United States Patent Application Publication	20250266218
Kind Code	A1
Publication Date	August 21, 2025
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RELAY

Abstract

A relay includes a first fixed terminal including a first fixed contact, a second fixed terminal positioned on left of the first fixed terminal and including a second fixed contact, a movable contactor including a first projection that comes into contact with or is separated from the first fixed contact, and a first magnet facing the movable contactor. The first magnet is provided on a right side of a right end of the movable contactor, the first projection overlaps the first fixed contact in top view, and a right end of the first fixed contact is positioned on a left side of the right end of the movable contactor and on a right side of a right end of the first projection.

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Family ID: **1000008616888**

Appl. No.: **18/859341**

Filed (or PCT Filed): **April 19, 2023**

PCT No.: **PCT/JP2023/015610**

Foreign Application Priority Data

CN	202210518738.1	May. 12, 2022

Publication Classification

Int. Cl.: **H01H9/44** (20060101); **H01H50/54** (20060101)

U.S. Cl.:

CPC **H01H9/443** (20130101); **H01H50/54** (20130101);

Background/Summary

TECHNICAL FIELD
[0001] The present invention relates generally to a relay.
BACKGROUND ART
[0002] A relay described in PTL 1 includes a contact portion including two movable contacts and two fixed contacts. The movable contacts and the fixed contacts come into contact with or are separated from each other.
[0003] In such a relay, when the movable contacts and the fixed contacts are separated from each other, an arc generated between the movable contacts and the fixed contacts may directly extend from left and right end surfaces of the movable contacts in a direction perpendicular to the left and right end surfaces. That is, a direction in which the arc is extended is parallel to a magnetic flux direction of a magnet.
[0004] Thus, since the Lorentz force necessary for extending the arc cannot be sufficiently secured, extinction of the arc may become difficult.
CITATION LIST
Patent Literature
[0005] PTL 1: Unexamined Japanese Patent Publication No. 2021-051978
SUMMARY OF THE INVENTION
[0006] The present invention includes a first fixed terminal including a first fixed contact, a second fixed terminal positioned on a left side of the first fixed terminal and including a second fixed contact, a movable contactor including a first projection that comes into contact with or is separated from the first fixed contact, and a first magnet facing the movable contactor.
[0007] Here, the first magnet is provided on a right side of a right end of the movable contactor. In addition, the first projection overlaps the first fixed contact in top view. Then, a right end of the first fixed contact is positioned to a left side of the right end of the movable contactor and on a right side of a right end of the first projection.
[0008] According to the present invention, arc-extinguishing capability of the relay can be improved.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0009] FIG. **1** is a plan view of a relay according to an exemplary embodiment of the present invention.
[0010] FIG. **2** is a side view of the relay according to the exemplary embodiment of the present invention.
[0011] FIG. **3** is a sectional view of the relay according to the exemplary embodiment of the present invention taken along line A-A in FIG. **1**.
[0012] FIG. **4** is a sectional view of the relay according to the exemplary embodiment of the present invention taken along line A-A in FIG. **1**.
[0013] FIG. **5** is a perspective view of a movable contactor of the relay according to the exemplary embodiment of the present invention.
[0014] FIG. **6** is a sectional view of the relay according to the exemplary embodiment of the present invention taken along line B-B in FIG. **2**.
DESCRIPTION OF EMBODIMENT
Exemplary Embodiment
[0015] An exemplary embodiment of the present invention will be described with reference to the

drawings. Note that, for the sake of convenience in description, up-down, left-right, and front-rear directions are illustrated in the drawings, and these directions do not limit directions when a device is attached and used at all.

[0016] As illustrated in FIGS. **1** to **4**, relay **1** according to the exemplary embodiment of the present invention includes first fixed terminal **11**, second fixed terminal **15**, housing **21**, movable contactor **30**, first magnet **41**, second magnet **42**, and movable shaft **51**.

[0017] As illustrated in FIGS. **1** and **3**, first fixed terminal **11** is made of a conductive material such as copper, has a substantially columnar shape, and is fixed to an upper surface of housing **21**. An upper end of first fixed terminal **11** is exposed to an outside of housing **21**, and a lower end of first fixed terminal **11** is inserted into housing **21**. A lower end surface of first fixed terminal **11** includes first fixed contact **12** that comes into contact with or is separated from first projection **31** of movable contactor **30** to be described later.

[0018] FIG. **6** is a sectional view of relay **1** according to the exemplary embodiment of the present invention taken along line B-B in FIG. **2**. In FIG. **6**, projections of first fixed contact **12** and second fixed contact **16** are indicated by a shaded circular region with a dotted boundary. As illustrated in FIG. **6**, first fixed contact **12** overlaps movable contactor **30** in plan view. Here, the "plan view" means viewing from above. An outer edge of first fixed contact **12** is positioned inside an outer edge of movable contactor **30** in plan view. Here, the "first fixed contact **12** overlaps movable contactor **30** in plan view" means that first fixed contact **12** and movable contactor **30** are projected on a horizontal plane perpendicular to a direction in plan view, and both the projections at least partially overlap each other. Similarly, "A and B overlap" described in the following description means that A and B are projected on a plane perpendicular to an observation direction, and projections of A and B at least partially overlap each other.

[0019] As illustrated in FIGS. **1** and **3**, second fixed terminal **15** is disposed on a left side of first fixed terminal **11**. First fixed terminal **11** and second fixed terminal **15** are disposed in a line in the left-right direction. Second fixed terminal **15** is made of a conductive material such as copper and has a substantially columnar shape. Second fixed terminal **15** is fixed to an upper wall portion of housing **21**, and has an upper end exposed to an outside of housing **21** and a lower end inserted into housing **21**. A lower end surface of second fixed terminal **15** includes second fixed contact **16** that comes into contact with or is separated from second projection **32** and/or third projection **33** of movable contactor **30** to be described later. In addition, as illustrated in FIG. **6**, second fixed contact **16** overlaps movable contactor **30** when looking down, and an outer edge of second fixed contact **16** is positioned inside an outer edge of movable contactor **30** when looking down.

[0020] As illustrated in FIGS. **1** to **3**, housing **21** is made of a heat resistant material such as ceramic and is a rectangular box opened downward, and includes an upper wall portion and a peripheral wall portion. Movable contactor **30** is housed in housing **21**, and housing **21** covers movable contactor **30**. First fixed terminal **11** and second fixed terminal **15** are inserted into housing **21**. Housing **21** is positioned between first magnet **41** and second magnet **42**. A lower opening of housing **21** is closed by bottom plate **22**, and through-hole **221** through which movable shaft **51** passes is provided at a center of bottom plate **22**. In order to enhance sealability between housing **21** and bottom plate **22**, coupling flange **23** is provided between housing **21** and bottom plate **22**.

[0021] As illustrated in FIGS. **5** and **6**, movable contactor **30** is made of a conductive material such as copper. A length of movable contactor **30** is larger than a width of movable contactor **30**. That is, a distance from right end portion **30***a* to left end portion **30***b* of movable contactor **30** is longer than a distance from one side surface **30***c* to other side surface **30***d* of movable contactor **30**. In addition, a width of movable contactor **30** is larger than a thickness of movable contactor **30**.

[0022] First projection **31** protruding upward is provided on an upper surface of movable contactor **30**. A shape of first projection **31** in plan view is a substantially trapezoidal shape symmetrical with respect to a center line of movable contactor **30** in the left-right direction, and a width of first

projection **31** in the front-rear direction increases from left to right. First projection **31** comes into contact with or is separated from first fixed contact **12**. That is, first projection **31** has a first movable contact. In other words, movable contactor **30** has first projection **31** that comes into contact with or is separated from first fixed contact **12**.

[0023] Further, movable contactor **30** further includes first base **34** positioned on a right side of first projection **31**. First projection **31** protrudes upward from first base **34**. Thus, a distance between first projection **31** and first fixed terminal **11** is smaller than a distance between first base **34** and first fixed terminal **11**.

[0024] An upper surface of first base **34** is an inclined surface that is inclined downward toward right end portion **30***a* of movable contactor **30**. The distance between first base **34** and first fixed terminal **11** increases toward right end portion **30***a* of movable contactor **30**. Thus, an arc is gradually extended as the arc moves on first base **34** toward right end portion **30***a*.

[0025] Further, first projection **31** and first base **34** are preferably connected by a side surface formed as a smooth curved surface of first projection **31**. As a result, the arc generated by first projection **31** can easily move toward first base **34**.

[0026] In addition, movable contactor **30** includes second projection **32** and third projection **33** disposed in parallel with second projection **32**. Each of second projection **32** and third projection **33** overlaps second fixed contact **16** in plan view. Second projection **32** and third projection **33** are provided on the upper surface of movable contactor **30** and are in a line in the front-rear direction. A current flows through movable contactor **30** in the left-right direction. Accordingly, the front-rear direction is a direction orthogonal to a direction in which the current flows through movable contactor **30**. That is, second projection **32** and third projection **33** are in a line in the direction orthogonal to the direction in which the current flows through movable contactor **30**.

[0027] Second projection **32** and third projection **33** have a substantially right-angled trapezoidal shape in plan view, and oblique sides thereof face each other in the front-rear direction. As a result, a shortest distance (that is, a distance in the front-rear direction) between second projection **32** and third projection **33** increases toward a left end of movable contactor **30**. Second projection **32** and third projection **33** have second movable contacts coming into contact with second fixed contact **16**.

[0028] Movable contactor **30** comes into contact with first fixed terminal **11** and second fixed terminal **15** at three points when relay **1** is closed by providing first projection **31** as the first movable contactor and providing second projection **32** and third projection **33** as the second movable contacts in movable contactor **30**. With this configuration, in a state where movable contactor **30** cones into contact with first fixed terminal **11** and second fixed terminal **15**, movable contactor **30** is prevented from rattling.

[0029] Note that, it is not essential that second fixed contact **16** comes into contact with both second projection **32** and third projection **33**, and for example, second fixed contact **16** may come into contact with either second projection **32** or third projection **33**.

[0030] Further, movable contactor **30** has second base **35** positioned on a left side of second projection **32**. Second projection **32** protrudes upward from second base **35**.

[0031] A distance between second projection **32** and second fixed terminal **15** is smaller than a distance between second base **35** and second fixed terminal **15**. An upper surface of second base **35** is an inclined surface that is inclined downward toward left end portion **30***b* of movable contactor **30**. Thus, the distance between second base **35** and second fixed terminal **15** increases toward left end portion **30***b* of movable contactor **30**. Thus, an arc is gradually extended as the arc moves on second base **35** toward left end portion **30***b*.

[0032] Further, second projection **32** and second base **35** are preferably connected by a side surface formed as a smooth curved surface of second projection **32**. As a result, the arc generated by second projection **32** can easily move from second projection **32** toward second base **35**. Similarly, third projection **33** and second base **35** are preferably connected by a side surface formed as a

smooth curved surface of third projection **33**. With this configuration, the arc generated by third projection **33** can easily move from third projection **33** toward second base **35**.

[0033] As illustrated in FIGS. **3** and **4**, movable contactor **30** is held by holder **52** at an upper end of movable shaft **51**, moves up and down along with movement of movable shaft **51** up and down, and can move between an opened position and a closed position. In FIG. **3**, movable contactor **30** is positioned at the opened position, and this state may be referred to as an "opened state". In FIG. **4**, movable contactor **30** is positioned at the closed position, and this state may be referred to as a "closed state".

[0034] Specifically, when an electromagnetic body is energized, movable shaft **51** moves upward, and movable contactor **30** moves upward. Thus, an upper surface of first projection **31** comes into contact with first fixed contact **12**, and upper surfaces of second projection **32** and third projection **33** come into contact with second fixed contact **16**. Movable contactor **30** moves upward, and thus, first fixed terminal **11** and second fixed terminal **15** are electrically connected to each other (see FIG. **4**).

[0035] FIG. **4** illustrates a state where relay **1** is switched to the closed position. When the energization to the electromagnetic body is stopped, movable shaft **51** moves downward by an action of a recovery spring, and movable contactor **30** moves downward. First projection **31** is separated from first fixed contact **12**, and second projection **32** and third projection **33** are separated from second fixed contact **16**. As a result, first fixed terminal **11** and second fixed terminal **15** are switched from the electrical connection state to an electrical disconnection state. In FIG. **3**, relay **1** is switched to an electrical disconnection position illustrated in FIG. **3**.

[0036] As illustrated in FIGS. **3** and **6**, first magnet **41** is provided on a right side of housing **21**, and second magnet **42** is provided on a left side of housing **21**. First magnet **41** and second magnet **42** are provided to face each other in the front-rear direction. First magnet **41** and second magnet **42** are held by substantially U-shaped first holder **45** and second holder **46**, respectively.

[0037] Here, first magnet **41** is held on an outer surface of right side wall **21***a* of housing **21**, and second magnet **42** is held on an outer surface of left side wall **21***b* of housing **21**. First magnet **41** and second magnet **42** are arrayed such that identical poles face each other. For example, in a case where N poles are arrayed to face each other, a left side surface of first magnet **41** is the N pole, a right side surface thereof is an S pole, a right side surface of second magnet **42** is the N pole, and a left side surface thereof is the S pole. Note that, identical poles of first magnet **41** and second magnet **42** may not face each other.

[0038] First magnet **41** is, for example, a permanent magnet such as a ferrite magnet or a neodymium magnet. First magnet **41** is provided on a right side of a right end of movable contactor **30** and faces movable contactor **30**. In addition, first magnet **41** is disposed to overlap movable contactor **30** as viewed from a right side, and a width of first magnet **41** in the front-rear direction is preferably larger than a width of movable contactor **30** in the front-rear direction.

[0039] In addition, a height of first magnet **41** in the up-down direction is preferably larger than a distance between first fixed contact **12** and first projection **31** when movable contactor **30** is in the opened position.

[0040] In this configuration, first magnet **41** generates a magnetic flux from right to left in a space between first fixed contact **12** and first projection **31**.

[0041] Second magnet **42** is, for example, a permanent magnet such as a ferrite magnet or a neodymium magnet. Second magnet **42** is provided on a left side of a left end of movable contactor **30** and faces movable contactor **30**. In addition, second magnet **42** is disposed to overlap movable contactor **30** as viewed from a left side, and a width of second magnet **42** in the front-rear direction is preferably larger than a width of movable contactor **30** in the front-rear direction.

[0042] In addition, a height of second magnet **42** in the up-down direction is preferably larger than a distance between second fixed contact **16** and second projection **32** and a distance between second fixed contact **16** and third projection **33** when movable contactor **30** is in the opened

position.
[0043] In this configuration, second magnet **42** generates a magnetic flux from left to right in a space between second fixed contact **16** and second projection **32** and a space between second fixed contact **16** and third projection **33**.
[0044] As illustrated in FIG. **6**, when movable contactor **30** moves downward from the closed position to the opened position, an arc is generated between first fixed contact **12** and first projection **31**, and an arc is also generated between second fixed contact **16**, second projection **32**, and third projection **33**.
[0045] The Lorentz force acting on the generated arc in a case where the current flows from first fixed terminal **11** side toward second fixed terminal **15** side when relay **1** is at the closed position will be described.
[0046] On first fixed terminal **11** side, the current flows from upward to downward from first fixed contact **12** toward first projection **31**. In addition, first magnet **41** generates a magnetic flux from right to left in a space between first fixed contact **12** and first projection **31**. Thus, Lorentz force F**1** directed rearward acts on the arc generated between first fixed contact **12** and first projection **31**.
[0047] In addition, on second fixed terminal **15** side, the current flows from downward to upward from second projection **32** and third projection **33** toward second fixed contact **16**. In addition, second magnet **42** generates a magnetic flux from left to right in a space between second fixed contact **16** and second projection **32** and third projection **33**. Thus, Lorentz force F**2** directed rearward acts on the arc generated between second fixed contact **16** and second projection **32** or third projection **33**.
[0048] Note that, the same applies to the Lorentz force acting on the generated arc in a case where the current flows from second fixed terminal **15** side to first fixed terminal **11** side when relay **1** is at the closed position. That is, Lorentz force F**1** directed forward acts on the arc generated between first fixed contact **12** and first projection **31**. Then, Lorentz force F**2** directed forward is generated with respect to the arc generated between second fixed contact **16** and second projection **32** or third projection **33**.
[0049] As illustrated in FIG. **6**, as viewed from above, a distance in the left-right direction between an inner surface of right side wall **21***a* of housing **21** and right end portion **30***a* of movable contactor **30** is smaller than a distance in the front-rear direction between an inner surface of front side wall **21***c* of housing **21** and side surface **30***c* of movable contactor **30**, and is smaller than a distance in the front-rear direction between an inner surface of rear side wall **21***d* of housing **21** and side surface **30***d* of movable contactor **30**.
[0050] That is, a shortest distance between an inner surface of housing **21** and right end portion **30***a* of movable contactor **30** is shorter than a shortest distance between the inner surface of housing **21** and side surface **30***c* and a shortest distance between the inner surface of housing **21** and side surface **30***d*. With this configuration, a space between the inner surface of housing **21** and right end portion **30***a* of movable contactor **30** is relatively small, and a space between the inner surface of housing **21** and side surfaces **30***c* and **30***d* of movable contactor **30** is relatively large.
[0051] As a result, it is possible to suppress an increase in size of housing **21** in the left-right direction while securing a space for extending an arc between side surfaces **30***c* and **30***d* of movable contactor **30** and the inner surface of housing **21**.
[0052] In addition, as viewed from above, a distance in the left-right direction between an inner surface of left side wall **21***b* of housing **21** and left end portion **30***b* of movable contactor **30** is smaller than a distance in the front-rear direction between the inner surface of front side wall **21***c* of housing **21** and side surface **30***c* of movable contactor **30**, and is smaller than a distance in the front-rear direction between the inner surface of rear side wall **21***d* of housing **21** and side surface **30***d* of movable contactor **30**.
[0053] That is, a shortest distance between the inner surface of housing **21** and left end portion **30***b* of movable contactor **30** is shorter than a shortest distance between the inner surface of housing **21**

and side surface **30***c* and a shortest distance between the inner surface of housing **21** and side surface **30***d*. With this configuration, a space between the inner surface of housing **21** and left end portion **30***b* of movable contactor **30** is relatively small, and a space between the inner surface of housing **21** and side surfaces **30***c* and **30***d* of movable contactor **30** is relatively large.

[0054] As a result, it is possible to suppress an increase in size of housing **21** in the left-right direction while securing a space for extending an arc between side surfaces **30***c* and **30***d* of movable contactor **30** and the inner surface of housing **21**.

[0055] In addition, a pair of first protrusions **24** and a pair of second protrusions **25** are provided on the inner surfaces of front side wall **21***c* and rear side wall **21***d* of housing **21** to face each other. First protrusion **24** is positioned on a right side of second protrusion **25**, and a protrusion height of first protrusion **24** in the front-rear direction is smaller than a protrusion height of second protrusion **25** in the front-rear direction.

[0056] First protrusion **24** can prevent the arc generated on first fixed contact **12** side from propagating to second fixed contact **16** side, and second protrusion **25** can prevent the arc generated on second fixed contact **16** side from propagating to first fixed contact **12** side. In addition, second protrusion **25** can also restrict the rotation of movable contactor **30** by abutting on movable contactor **30** or holder **52**.

[0057] As illustrated in FIG. **6**, as viewed from above, first projection **31** overlaps first fixed contact **12**, and first projection **31** is completely covered by first fixed contact **12**. In addition, a right end of first fixed contact **12** is positioned on a left side of the right end of movable contactor **30** and is positioned on a right side of a right end of first projection **31**. As a result, a distance by which the arc moves can be secured between the right end of first projection **31** and the right end (right end portion **30***a*) of movable contactor **30**.

[0058] Specifically, a case where the current flows from first fixed terminal **11** to second fixed terminal **15** when relay **1** is in the closed state will be described as an example. When movable contactor **30** moves from the closed position to the opened position, an arc is generated at a contact portion between first fixed contact **12** and first projection **31**, and the arc moves along the upper surface of movable contactor **30** with first projection **31** as a start point.

[0059] Since a movable distance of the arc generated between the right end (right end portion **30***b*) of first projection **31** and the right end of movable contactor **30** is set, the arc moving toward right end portion **30***a* of movable contactor **30** can be suppressed.

[0060] Here, when the arc extends rightward from right end portion **30***a* of movable contactor **30**, a direction in which the arc extends and a direction of the magnetic flux of first magnet **41** are substantially parallel, and the Lorentz force is less likely to act on the arc. As a result, the arc is less likely to be extinguished. In addition, in a case where the space between the inner surface of housing **21** and right end portion **30***a* of movable contactor **30** is relatively small, it is difficult to further extend the arc and extinguish the arc.

[0061] On the other hand, when the configuration of the present invention is used, the generated arc moves toward side surface **30***d* of movable contactor **30** and is extended rearward from side surface **30***d* of movable contactor **30**. Thus, a relatively large Lorentz force easily acts on the arc, and the arc is easily extinguished.

[0062] In addition, in a case where the space between the inner surface of housing **21** and side surface **30***d* of movable contactor **30** is larger than the space between the inner surface of housing **21** and right end portion **30***a* of movable contactor **30**, the arc is more easily extended, and thus, the arc is more easily extinguished.

[0063] As viewed from above, second projection **32** and third projection **33** overlap second fixed contact **16**. In addition, a left end of second fixed contact **16** is positioned on a right side of the left end of movable contactor **30** and is positioned on a left side of left ends of second projection **32** and third projection **33**. As a result, it is possible to secure the distance by which the arc moves between the left end of second projection **32** and the left end (left end portion **30***b*) of movable

contactor **30** and between the left end of third projection **33** and the left end (left end portion **30***b*) of movable contactor **30**.

[0064] Specifically, a case where the current flows from first fixed terminal **11** to second fixed terminal **15** when movable contactor **30** of relay **1** is in the closed state will be described as an example. When movable contactor **30** moves from the closed position to the opened position, an arc is generated between a contact portion between second fixed contact **16** and second projection **32** or between a contact portion between second fixed contact **16** and third projection **33**. The arc moves along the upper surface of movable contactor **30** starting from second projection **32** or third projection **33**. Since the distance by which the arc moves is set between second projection **32** and the left end (left end portion **30***b*) of movable contactor **30** or between the left end of third projection **33** and the left end (left end portion **30***b*) of movable contactor **30**, the arc moving toward left end portion **30***b* of movable contactor **30** can be suppressed.

[0065] Here, when the arc extends leftward from left end portion **30***b* of movable contactor **30**, a direction in which the arc extends and a direction of the magnetic flux of second magnet **42** are substantially parallel, and the Lorentz force is less likely to act on the arc. As a result, the arc is less likely to be extinguished. In addition, in a case where the space between the inner surface of housing **21** and left end portion **30***b* of movable contactor **30** is relatively small, the arc is further extended and the arc is hardly extinguished.

[0066] On the other hand, when the structure of the present invention is used, the generated arc moves toward side surface **30***d* of movable contactor **30** and is extended rearward from side surface **30***d* of movable contactor **30**. Thus, a relatively large Lorentz force is easily generated in the arc, and the arc is easily extinguished.

[0067] In addition, in a case where the space between the inner surface of housing **21** and side surface **30***d* of movable contactor **30** is larger than the space between the inner surface of housing **21** and right end portion **30***a* of movable contactor **30**, the arc is more easily extended, and thus, the arc is more easily extinguished.

[0068] In addition, the upper surface of first base **34** is formed as the inclined surface. Thus, even though movable contactor **30** is inclined in the left-right direction when the movable contactor moves from the closed position to the opened position, the distance between first projection **31** and first fixed terminal **11** is smaller than the distance between first base **34** and first fixed terminal **11**.

[0069] In addition, the upper surface of second base **35** is formed as the inclined surface. Thus, even though movable contactor **30** is inclined in the left-right direction when the movable contactor moves from the closed position to the opened position, the distance between second projection **32** and second fixed terminal **15** and the distance between third projection **33** and second fixed terminal **15** are smaller than the distance between second base **35** and second fixed terminal **15**.

[0070] Accordingly, the arc easily moves along the upper surface of movable contactor **30** starting from first projection **31**, second projection **32**, and third projection **33**, and the movement distance of the arc can be further secured.

[0071] Note that, although it has been described that the arc moving toward side surface **30***d* of movable contactor **30** is extended rearward from side surface **30***d* of movable contactor **30**, the arc may move toward side surface **30***c* of movable contactor **30** and may extend forward from side surface **30***c* of movable contactor **30** by changing magnetic poles of first magnet **41** and second magnet **42** and an orientation of the current flowing when relay **1** is in the closed state.

[0072] The exemplary embodiment of the present invention has been described in detail above. However, the above-described exemplary embodiment is not intended to limit the present invention. The present invention also includes modifications in which various changes devised by those skilled in the art are applied to the above-described exemplary embodiment without departing from the meaning of the words described in the claims.

[0073] For example, in the above-described exemplary embodiment, although second projection **32** and third projection **33** are provided in movable contactor **30**, second projection **32** and third

projection **33** may be one projection such as first projection **31**.
[0074] In addition, for example, in the above-described exemplary embodiment, although first projection **31** is provided on movable contactor **30**, another projection disposed in parallel with first projection **31** may be provided to form two or more projections such as second projection **32** and third projection **33**.
[0075] For example, in the above-described exemplary embodiment, the upper surfaces of first base **34** and second base **35** may not be the inclined surfaces inclined downward, but may be flat surfaces aligned with upper surfaces of other portions of movable contactor **30**, for example.
[0076] Relay **1** described above can improve arc-extinguishing capability.
REFERENCE MARKS IN THE DRAWINGS
[0077] **1** relay [0078] **11** first fixed terminal [0079] **12** first fixed contact [0080] **15** second fixed terminal [0081] **16** second fixed contact [0082] **21** housing [0083] **21***a* right side wall [0084] **21***b* left side wall [0085] **21***c* front side wall [0086] **21***d* rear side wall [0087] **22** bottom plate [0088] **221** through-hole [0089] **23** coupling flange [0090] **24** first protrusion [0091] **25** second protrusion [0092] **30** movable contactor [0093] **30***a* right end portion [0094] **30***b* left end portion [0095] **30***c* side surface [0096] **30***d* side surface [0097] **31** first projection [0098] **32** second projection [0099] **33** third projection [0100] **34** first base [0101] **35** second base [0102] **41** first magnet [0103] **42** second magnet [0104] **45** first holder [0105] **46** second holder [0106] **51** movable shaft [0107] **52** holder

Claims

1. A relay comprising: a first fixed terminal including a first fixed contact; a second fixed terminal positioned on left of the first fixed terminal and including a second fixed contact; a movable contactor including a first projection that comes into contact with or is separated from the first fixed contact; and a first magnet facing the movable contactor, wherein the first magnet is provided on a right side of a right end of the movable contactor, the first projection overlaps the first fixed contact in top view, and a right end of the first fixed contact is positioned on a left side of the right end of the movable contactor and on a right side of a right end of the first projection.
2. The relay according to claim 1, wherein a length that is a distance from the right end to a left end of the movable contactor is larger than a width of the movable contactor, and the first magnet overlaps the movable contactor as viewed from right.
3. The relay according to claim 1, wherein a left end of the second fixed contact is positioned on a right side of a left end of the movable contactor.
4. The relay according to claim 1, wherein the first fixed contact overlaps the movable contactor in top view, and an outer edge of the first fixed contact is positioned inside an outer edge of the movable contactor in top view.
5. The relay according to claim 1, wherein the movable contactor further includes a first base, the first base is positioned on a right side of the first projection, and a distance between the first projection and the first fixed terminal is smaller than a distance between the first base and the first fixed terminal.
6. The relay according to claim 1, wherein an upper surface of the first projection come into contact with the first fixed contact.
7. The relay according to Claim 1, comprising: a second magnet facing the movable contactor, wherein the second magnet is provided on a left side of a left end of the movable contactor, and the second magnet overlaps the movable contactor as viewed from left.
8. The relay according to claim 7, wherein the first magnet and the second magnet are in a line, and identical poles of the first magnet and the second magnet face each other.
9. The relay according to claim 7, further comprising: a case that covers the movable contactor, wherein in top view, a shortest distance between an inner surface of the case and a right end surface

of the movable contactor is shorter than a shortest distance between the inner surface of the case and a side surface connecting the right end surface and a left end surface of the movable contactor.

10. The relay according to claim 9, wherein the first fixed terminal and the second fixed terminal are inserted into the case, and the case is positioned between the first magnet and the second magnet.

11. The relay according to claim 1 wherein the movable contactor further includes a second projection, and the second projection overlaps the second fixed contact in top view.

12. The relay according to claim 11, wherein the movable contactor further includes a third projection disposed in a line with the second projection, the third projection overlaps the second fixed contact in top view, and the second fixed contact comes into contact with or is separated from the second projection or the third projection.

13. The relay according to claim 11, wherein the movable contactor further includes a third projection disposed in a line with the second projection, the third projection overlaps the second fixed contact in top view, and the second fixed contact comes into contact with or is separated from both the second projection and the third projection.

14. The relay according to claim 12, wherein the second projection and the third projection are positioned on an upper surface of the movable contactor, and are in a line in the movable contactor in a direction orthogonal to a direction in which a current flows.

15. The relay according to claim 12, wherein a shortest distance between the second projection and the third projection increases toward a left end of the movable contactor.

16. The relay according to claim 5, wherein an upper surface of the first base is inclined downward toward the right end of the movable contactor.

17. The relay according to claim 11, wherein the movable contactor further includes a second base, the second base is positioned on a left side of the second projection, a distance between the second projection and the second fixed terminal is smaller than a distance between the second base and the second fixed terminal, and an upper surface of the second base is inclined downward toward a left end of the movable contactor.