A sheet stacking apparatus for stacking a sheet includes a plurality of sheet stacking units, each of which includes a stacking member, a pushing unit, and a drive transmission unit. The plurality of sheet stacking units are lapped over one another in a sheet thickness direction. The stacking member stacks thereon a sheet conveyed by a conveyance member. The pushing unit pushes an edge of a sheet stacked on the stacking member to move the sheet. The drive transmission unit transmits, to the pushing unit, a drive force generated by a drive source for driving the pushing unit. The drive transmission unit is located outside the stacking member in a direction perpendicular to a direction in which the pushing unit moves the sheet.
SHEET STACKING APPARATUS, SHEET STORING APPARATUS, AND IMAGE FORMING APPARATUS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a sheet stacking apparatus that stacks sheets, a sheet storing apparatus that stores sheets, and an image forming apparatus.

[0003] 2. Description of the Related Art

[0004] Some conventional image forming apparatuses, such as copying machines, are equipped with a post-processing apparatus that temporarily stacks a plurality of sheets on a tray, staples the sheets, and discharges the stapled sheets (refer to FIG. 2 in Japanese Patent Application Laid-Open No. 2008-156089). Also, Japanese Patent Application Laid-Open No. 2008-156089 discusses a configuration in which, to move a plurality of sheets, a claw-shaped member capable of pushing out a plurality of sheets is driven by an endless belt mounted below a stacking member.

[0005] In recent years, the market has demanded downsized image forming apparatuses. While Japanese Patent Application Laid-Open No. 2008-156089 does not discuss an apparatus equipped with a plurality of trays for stacking, if the post-processing apparatus is simply equipped with a plurality of configurations discussed in Japanese Patent Application Laid-Open No. 2008-156089, the size of the apparatus may inevitably increase.

SUMMARY OF THE INVENTION

[0006] The present invention is directed to a sheet stacking apparatus, a sheet storing apparatus, and an image forming apparatus, each of which is equipped with a plurality of sheet stacking units without an increase in size of the apparatus.

[0007] According to an aspect of the present invention, a sheet stacking apparatus for stacking a sheet includes a plurality of sheet stacking units that are lapped over one another in a sheet thickness direction, each of the plurality of sheet stacking units including a stacking member configured to stack thereon a sheet conveyed by a conveyance member, a conveying unit configured to push an edge of a sheet stacked on the stacking member to move the sheet, and a drive transmission unit configured to transmit, to the pushing unit, a drive force generated by a drive source for driving the pushing unit, wherein the drive transmission unit is located outside the stacking member in a direction perpendicular to a direction in which the pushing unit moves the sheet.

[0008] Further features of the present invention will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIGS. 1A and 1B are perspective views illustrating a configuration of a sheet storing unit according to a first exemplary embodiment.

[0010] FIGS. 2A and 2B are sectional views illustrating a configuration of the sheet storing unit according to the first exemplary embodiment.

[0011] FIG. 3 is a sectional view illustrating a configuration of sheet storing units according to the first exemplary embodiment.

[0012] FIGS. 4A and 4B are perspective views illustrating a configuration of a sheet storing apparatus according to the first exemplary embodiment.

[0013] FIG. 5 is a sectional view illustrating an overall configuration of an image forming apparatus according to the first exemplary embodiment.

[0014] FIG. 6 is a perspective view illustrating an external appearance of the image forming apparatus according to the first exemplary embodiment.

[0015] FIGS. 7A and 7B are perspective views illustrating a sheet storing unit according to a second exemplary embodiment.

[0016] FIG. 8 illustrates a configuration of a sheet storing unit according to a modification example.

[0017] FIG. 9 illustrates a configuration of a sheet storing unit according to another modification example.

[0018] FIG. 10 is a block diagram according to the first exemplary embodiment.

DESCRIPTION OF THE EMBODIMENTS

[0019] Various exemplary embodiments, features, and aspects of the invention will be described in detail below with reference to the drawings.

[0020] FIG. 5 is a sectional view illustrating a configuration of an image forming apparatus 100 equipped with a sheet storing apparatus 200 according to a first exemplary embodiment of the present invention. As illustrated in FIG. 5, a main body of the image forming apparatus 100 (hereinafter referred to as an apparatus body 100) includes an image forming unit 101, a feeding unit 102, which feeds a sheet S to the image forming unit 101, a fixing unit 103, and a sheet discharging unit 104. The sheet storing apparatus 200, which temporarily stores a sheet S having an image formed thereon, is attached to the apparatus body 100.

[0021] The image forming unit 101 includes a photosensitive drum 111, which rotates clockwise as viewed in FIG. 5, an exposure device 113, and a charging roller 112, a developing device 114, and a transfer roller 115, which are arranged almost in turn along the rotational direction of the photosensitive drum 111. The image forming unit 101 uses such process units to form a toner image on the sheet S with an electrophotographic image forming process.

[0022] The feeding unit 102, which feeds a sheet S, includes a feeding cassette 105, in which sheets S to be image-formed are stored, a feeding roller 107, a conveyance guide 109, and a registration roller 110.

[0023] The fixing unit 103 includes a fixing roller 116, a pressure roller 117, which is caused to contact the fixing roller 116 from below, and a fixing discharging roller pair 118, and is configured to fix a toner image formed on the sheet S by the image forming unit 101.

[0024] The sheet discharging unit 104 includes a first switching member 120, a conveyance roller 121, a discharging guide 122, a discharging roller 123, and a discharging stacking member 124, which is formed on the top surface of the apparatus body 100.

[0025] The first switching member 120 can be switched by a central processing unit (CPU) 50 (illustrated in FIG. 10) between a position indicated with the solid line in FIG. 5 to direct the image-formed sheet S toward the sheet storing apparatus 200 and a discharging position indicated with the broken line to discharge the image-formed sheet S to the discharging stacking member 124.
FIG. 10 is a block diagram according to the first exemplary embodiment. As illustrated in FIG. 10, the CPU 50 is connected to a read-only memory (ROM) and a random access memory (RAM). The CPU 50 uses the RAM as a work memory to execute a program stored in the ROM.

Next, an image forming operation of the apparatus body 100 is described. When the apparatus body 100 receives image information from an external apparatus, such as a personal computer (PC), or a network, such as a local area network (LAN), the exposure device 113 emits laser light L based on the image information. The laser light L exposes the surface of the photosensitive drum 111, which is uniformly charged at a predetermined polarity and potential by the charging roller 112.

This removes electric charge from the exposed portion of the surface of the photosensitive drum 111, so that an electrostatic latent image is formed on the surface of the photosensitive drum 111. Then, toner is attached to the photosensitive drum 111 by developing device 114 to make the electrostatic latent image visible as a toner image. The toner image on the photosensitive drum 111 is transferred onto the sheet S at a transfer nip portion formed between the photosensitive drum 111, which is rotating clockwise, and the transfer roller 115.

On the other hand, the sheet S is to be supplied to the image forming unit 101 is separated and fed on a sheet-by-sheet basis from the feeding cassette 105 by the feeding roller 107, and is then conveyed to the registration roller 110 along the conveyance guide 109. At this time, since the registration roller 110 is in a stopped state, the sheet S is temporarily stopped by the registration roller 110. Then, the sheet S, which has been temporarily stopped, is conveyed to the transfer nip portion by the registration roller 110, which starts to rotate with timing synchronized with a toner image formed by the image forming unit 101.

The toner image formed on the photosensitive drum 111 is transferred onto the sheet S by the transfer roller 115. Then, the sheet S having the toner image transferred thereon is conveyed to the fixing unit 103, and is nipped and conveyed by the fixing nip portion formed between the fixing roller 116 and the pressure roller 117. At the fixing nip portion, the sheet S is heated and pressed, so that the toner image is fixed onto the surface of the sheet S.

In a case where the sheet S is to be discharged and stacked onto the discharging stacking member 124, the CPU 50 sets the first switching member 120 to a position (position indicated with the broken line) to convey the sheet S toward the discharging roller 123. Accordingly, the sheet S having an image formed thereon is conveyed along the discharging guide 122 by the conveyance roller 121 and is then discharged onto the discharging stacking member 124 by the discharging roller 123.

On the other hand, in a case where the sheet S is to be conveyed to the sheet storing apparatus 200, the CPU 50 previously sets the first switching member 120 to a position indicated with the solid line in FIG. 5. Accordingly, the sheet S is conveyed toward the sheet storing apparatus 200 from the apparatus body 100 through the conveyance path 128.

The sheet storing apparatus 200 includes a plurality of sheet storing units 201 to 203 that are lapped over one another. Conveyance roller pairs (conveyance members) 204 to 206 respectively convey sheets S to the sheet storing units 201 to 203.

The conveyance destination of the sheet S is switched by a second switching member 211 and a third switching member 212. Thus, the sheet S is guided by the conveyance guides 207 to 210 and is then conveyed to any one of the sheet storing units 201 to 203.

The second switching member 211 and the third switching member 212 are switched between a position indicated with the solid line and a position indicated with the broken line in FIG. 5 by an actuator (not illustrated) controlled by the CPU 50. For example, in a case where the sheet S is to be conveyed to the sheet storing unit 201, the CPU 50 respectively switches the first to third switching members 120, 211, and 212 to the positions indicated with the solid line in FIG. 5. Accordingly, the sheet S passes through the conveyance guides 207 and 208 in this order from the conveyance guide 128, and is conveyed to the sheet storing unit 201.

Also, in a case where the sheet S is to be conveyed to the sheet storing unit 202, the CPU 50 switches and holds only the third switching member 212 to the position indicated with the broken line. Accordingly, the sheet S passes through the conveyance guides 128, 207, and 209 in this order, and is then conveyed to the sheet storing unit 202.

Next, the more detailed description of the configuration of the sheet storing apparatus 200 are described. In the present exemplary embodiment, since the sheet storing units 202 and 203 have the same configuration as that of the sheet storing unit 201, only the sheet storing unit 201 is described, and the other sheet storing units 202 and 203 are omitted from description.

First, the whole picture of the sheet storing apparatus 200 is described. FIG. 3 is a sectional view illustrating a configuration of the sheet storing apparatus 200. As illustrated in FIG. 3, the sheet storing unit 201 includes a fixed stacking member 231 configured to stack a sheet S thereon. The sheet S is conveyed to the fixed stacking member 231 by the conveyance roller pair 204, which conveys the sheet S to the sheet storing unit 201. The fixed stacking member 231 is fixed to the sheet storing unit 201 and does not move. The sheet storing unit 201 further includes a pushing unit 233 configured to push the upstream edge of the sheet S in the conveyance direction stacked on the fixed stacking member 231 to move a downstream-side part of the sheet S in the conveyance direction to a position where the sheet S is receivable by the user. The sheet storing unit 201 still further includes a discharge port 234 configured to discharge therefrom the sheet S pressed and moved by the pushing unit 233, and a leading-edge restriction member 244 configured to restrict the downstream edge of the sheet S to prevent the sheet S stored in the sheet storing unit 201 from being exposed to the outside of the sheet storing unit 201.

In the first exemplary embodiment, the leading-edge restriction members 244 is mounted to be rotatable around a pivot shaft 244a. The CPU 50 controls an actuator (not illustrated) to rotate the leading-edge restriction member 244.
between a position indicated with the solid line and a position indicated with the broken line as illustrated in FIG. 3.

[0041] Next, the pushing unit 233 and the drive transmission unit 241, which transmits a drive force from the motor M (drive unit) to the pushing unit 233, are described in detail. FIGS. 1A and 1B are perspective views illustrating an upstream-side portion of the sheet storing unit 201. The pushing unit 233 includes protrusion-shaped contact members 233a, which are configured to contact the upstream edge of the sheet S in the conveyor direction stacked on the fixed stacking member 231. The contact members 233a each extend in the sheet thickness direction so as to be able to push a plurality of sheets S at a time. In the first exemplary embodiment, the height of each of the contact members 233a is set to about 5 mm so as to be able to push about 20 sheets at a time.

[0042] The pushing unit 233 further includes a moving stacking member 233b, which is formed to be movable integrally with the contact members 233a and configured to stack thereon an upstream-side portion of the sheet S. The moving stacking member 233b is in the shape of a surface folded at the contact members 233a. As illustrated in FIGS. 1A and 1B, in the first exemplary embodiment, the contact members 233a are arranged at two positions symmetrical about the center of the width of the pushing unit 233 in the direction perpendicular to the conveyor direction of the sheet S.

[0043] In FIG. 1A, the contact members 233a and the moving stacking member 233b are in the standby position. The contact members 233a when located in the standby position does not disturb the conveyance and stacking of the sheet S onto the fixed stacking member 231 of the sheet storing unit 201 via the conveyance roller pair 204.

[0044] In FIG. 1B, the contact members 233a and the moving stacking member 233b are in the discharging position. The CPU 50 causes a motor M (FIG. 4A) to rotate forward to move the contact members 233a and the moving stacking member 233b from the standby position to the discharging position, thus exposing the sheet S stacked on the fixed stacking member 231 to the outside via the discharge port 234. At this time, the CPU 50 rotates the leading-edge restriction member 244 to the position indicated with the broken line in FIG. 3.

[0045] Furthermore, the moving stacking member 233b has a width extending to the outside of the two ends of the width of the sheet S along the y direction in FIG. 1A. Thus, a right guide 233c and a left guide 233d are respectively formed at the two ends of the moving stacking member 233b. As illustrated in FIGS. 4A and 4B, the right guide 233c engages with a right side plate rail 251a, and the left guide 233d engages with a left side plate rail 252a. As illustrated in FIGS. 2A and 2B, the moving stacking member 233b is arranged on the upper surface of the fixed stacking member 231 in a contact state.

[0046] Next, the drive transmission unit 241 is described. As illustrated in FIGS. 1A and 1B, the drive transmission unit 241 is arranged outside the fixed stacking member 231 in the width direction of the sheet S. The fixed stacking member 231 includes a rack 241a and a pinion 241b, and is arranged outside the right guide 233c.

[0047] The rack 241a is formed integrally with the right guide 233c and meshes with the pinion 241b. As the pinion 241b is rotated forward and backward by a drive force from the motor M, the pushing unit 233 reciprocates between the standby position and the discharging position. In discharging the sheet S, the pushing unit 233 pushes the upstream edge of the sheet S to discharge the sheet S.

[0048] Next, the overall configuration of the pushing unit 233 and the drive transmission unit 241 is described with reference to FIGS. 4A and 4B. FIGS. 4A and 4B are perspective views of the sheet storing apparatus 200. FIG. 4A illustrates the arrangement of the pushing unit 233, a right side plate 251, and a left side plate 252 in the sheet storing apparatus 200. FIG. 4B illustrates the arrangement of the drive transmission unit 241 in the sheet storing apparatus 200.

[0049] As illustrated in FIGS. 4A and 4B, the fixed stacking member 231 is supported with protruding portions of the fixed stacking member 231 being inserted into a right rectangle hole 251b formed on the right side plate 251 and a left rectangle hole 252b formed on the left side plate 252.

[0050] The right guide 233c engages with the right side plate rail 251a of the right side plate 251, so that the position of the right guide 233c in the y direction in FIG. 4A is restricted. Also, the right guide 233c is movable along the right side plate rail 251a in the x direction in FIG. 4A. Furthermore, since the moving stacking member 233b is arranged on the upper surface of the fixed stacking member 231 in a contact state, the position of the moving stacking member 233b in the minus z direction is restricted. Also, the position of the moving stacking member 233b in the plus z direction is restricted by the right side plate rail 251a.

[0051] The left guide 233d engages with left side plate rail 252a of the left side plate 252, so that the position of the left guide 233d in the plus z direction in FIG. 4B is restricted.

[0052] As illustrated in FIG. 4B, the drive transmission unit 241 is located on one end of the fixed stacking member 231 across the right side plate 251.

[0053] The pinion 241b is rotated by a drive force from the motor M, which is fixed to the right side plate 251. The drive force from the motor M is transmitted to a drive shaft 253 and is then transmitted to the pinion 241b via an electromagnetic clutch 241c.

[0054] The sheet storing units 202 and 203 have a configuration similar to that of the sheet storing unit 201. Thus, the CPU 50 may selectively transmit the drive force to the pinion 241b by energizing the electromagnetic clutches 241c of any one of the sheet storing units 201 to 203. Then, the CPU 50 can move the rack 241a and the pushing unit 233 of the selected sheet storing unit to discharge the sheet S.

[0055] Next, an operation sequence for discharging the sheet S is described with reference to FIGS. 2A and 2B and FIG. 6. FIGS. 2A and 2B are enlarged sectional views illustrating the vicinity of the conveyance roller pair 204 of the sheet storing unit 201. FIG. 6 is a perspective view illustrating an external appearance of the image forming apparatus 100.

[0056] As the conveyance roller pair 204 rotates in the arrow directions in FIG. 2A, the sheet S having the passed through the conveyance guide 261 is conveyed to the sheet storing unit 201. At this time, the pushing unit 233 is in the standby position so as not to disturb the conveyance of the sheet S via the conveyance roller pair 204.

[0057] Furthermore, since the leading-edge restriction member 244 illustrated in FIG. 3 is located on the downstream side of the sheet storing unit 201 in the conveyance direction, the sheet S conveyed by the conveyance roller pair 204 is prevented from falling out of the image forming apparatus 100. Accordingly, the trailing edge of the sheet S is certainly stacked on the moving stacking member 233b.
When the user issues a discharging instruction via an operation display unit 292 (FIG. 6) mounted on the apparatus body 100, the CPU 50 starts a discharging operation for the sheet S via the pushing unit 233. To discharge the sheet S, first, the leading-edge restriction member 244 is rotated by an actuator (not illustrated) up to the position indicated with the broken line in FIG. 3, so that a conveyance path to the discharge port 234 is formed. Then, the pushing unit 233 starts operations.

When the pushing unit 233 discharges the sheet S, since the sheet S is held by the contact members 333a and the moving stacking member 233b, the trailing edge of the sheet S does not slip through the pushing unit 233, so that the sheet S can be certainly discharged. Furthermore, since the lower surface of the fixed stacking member 231 serves as a ceiling plane of the sheet storing unit 202, a sheet S can be conveyed to the sheet storing unit 202 even when the sheet S stacked in the sheet storing unit 201 is being discharged.

To discharge the sheet S, the pushing unit 233 moves toward the discharge port 234 along the sheet discharging direction, and then stops at the discharging position illustrated in FIG. 2B. When the sheet S has been moved to the position illustrated in FIG. 2B, a part of the sheet S is exposed from the discharge port 234 as illustrated in FIG. 6, so that the sheet S becomes receivable by the user.

When a reception detection unit 70 (FIG. 10) detects that the user has received the sheet S discharged from the discharge port 234, the CPU 50 returns the pushing unit 233 from the discharging position to the standby position. This enables the sheet storing unit 201 to receive a next sheet.

As described above, in the first exemplary embodiment, the drive transmission unit 241, which transmits a drive force for discharging a sheet stored in the sheet storing unit 201, is located outside the fixed stacking member 231 and the moving stacking member 233b in the sheet width direction (the y direction in FIGS. 1A and 1B).

Accordingly, the thickness required for the sheet storing unit 201 can be constituted only by a space for storing sheets S and the thicknesses of the fixed stacking member 231 and the moving stacking member 233b.

According to the first exemplary embodiment, the sheet storing apparatus 200 can be downsized in the height direction. In particular, even when the sheet storing apparatus 200 is equipped with a plurality of sheet storing units that are lapped over one another, the height thereof can be minimized.

Furthermore, according to the first exemplary embodiment, even when a sheet S is being discharged from a sheet storing unit, a sheet can be conveyed to another sheet storing unit.

Next, a second exemplary embodiment of the present invention is described. In the second exemplary embodiment, the description of configurations and operations similar to that of the first exemplary embodiment is not repeated as appropriate. The second exemplary embodiment differs from the first exemplary embodiment in the configuration of a pushing unit, which pushes an edge of the sheet S to move the sheet S.

FIGS. 7A and 7B are perspective views of a sheet storing unit 220 according to the second exemplary embodiment. FIG. 7A illustrates a state in which a pushing unit 333 is in the standby position. FIG. 7B illustrates a state in which the pushing unit 333 is in the discharging position.

As illustrated in FIG. 7A, the pushing unit 333 includes a contact member 333a and protruding portions 333e, which protrude from the contact member 333a in the minus z direction in FIG. 7A. The protruding portions 333e are set in stacking grooves (groove portions) 331b of the fixed stacking member 331. Furthermore, the protruding portions 333e are arranged such that the lowest surface of each of the protruding portions 333e contacts the upper surface of the associated stacking groove 331b.

When the pushing unit 333 moves from the standby position to the discharging position, the protruding portions 333e move in the discharging direction of the sheet S (the z direction) while being set in the stacking grooves 331b. At this time, since the protruding portions 333e and the stacking grooves 331b overlap in the thickness direction of the sheet S (the z direction), the trailing edge of the sheet S is prevented from slipping through a space between the protruding portions 333e and the fixed stacking member 331, so that the sheet S can be certainly discharged.

Accordingly, the second exemplary embodiment has, in addition to advantageous effects similar to those of the first exemplary embodiment, the effect of reducing the weight of the sheet storing unit 220, because the moving stacking member 233b in the first exemplary embodiment is not required.

The above first and second exemplary embodiments have been described with a configuration in which three sheet storing units are lapped over one another. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, two sheet storing units or four or more sheet storing units are lapped over one another. Also, the above first and second exemplary embodiments have been described with a configuration in which a single motor is used as a drive source for the drive transmission unit 241. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, motors are arranged for the respective sheet storing units.

Furthermore, the above first and second exemplary embodiments have been described with a configuration in which the drive transmission unit 241 includes the rack 241a and the pinion 241b. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, a belt is used as a drive transmission unit.

In addition, the present invention can also apply to a configuration in which the first exemplary embodiment and the second exemplary embodiment are combined such that protruding portions, which are provided on a moving stacking member formed integrally with contact members, are set in stacking grooves of the fixed stacking member 231.

Also, the above first and second exemplary embodiments have been described with a configuration in which the fixed stacking member 231 is a planar member. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, the fixed stacking member 231 is a linear member or a belt-like member.

Furthermore, the above first and second exemplary embodiments have been described with a configuration in which the sheet storing apparatus 200 is mounted inside the image forming apparatus 100. However, the present invention is not limited to such a configuration. The present invention
can also apply to a configuration in which, for example, a sheet storing apparatus is mounted outside an image forming apparatus.

[0077] In addition, the above first and second exemplary embodiments have been described with a configuration in which the pushing unit is restricted by the right side plate rail formed on the right side plate. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, a rail member is provided separately from the right side plate, or the pushing unit is restricted by the protruding portions 333e and the stacking grooves 331b in the second exemplary embodiment.

[0078] Furthermore, the above first and second exemplary embodiments have been described with a configuration in which the lower surface of the stacking member serves a ceiling plane of the lower sheet storing unit. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, a separate guide member or the like, which is arranged on the lower surface of the stacking member, is used as a ceiling plane of a sheet conveyance guide.

[0079] Also, the above first and second exemplary embodiments have been described with a configuration in which the pushing unit is composed of integrally formed components. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, individual components are coupled to constitute the pushing unit.

[0080] In addition, the first exemplary embodiment has been described with a configuration in which a trailing-edge portion of the sheet S in the conveyance direction is stacked on the moving stacking member 233b. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, the whole surface of the sheet S is stacked on a moving stacking member 433b, as illustrated in FIG. 8. In this case, a cutout 433f or the like may be formed on the downstream side of the moving stacking member 433b so that the user can easily receive the sheet S. With this configuration, a sliding friction between the sheet S and the fixed stacking member 231, which would occur when the sheet S is discharged from the sheet storing unit, does not occur. Therefore, it is possible to prevent the occurrence of friction noise or the damage of the sheet S.

[0081] Also, the first exemplary embodiment has been described with a configuration in which the moving stacking member 233b is arranged on the fixed stacking member 231. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, as illustrated in FIG. 9, the fixed stacking member 231 is omitted, a moving stacking member 533b supports a part or the whole of the sheet S from below, and the position of a pushing unit 533 in the z direction is restricted only by a right (left) guide and a right (left) side plate rail. With this configuration, an additional thickness of the sheet storing unit can be only the thickness of the moving stacking member 533b. Therefore, it is possible to more reduce the height than in the first exemplary embodiment.

[0082] Furthermore, the first exemplary embodiment has been described with a configuration in which each of the protruding portions 333e contacts the upper surface of the associated stacking groove 331b. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, the stacking groove 331b is formed in a hole shape unless the protruding portions 333e protrude from the lower surface of the fixed stacking member 331.

[0083] In addition, the above first and second exemplary embodiments have been described with a configuration in which the direction in which the conveyance roller pair 204 conveys the sheet S is the same as the direction in which the pushing unit 233 moves the sheet S. However, the present invention is not limited to such a configuration. The present invention can also apply to a configuration in which, for example, the pushing unit 233 moves the sheet S in the direction perpendicular to the direction in which the conveyance roller pair 204 conveys the sheet S.

[0084] Furthermore, the first exemplary embodiment has been described with a configuration in which the stacking member configured to stack a sheet thereon includes a fixed stacking member and a moving stacking member, the second exemplary embodiment has been described with a configuration in which the stacking member configured to stack a sheet thereon includes only a fixed stacking member, and the modification examples illustrated in FIGS. 8 and 9 have been described with a configuration in which the stacking member configured to stack a sheet thereon includes only a moving stacking member. Thus, the present invention can apply to a configuration in which the stacking member configured to stack a sheet thereon only needs to include at least one of the fixed stacking member and the moving stacking member.

[0085] Also, the above first and second exemplary embodiments have been described with a case where the present invention is applied to a sheet storing apparatus for storing sheets. However, the present invention can also be applied to a sheet stacking apparatus for stacking sheets.

[0086] While the present invention has been described with reference to exemplary embodiments, it is to be understood that the invention is not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.


What is claimed is:

1. A sheet stacking apparatus for stacking a sheet, the sheet stacking apparatus comprising:
   a plurality of sheet stacking units that are lapped over one another in a sheet thickness direction, each of the plurality of sheet stacking units including:
   a stacking member configured to stack thereon a sheet conveyed by a conveyance member,
   a pushing unit configured to push an edge of a sheet stacked on the stacking member to move the sheet,
   a drive transmission unit configured to transmit, to the pushing unit, a drive force generated by a drive source for driving the pushing unit,
   wherein the drive transmission unit is located outside the stacking member in a direction perpendicular to a direction in which the pushing unit moves the sheet.

2. The sheet stacking apparatus according to claim 1, wherein the pushing unit includes a contact member extending in the sheet thickness direction and configured to contact
the edge of the sheet stacked on the stacking member and to be movable to move the sheet.

3. The sheet stacking apparatus according to claim 2, wherein the pushing unit further includes a moving stacking member provided to be movable integrally with the contact member and configured to stack thereon the sheet conveyed by the conveyance member.

4. The sheet stacking apparatus according to claim 3, further comprising:
a right side plate and a left side plate configured to movably support the moving stacking member; and
rails provided respectively at the right side plate and the left side plate and configured to guide the moving stacking member.

5. The sheet stacking apparatus according to claim 2, wherein the pushing unit moves the contact member from a standby position to a push-out position to expose a part of the sheet to outside the sheet stacking apparatus.

6. The sheet stacking apparatus according to claim 5, wherein the direction in which the pushing unit moves the sheet is the same as a direction in which the conveyance member conveys the sheet, and
wherein the standby position of the contact member is set more upstream than an upstream edge of the sheet conveyed by the conveyance member and stacked on the stacking member.

7. The sheet stacking apparatus according to claim 2, wherein the contact member has a thickness enough to contact a plurality of sheets at a time.

8. The sheet stacking apparatus according to claim 1, wherein the stacking member has a groove portion, and
wherein a part of the pushing unit moves inside the groove portion.

9. The sheet stacking apparatus according to claim 1, wherein the drive transmission unit includes:
a pinion fixed in position and configured to be rotated by the drive force from the drive source, and
a rack meshing with the pinion.

10. The sheet stacking apparatus according to claim 1, wherein the drive source and the drive transmission unit are located on one end of the stacking member in the direction perpendicular to the direction in which the pushing unit moves the sheet.

11. The sheet stacking apparatus according to claim 1, wherein a lower surface of the stacking member of an upper sheet stacking unit serves as a ceiling plane of the lower sheet stacking unit.

12. The sheet stacking apparatus according to claim 1, further comprising a restriction member located downstream of the stacking member in the direction in which the pushing unit moves the sheet and configured to restrict a position of a leading edge of the sheet.

13. A sheet storing apparatus for storing a sheet, the sheet storing apparatus comprising:
a plurality of sheet storing units that are lapped over one another in a sheet thickness direction, each of the plurality of sheet storing units including:
a stacking member configured to stack thereon a sheet conveyed by a conveyance member,
a pushing unit configured to push an edge of a sheet stacked on the stacking member to move the sheet, and
a drive transmission unit configured to transmit, to the pushing unit, a drive force generated by a drive source for driving the pushing unit,
wherein the drive transmission unit is located outside the stacking member in a direction perpendicular to a direction in which the pushing unit moves the sheet.

14. An image forming apparatus comprising:
an image forming unit configured to form an image on a sheet; and
a sheet storing apparatus configured to store the sheet having the image formed thereon by the image forming unit, the sheet storing apparatus comprising:
a plurality of sheet storing units that are lapped over one another in a sheet thickness direction, each of the plurality of sheet storing units including:
a stacking member configured to stack thereon a sheet conveyed by a conveyance member,
a pushing unit configured to push an edge of a sheet stacked on the stacking member to move the sheet, and
a drive transmission unit configured to transmit, to the pushing unit, a drive force generated by a drive source for driving the pushing unit,
wherein the drive transmission unit is located outside the stacking member in a direction perpendicular to a direction in which the pushing unit moves the sheet.

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