ABSTRACT

Providing a sheet collecting device capable of being downsized and of operating stably wherein a sheet ejecting device that conveys and ejects a sheet in the direction for making the sheet fall along a slanted sheet collecting board is provided, and a leading edge stopper that holds sheets on the sheet collecting board is set so that a trailing edge of the sheet may be at a constant height independently of a sheet size.
FIG. 5

START

ST1 ACQUIRE SIZE INFORMATION

ST2 MOVE LEADING EDGE STOPPER TO FIRST STOP POSITION

ST3 ALIGN SHEETS

ST4 GRIP LEADING EDGE

ST5 CENTER FOLDING OR SADDLE STITCHING-CENTER FOLDING?

YES

ST6 MOVE LEADING EDGE STOPPER TO SECOND STOP POSITION

ST7 STITCHING OPERATION

ST8 GRIP LEADING EDGE

ST9 MOVE LEADING EDGE STOPPER TO THIRD STOP POSITION

ST10 FOLDING OPERATION

NO

ST11 MOVE LEADING EDGE STOPPER TO THIRD STOP POSITION

ST12 FOLDING OPERATION

END
FIG. 7

START

ACQUIRE SIZE INFORMATION ST1

MOVE LEADING EDGE STOPPER TO FIRST STOP POSITION ST2

ALIGN SHEETS ST3

GRIP LEADING EDGE ST4

MOVE LEADING EDGE STOPPER TO FOURTH STOP POSITION ST20

STITCHING OPERATION ST21

EJECT STITCHED SHEETS ST22

END
SHEET COLLECTING DEVICE, POST-PROCESSING APPARATUS AND IMAGE FORMING APPARATUS


BACKGROUND OF THE INVENTION

[0002] The present invention relates to improvement of a sheet collecting device which is provided on an image forming apparatus or on a post-processing apparatus.

[0003] A stapler that binds a plurality of sheets generally has a sheet collecting board on which plural sheets are stacked, and it conducts stitching process for sheets stacked on the sheet collecting board.

[0004] A folding device that folds therein a center portion of a sheet also has a sheet collecting board, and it conducts folding process for sheets stacked on the sheet collecting board.

[0005] In a technology disclosed in Unexamined Japanese Patent Application Publication No. 2000-63031, a sheet collecting board (triple tray) is provided, and a sheet is caused to go up above the sheet collecting board by conveyance by a sheet ejection device, and the sheet released from the sheet ejection device falls on the sheet collecting board to be stopped at a prescribed position on the sheet collecting board.

[0006] Then, by repeating these operations, a plurality of sheets are stacked on the sheet collecting board.

[0007] In a technology disclosed in Unexamined Japanese Patent Application Publication No. 2000-63031, a leading edge (trailing edge in the case of carrying-in) of a sheet is stopped at a fixed position or at a position for saddle stitching or center folding.

[0008] In Unexamined Japanese Patent Application Publication No. 11-322163, there is disclosed a sheet processing device wherein plural sheets are stacked on a slanted sheet collecting board (vertical path) by repeating sheet conveyance in which a sheet is supplied to the vertical path and the sheet is dropped along the vertical path to be stopped by a stopper, and thereby, the stacked sheets are stitched.

[0009] In Unexamined Japanese Patent Application Publication No. 11-322163, when stacking sheets which are ejected continuously, a trailing edge (upper end) of the precedent sheet hits a leading edge (lower end). Therefore, to avoid this problem, a position of a sheet ejection exit of a sheet ejection device is switched by use of a flipper.

[0010] In the case of sheet ejection by a sheet ejection device in Unexamined Japanese Patent Application Publication No. 2000-63031 wherein a sheet is caused to rise above a collecting board, and a sheet released from a sheet ejection device is allowed to fall on the sheet collecting board to be stacked on a prescribed position, a space for securing a conveyance path for switchback of a sheet is required, resulting in a problem that a size of the apparatus is increased.

[0011] There is also a problem that high-speed conveyance becomes difficult, because switchback of a sheet makes a conveyance time per one sheet longer.

[0012] In a sheet processing device wherein sheets in various sizes are stacked on the sheet collecting board through switching of sheet ejection exits by using a flipper, like the device disclosed in Unexamined Japanese Patent Application Publication No. 11-322163, a mechanism is complicated and operations are not stabilized to cause conveyance troubles easily, because a conveyance path switching mechanism is needed.

[0013] Further, in the case of sheet sizes wherein a difference of the length is small, there is a problem that coping with various sizes is difficult, because switching conveyance paths is difficult.

SUMMARY

[0014] The aforementioned problems are solved by the following embodiments of the invention.

[0015] 1. A sheet collecting device having therein a sheet collecting board that has a sheet supporting surface which is slanted so that the upstream side thereof in the sheet conveyance direction in the case of sheet carrying-in is higher than the downstream side, an ejection device that is arranged upstream of the sheet collecting board, and that conveys a sheet in a direction so that the sheet falls along the sheet collecting board to be ejected onto the sheet collecting board, a leading edge stopper that stops the sheet on the sheet collecting board, a stopper moving device that changes the position of the aforementioned leading edge stopper and a control device that controls the stopper moving device, wherein the control device controls the stopper moving device so that the trailing edge of the sheet in the case of sheet carrying-in on the sheet collecting board is at a fixed position regardless of a sheet size difference.

[0016] 2. A post-processing apparatus having therein the sheet collecting device described in the aforementioned item 1 and a stapler that conducts a stitching process on the sheet collecting board for sheets stacked on the aforementioned sheet collecting board, wherein the aforementioned control device controls the stopper moving device to set the leading edge stopper at the first stop position for sheet collecting, and then, to move the leading edge stopper to be set at the second stop position, and the aforementioned stapler conducts the stitching process for the sheets supported by the leading edge stopper that is set at the second stop position.

[0017] 3. A post-processing apparatus having therein the sheet collecting device described in the aforementioned item 1 and a folding device that conducts a folding process for sheets collected on the sheet collecting board, wherein the aforementioned control device controls the stopper moving device to set the leading edge stopper at the first stop position for sheet collecting, and then, to move the leading edge stopper to be set at the third stop position, and the aforementioned folding device conducts the folding process for the sheets supported by the leading edge stopper that is set at the third stop position.

[0018] 4. An image forming apparatus that has the sheet collecting device described in the aforementioned item 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] FIG. 1 shows an overall view of an image forming apparatus relating to an embodiment of the invention.

[0020] FIG. 2 is a diagram showing a sheet collecting device relating to an embodiment of the invention.

[0021] FIG. 3 is a diagram showing a sheet carry-in section of a sheet collecting device.

[0022] FIG. 4 is a block diagram of a control system of a post-processing apparatus relating to embodiment 1 of the invention.
The invention will be described as follows, referring to the illustrated embodiments to which, however, the invention is not limited.

<Image Forming Apparatus>

FIG. 1 is an overall view of an image forming apparatus relating to an embodiment of the invention equipped with image forming apparatus main body A and post-processing apparatus FS.

Illustrated image forming apparatus main body A is equipped with image reading section 1, image processing section 2, image writing section 3, image forming section 4, sheet-feeding cassette 5, sheet-feeding device 6, fixing unit 7, sheet discharge section 8 and automatic two-sided copying sheet-feeding section (ADU) 9.

On the upper part of the image forming apparatus main body A, there is mounted automatic document feeding device DF. The post-processing apparatus FS is connected on the illustrated left side of the image forming apparatus main body A, that is, the sheet discharge section 8 side.

A document placed on a document stand of automatic document feeding device DF is conveyed in the direction of an arrow, and images on one side or on two sides of the document are read by an optical system of image reading section 1 and further read into CCD image sensor 1A.

Analog signals which have been converted photoelectrically by CCD image sensor 1A are subjected to analog processing, A/D conversion, shading correction and image compression in image processing section 2, and then, are sent to image writing section 3.

When forming images, output light is emitted from a semiconductor laser of image writing section 3, to irradiate photoconductor drum 4A of image forming section 4, so that a latent image is formed on the photoconductor drum 4A. In the image forming section 4, processes such as charging, exposure, developing, transfer, separation and cleaning are conducted. Recording sheet S1 fed by sheet-feeding device 6 from sheet-feeding cassette 5 comes in contact with the photoconductor drum 4A on which the latent image is made to be a toner image through developing process, and the toner image is transferred by transfer device 4B onto the recording sheet S1. The recording sheet S1 carrying the toner image is subjected to fixing by fixing unit 7, and is fed into post-processing apparatus FS from sheet discharge section 8. In the case of two-side copying, the recording sheet S1 whose one side has been finished in terms of image processing is fed into automatic two-side copying sheet-feeding section 9 through conveyance path switching plate 8A, and is subjected to image processing on its reverse side in image forming section 4 to be discharged from sheet discharge section 8 after being fixed.

Next, a post-processing apparatus relating to an embodiment of the invention will be described, referring to FIG. 1.

Post-processing apparatus FS has therein sheet carry-in section 20, insertion sheet feeding sections 30a and 30b and a plurality of post-processing sections. The post-processing section has therein punching process section 40, folding process section 50, superposing process section 60, staplers 71 and 103 and sheet discharge section 80.

Insertion sheet S2 is loaded in insertion sheet feeding section 30a, and another insertion sheet S3 is loaded in insertion sheet feeding section 30b.

Insertion sheets S2 and S3 are sheets to be inserted in recording sheet S1 discharged from image forming apparatus main body A, such as a cover sheet and an inserted sheet, and they can be subjected to punching process and folding process in the same way as recording sheet S1.

Inserted sheets S2 and S3 fed out of insertion sheet feeding sections 30a and 30b are conveyed to sheet carry-in section 20 through a conveyance path running downward (having no reference symbol).

Punching process section 40 is arranged on sheet carry-in section 20.

Meanwhile, in the description hereafter, recording sheet S1, insertion sheets S2 and S3 are given a generic name of sheet S.

Folding process section 50 is arranged on conveyance path H1 that is branched downward from sheet carry-in section 20.

Superposing process section 60 is arranged at down-stream side of conveyance path H2 that is branched upward from sheet carry-in section 20, and is equipped with conveyance paths H3, H4 and H5.

The superposing process section 60 causes succeeding sheet S to be conveyed by conveyance path H4 and conveyance paths H3 and H5 to secure a period of time for preceding sheet S to conduct stitching process in stapler 71 located on the down-stream side.

The conveyance path positioned at the down-stream side of conveyance path H2 is branched into conveyance paths which are curved doubly as inside conveyance path H4 and outside conveyance paths H3 and H5.

On an exit of conveyance path H4 that is branched from conveyance path H2 to form a curved inside conveyance path, there is provided conveyance roller 21. When the first sheet of sheets S to be stitched is conveyed there, the conveyance roller 21 is at standstill and stops a leading edge of the first sheet. It causes the first sheet to stand by under the condition that the first sheet is in contact with conveyance roller 21.

Sheet S conveyed through conveyance path H4 stands by under the state where its leading edge is stopped by conveyance roller 21 as stated above, while, a succeeding sheet S enters conveyance path H3 from conveyance path H2 and arrives at the conveyance roller 21.

From the conveyance roller 21, preceding sheet S and succeeding sheet S are conveyed together under the state where both sheets S are superposed, and are conveyed to collecting section 70.

Conveyance path H3 is connected with conveyance path H2 at the downstream side of the conveyance path H2, and conveyance path H5 is connected with conveyance path H3.
[0048] The conveyance path H3 is branched into conveyance path H5 and conveyance path H6.

[0049] Conveyance path H6 forms a sheet discharge path through which sheet S is discharged to fixed sheet discharge tray 81.

[0050] Fixed sheet discharge tray 81 is arranged at a position so as to be protruded from post-processing apparatus 1S that is at the downstream side of conveyance path H6 branched from superposing process section 60 at conveyance rollers 24 on conveyance path H3.

[0051] As stated above, sheet S conveyed through conveyance paths H2, H3 and H6 and discharged is stacked on the fixed sheet discharge tray 81.

[0052] Sheet discharge section 80 has sheet discharge roller 22, and discharges sheet S on elevating sheet discharge tray 82.

[0053] The sheet discharge rollers 22 are composed of a pair of rollers, and in the case of non-sheet-discharge, the paired rollers stay apart from each other. While, in the case of sheet discharge, the paired rollers come in contact with each other to nip and convey sheet S to discharge it on the elevating sheet discharge tray 82.

[0054] Sheet S conveyed by conveyance roller 21 travels in the direction toward a left side between a pair of rollers 22 which stay away from each other, and when a trailing edge of the sheet S leaves the conveyance roller 21, the sheet S falls on collecting section 70 to slide down its slope, and it is caught by a stapler 71 (not shown) to stop on the collecting section 70.

[0055] After the set number of sheets S have been stacked on the collecting section 70, stapler 71 operates to stitch the sheets S.

[0056] The sheets S thus stitched are lifted up by the aforesaid stopper, and move on the collecting section 70 toward a left side.

[0057] In this case, a pair of rollers constituting the sheet discharge rollers 22 come in contact with each other to nip and convey sheet S to discharge it on the elevating sheet discharge tray 82.

[0058] In the folding mode, sheet S is conveyed downward through conveyance path H1 from sheet carry-in section 20, and then, is subjected to center folding or folding into three in folding process section 50, and is discharged to lower sheet discharge tray 83.

[0059] In the saddle stitching mode, sheet S is conveyed downward through conveyance path H1 from sheet carry-in section 20. The sheet S is subjected to saddle-stitching process in stapler 103 and is discharged to lower sheet discharge tray 83 after being subjected to center folding process in folding process section 50.

[0060] Sheet discharge paths for sheet S include the following four paths:

1. sheet carry-in section 20 → conveyance path H2 → conveyance path H3 → conveyance path H6 → fixed sheet discharge tray 81
2. sheet carry-in section 20 → conveyance path H2 → conveyance path H1, H4 and H5 → collecting section 70 → elevating sheet discharge tray 82
3. sheet carry-in section 20 → conveyance path H2 → H4 → sheet discharge section 80 → elevating sheet discharge tray 82
4. sheet carry-in section 20 → conveyance path H1 → folding process section 50 → lower sheet discharge tray 83

[0065] Paths 1), 2) and 4) are those described above.

[0066] Path 3) is selected when forming a large amount of images without conducting stitching process and folding process.

[0067] Sheet S is discharged on elevating sheet discharge tray 82 without any post processing, and the elevating sheet discharge tray 82 moves downward as shown by chain lines in FIG. 1 so that the uppermost surface of discharged sheets S may be always at the constant height.

[0068] Therefore, several thousand sheets may be stacked on the elevating sheet discharge tray 82.

<Sheet Collecting Device>

[0069] A sheet collecting device relating to Embodiment 1 of the invention will be described as follows, referring to FIGS. 2 and 3.

[0070] FIG. 2 is a diagram showing a sheet collecting device relating to an embodiment of the invention, and FIG. 3 is a diagram showing a sheet carry-in section of a sheet collecting device.

[0071] The numeral 100 represents an intermediate stack tray that is a sheet collecting board supporting sheets S to be stitched or folded. 101 represents a guide that constitutes conveyance path H1 in FIG. 1. 102 represents a conveyance roller that forms a lower end of a sheet ejection section which ejects a sheet to intermediate stack tray 100. 103 represents a staple that conducts stitching process for sheets S, 104 represents an aligning member that aligns sheets S in their width direction (direction perpendicular to the conveyance direction), 105 represents a leading edge stopper that stops sheet S having been conveyed and that supports sheet S on intermediate stack tray 100, 106 represents an gripping member that grips sheet S, 52 represents a folding plate, and 53, 55 represents a folding roller. The folding rollers 53, 55 constitute a folding process section 50.

[0072] The intermediate stack tray 100 is provided below conveyance path H1 as is illustrated.

[0073] Further, the intermediate stack tray 100 is provided to be inclined so that a downstream side in the conveyance direction may be positioned to be lower and an upstream side may be positioned to be upper, thus, sheet S ejected on the intermediate stack tray 100 slides down along the intermediate stack tray 100 and is caught by the leading edge stopper 105 to be stopped.

[0074] The stapler 103 conducts stitching operations to staple sheets on the intermediate stack tray 100.

[0075] The aligning member 104 is driven by motor M2 to be reciprocated in the width direction that is perpendicular to the conveyance direction of sheet S, to align edges of sheets S in the width direction.

[0076] The leading edge stopper 105 is driven by motor M1 representing a stopper moving device to move in the sheet conveyance direction, and is set at the position corresponding to a sheet size.

[0077] A position for the leading edge stopper 105 to be set at will be described as follows, referring to FIG. 3.

[0078] Sheet S conveyed by conveyance roller 102 that serves as an ejecting device that ejects sheet S to the intermediate stack tray 100 falls at the moment when it leaves conveyance rollers 102 that forms an ejection exit through which the sheet is ejected, and it is caught by the leading edge stopper 105 to be placed on the intermediate stack tray 100.
The leading edge stopper 105 is set so that the sheet S may stop after the trailing edge leaves conveyance roller 102 surely.

The leading edge stopper 105 is driven by motor M1 to move to be set so that trailing edge position H2 of sheet S that is placed on the intermediate stack tray 100 may be always at a constant height, even in the case where sheets S each having a different size are conveyed.

A plurality of sheets S are placed on the intermediate stack tray 100 and when plural sheets are placed, succeeding sheet S is supplied to the intermediate stack tray 100 under the state where preceding sheet S exists on the intermediate stack tray 100.

In this case, it is necessary to set the position of the leading edge stopper 105 so that a trailing edge of carry-in (upper end) of the preceding sheet may not hit a leading edge of carry-in (upper end) of the succeeding sheet.

The leading edge of the succeeding sheet is ejected along a path shown with chain line L1 from conveyance roller 102.

Path L1 is determined by a shape of a conveyance path although it may be slightly changed depending on properties of sheet S, and it does not take a position that is higher than the upper limit leading edge landing point shown by landing position height H13 where the leading edge of sheet S lands on the intermediate stack tray 100.

The upper limit of height H13 of the landing position is determined, in a design stage of the device, by a sheet-feeding test wherein the maximum thickness of sheets S stacked on the intermediate stack tray 100 is estimated.

By setting the leading edge stopper 105 so that height H12 of a position of a trailing edge of sheet S on the intermediate stack tray 100 may be higher than height H13 of a landing position, sheets S supplied continuously on the intermediate stack tray 100 are stacked on the intermediate stack tray 100 smoothly, without any collision between respective sheets.

As described above, when the position of the leading edge stopper 105 is set so that height H12 of a trailing edge of sheet S stacked on the intermediate stack tray 100 may be lower than the lower bottom (ejection exit) of conveyance roller 102 that forms a lower end of a sheet ejection section of conveyance path H1, and height H12 of a trailing edge of sheet S may be higher than height H13 of a landing position of sheet S, sheets S supplied continuously on the intermediate stack tray 100 are stacked smoothly.

When sheets S of the set quantity are stacked on the intermediate stack tray 100, gripping member 106 rotates in the direction of arrow W1 to grip sheet S. In this case, the gripping member 106 moves together with leading edge stopper 105.

The gripping member 106 is driven by solenoid SL to rotate in the direction of arrow W1, and grips sheet S between the intermediate stack tray 100 and the gripping member 106.

In the processing of saddle stitching for a plurality of sheets S, leading edge stopper 105 is set to the position where a center line of sheet S in its conveyance direction agrees with a stapling position of stapler 103, under the state where sheet S is gripped by gripping member 106.

Under this state, a stitching process is conducted by stapler 103.

Folding process section 50 has folding plate 52 and folding rollers 53, 54 and 55.

In center folding process, leading edge stopper 105 is set to the position where a center line of sheet S agrees with a middle position between folding roller 53 and folding roller 54. Under this condition, when folding plate 52 enters a space between folding roller 53 and folding roller 54, then, sheet S is inserted in a space between both rollers 53 and 54, and when folding rollers 53 and 54 are rotated under the condition that sheet S is inserted, the sheet S is conveyed while it is subjected to the folding process.

A processing apparatus that conducts folding process by using folding plate and three folding rollers 53-55 is widely known, and for example, those disclosed in Unexamined Japanese Patent Application Publication No. 2006-56669 can be used.

As stated above, leading edge stopper 105 moves to the first stop position that is a position for stacking sheets S, the second stop position for a stitching process and to the third stop position for a folding process, and as is shown with dotted lines in FIG. 2, the leading edge stopper 105 and the gripping member 106 move uniately when they move between the aforesaid plural stop positions.

Operations of the post-processing apparatus with the aforesaid structure will be described as follows, referring to FIGS. 4-6.

FIG. 4 is a block diagram of a control system of a post-processing apparatus relating to Embodiment 1 of the invention, FIG. 5 is a flow chart of operations of a post-processing apparatus in saddle stitching-center folding and FIG. 7 is a flow chart of operations of a post-processing apparatus in side stitching.

In FIG. 4, the numeral 200 represents a control device provided on post-processing apparatus FS, and 201 represents a main control device that is provided on an image forming apparatus main body and controls an overall image forming apparatus.

The control device 200 controls post-processing apparatus FS shown in FIG. 1.

In step S11 sheet size information, namely, size information such as A4 size and B4 size are acquired from the main control device 201. Meanwhile, this size information includes information of longitudinal feeding (conveyance wherein a length in a width direction is of the long side) and information of lateral feeding (conveyance wherein a length in a conveyance direction is of the long side).

In step S12, motor M1 operates, and leading edge stopper 105 moves to the first stop position.

The first stop position is a position where sheet S is supported so that the trailing edge of sheet S on intermediate stack tray 100 in the state of carry-in in all sheet sizes may be at the height shown by H2 in FIG. 3.

Sheets S of the set quantity are supplied to intermediate stack tray 100 while leading edge stopper 105 is set to the first stop position.

Alignment in step S13 means operations wherein the aligning member 104 is driven by motor M2 to be reciprocated in the width direction, and this sheet alignment is carried out every time each sheet S is supplied.

When sheets S of the set quantity have been stacked, solenoid SL operates in step S14 to rotate gripping member 106, whereby, edges of sheets S are gripped.

Next, in step S15, a judgment is made whether the mode is for saddle stitching-center folding or for center folding in which no saddle stitching is carried out. The judgment in step S15 is made based on information coming from main control device 201.

In the case of the saddle stitching-center folding (Y of step S15), motor M1 operates to move leading edge stopper 105 in step S16. A movement of the leading edge stopper 105 is a movement to the second stop position where a center
line of sheet S in its conveyance direction agrees with a stapling position of stapler 103.

In step ST17, stitching process for stapling on sheets S is carried out, and in step ST18, edges of sheets S are gripped again by gripping member 106.

Gripping of sheet S is continued while leading edge stopper 105 is moving, and the gripping is released when the movement of the leading edge stopper 105 is completed and when the sheet S is set to the set height.

In step ST19 following the step ST18, leading edge stopper 105 moves and stops. This movement in ST19 is to move leading edge stopper 105 to the third stop position where the center line of sheet S agrees with a middle position between folding roller 53 and folding roller 54.

In step ST10, the sheets are folded. The folded sheets S are discharged to the lower sheet discharge tray 83.

In a folding process without stitching, namely, in a center folding process, the procedure proceeds from step ST15 to step ST11, then, leading edge stopper 105 is moved to the third stop position, and a center line of sheet S is in the conveyance direction is caused to agree with a middle position between folding roller 54 and folding roller 55.

In step ST12 that follows step ST11, a folding process is carried out, and the sheet S folded in step ST12 is discharged to end the processes.

FIG. 6 is a diagram showing a sheet collecting device relating to Embodiment 2 of the invention, and FIG. 7 is a flow chart of operations of Embodiment 2.

Embody 2 is an example wherein side stitching is carried out for sheets S stacked on an intermediate stack tray.

Side stitching is a processing to stitch edges of sheets S. In the side stitching, stitched sheets S are discharged without being folded.

Leading edge stopper 105 supports sheet S under the illustrated state, in collecting and in stitching process of sheet S.

When the stitching process has been completed, leading edge stopper 105 is driven by solenoid 8L1 to rotate in the direction of arrow W2, and releases sheet holding.

Sheet S released in terms of holding falls along intermediate stack tray 100 to be discharged.

In FIG. 7, steps from step ST11 to step ST14 are the same as those in FIG. 5, and sheet S is gripped by gripping member 106 at the first stop position.

In step ST20 following ST14, leading edge stopper 105 moves so that a stitching position of sheet S may agree with stitching position of stapler 103.

In step ST21, stapler 103 conducts a stitching process, and in step ST22, gripping member 106 releases gripping and leading edge stopper 105 rotates in the direction of arrow W2 to cause sheet S to fall, thus, sheet S is discharged.

In the present embodiment, a sheet is caused to fall in the direction of ejecting from a sheet ejecting device on a sheet collecting board, and a position of a leading edge stopper is set so that a trailing edge of the sheet (upper end) may be at a constant position, whereby downsizing is possible and a sheet collecting device that operates stably can be realized.

What is claimed is:

1. A sheet collecting device comprising:
   a sheet collecting board including a sheet supporting surface which is inclined so that an upstream side thereof in a sheet conveyance direction when a sheet is carried in is higher than a downstream side thereof;
   an ejecting device which is positioned upstream of the sheet collecting board and which ejects the sheet on the sheet collecting board by conveying the sheet in a direction so that the sheet falls along the sheet collecting board;
   a leading edge stopper which stops the sheet on the sheet collecting board;
   a stopper moving device which changes a position of the leading edge stopper; and
   a control device which controls the stopper moving device so that a position of a trailing edge of the sheet when the sheet is carried in on the sheet collecting board is constant regardless of a difference of a size of the sheet.

2. The sheet collecting device of claim 1, wherein the control device controls the stopper moving device based on sheet size information.

3. The sheet collecting device of claim 1, wherein the ejecting device has an ejection exit for ejecting the sheet and the position of the trailing edge of the sheet on the sheet collecting board is lower than a position of the ejection exit.

4. A post-processing apparatus comprising:
   the sheet collecting device of claim 1;
   a stapler which staples sheets on the sheet collecting board, the sheets having been collected on the sheet collecting board, wherein the control device controls the stopper moving device so as to move and set the leading edge stopper at a second stop position after setting the leading edge stopper at a first stop position for collecting the sheets and wherein the stapler staples the sheets supported by the leading edge stopper set at the second stop position.

5. A post-processing apparatus comprising:
   the sheet collecting device of claim 1;
   a folding device which folds the sheet having been collected on the sheet collecting board, wherein the control device controls the stopper moving device so as to move and set the leading edge stopper at a second stop position after setting the leading edge stopper at a first stop position for collecting the sheets and wherein the folding device folds the sheet supported by the leading edge stopper set at the second stop position.

6. The post-processing apparatus of claim 4 comprising: a gripping member which grips the sheets, wherein when the leading edge stopper moves while supporting the sheets, the control device controls the stopper moving device and the gripping member so that the leading edge stopper moves after the gripping member grips the sheets.

7. The post-processing apparatus of claim 5 comprising: a gripping member which grips the sheet, wherein when the leading edge stopper moves while supporting the sheet, the control device controls the stopper moving device and the gripping member so that the leading edge stopper moves after the gripping member grips the sheet.

8. An image forming apparatus comprising:
   an image forming apparatus main body which forms an image on a sheet; and
   the sheet collecting device of claim 1 which collects the sheet on which the image is formed by the image forming apparatus main body.