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Fixing device including heater in which first and second resistance heating elements are positioned apart from each other on first surface of substrate by predetermined distance in conveying direction

Abstract

A fixing device includes a heating rotary body, a pressure rotary body, a heater, and a thermal conductive member. The pressure rotary body is configured to form a nipping portion and to convey a sheet in a conveying direction while nipping the sheet between the pressure rotary body and the heating rotary body. The heater includes a substrate having a first surface and a second surface, and a first and second resistance heating elements provided on the first surface. The first and second resistance heating elements extend in a crossing direction crossing the conveying direction and are positioned apart from each other by a predetermined distance in the conveying direction. The thermal conductive member is in contact with the second surface. In the conveying direction, the thermal conductive member has a dimension greater than the predetermined distance and smaller than or equal to a dimension of the nipping portion.

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Background/Summary

REFERENCE TO RELATED APPLICATIONS

(1) This application claims priority from Japanese Patent Application No. 2022-190902 filed on Nov. 30, 2022. The entire content of the priority application is incorporated herein by reference.

BACKGROUND ART

(2) There has been conventionally known a fixing device including a rotatable belt, a ceramic heater and a pressure roller. In the conventional fixing device, the ceramic heater and the pressure roller are configured to nip the belt in cooperation with each other. The ceramic heater includes a substrate and a resistance heating element. The ceramic heater has a nip surface in contact with the nip surface, and a back surface that is the opposite surface of the nip surface. A sheet-like thermal conductive member is arranged on the back surface and is in contact with the same. The thermal conductive member is configured to make uniform the temperature of the substrate.

DESCRIPTION

(3) Because the thermal conductive member has a heat capacity, it is desirable to minimize the size of the thermal conductive member in order to efficiently use heat generated by the heater to

perform thermal fixing of an image.

(4) In view of the foregoing, it is an object of the present disclosure to provide a fixing device in which the heat distribution of a heater can be made uniform while suppressing a thermal conductive member from removing heat greater than necessary.

(5) In order to attain the above and other objects, the present disclosure provides a fixing device including a heating rotary body, a pressure rotary body, a heater, and a thermal conductive member. The pressure rotary body is configured to: form a nipping portion between the pressure rotary body and the heating rotary body; and convey a sheet in a conveying direction while nipping the sheet between the pressure rotary body and the heating rotary body. The heater is accommodated inside the heating rotary body. The heater includes a substrate, a first resistance heating element, and a second resistance heating element. The substrate has a first surface and a second surface opposite the first surface. The first resistance heating element extends in a crossing direction crossing the conveying direction. The first resistance heating element is provided on the first surface of the substrate. The second resistance heating element extends in the crossing direction. The second resistance heating element is provided on the first surface of the substrate. The second resistance heating element is positioned apart from the first resistance heating element by a predetermined distance in the conveying direction. The thermal conductive member is in contact with the second surface of the substrate. In the conveying direction, the thermal conductive member has a dimension that is greater than the predetermined distance and smaller than or equal to a dimension of the nipping portion.

(6) In the above structure, since in the conveying direction the dimension of the thermal conductive member is greater than the dimension of the predetermined distance and smaller than or equal to the dimension of the nipping portion, the heat distribution of the heater can be made uniform while suppressing the thermal conductive member from removing heat greater than necessary.

(7) According to another aspect, the present disclosure provides a fixing device including a heating rotary body, a pressure rotary body, a heater, and a thermal conductive member. The pressure rotary body is configured to: form a nipping portion between the pressure rotary body and the heating rotary body; and convey a sheet in a conveying direction while nipping the sheet between the pressure rotary body and the heating rotary body. The heater is accommodated inside the heating rotary body. The heater includes a substrate, a first resistance heating element, and a second resistance heating element. The substrate has a first surface and a second surface opposite the first surface. The first resistance heating element extends in a crossing direction crossing the conveying direction. The first resistance heating element is provided on the first surface of the substrate. The second resistance heating element extends in the crossing direction. The second resistance heating element is provided on the first surface of the substrate. The second resistance heating element is positioned apart from the first resistance heating element by a predetermined distance in the conveying direction. The thermal conductive member is in contact with the second surface of the substrate. In the conveying direction, the substrate has a dimension that is greater than a dimension of the nipping portion. In the conveying direction, the dimension of the nipping portion is greater than the predetermined distance and is greater than or equal to a dimension of the thermal conductive member.

(8) According to still another aspect, the present disclosure provides a fixing device including a belt, a pressure roller, a heater, and a thermal conductive plate. The pressure roller is configured to: form a nipping portion between the pressure roller and the belt; and convey a sheet in a conveying direction while nipping the sheet between the pressure roller and the belt. The heater is accommodated inside the belt. The heater includes a substrate, a first resistance heating element, a second resistance heating element. The substrate having a first surface and a second surface opposite the first surface. The first resistance heating element extends in a crossing direction crossing the conveying direction. The first resistance heating element is provided on the first surface of the substrate. The second resistance heating element extends in the crossing direction.

The second resistance heating element is provided on the first surface of the substrate. The second resistance heating element is positioned apart from the first resistance heating element by a predetermined distance in the conveying direction. The thermal conductive plate is in contact with the second surface of the substrate. In the conveying direction, the thermal conductive plate has a dimension that is greater than the predetermined distance and smaller than or equal to a dimension of the nipping portion.

Description

(1) In the above structures, the heat distribution of the heater can be made uniform while suppressing the thermal conductive member from removing heat greater than necessary.
(2) FIG. **1** is a cross-sectional view of a heating unit.
(3) FIG. **2** is an exploded perspective view of a heater.
(4) FIG. **3** is a cross-sectional view of a heating unit.
(5) FIG. **4** is a cross-sectional view of a heating unit.
(6) FIG. **5** is a cross-sectional view of a heating unit.
(7) FIG. **6**A is an exploded perspective view of a heater having four heating patterns.
(8) FIG. **6**B is a cross-sectional view of the heater depicted in FIG. **6**A.
(9) FIG. **7**A is an exploded perspective view of a heater including a resistance heating element having terminals at both end portions thereof.
(10) FIG. **7**B is a cross-sectional view of the heater depicted in FIG. **7**A.
(11) A fixing device **1** according to a first embodiment is used with various apparatuses including an image forming apparatus and a device configured to thermally transfer foil onto a medium. As illustrated in FIG. **1**, the fixing device **1** includes a heating unit **2** and a pressure rotary body **3**. At least one of the heating unit **2** and the pressure rotary body **3** is urged by an urging mechanism (not illustrated) toward the other of the heating unit **2** and the pressure rotary body **3**. The pressure rotary body **3** is an example of the “pressure roller”.
(12) The heating unit **2** includes a belt B, a heater **10**, a holder **20**, and a thermal conductive member **30**. The belt B is configured to heat a sheet S by rotating while the sheet S is nipped between the belt B and the pressure rotary body **3**. The belt B is an example of the “heating rotary body”. The thermal conductive member **30** is an example of the “thermal conductive plate”.
(13) The belt B is an endless belt and made of metal or resin. The belt B is configured to rotate around the heater **10** while being guided by the holder **20**. The belt B has an outer circumferential surface and an inner circumferential surface. The outer circumferential surface is configured to contact the sheet S to be subjected to heating. The inner circumferential surface is in contact with the heater **10**.
(14) The heater **10** includes a substrate **11**, a resistance heating element **12**, and a cover **13**. The heater **10** is accommodated inside the belt B. Note that, in the present disclosure, the expression “the heater **10** is accommodated inside the belt B” does not necessarily denote that the entire heater **10** is accommodated inside the belt B but specifies that at least part of the heater **10** is accommodated inside the belt B. As illustrated in FIG. **2**, the substrate **11** is configured of a ceramic slender plate having an elongated rectangular shape. The heater **10** is what is commonly known as a ceramic heater. The substrate **11** extends in a crossing direction crossing a conveying direction in which the sheet S is conveyed. In the present embodiment, the crossing direction is orthogonal to the conveying direction of the sheet S. Hereinafter, the conveying direction of the sheet S will be simply referred to as the “conveying direction”, and the crossing direction crossing the conveying direction will be simply referred to as the “crossing direction”.
(15) The resistance heating element **12** is provided on the substrate **11**. The resistance heating element **12** is a heating resistor, for example. The resistance heating element **12** is formed on one

surface of the substrate **11** by printing. The resistance heating element **12** includes a first terminal **12**A, a second terminal **12**B, a first heating pattern **121**, and a second heating pattern **122**. The first terminal **12**A is provided at one end of the first heating pattern **121**. The first terminal **12**A is a terminal used for supplying electric power to the resistance heating element **12**. The second terminal **12**B is provided at one end of the second heating pattern **122**. The second terminal **12**B is a terminal used for supplying electric power to the resistance heating element **12**. The first heating pattern **121** extends in the crossing direction crossing the conveying direction of the sheet S. The second heating pattern **122** extends in the crossing direction. The other end of the first heating pattern **121** and the other end of the second heating pattern **122** are electrically connected to each other. The second heating pattern **122** is positioned downstream relative to the first heating pattern **121** in the conveying direction. The second heating pattern **122** is positioned apart from the first heating pattern **121** in the conveying direction by a predetermined distance D**1**. The first heating pattern **121** is an example of the "first resistance heating element". The second heating pattern **122** is an example of the "second resistance heating element".

(16) The cover **13** covers the resistance heating element **12**. The cover **13** is made of glass, for example.

(17) As illustrated in FIG. **1**, the holder **20** is a member supporting the heater **10**. The holder **20** includes a supporting portion **21** and guide portions **22**. The supporting portion **21** has a plate-like shape corresponding to the shape of the heater **10**. The supporting portion **21** has a supporting surface **21**A supporting the heater **10** and the thermal conductive member **30**. The guide portions **22** are provided at both end edges of the supporting portion **21** in the conveying direction. Each guide portion **22** has a guide surface **22**G along the inner circumferential surface of the belt B.

(18) The thermal conductive member **30** has a thermal conductivity that is greater than the thermal conductivity of the substrate **11**. The thermal conductive member **30** has a plate-like shape or a sheet-like shape. The thermal conductive member **30** is a member for making uniform the temperature of the heater **10** in directions along the surface of the substrate **11** by conducting heat in directions parallel to the surface of the substrate **11**, i.e., in the directions along the surface of the substrate **11**. The thermal conductive member **30** is positioned between the heater **10** and the supporting portion **21** of the holder **20**. When the sheet S is nipped by the heating unit **2** and the pressure rotary body **3**, the thermal conductive member **30** is nipped by the heater **10** and the supporting portion **21**.

(19) The thermal conductive member **30** has a thermal conductivity in the directions along the surface of the substrate **11** that is greater than the thermal conductivity of the substrate **11** in the directions along the surface of the substrate **11**. While there is no particular restriction on the material of the thermal conductive member **30**, for example, the thermal conductive member **30** may be made of metal having a high thermal conductivity such as aluminum, aluminum alloy, or copper. Also, the thermal conductive member **30** may be a graphite sheet. In this case, the graphite sheet has a greater thermal conductivity in directions orthogonal to the thickness direction of the graphite sheet than in the thickness direction. In other words, the thermal conductivity of the graphite sheet in the directions orthogonal to the thickness direction is greater than the thermal conductivity of the graphite sheet in the thickness direction. Further, although there is no limitation on the thickness of the thermal conductive member **30**, for example, the thermal conductive member **30** may be a film-like member that is thinner than 0.1 mm, or a plate-like member that is thicker than 1 mm.

(20) The pressure rotary body **3** is a rotatable roller. The pressure rotary body **3** includes a shaft **3**A and an elastic layer **3**B. The shaft **3**A has a columnar shape and is made of metal. The shaft **3**A extends in the crossing direction. The elastic layer **3**B is configured of an elastically deformable member and covers the shaft **3**A. The pressure rotary body **3** is configured to form a nipping portion NP between the pressure rotary body **3** and the belt B by nipping the belt B in cooperation with the heater **10** between the pressure rotary body **3** and the heater **10**. The nipping portion NP is

a portion for applying heat and pressure to the sheet S. The nipping portion is a contact portion between the belt B and the pressure rotary body **3**, i.e., a portion in which the belt B and the pressure rotary body **3** contact each other.
(21) The pressure rotary body **3** is configured to be driven to rotate by receiving a driving force of a motor (not illustrated). When the pressure rotary body **3** is driven and rotates, the belt B rotates following the rotation of the pressure rotary body **3** by the friction force generated between the pressure rotary body **3** and the belt B (or the sheet S). Hence, the pressure rotary body **3** conveys the sheet S between the pressure rotary body **3** and the belt B. Accordingly, for example, when the sheet S having a toner image transferred thereon is conveyed between the pressure rotary body **3** and the heated belt B, the toner image is thermally fixed to the sheet S.
(22) Hereinafter, the dimensions of the substrate **11**, thermal conductive member **30** and nipping portion NP will be described. The thermal conductive member **30** has a dimension D**3** in the conveying direction. The predetermined distance D**1** described above is the distance in the conveying direction between an inward end edge **121**A of the first heating pattern **121** and an inward end edge **122**A of the second heating pattern **122**. In the conveying direction, the dimension D**3** of the thermal conductive member **30** is greater than the predetermined distance D**1**. Note that the inward end edge **121**A of the first heating pattern **121** denotes the downstream end edge of the first heating pattern **121** in the conveying direction. The inward end edge **122**A of the second heating pattern **122** denotes the upstream end edge of the second heating pattern **122** in the conveying direction.
(23) Also, in the conveying direction, the dimension D**3** of the thermal conductive member **30** is greater than a distance D**2**. The distance D**2** is the distance in the conveying direction between an outward end edge **121**B of the first heating pattern **121** (i.e., the upstream end edge of the first heating pattern **121** in the conveying direction) and an outward end edge **122**B of the second heating pattern **122** (i.e., the downstream end edge of the second heating pattern **122** in the conveying direction).
(24) The nipping portion NP has a dimension D**4** in the conveying direction. In the conveying direction, the dimension D**3** of the thermal conductive member **30** is smaller than or equal to the dimension D**4** of the nipping portion NP. Note that, when a configuration is employed that can change the dimension D**4** of the nipping portion NP by moving at least one of the heating unit **2** and the pressure rotary body **3**, the above-described comparison between the dimensions D**3** and D**4** is based on the assumption that the dimension D**4** is the maximum dimension of the nipping portion NP in the conveying direction.
(25) The substrate **11** has a dimension D**5** in the conveying direction. In the conveying direction, the dimension D**3** of the thermal conductive member **30** is greater than or equal to 40% (forty percent) of the dimension D**5** of the substrate **11**. Also, in the conveying direction, the dimension D**3** of the thermal conductive member **30** is smaller than or equal to the dimension D**5** of the substrate **11**.
(26) In the conveying direction, the dimension D**5** of the substrate **11** is greater than the dimension D**4** of the nipping portion NP.
(27) As illustrated in FIG. **2**, the substrate **11** has a dimension L**1** in the crossing direction, and the thermal conductive member **30** has a dimension L**2** in the crossing direction. In the crossing direction, the dimension L**2** of the thermal conductive member **30** is smaller than the dimension L**1** of the substrate **11**.
(28) In the fixing device **1** according to the first embodiment described above, the following technical advantages can be attained. In the fixing device **1**, in the conveying direction, the dimension D**3** of the thermal conductive member **30** is greater than the predetermined distance D**1** and is smaller than the dimension D**4** of the nipping portion NP. This configuration can suppress the thermal conductive member **30** from conducting heat to the outside of the nipping portion NP, thereby making the heat distribution of the heater **10** uniform while suppressing the thermal

conductive member **30** from removing heat greater than necessary. Hence, the heater **10** is suppressed from losing heat greater than necessary, thereby resulting in saving electric power.
(29) Also, in the crossing direction, the dimension L**2** of the thermal conductive member **30** is smaller than the dimension L**1** of the substrate **11**. This configuration can suppress the thermal conductive member **30** from removing heat greater than necessary from the heater **10**.
(30) <Modifications and Variations>
(31) While the invention has been described in conjunction with various example structures outlined above and illustrated in the figures, various alternatives, modifications, variations, improvements, and/or substantial equivalents, whether known or that may be presently unforeseen, may become apparent to those having at least ordinary skill in the art. Accordingly, the example embodiments of the disclosure, as set forth above, are intended to be illustrative of the invention, and not limiting the invention. Various changes may be made without departing from the spirit and scope of the disclosure. Therefore, the disclosure is intended to embrace all known or later developed alternatives, modifications, variations, improvements, and/or substantial equivalents. Some specific examples of potential alternatives, modifications, or variations in the described invention are provided below:
(32) For example, FIG. **3** illustrates a fixing device **1**A according to a second embodiment. The fixing device **1**A is provided with a heating unit **2**A including a thermal conductive member **30**A. As in the heating unit **2**A illustrated in FIG. **3**, in the conveying direction, the dimension D**4** of the nipping portion NP may be greater than the predetermined distance D**1** and greater than or equal to the dimension D**3** of the thermal conductive member **30**A. Further, in the conveying direction, the dimension D**4** of the nipping portion NP is greater than the distance D**2** between the outward end edge **121**B of the first heating pattern **121** and the outward end edge **122**B of the second heating pattern **122**. Note that, in the conveying direction, the dimension D**3** of the thermal conductive member **30**A is equal to the dimension D**5** of the substrate **11** in the second embodiment.
(33) In the second embodiment, since in the conveying direction the dimension D**4** of the nipping portion NP is greater than or equal to the dimension D**3** of the thermal conductive member **30**A, the thermal conductive member **30**A can be suppressed from conducting heat to the outside of the nipping portion NP. Accordingly, the thermal conductive member **30**A can be suppressed from removing heat greater than necessary from the heater **10** while making uniform the heat distribution in an appropriate region of the heater **10** that corresponds to the nipping portion NP.
(34) For example, FIG. **4** illustrates a fixing device **1**B according to a third embodiment. The fixing device **1**B is provided with a heating unit **2**B including a thermal conductive member **30**B. As in the heating unit **2**B illustrated in FIG. **4**, in the conveying direction, the dimension D**3** of the thermal conductive member **30**B may be greater than or equal to the predetermined distance D**1** between the inward end edge **121**A of the first heating pattern **121** and the inward end edge **122**A of the second heating pattern **122** and smaller than or equal to the distance D**2** between the outward end edge **121**B of the first heating pattern **121** and the outward end edge **122**B of the second heating pattern **122**. In the third embodiment, the pressure rotary body **3** is configured to form the nipping portion NP between the pressure rotary body **3** and the belt B by nipping the belt B in cooperation with the heater **10** and holder **20** between the pressure rotary body **3** and the heater **10** and holder **20**. In the third embodiment, since in the conveying direction the dimension D**4** of the nipping portion NP is greater than or equal to the dimension D**3** of the thermal conductive member **30**B, the thermal conductive member **30**B can be suppressed from removing heat greater than necessary from the heater **10** while making uniform the heat distribution in an appropriate region of the heater **10** that corresponds to the nipping portion NP.
(35) For example, FIG. **5** illustrates a fixing device **1**C according to the fourth embodiment. The fixing device **1**C is provided with a heating unit **2**C including a thermal conductive member **30**C. As in the heating unit **2**C illustrated in FIG. **5**, in the conveying direction, the dimension D**3** of the thermal conductive member **30**C may be greater than the dimension D**5** of the substrate **11**. In the

fourth embodiment, since the dimension D**4** of the nipping portion NP is greater than the dimension D**3** of the thermal conductive member **30**C, the thermal conductive member **30**C can be suppressed from conducting heat to the outside of the nipping portion NP. Thus, the thermal conductive member **30**C can be suppressed from removing heat greater than necessary from the heater **10** while making uniform the heat distribution in an appropriate region of the heater **10**.
(36) In the embodiments described above, the resistance heating element **12** includes the two heating patterns extending in the crossing direction. However, the number of the heating patterns is not limited to a particular number, but may be three or more.
(37) For example, FIGS. **6**A and **6**B illustrate part of a fixing device according to a variation of the embodiments. The fixing device in this variation is provided with a heater **10**D and a thermal conductive member **30**D. The heater **10**D includes a substrate **11**D and a resistance heating element **12**D provided thereon. The resistance heating element **12**D has four heating patterns. Specifically, the resistance heating element **12**D includes a first heating pattern **121**D, a second heating pattern **122**D, a third heating pattern **123**D, and a fourth heating pattern **124**D, each of which extends in the crossing direction. These four heating patterns (i.e., the first heating pattern **121**D, second heating pattern **122**D, third heating pattern **123**D, and fourth heating pattern **124**D) are electrically connected so that the four heating patterns can generate heat. The third heating pattern **123**D and fourth heating pattern **124**D are positioned between the first heating pattern **121**D and the second heating pattern **122**D in the conveying direction. In this configuration, the dimension D**3** of the thermal conductive member **30**D is greater than a predetermined distance D**6**, which is the distance between an inward end edge **125**D (i.e., the downstream end edge in the conveying direction) of the third heating pattern **123**D and an inward end edge **126**D (i.e., the upstream end edge in the conveying direction) of the fourth heating pattern **124**D. In this variation, the dimension D**3** of the thermal conductive member **30**D is smaller than the dimension D**4** of the nipping portion NP, and accordingly, the thermal conductive member **30**D can be suppressed from conducting heat to the outside of the nipping portion NP. Hence, the thermal conductive member **30**D can be suppressed from removing heat greater than necessary from the heater **10**D while making uniform the heat distribution in an appropriate region of the heater **10**D. The third heating pattern **123**D is an example of the “first resistance heating element”. The fourth heating pattern **124**D is an example of the “second resistance heating element”.
(38) In the resistance heating element **12** in the above-mentioned embodiments, the first terminal **12**A is provided at one end portion of the first heating pattern **121**, the second terminal **12**B is provided at one end portion of the second heating pattern **122**, and the other end portion of the first heating pattern **121** and the other end portion of the second heating pattern **122** are electrically connected to each other. However, the resistance heating element **12** is not limited to this configuration.
(39) For example, FIGS. **7**A and **7**B illustrate part of a fixing device according to another variation of the embodiments. The fixing device in this variation is provided with a heater **10**E and a thermal conductive member **30**E. The heater **10**E includes a substrate **11**E and a resistance heating element **12**E provided thereon. The resistance heating element **12**E includes a first heating pattern **121**E, a second heating pattern **122**E, a third heating pattern **123**E, a fourth heating pattern **124**E, a first terminal T**1**, a second terminal T**2**, and a third terminal T**3**. The first terminal T**1** is provided at one end of both the first heating pattern **121**E and the second heating pattern **122**E. In other words, one end of the first heating pattern **121**E and one end of the second heating pattern **122**E are both connected to the first terminal T**1**. The second terminal T**2** is provided at one end of both the third heating pattern **123**E and the fourth heating pattern **124**E. In other words, one end of the third heating pattern **123**E and one end of the fourth heating pattern **124**E are both connected to the second terminal T**2**. The third terminal T**3** is provided at the other end of all of the first heating pattern **121**E, second heating pattern **122**E, third heating pattern **123**E, and fourth heating pattern **124**E. In other words, the other end of the first heating pattern **121**E, the other end of the second

heating pattern **122**E, the other end of the third heating pattern **123**E, and the other end of the fourth heating pattern **124**E are all connected to the third terminal T**3**. In this configuration, the dimension D**3** of the thermal conductive member **30**E is greater than a predetermined distance D**7**, which is the distance between an inward end edge **125**E (i.e., the downstream end edge in the conveying direction) of the third heating pattern **123**E and an inward end edge **126**E (i.e., the upstream end edge in the conveying direction) of the fourth heating pattern **124**E. In this variation, the dimension D**3** of the thermal conductive member **30**E is smaller than the dimension D**4** of the nipping portion NP, and accordingly, the thermal conductive member **30**E can be suppressed from conducting heat to the outside of the nipping portion NP. Hence, the thermal conductive member **30**E can be suppressed from removing heat greater than necessary from the heater **10**E while making uniform the heat distribution in an appropriate region of the heater **10**E. The third heating pattern **123**E is an example of the "first resistance heating element". The fourth heating pattern **124**E is an example of the "second resistance heating element".
(40) In the embodiments described above, the thermal conductive member **30** is configured of a single sheet-like member, but the thermal conductive member **30** may be configured of a combination of a plurality of sheet-like members. In this case, the material, thermal conductivity, and shape of the plurality of sheet-like members may be different from one another. Also, the material, thermal conductivity, and shape of the plurality of sheet-like members may be the same as one another.
(41) In the embodiments described above, the substrate **11** of the heater **10** is the ceramic plate having the rectangular shape elongated in the crossing direction. However, provided that the substrate **11** has a thermal conductivity that is smaller than the thermal conductivity of the thermal conductive member **30**, the substrate **11** may be a slender metal plate (e.g., a slender stainless plate) having an elongated rectangular shape.
(42) The elements described in connection with the embodiments and modifications thereto may be combined as appropriate.

Claims

1. A fixing device comprising: a heating rotary body; a pressure rotary body configured to: form a nipping portion between the pressure rotary body and the heating rotary body; and convey a sheet in a conveying direction while nipping the sheet between the pressure rotary body and the heating rotary body, a heater accommodated inside the heating rotary body, the heater including: a substrate having a first surface and a second surface opposite the first surface; a first resistance heating element extending in a crossing direction crossing the conveying direction, the first resistance heating element being provided on the first surface of the substrate; and a second resistance heating element extending in the crossing direction and provided on the first surface of the substrate, the second resistance heating element being positioned apart from the first resistance heating element by a predetermined distance in the conveying direction; and a thermal conductive member in contact with the second surface of the substrate, wherein, in the conveying direction, the thermal conductive member has a dimension that is greater than a distance between an outward end edge of the first resistance heating element and an outward end edge of the second resistance heating element, and the dimension of the thermal conductive member is smaller than or equal to a dimension of the substrate.
2. The fixing device according to claim 1, wherein, in the conveying direction, the dimension of the substrate is greater than a dimension of the nipping portion.
3. The fixing device according to claim 1, wherein, in the conveying direction, the nipping portion has a dimension that is greater than the predetermined distance and is greater than or equal to the dimension of the thermal conductive member.
4. The fixing device according to claim 1, wherein, in the conveying direction, the dimension of the

thermal conductive member is greater than or equal to 40% of the dimension of the substrate.
5. The fixing device according to claim 1, wherein, in the crossing direction, the dimension of the thermal conductive member is smaller than the dimension of the substrate.
6. The fixing device according to claim 1, wherein the thermal conductive member is a plate-like member made of one of aluminum, an aluminum alloy, and copper.
7. A fixing device, comprising: a heating rotary body; a pressure rotary body configured to: form a nipping portion between the pressure rotary body and the heating rotary body; and convey a sheet in a conveying direction while nipping the sheet between the pressure rotary body and the heating rotary body, a heater accommodated inside the heating rotary body, the heater including: a substrate having a first surface and a second surface opposite the first surface; a first resistance heating element extending in a crossing direction crossing the conveying direction, the first resistance heating element being provided on the first surface of the substrate; and a second resistance heating element extending in the crossing direction and provided on the first surface of the substrate, the second resistance heating element being positioned apart from the first resistance heating element by a predetermined distance in the conveying direction; and a thermal conductive member in contact with the second surface of the substrate, wherein, in the conveying direction, the thermal conductive member has a dimension that is greater than the predetermined distance and smaller than or equal to a dimension of the nipping portion, wherein the thermal conductive member is a graphite sheet, and wherein a thermal conductivity of the graphite sheet in a direction orthogonal to a thickness direction of the graphite sheet is greater than a thermal conductivity of the graphite sheet in the thickness direction.
8. The fixing device according to claim 1, wherein, in the conveying direction, the nipping portion has a dimension that is greater than the distance between the outward end edge of the first resistance heating element and the outward end edge of the second resistance heating element.
9. A fixing device comprising: a belt; a pressure roller configured to: form a nipping portion between the pressure roller and the belt; and convey a sheet in a conveying direction while nipping the sheet between the pressure roller and the belt; a heater accommodated inside the belt, the heater including: a substrate having a first surface and a second surface opposite the first surface; a first resistance heating element extending in a crossing direction crossing the conveying direction, the first resistance heating element being provided on the first surface of the substrate; and a second resistance heating element extending in the crossing direction and provided on the first surface of the substrate, the second resistance heating element being positioned apart from the first resistance heating element by a predetermined distance in the conveying direction; and a thermal conductive plate in contact with the second surface of the substrate, wherein, in the conveying direction, the thermal conductive plate has a dimension that is greater than a distance between an outward end edge of the first resistance heating element and an outward end edge of the second resistance heating element, and the dimension of the thermal conductive plate is smaller than or equal to a dimension of the substrate.
10. The fixing device according to claim 9, wherein, in the conveying direction, the dimension of the substrate is greater than a dimension of the nipping portion.
11. The fixing device according to claim 9, wherein, in the conveying direction, the nipping portion has a dimension that is greater than the predetermined distance and is greater than or equal to the dimension of the thermal conductive plate.
12. The fixing device according to claim 9, wherein, in the conveying direction, the dimension of the thermal conductive plate is greater than or equal to 40% of the dimension of the substrate.
13. The fixing device according to claim 9, wherein, in the crossing direction, the dimension of the thermal conductive plate is smaller than the dimension of the substrate.
14. The fixing device according to claim 9, wherein the thermal conductive plate is made of one of aluminum, an aluminum alloy, and copper.
15. The fixing device according to claim 9, wherein the thermal conductive plate is a graphite

sheet, and wherein a thermal conductivity of the graphite sheet in a direction orthogonal to a thickness direction of the graphite sheet is greater than a thermal conductivity of the graphite sheet in the thickness direction.