A sheet-feeding device is used in an apparatus main body having a box-shaped apparatus external surface and includes a sheet feeding cassette having an outer side surface and detachably mounted to the apparatus main body; and an elastic member provided on the outer side surface of the sheet feeding cassette. The outer side surface of the sheet feeding cassette constitutes a part of the apparatus external surface in a state where the sheet feeding cassette is mounted to the apparatus main body. At least a part of the elastic member projects outward from the apparatus external surface farther than the outer side surface.
BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a sheet-feeding device for use in image forming apparatuses such as a copying machine, a printer, and a facsimile machine, and image forming apparatuses provided with the same.

[0003] 2. Description of the Related Art

[0004] As a sheet-feeding device for use in an image forming apparatus, a sheet feeding cassette which stores a sheet and is detachably mounted to an apparatus main body of the image forming apparatus is widely used. Usually, a sheet feeding cassette has an outer side surface, and the outer side surface constitutes a part of an external surface of the apparatus main body in a state where the sheet feeding cassette is mounted to the apparatus main body. Further, a handle member made of resin is often provided on the outer side surface of the sheet feeding cassette. When an operator grabs the handle member with hands to draw the sheet feeding cassette outward from the apparatus main body, an inner portion of the sheet feeding cassette becomes open to outside. On the other hand, when the sheet feeding cassette is inserted into the apparatus main body, the inner portion of the sheet feeding cassette is closed.

[0005] When the sheet feeding cassette is opened or closed, a hand may slip so that an operator may fail to grab the handle member. Therefore, for example, Japanese Patent Unexamined Publication No. 2005-189752 discloses a technology of an image forming apparatus provided with an anti-slip member. In this conventional technology, the anti-slip member is provided on a handle portion of an apparatus main body. This configuration eliminates failure to grab the handle member at a time of conveying the apparatus main body, so that an operator can securely hold the apparatus main body with hands.

[0006] However, in a case where the cassette comes in contact with a wall or the like unexpectedly at a time of conveying the apparatus main body, even if the configuration above is adopted in the handle member of the cassette, it may cause a problem that an outer side surface of the cassette is damaged due to a shock caused by the contact. Further, the wall in contact may also be damaged. This is because the anti-slip member is not provided on sides of the apparatus main body and is provided in a lower side of the apparatus main body.

[0007] As described above, some measures for relieving the shock need to be taken, but the technology does not take this point in consideration especially.

SUMMARY OF THE INVENTION

[0008] An object of the present invention is to provide a sheet-feeding device capable of relieving the shock by contact and an image forming apparatus provided with the sheet-feeding device.

[0009] A sheet-feeding device in accordance with an aspect of the present invention for achieving the object includes a sheet-feeding device for use in an apparatus main body having a box-shaped apparatus external surface, including: a sheet feeding cassette having an outer side surface and detachably mounted to the apparatus main body; and an elastic member provided on the outer side surface of the sheet feeding cassette. The outer side surface of the sheet feeding cassette constitutes a part of the apparatus external surface in a state where the sheet feeding cassette is mounted to the apparatus main body, and at least a part of the elastic member projects outward from the apparatus external surface farther than the outer side surface.

[0010] Further, an image forming apparatus in accordance with another aspect of the present invention includes: an image forming unit for performing an image forming operation to a sheet; an apparatus main body for accommodating the image forming unit; and a sheet-feeding device for storing a sheet to be fed to the image forming unit. The sheet-feeding device has the above-described configuration.

[0011] These and other objects, features and advantages of the present invention will become more apparent upon reading of the following detailed description along with the accompanied drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 is a perspective view showing a complex machine in accordance with an embodiment of the present invention.

[0013] FIG. 2 is a front sectional view schematically showing an internal structure of the complex machine shown in FIG. 1.

[0014] FIG. 3 is a perspective view showing a sheet feeding cassette mounted to the complex machine shown in FIG. 1.

[0015] FIG. 4 is a perspective view of the sheet feeding cassette in a state where an elastic member is detached.

[0016] FIG. 5 is a partial side view of the apparatus main body of the complex machine.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] Herebelow, an embodiment of the present invention will be described with reference to the drawings.

[0018] FIG. 1 is a perspective view showing a complex machine 1 which is an embodiment of an image forming apparatus in accordance with the present invention. FIG. 1 is a perspective view of the complex machine 1 viewed from left and front sides and above, and shows a front surface of the complex machine 1 facing an operator and a left side surface of the complex machine 1. The complex machine 1 is an apparatus of so-called in-body sheet discharging type and includes an apparatus main body 2, an image reading section 9 arranged in an upper portion of the apparatus main body 2, and an in-body sheet discharging tray 15 formed between the apparatus main body 2 and the image reading section 9.

[0019] The apparatus main body 2 has a box-shaped apparatus external surface and a housing structure for accommodating various units for image forming which will be described hereinafter. The image reading section 9 also has a housing structure, and a contact glass is fitted in a top portion, and an optical unit for optically reading a document image is accommodated inside.

[0020] On an upper side of the image reading section 9, a document feeding device 8 which is rotatable upward and downward about its rear end to open and close the image reading section 9 is mounted. When the complex machine 1 is used as a copying machine, a facsimile machine, or a network scanner, a document is conveyed from the document feeding
device 8 so that an image side of the document is optically read by the image reading section 9.

[0021] On a front side of the image reading section 9, an operation display device 20 is provided. The operation display device 20 includes a plurality of operation keys and switches for use in user's operations and is provided with a display screen 21 for displaying various information.

[0022] In a lower portion of the apparatus main body 2, a sheet-feeding device 3 of a front loading type is arranged. In the present embodiment, the sheet-feeding device 3 is provided with two sheet feeding cassettes 4 arranged in a height direction of the apparatus main body 2. Each sheet feeding cassette 4 is detachably mounted to the apparatus main body 2. When the sheet feeding cassette 4 is drawn toward a front surface side (front side) of the complex machine 1, an inner portion of the sheet feeding cassette 4 becomes open to outside. On the other hand, when the sheet feeding cassette 4 is inserted toward a back side (rear side) of the complex machine 1, the inner portion is closed.

[0023] FIG. 2 is a front sectional view schematically showing an internal structure of the complex machine 1. The arrows indicated by solid lines in FIG. 2 show conveying paths and conveying directions of a sheet. Each sheet feeding cassette 4 accommodates various sheets P subjected to image forming in a stacked state, and the sheets P are separated and conveyed leftward from the sheet feeding cassette 4.

[0024] On the left side of the sheet-feeding device 3, a sheet-feeding section 6 is arranged. The sheets P conveyed from the sheet feeding cassette 4 is conveyed vertically upward along the left side surface of the apparatus main body 2. Further, in the left side surface of the apparatus main body 2, there is provided a manual feeding tray 5 which can be opened and closed. A sheet conveyed from the tray 5 is also conveyed leftward from the right side of the main body 2, and thereafter vertically conveyed upward.

[0025] The apparatus main body 2 is provided therein with a registration roller 7, an image forming section 9, and a transferring section 11 sequentially on a downstream side in a sheet conveying direction. The image forming section 10 includes a photoconductive drum 101 having a surface on which an electrostatic latent image and a toner image are formed, a charging device 102 for uniformly charging the surface of the photoconductive drum 101, a developing device 103 for feeding toners to develop the electrostatic latent image, and a cleaning device 104 for cleaning the surface of the photoconductive drum 101.

[0026] On the right side of the image forming section 10, there is provided an exposure device 14 having a laser light source. The exposure device 14 irradiates a laser light modulated in accordance with image data toward a peripheral surface of the uniformly charged photoconductive drum 101 so as to form the electrostatic latent image. The transferring section 11 includes a transferring roller which forms a nip portion with the photoconductive drum 101. A toner image formed on the peripheral surface of the photoconductive drum 101 is transferred onto a sheet P which passes through the nip portion.

[0027] On a downstream side of the transferring section 11 in the sheet conveying direction, a fixing section 12 having a pair of rollers 40 and a discharge branching section 13 are arranged sequentially. The pair of rollers 40 includes a heating roller and a pressing roller to form a fixing nip portion and presses and heats the sheet P passing through the fixing nip portion to fix the toner image on the sheet P.

[0028] When one side printing is executed, a sheet discharged from the fixing section 12 passes through the discharge branching section 13 and is discharged to the sheet-discharging tray 15. On the other hand, a duplex printing unit 32 is arranged between the discharge branching section 13 and the sheet-conveying section 6. When duplex printing is executed, the duplex printing unit 32 conveys the sheet P discharged from the fixing section 12 back to the sheet-conveying section 6, and then the sheet is conveyed toward the image forming section 10 again.

[0029] Hereinafter, details of the sheet feeding cassette 4 will be described with reference to FIGS. 3 and 4. The sheet feeding cassette 4 includes an accommodating section 401 for accommodating sheets, a guide portion 402 for allowing the sheet feeding cassette 4 to slide smoothly from the apparatus main body 2, and a dressing cover 403 positioned on the front side of the accommodating section 401 and the guide portion 402.

[0030] As shown in FIG. 3, the accommodating section 401 is a cavity defined by a back plate 52 extending in a leftward and rightward direction on the rear side, side plates 54 and 56 extending in a forward and backward direction on the left and right sides, and a back side frame of the dressing cover 403. The accommodating section 401 accommodates a plurality of sheets P in a stacked state. Further, the accommodating section 401 is provided with a pair of cursors 58 which slide in a forward and backward direction for adjustment of widths in accordance with sizes of sheets to be accommodated.

[0031] The guide portion 402 includes a guide rail extending in a forward and backward direction and a guide roller and is slidably supported by an unillustrated guide member provided in the apparatus main body 2, so that drawing of the sheet feeding cassette 4 in a forward direction and inserting in a backward direction with respect to the apparatus main body 2 can be realized.

[0032] The dressing cover 403 is formed of a member which is the same as an exterior member of the apparatus main body 2 and is positioned on a front side surface side (front side) of the apparatus main body 2 in a state where the sheet feeding cassette 4 is mounted to the apparatus main body 2. Usually, an exterior member is made of a resin material. Therefore, the dressing cover 403 is also made of a similar resin material. A front side surface 50 (outer side surface) of the dressing cover 403 is apart which can be visually confirmed from outside in a state where the sheet feeding cassette 4 is mounted to the apparatus main body 2, and it constitutes a part of an external surface of the apparatus main body 2.

[0033] The dressing cover 403 (front side surface 50) is provided with a handle member 62 which is operated by an operator at a time of drawing or inserting the sheet feeding cassette 4. The handle member 62 includes a rod-like grip portion 64 integrally formed with the dressing cover 403. Specifically, in a substantially central portion in the leftward and rightward direction of the front side surface 50, a retreated portion 60 recessing backward is formed. The retreated portion 60 is utilized to form the grip portion 64. In other words, the retreated portion 60 forms the front side surface 50 to include a first surface 50A in flush with the external surface of the apparatus main body 2 (in the present embodiment, it is a front surface of the apparatus front cover 16 shown in FIG. 1), and a second surface 50B which is recessed backward from the first surface 50A. The grip portion 64 is an elongated member extending in a horizontal direction (leftward and backward direction) so as to cross the
front side of the second surface 50B, and a front surface 65 of the grip portion 64 is in flush with the first surface 50A.

[0034] Between the grip portion 64 and the retreated portion 66, a space for allowing fingers of a hand to pass through is defined. An operator can grip the grip portion 64 by inserting his or her fingers to the space and placing his or her palm onto the front surface 65. The grip portion 64 is provided with an operating section 66 for releasing engagement between the apparatus main body 2 and the sheet feeding cassette 4. The operating section 66 is urged backward by an unillustrated spring arranged inside the grip portion 64.

[0035] In the sheet feeding cassette 4 so configured as described above, there is provided an elastic member 70 on the front surface 65 of the grip portion 64 in the present embodiment. As shown in FIG. 4, the elastic member 70 is an elongated plate-like member extending in a horizontal direction. As a material of the elastic member 70, for example, a thermal plastic elastomer, more favorably a polyester thermal plastic elastomer, may be used. The elastic member 70 may be configured one kind or a plurality of kinds of materials among the polyester series, polyurethane series, polylau-lin series, polyvinyl chloride series, polyethylene series, and polyanide series. Further, in place of the elastomer, a relatively flexible resin material may be used, for example, PP (polypropylene), PE (polyethylene), or POM (polycetal).

[0036] The elastic member 70 is joined to the grip portion 64 without using an adhesive. As shown in FIG. 4, the elastic member 70 includes a projecting surface 72 and a joint surface 74 positioned on a back surface of the projecting surface 72. The joint surface 74 is so configured as to face the front surface 65, and the projecting surface 72 is so configured as to be oriented outward from the apparatus main body 2. In opposite end portions and a periphery of a substantially central portion of the joint surface 74, a plurality of claw-shaped projections 75 are formed. In the front surface 65, a plurality of recessions 51 corresponding to the projections 75 are formed. The projections 75 and the recessions 51 are engaged by utilizing elasticity of resin (snap-fitted), so that the front surface 65 and the joint surface 74 are joined together.

[0037] FIG. 5 is a side view of the apparatus main body 2. As being clear from the drawing, the projecting surface 72 of the elastic member 70 projects toward front outer side from the apparatus main body 2 farther than the front surface 65 of the grip portion 64 and the front side surface 50 (first surface 50A) of the dressing cover 403. Further, the projecting surface 72 projects toward front outer side farther than a front side surface 16A of the apparatus front cover 16. In other words, the projecting surface 72 projects toward front outer side on the front surface side of the apparatus main body 2 farther than any other portion in its periphery.

[0038] A length of the elastic member 70 in a leftward and rightward direction is substantially the same as a length of the grip portion 64 in a leftward and rightward direction. A width of the elastic member 70 in a vertical direction is about one-third of the width of the front surface 65 in a vertical direction. As a result of arranging the grip portion 64 in the leftward and rightward direction of the front side surface 50 and a center in the vertical direction, the elastic member 70 forms a projecting portion in vicinity of a center of the front side surface 50. This is advantageous in view of guarding the front side surface 50 evenly. Further, the length of the elastic member 70 in the leftward and rightward direction is about a half of the length of the front side surface 50 in the leftward and rightward direction. Therefore, effective guarding can be made with respect to rubbing on a wall surface.

[0039] In the present embodiment, the elastic members 70 of the sheet feeding cassettes 4 have respective colors which are different from one another. In the present embodiment, two sheet feeding cassettes 4 are arranged vertically (FIG. 1). A color of the elastic member 70 of an upper sheet feeding cassette 4 is different from a color of the elastic member 70 provided on a lower sheet feeding cassette 4. Such difference in color is made, for example, to discriminate a size and a kind of sheets to be stored in the sheet feeding cassettes 4.

[0040] Next, use of the above-described complex machine 1 will be described. Firstly, when the complex machine 1 is conveyed, an operator grabs an unillustrated handle portion of the apparatus main body 2 to lift up the complex machine 1 and convey the same to a desired position. Further, when the sheet feeding cassette 4 is drawn, the operator grabs the grip portion 64 in such a manner that the elastic member 70 positions at his or her palm, pushes the operating section 66 with his or her finger against a biasing force of the spring to release engagement between the apparatus main body 2 and the sheet feeding cassette 4.

[0041] In state, if the grip portion 64 is drawn toward a front side of the complex machine 1 to allow the sheet feeding cassette 4 and an unillustrated stopper of the apparatus main body 2 to come in contact, the accommodating section 401 becomes open to outside. Accordingly, an operator can supply new sheets P into the accommodating section 401 or replace the sheets with other kind of sheets. The elastic member 70 is replaced in accordance with changes in size and kind of the sheets.

[0042] Further, in the drawn state, if the grip portion 64 is lifted up and drawn farther toward the front surface side of the complex machine 1, the sheet feeding cassette 4 can be detached from the apparatus main body 2, so that the operator can transport only the sheet feeding cassette 4 to other location. On the other hand, in the drawn state, if the grip portion 64 is inserted toward the back side of the complex machine 1 until a sound of engagement can be heard, the apparatus main body 2 and the sheet feeding cassette 4 engages with each other, so that the accommodating section 401 becomes close from outside.

[0043] Next, an operation of the complex machine 1 will be described. When an operator gives an image forming instruction through the operation display device 20, sheets P are separated and conveyed one after another from the sheet feeding cassette 4 or the manual feeding tray 5, and then the sheet P reaches the registration roller 7 through the sheet conveying section 6. The registration roller 7 adjusts inclination conveyance of the sheet P and allows the sheet P to be conveyed to the transferring section 11 while adjusting a timing of a toner image formed by the image forming section 10.

[0044] Further, irradiation of the laser light by the exposure device 14 is controlled in accordance with image data from the controller. Accordingly, an electrostatic latent image of a document image is formed on the photoconductive drum 101 of the image forming section 10. Next, toners are supplied from the developing device 103 to the electrostatic latent image, so that a toner image is formed on the photoconductive drum 101. The toner image is transferred to the sheet P in the transferring section 11.

[0045] Thereafter, the sheet P is conveyed to the fixing section 12 in a state of bearing a toner image to be fixed, and then the toner image heated and pressed to be fixed. The sheet
When duplex printing is performed on the contrary to this one-sided printing, the sheet P discharged from the fixing section 12 moves back to the duplex printing unit 32 before being discharged to the tray 15, and merges with the sheet-feeding section 6, and then is conveyed to the transferring section 11 again. In this case, a toner image is transferred to a side of the sheet P on which printing is not performed.

As described above, according to the present embodiment, the sheet feeding cassette 4 is so configured as to be detachably mounted by being drawn from and inserted to the apparatus main body 2. The sheet feeding cassette 4 is provided with the handle member 62, and the handle member 62 has the grip portion 64. On the front surface 65 of the grip portion 64, the elastic member 70 is provided. The projecting surface 72 of the elastic member 70 is so formed as to project toward a front outer side of the apparatus main body 2 further than the front surface 65.

Therefore, in a case where the sheet feeding cassette 4 and a peripheral wall comes in contact at a time of conveying the complex machine 1, the elastic member 70 reduces a shock. Accordingly, damages to the front side surface 50 of the sheet feeding cassette 4 and the front surface 65 of the grip portion 64 can be avoided, and damages to the wall in contact can be also avoided. Further, a shock to the sheet feeding cassette 4 can be reduced, so that damages to inner part of the sheet feeding cassette 4 can be also avoided.

Additionally, the elastic member 70 also absorbs a shock at a time of mounting and detaching operation of the sheet feeding cassette 4. In the operation of drawing the sheet feeding cassette 4, the front side surface 50 of the sheet feeding cassette 4 or the front surface 65 of the grip portion 64 may collide with an operator depending on a distance between the sheet feeding cassette 4 and an operator, so that the shock due to this contact may be applied to the operator and the sheet feeding cassette 4. Further, in this drawing operation, the sheet feeding cassette 4 may come in contact with a stopper of the apparatus main body 2 so that a shock due to a contact between the cassette 4 and the stopper may be applied to a hand or an elbow of the operator.

Further, in a case of an operation of inserting the cassette 4, the sheet feeding cassette 4 is inserted to a predetermined engagement position in the apparatus main body 2. However, at a moment of completion of the insertion, a shock due to a contact between an operator's hand or leg and the front surface 65 of the front side surface 50 may be applied to the operator or inside of the cassette 4. However, according to the present embodiment, in a case where the sheet feeding cassette 4 comes in contact with an operator or the apparatus main body 4 at a time of conducting an operation of mounting and detaching the sheet feeding cassette 4, the elastic member 70 reduces a shock so that a shock to the operator and inside the sheet feeding cassette 4 can be also reduced.

Further, according to the configuration of the grip portion 64 having the elastic member 70, grabbing the grip portion 64 causes the elastic member 70 to stop slipping at a time of performing mounting and detaching operation of the sheet feeding cassette 4 by drawing and inserting, and at a time of detaching and conveying only the sheet feeding cassette 4 from the apparatus main body 2. Therefore, failure to grab the grip portion 64 can be eliminated so that the mounting and dismounting can be performed quickly and damages to inside and outside of the sheet feeding cassette 4 due to falling can be avoided.

Further, since the elastic member 70 is so configured as to be detachably mounted to the front surface 65 by snap-fitting of projections and recessions, easy and inexpensive configuration can be achieved. Further, even if the elastic member 70 is damaged due to a contact between the elastic member 70 and a peripheral wall, the elastic member 70 can be easily replaced with other elastic member.

Further, since the elastic members 70 of the sheet feeding cassettes 4 have respective colors different from one another, contents of the sheet feeding cassette 4, such as size and kind of sheet accommodated in each sheet feeding cassette 4, can be visually confirmed in an easy manner by an operator and a person who works at a location far away from the apparatus main body 2 at one glance.

Further, since the sheet feeding cassette 4 has the elastic member 70, a shock to an inside of the apparatus main body 2 can be avoided so that favorable image can be maintained. As a result, it contributes to reliability with respect to the complex machine 1.

The present invention is not limited to the embodiment above, and may be modified in various ways within a scope of the invention.

For example, the elastic member 70 is provided on the front side surface 65 of the grip portion 64 in the present embodiment, but the present invention is not necessarily limited to this configuration. In other words, in a case where the grip portion 64 is not provided on the front side surface 50 of the cassette 4, an elastic member may be provided on the front side surface 50, and the elastic member may be so formed as to project outward from the front side surface 50 of the apparatus main body 2. In this case, similarly to the case described above, a shock due to contact can be reduced.

Further, the elastic member 70 may be made of, for example, an electrically conductive rubber. Specifically, the elastic member may be made by adding a carbon series which is an electrically conductive material, and the elastic member may be grounded at an appropriate position of the apparatus main body 2, so that discomfort to an operator due to a static electricity can be avoided.

Furthermore, in the present embodiment, the complex machine 1 is described as an example of the image forming apparatus. However, the present invention may be surely applied to a copying machine, a multi-functional peripheral equipments (MFP) for network, a printer, a facsimile machine, a scanner, and the like.

The above-described embodiment mainly includes invention having the following configuration.

A sheet-feeding device in accordance with an aspect of the present invention includes a sheet-feeding device for use in an apparatus main body having a box-shaped apparatus external surface, and the sheet-feeding device includes: a sheet feeding cassette having an outer side surface and detachably mounted to the apparatus main body; and an elastic member provided on the outer side surface of the sheet feeding cassette. The outer side surface of the sheet feeding cassette constitutes a part of the apparatus external surface in a state where the sheet feeding cassette is mounted to the apparatus main body, and at least a part of the elastic member projects outward from the apparatus external surface farther than the outer side surface.
According to this configuration, an elastic member is provided on an outer side surface of the sheet feeding cassette, and the elastic member projects outward from the apparatus main body farther than the outer side surface. Therefore, in a case where the sheet feeding cassette comes in contact with a peripheral wall at a time when an apparatus main body is conveyed, the elastic member reduces a shock, so that damage to the outer side surface of the sheet feeding cassette and damage to the wall in contact can be avoided. Further, in a case where the sheet feeding cassette and the operator comes in contact at a time of mounting and dismounting the sheet feeding cassette, the elastic member reduces a shock, so that a shock to the operator and an inside of the sheet feeding cassette can be reduced.

In the configuration above, it is preferable that the sheet feeding cassette has a handle member having a grip portion in the outer side surface, and the elastic member is formed on a front surface of the grip portion.

According to this configuration, at a time of mounting and dismounting the sheet feeding cassette and at a time of conveying only a cassette dismounted from the apparatus main body, grabbing the grip portion causes the elastic member to avoid slipping. Accordingly, failure to grab the grip portion can be eliminated, and damage to the cassette due to falling can also be avoided.

In the configuration above, if the elastic member is made of an electrically conductive material, discomfort to an operator due to static electricity can be avoided.

In the configuration above, it is preferable that a plurality of sheet feeding cassettes are provided, and elastic members of the sheet feeding cassettes have respective colors which are different from one another. According to this configuration, an operator can easily confirm contents of the cassette.

In the configuration above, it is preferable that the elastic member is detachably mounted to the outer side surface. According to this configuration, an elastic member can be easily replaced even if the elastic member comes in contact with a peripheral wall to be damaged.

In the configuration above, the outer side surface of the sheet feeding cassette may have a first surface which is substantially flush with the apparatus external surface and a second surface recessed from the first surface, and the grip portion may be so formed as to cross a front side of the second surface, and a front surface of the grip portion is flush with the first surface. According to this configuration, if the grip portion is provided in such a state where the outer side surface of the sheet feeding cassette does not project, the grip portion and the outer side surface having such configuration can be guarded by the elastic member at a minimum projection height.

In this case, it is preferable that the grip portion has a horizontally elongated shape and the front surface also has an elongated shape, and the elastic member includes a horizontally elongated plate member. According to this configuration, an elastic member having a simple shape can perform effective guarding.

An image forming apparatus in accordance with another aspect of the present invention includes an image forming apparatus including: an image forming unit for performing an image forming operation to a sheet; an apparatus main body for accommodating the image forming unit; and a sheet-feeding device for storing a sheet to be fed to the image forming unit. The apparatus main body has a box-shaped apparatus external surface, and the sheet-feeding device includes: a sheet feeding cassette having an outer side surface and detachably mounted to the apparatus main body; and an elastic member provided on the outer side surface of the sheet feeding cassette. The outer side surface of the sheet feeding cassette constitutes a part of the apparatus external surface in a state where the sheet feeding cassette is mounted to the apparatus main body. At least a part of the elastic member projects outward from the apparatus external surface farther than the outer side surface.

According to this configuration, in addition to the above-described operation, the sheet feeding cassette has the elastic member. Accordingly, a shock applied to an inside of the apparatus main body of the image forming apparatus can be avoided so that favorable image can be maintained. Consequently, it contributes to improve reliability with respect to the image forming apparatus.

This application is based on Japanese Patent application serial No. 2007-127602 filed in Japan Patent Office on May 14, 2007, the contents of which are hereby incorporated by reference.

Although the present invention has been fully described by way of example with reference to the accompanying drawings, it is to be understood that various changes and modifications will be apparent to those skilled in the art. Therefore, unless otherwise such changes and modifications depart from the scope of the present invention hereinafter defined, they should be construed as being included therein.

What is claimed is:

1. A sheet-feeding device for use in an apparatus main body having a box-shaped apparatus external surface, comprising: a sheet feeding cassette having an outer side surface and detachably mounted to the apparatus main body; and an elastic member provided on the outer side surface of the sheet feeding cassette, wherein the outer side surface of the sheet feeding cassette constitutes a part of the apparatus external surface in a state where the sheet feeding cassette is mounted to the apparatus main body, and at least a part of the elastic member projects outward from the apparatus external surface farther than the outer side surface.

2. The sheet-feeding device according to claim 1, wherein the sheet feeding cassette has a handle member having a grip portion in the outer side surface, and the elastic member is formed on a front surface of the grip portion.

3. The sheet-feeding device according to claim 1, wherein the elastic member is made of an electrically conductive material.

4. The sheet-feeding device according to claim 1, wherein a plurality of sheet feeding cassettes are provided, and elastic members of the sheet feeding cassettes have respective colors which are different from one another.

5. The sheet-feeding device according to claim 1, wherein the elastic member is detachably mounted to the outer side surface.

6. The sheet-feeding device according to claim 2, wherein the outer side surface of the sheet feeding cassette has a first surface which is substantially flush with the apparatus external surface, and a second surface recessed from the first surface, and
the grip portion is so formed as to cross a front side of the second surface, and a front surface of the grip portion is flush with the first surface.

7. The sheet-feeding device according to claim 6, wherein the grip portion has a horizontally elongated shape and the front surface also has an elongated shape, and the elastic member includes a horizontally elongated plate member.

8. An image forming apparatus comprising:
an image forming unit for performing an image forming operation to a sheet;
an apparatus main body for accommodating the image forming unit; and
a sheet-feeding device for storing a sheet to be fed to the image forming unit;
wherein the apparatus main body has a box-shaped apparatus external surface, and the sheet-feeding device includes:
a sheet feeding cassette having an outer side surface and detachably mounted to the apparatus main body; and
an elastic member provided on the outer side surface of the sheet feeding cassette, and
the outer side surface of the sheet feeding cassette constitutes a part of the apparatus external surface in a state where the sheet feeding cassette is mounted to the apparatus main body, and at least a part of the elastic member projects outward from the apparatus external surface farther than the outer side surface.

9. The image forming apparatus according to claim 8, wherein the sheet feeding cassette has a handle member having a grip portion in the outer side surface, and the elastic member is formed on a front surface of the grip portion.

10. The image forming apparatus according to claim 8, wherein the elastic member is made of an electrically conductive material.

11. The image forming apparatus according to claim 8, wherein a plurality of sheet feeding cassettes are provided, and elastic members of the sheet feeding cassettes have respective colors which are different from one another.

12. The image forming apparatus according to claim 8, wherein the elastic member is detachably mounted to the outer side surface.

13. The image forming apparatus according to claim 9, wherein the outer side surface of the sheet feeding cassette has a first surface which is substantially flush with the apparatus external surface, and a second surface recessed from the first surface, and the grip portion is so formed as to cross a front side of the second surface, and a front surface of the grip portion is flush with the first surface.

14. The image forming apparatus according to claim 13, wherein the grip portion has a horizontally elongated shape and the front surface also has an elongated shape, and the elastic member includes a horizontally elongated plate member.