34**A may be provided with ribs (not shown) extending along the front-rear direction in a plan view. In this way, the mechanical strength of the bumper cover **34** and **34**A (inclined portion **35**) can be improved without deteriorating the aerodynamic performance of the bumper cover **34** and **34**A (inclined portion **35**).

What is claimed is:

**1**. A vehicle lower part structure, comprising:

a resin rear floor portion provided in a rear part of a vehicle and including a floor pan forming portion; and

a resin undercover portion that forms a lower surface of the rear part and that is molded integrally with the rear floor portion.

**2**. The vehicle lower part structure according to claim **1**, wherein the floor pan forming portion includes a vertical wall portion that extends downward and whose lower end is connected to the undercover portion.

**3**. The vehicle lower part structure according to claim **1**, further comprising:

a bumper cover that is provided in the rear part and whose front end is connected to a rear end of the undercover portion; and

a lower surface of the rear end of the undercover portion and a lower surface of the front end of the bumper cover are flush with each other.

* * * * *