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IMAGE FORMING DEVICE

Abstract

An image forming device comprises: an image scanner; a printer provided below the image scanner; a sheet discharge tray provided between the image scanner and the printer and forming, between the sheet discharge tray and the image scanner, a sheet discharge space into which a sheet printed by the printer is discharged; and an operation panel attached on a front side of the image scanner, wherein the operation panel includes an operation unit operated by a user, a frame provided surrounding the operation unit, and a light emitter including a lamp that makes a predetermined notification to the user, and the light emitter protrudes from a lower portion of the frame at a position away from the sheet discharge space in a front view of the image forming device.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority from Japanese Application JP2024-019890, the content to which is hereby incorporated by reference into this application.

BACKGROUND OF THE DISCLOSURE

1. Field of the Disclosure

[0002] The present disclosure relates to an image forming device.

2. Description of the Related Art

[0003] In recent years, image forming devices have been developed. In such an image forming device, an operation panel is attached on a front side of an image scanning device. The operation panel is provided with a light emitter including a notification lamp that makes a predetermined notification of a state of the image forming device, such as an error, to a user.

SUMMARY

[0004] In the above-described image forming device, a portion of the operation panel overlapping a sheet discharge space between a printer and an image scanner is large in a front view. Thus, the visibility of the sheet discharge space from a position on the front side of the image forming device is not good.

[0005] The present disclosure has been made in view of the problem described above. An object of the disclosure is to provide an image forming device in which a notification lamp is provided to improve the visibility of a sheet discharge space.

Solution to Problem

[0006] An image forming device according to an aspect of the disclosure includes: an image scanner; a printer provided below the image scanner; a sheet discharge tray provided between the image scanner and the printer and forming, between the sheet discharge tray and the image scanner, a sheet discharge space into which a sheet printed by the printer is discharged; and an operation panel attached on a front side of the image scanner. The operation panel includes an operation unit operated by a user, a frame surrounding the operation unit, and a light emitter including a lamp that makes a predetermined notification to the user. The light emitter protrudes from a lower portion of the frame at a position away from the sheet discharge space in a front view of the image forming device.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a front view of an image forming device of a first embodiment.

[0008] FIG. 2 is a perspective view of the image forming device of the first embodiment.

[0009] FIG. 3 is a perspective view illustrating a state in which a door of the image forming device of the first embodiment is opened.

[0010] FIG. 4 is a front view of an image forming device of a second embodiment.

[0011] FIG. 5 is a functional block diagram of an image forming device of a third embodiment.

[0012] FIG. 6 is a diagram illustrating a state in which a light emitter of the image forming device

of the third embodiment protrudes from a frame.

[0013] FIG. 7 is a diagram illustrating a state in which the light emitter of the image forming device of the third embodiment is accommodated in the frame.

[0014] FIG. 8 is a perspective view of an image forming device of a fourth embodiment.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0015] Image forming devices of embodiments of the disclosure will be described below with reference to the accompanying drawings. In the drawings, the same or equivalent elements are denoted by the same reference numerals and signs, and redundant descriptions will not be repeated.

First Embodiment

[0016] An image forming device **100** of a first embodiment will be described below with reference to FIG. 1 to FIG. 3.

[0017] FIG. 1 is a front view of the image forming device **100** of the present embodiment. FIG. 2 is a perspective view of the image forming device **100** of the present embodiment.

[0018] The image forming device **100** according to the present embodiment illustrated in FIG. 1 and FIG. 2 is a multifunction peripheral having a copy function, a print function, a facsimile function, and a scanner function. As illustrated in FIG. 1 and FIG. 2, the image forming device **100** includes a document feeding device **10**, an image scanner **20**, a printer **30**, a sheet discharge tray **40**, an operation panel **50**, a controller **60**, and a sheet feed tray **90**.

[0019] The document feeding device **10** automatically feeds a document supplied to a feed path by a user to the image scanner **20**. The image scanner **20** scans an image drawn on the document fed through the feed path. Data of the image scanned by the image scanner **20** is transmitted to the controller **60**.

[0020] The printer **30** is provided below the image scanner **20**. The printer **30** includes a door **31** that opens to the front side of the image forming device **100**. The printer **30** prints the data of the image scanned by the image scanner **20** on a sheet supplied from the sheet feed tray **90** based on a command signal transmitted from the controller **60**.

[0021] The sheet discharge tray **40** is provided between the image scanner **20** and the printer **30**. A sheet discharge space S to which a sheet P printed by the printer **30** is discharged is formed between the sheet discharge tray **40** and the image scanner **20**. The sheet discharge space S is a recessed portion recessed from the front side toward the back side of the image forming device **100**. The sheet P printed by the printer **30** is discharged to the sheet discharge space S above the sheet discharge tray **40** in a direction indicated by the open arrows in FIG. 1 and FIG. 2. That is, the printed sheet P is discharged from the back side to the front side of the sheet discharge space S. However, the printed sheet P may be discharged from the right side to the left side of the sheet discharge space S, or may be discharged from the left side to the right side of the sheet discharge space S.

[0022] The operation panel **50** is a touch panel on which icons and the like are displayed. The operation panel **50** transmits a command signal to the controller **60** in response to a user's operation. The controller **60** controls the printing operation of the printer **30** based on a command signal transmitted from the operation panel **50**. The controller **60** controls the state of turning on, turning off, or blinking of a lamp **53L** for notification based on a command signal transmitted from the operation panel **50**.

[0023] The operation panel **50** is attached on the front side of the image scanner **20**. The operation panel **50** includes an operation unit **51**, a frame **52**, and a light emitter **53**. The frame **52** of the operation panel **50** may include a push button switch.

[0024] The operation unit **51** includes a touch panel configured to be operated by a user. The frame **52** is provided so as to surround the operation unit **51**. The operation unit **51** is formed of a liquid crystal panel, and the frame **52** is formed of plastic. The light emitter **53** includes the lamp **53L** for making a predetermined notification to a user. The lamp **53L** notifies a state of the image forming device **100** such as a state in which an error such as a paper jam occurs by lighting or the like, for

example. The light emitter **53** which is horizontally long includes therein the lamp **53L** which is horizontally long. The lamp **53L** is configured with a light emitting diode and a plastic cover that diffuses the light emitted by the light emitting diode.

[0025] The light emitter **53** protrudes from a lower portion **52L** of the frame **52** at a position away from the sheet discharge space **S** in a front view (see FIG. **1**) of the image forming device **100**. That is, the light emitter **53** is provided so as not to overlap with the sheet discharge space **S** in the front view of the image forming device. Thus, the lamp **53L** for notification can be provided to improve the visibility of the sheet discharge space **S** from a position on the front side of the image forming device **100**. In addition, the possibility of occurrence of jamming due to a contact between the sheet **P** discharged onto the sheet discharge tray **40** and the light emitter **53** can be reduced.

[0026] Each corner of the light emitter **53** are formed in a curved shape, and corners having an acute angle are not provided. Accordingly, even when a user's hand or the like is brought into contact with a corner of the light emitter **53**, the possibility of injury to the user is reduced.

[0027] A part of a lower portion of the operation panel **50** is provided at a position overlapping with the sheet discharge space **S** in a front view of the image forming device **100**. Thus, it is possible to provide the lamp **53L** to improve the visibility of the sheet discharge space **S** while improving the operability of the operation panel **50** for a user by increasing the size of the operation panel **50**.

[0028] In the present embodiment, the operation panel **50** is provided at a position offset to the left side in a front view of the image forming device **100**. Thus, the light emitter **53** protrudes from the lower portion **52L** of the frame **52** at a position on the left side of the operation panel **50** in a front view of the image forming device **100**.

[0029] According to this configuration, the lamp **53L** for making a predetermined notification to a user can be provided to improve the visibility of the sheet discharge space **S**, by effectively using the arrangement of the operation panel **50** offset to the left side.

[0030] FIG. **3** is a perspective view illustrating a state in which the door **31** of the printer **30** of the image forming device **100** of the present embodiment is opened. Note that the arrows in FIG. **3** indicate a direction in which the door **31** is opened.

[0031] As illustrated in FIG. **3**, the light emitter **53** protrudes from the lower portion **52L** of the frame **52** at a position away from the opening and closing path of the door **31**, in other words, the movement locus of the door **31** in a front view of the image forming device **100**. Thus, it is possible to provide the lamp **53L** for notification to improve the visibility of the sheet discharge space **S** while preventing the light emitter **53** from obstructing the opening and closing of the door **31** of the printer **30** by a user.

Second Embodiment

[0032] An image forming device **100** of a second embodiment will be described below with reference to FIG. **4**. In the following, description of points similar to those of the image forming device **100** of the first embodiment will not be repeated. The image forming device **100** of the present embodiment differs from the image forming device **100** of the first embodiment in the following points.

[0033] FIG. **4** is a front view of the image forming device **100** of the present embodiment. In FIG. **4**, the open arrow indicates a discharge direction of the sheet **P** to the sheet discharge space **S**.

[0034] As illustrated in FIG. **4**, in the present embodiment, the operation panel **50** is provided at a position offset to the right side in a front view of the image forming device **100**. Thus, in the image forming device **100** of the present embodiment, the light emitter **53** protrudes from the lower portion **52L** of the frame **52** at a position on the right side of the operation panel **50** in a front view of the image forming device **100** (see FIG. **4**).

[0035] According to this configuration, the lamp **53L** for making a predetermined notification to a user can be provided to improve the visibility of the sheet discharge space **S**, by effectively using the arrangement of the operation panel **50** offset to the right side.

Third Embodiment

[0036] An image forming device **100** of a third embodiment will be described below with reference to FIG. 5 to FIG. 7. In the following, description of points similar to those of the image forming device **100** of the first embodiment or the second embodiment will not be repeated. The image forming device **100** of the present embodiment differs from the image forming device **100** of the first embodiment or the second embodiment in the following points.

[0037] FIG. 5 is a functional block diagram of the image forming device **100** of the present embodiment.

[0038] As illustrated in FIG. 5, the image forming device **100** of the present embodiment further includes a human detection sensor **70** and a mover **80** in addition to the components of the image forming device **100** of the first embodiment.

[0039] The human detection sensor **70** detects that a user is present at a position within a predetermined range from a reference position of the image forming device **100**, and transmits a detection signal capable of identifying the user to the controller **60**. The mover **80** is a mechanism that is controlled by the controller **60** to move the light emitter **53** with respect to the frame **52**. The mover **80** switches between a state in which the light emitter **53** protrudes from the frame **52** (see FIG. 6) and a state in which the light emitter **53** is accommodated in the frame **52** (see FIG. 7). When the human detection sensor **70** does not detect the presence of a user at any position within the predetermined range from the reference position of the image forming device **100**, the light emitter **53** is being accommodated in the frame **52** (see FIG. 7).

[0040] FIG. 6 is a diagram illustrating a state in which the light emitter **53** of the image forming device **100** of the present embodiment protrudes from the frame **52**. FIG. 7 is a diagram illustrating a state in which the light emitter **53** of the image forming device **100** of the present embodiment is accommodated in the frame **52**. The arrows illustrated in FIG. 6 and FIG. 7 indicate the moving direction of the light emitter **53**.

[0041] In the present embodiment, the controller **60** controls the mover **80** to move the light emitter **53** based on the detection result of the human detection sensor **70**. There is a case in which the human detection sensor **70** detects the presence of a user at a position within the predetermined range from the reference position of the image forming device **100**.

[0042] In this case, the controller **60** controls the mover **80** to switch the state of the operation panel **50** from the state in which the light emitter **53** protrudes from the frame **52** as illustrated in FIG. 6 to the state in which the light emitter **53** is accommodated in the frame **52** as illustrated in FIG. 7. Accordingly, in a state in which the user is using the image forming device **100**, the light emitter **53** is prevented from protruding to interfere with the user's operation or work at a position in front of the operation panel **50**.

Fourth Embodiment

[0043] An image forming device **100** of a fourth embodiment will be described below with reference to FIG. 8. In the following, description of points similar to those of the image forming device **100** of the first to third embodiments will not be repeated. The image forming device **100** of the present embodiment differs from the image forming device **100** of the first to third embodiments in the following points.

[0044] FIG. 8 is a perspective view of the image forming device **100** of the present embodiment. In FIG. 8, the open arrow indicates a discharge direction of the sheet P to the sheet discharge space S.

[0045] As illustrated in FIG. 8, the image forming device **100** of the present embodiment is a printer-only machine. Even in such a printer-only machine, when the relationship between the operation panel **50** and the sheet discharge space S in a front view as described in the first to third embodiments is established, the same effects as those described in the first to third embodiments can be obtained.

[0046] While there have been described what are at present considered to be certain embodiments of the disclosure, it will be understood that various modifications may be made thereto, and it is

intended that the appended claim cover all such modifications as fall within the true spirit and scope of the disclosure.

Claims

1. An image forming device comprising: an image scanner; a printer provided below the image scanner; a sheet discharge tray provided between the image scanner and the printer and forming, between the sheet discharge tray and the image scanner, a sheet discharge space into which a sheet printed by the printer is discharged; and an operation panel attached on a front side of the image scanner, wherein the operation panel includes an operation unit operated by a user, a frame provided surrounding the operation unit, and a light emitter including a lamp that makes a predetermined notification to the user, and the light emitter protrudes from a lower portion of the frame at a position away from the sheet discharge space in a front view of the image forming device.
 2. The image forming device according to claim 1, wherein a part of a lower portion of the operation panel is provided at a position overlapping with the sheet discharge space in the front view.
 3. The image forming device according to claim 1, wherein the printer includes a door that opens to a front side of the image forming device, and the light emitter protrudes from the lower portion of the frame at a position away from an opening and closing path of the door in the front view.
 4. The image forming device according to claim 1, further comprising: a human detection sensor that detects that the user is present at a position within a predetermined range from a reference position of the image forming device; a mover that moves the light emitter with respect to the frame; and a controller that controls the mover to move the light emitter based on a detection result of the human detection sensor, wherein when the human detection sensor detects that the user is present at the position within the predetermined range from the reference position, the controller controls the mover to switch a state of the operation panel from a state in which the light emitter protrudes from the frame to a state in which the light emitter is accommodated in the frame.
 5. The image forming device according to claim 1, wherein the operation panel is provided at a position offset to a left side in the front view, and the light emitter protrudes from the lower portion of the frame at a position on a left side of the operation panel in the front view.
 6. The image forming device according to claim 1, wherein the operation panel is provided at a position offset to a right side in the front view, and the light emitter protrudes from the lower portion of the frame at a position on a right side of the operation panel in the front view.
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