Description

The present invention relates to a developer vessel for containing a developer therein, said developer vessel comprising a vessel proper having a closed top, a barrel and a tapered inclined portion continuous to the barrel, recited from the top in the state where the vessel is attached to the developing device, a receiving plate, which has a substantially flat supporting surface, substantially straight two side edges and an opening communicating with the vessel proper, an opening tab composed of a film which covers the opening of the receiving plate and is peelably bonded to the flat supporting surface, and a shutter composed of a plate having, on both the sides, engagement portions to be engaged with both the side edges of the receiving plate, wherein said film has a width smaller than the distance between both the attachment side edges of the receiving plate, and said film has such a length that the film is folded on the fitting and inserting end of the receiving plate and the lapel of the folded film is protruded from the other end of the receiving plate.

Such a developer vessel is disclosed by US-A-4,062,385.

In the field of electrophotographic copying machines, a powdery developer generally called "toner" is used. This powdery developer is composed of a powdery dispersion of a colorant such as carbon black and, if necessary, a charge-controlling agent in a binder resin. From the view of the resolving power in a formed image, the powder is formed of finely divided particles, and in view of the image density, a large coloring power is given to this powder. Moreover, in view of the adaptability to the developing operation, an excellent flowability is given to this powder. In general, this powder is filled and packed in a vessel and supplied to users of copying machines. However, because of the above-mentioned characteristics, at the time of opening of the vessel or supply of the powder to the developer hopper, the powder is scattered around to contaminate the hands of an operator and surroundings of a copying machine.

Many proposals have been made to prevent scattering of a toner at the time of opening of the developer vessel or supply of the toner. For example, Japanese Utility Model Publication No. 62-41325 proposes a developer cartridge which is fitted and inserted in a developing device of an electrophotographic copying machine in the state where an opening is located above and which is turned to locate the opening below so that a developer is supplied from the opening, said developer cartridge comprising a guide member for maintaining the cartridge at the time of insertion so that the opening is located above, a seal member for sealing the opening, and a folded portion formed by folding the seal member on the cartridge insertion side, wherein the seal member is opened while the cartridge is being inserted.

Furthermore, Japanese Unexamined Utility Model Publication No. 62-14458 discloses a developer vessel comprising a vessel proper for containing a developer therein, an adapter sleeve member fitted integrally to a mouth portion of the vessel proper and rotatably attached and fitted to a supply opening of a developer hopper, a first shutter member having an opening, which is fixed to the adapter sleeve member, and a second shutter member having an opening, which is rotatably arranged within the adapter sleeve member, wherein supply of the developer into the hopper is made possible by bringing both the openings in line with each other.

In each of these developer vessels, a developer in a packaging vessel is discharged into a hopper, and the developer is stored in the hopper and is used, and therefore, it is necessary to provide two spaces in a copying machine, that is, a space for the hopper for storing the developer therein and a space for insertion of the cartridge for discharging the developer to the hopper.

Also in the developer vessel according to US-A-4,062,385 the developer is discharged into a hopper, while further, in the known vessel, the receiving plate of the vessel proper forms one, undetachable part of the vessel itself.

In the case where a packaging vessel for a developer is attached within a copying machine and is used as the hopper for storing the developer therein and perpetually supplying the developer into a developing device, it is expected that the necessary space of the copying machine will be reduced and the size of the copying machine will be diminished, but in this case, it is difficult to prevent scattering of the developer when the vessel is opened and the vessel is attached to the developing device.

It is therefore a primary object of the present invention to provide a developer vessel for containing a developer therein, which is attached to a developing device of an electrophotographic copying machine and is used as a developer hopper, wherein opening of the vessel and attachement of the vessel to the developing device can be accomplished easily without scattering of a developer.

Another object of the present invention is to provide a developer vessel in which the above function can be exerted by a relatively simple structure.

To obtain this, in accordance with a first embodiment of the present ivention, a developer vessel of the above-mentioned type is characterized in that the vessel proper has a short cylindrical neck having a screw formed on the outer periphery thereof on the bottom end of the inclined portion and is integrally blow-formed from a plastic material, that the receiving plate has, on the side opposite to the supporting surface and around the opening, a short cylindrical connecting portion having a screw formed on the inner

circumference thereof and is integrally injection-formed from a plastic material, in which the screw of the neck and the screw of the connecting portion are engaged with each other to integrate the vessel proper and the receiving plate with each other, and that the developer vessel forms a developer hopper for the developing device of an electrophotographic copying machine.

In accordance with a second embodiment of the present invention, a developer vessel of the above-mentioned type is characterized in that the vessel proper has, on the bottom of the inclined portion, a short cylindrical neck having a plurality of projections extending outward of the radius on the outer periphery thereof and is integrally blow-formed from a plastic material, that the receiving plate has, on the side opposite to the supporting surface and around the opening, a short cylindrical connecting portion having an engagement part and is integrally injection-formed from a plastic material, in which the projections of the neck are engaged with the engagement part of the connecting portion to integrate the vessel proper and the receiving plate with each other, and that the developer vessel forms a developer hopper for the developing device of an electrophotographic copying machine.

According to still another preferred embodiment of the present invention, the shutter has, as an engagement part, a concave groove slidably engaged with both the side edges of the receiving plate, and when the developer vessel is dismounted from the developing device, dismounting is effected by sliding the developer vessel in the state where both the side edges are fitted and inserted in the concave groove.

The present invention as outlined in the appended claims will now be described with reference to two preferred embodiments as illustrated in the accompanying drawings, in which

Fig. 1 is a diagram systematically illustrating respective members of a developer vessel according to one embodiment of the present invention.

Fig. 2 is a bottom view illustrating a receiving plate in the state where an opening tab is bonded to the receiving plate.

Fig. 3 is a side view illustrating the receiving plate in the state where the opening tab is bonded to the receiving plate.

Fig. 4 is a diagram illustrating the sectional structure of the opening tab.

Fig. 5 is a view illustrating the entire developer vessel according to the embodiment of the present invention.

Fig. 6 is a diagram showing a main portion of a developing device to which the developer vessel according to the embodiment of the present invention is attached, in which (a) is a plane view and (b) is a side view.

Fig. 7 is a diagram illustrating the state where the developer vessel according to the embodiment of the present invention is attached to the developing device.

Fig. 8 is a diagram illustrating the movements of a seal member and an opening tab when the opening tab is peeled in the state where the developer vessel according to the embodiment of the present invention is attached to the developing device, in which (a) shows the state before peeling and (a) shows the state during peeling.

Fig. 9 is a diagram illustrating the state where the developer vessel according to the embodiment of the present invention is dismounted from the developing device.

Fig. 10 is a perspective view illustrating systematically a developer vessel according to still another embodiment of the present invention while disintegrating it into two parts.

Fig. 11 is a perspective illustrating the state where the two parts shown in Fig. 11 are easily assembled.

Fig. 12 is an enlarged view of the fitting portion between a vessel proper and a receiving plate of the vessel shown in Fig. 12, which illustrates the section taken along the line XIII-XIII in Fig. 12.

In the drawings, reference numerals represent the following members and parts.

1: vessel proper, 2: receiving plate, 3: opening tab, 4: shutter, 5: developer supply portion, 21: flat supporting surface of receiving plate, 22: both the side edges of receiving plate, 24: fitting and insertion end, 31: portion to be bonded of opening tab, 32: free lapel portion of opening tab, 41: engagement portion, 43: slidably engaged concave groove, 51: fitting and insertion portion, 53: developer delivery mechanism, 56: seal member, 60: positioning engagement projection.

Fig 1 illustrates systematically respective members of a developer vessel according to one embodiment of the present invention in the disintegrated state. This developing vessel comprises a vessel proper 1, a receiving plate 2, an opening tab 3 and a shutter 4. The vessel proper 1 is blow-formed from a single-layer or multi-layer plastic parison, and the vessel proper 1 comprises a closed portion 11 acting as the bottom when the vessel is used as the packaging vessel and acting as the top when the vessel is used as the hopper, a barrel 12 and an inclined portion (frustoconical portion) 13 tapered toward the top end. In this embodiment, a short cylindrical neck 14 is formed on the top end of the inclined portion 13, and a male screw 15 for connection to the receiving plate 2 is formed on the outer periphery of the neck 14.

The receiving plate 2, for example, is injection-formed from a plastic material, and the receiving plate 2 has a substantially flat surface 21, substantially straight side edges 22a (22b) for fitting and attachment to the developing device, and an opening 23

communicating with the vessel proper 1. The receiving plate 2 has a substantially square or rectangular shape, and it will be understood that the receiving plate 2 has an end 24 for fitting and insertion into the developing device and an opposite end 25. In this embodiment, the receiving plate 2 has a short cylindrical connecting portion 26 on the side opposite to the flat supporting surface 21 and around the opening 23, and a clamping female screw 27 is formed on the inner circumference of the connecting portion 26. By engaging the male screw 15 of the vessel proper 1 with the female screw 27 of the receiving plate 2, the vessel proper 1 and receiving plate 2 are clamped and integrated with each other.

An engagement hole 28 or projection can be formed on the receiving plate 2 for regulating the position of the receiving plate 2 when it is fitted and attached to the developing device. Furthermore, a dismounting grip 29 can be formed.

A single-layer or multi-layer plastic film or a plastic film/aluminum foil laminate is used for the opening tab 3. The opening tab 3 comprises a portion 31 to be bonded to the flat supporting surface 21 of the receiving plate 2 and a free lapel portion 32. As shown in Fig. 2, this film 3 has a width d_1 shorter than the distance d_0 between both the side edges 22a and 22b of the receiving plate 2 for fitting and attachment to the developing device, and as shown in Fig. 3, the film 3 is folded along a folding line 33 in the vicinity of the fitting and inserting end 24 of the receiving plate 2 and a grip portion 34 is protruded outward from the opposite end 25 of the receiving plate 2. At least the surface, confronting to the receiving plate 2, of the opening tab 3 should be composed of a peelably bondable material, especially a heat-sealable material. By the peelable bonding or peelable heat sealing is meant a bonding or heat sealing capable of keeping a sealing state in an ordinary storage state but capable of being peeled by hands, and in general, a bonding or heat sealing having a seal strength (peel strength) of 100 to 1500 g/1.5 cm of the width is meant. For example, it is impossible to attain a peelable bonding between polyethylene sheets or between polypropylene sheets but if a sealing layer of a blend comprising polyethylene (polypropylene) and a small amount of other resin such as polypropylene (polyethylene) or a rubber is used, it is possible to provide a peelable heat sealing.

Fig. 4 shows the sectional structure of an example of the opening tab preferably used in the present invention. A peelable heat-sealing layer 36 composed of a blend as mentioned above is formed on one surface of a base film 35.

The shutter 4 comprises a plate 42 having an engagement part 41 to be detachably engaged with both the side edges of the receiving plate. In the present embodiment, the engagement part 41 comprises a concave groove 43 slidably engaged with the side edges 22a (22b) of the receiving plate. As shown in Fig. 5, assembling of the developer vessel is completed by engaging the shutter 4 with the receiving plate 2 having the opening tab 3 peelably bonded thereto. Incidentally, the grip portion 34 is secured to the barrel 12 by bonding.

Referring to Figs. 6-(a) and 6-(b) showing a main portion of the developing device to which the developer vessel of the present invention is attached, a developer supply zone 5 comprises, in general, a fitting portion 51 capable of fitting and attaching both the fitting ends of the receiving plate 2 of the developer vessel thereto and supporting them thereon, a developer-receiving portion 52 for receiving the developer from the opening 23 of the developer vessel and a developer-delivering mechanism 53 for feeding the developer in the developer-receiving portion 52 to a known magnetic brush roller or stirring roller (not shown). The fitting portion 51 comprises an upper frame 54 and a lower frame 55, which are spaced from each other by a certain distance. A sealing member 56 for effecting sealing to the receiving plate 2, which is composed, for example, of a polyurethane foam layer, is formed on the lower frame 55. The developer-delivering mechanism 53 can be a spiral conveyor driven by a motor 57, and in order to assuredly discharge the developer from the developer vessel as the hopper, a hammer 59 intermittently driven by the motor 57 through a cam mechanism 58 can be disposed in the developer-delivering mechanism 53. A positioning engagement projection 60 to be engaged with the engagement hole 28 of the receiving plate is arranged in front of the developer supply zone 5.

When the developer vessel is attached to the developing device of the copying machine and used as the hopper, at first, the shutter 4 is dismounted from the receiving plate 2, and then, as shown in Fig. 7, the developer vessel is fitted and inserted between the upper frame 54 and the sealing member 56 of the lower frame 55 of the developer supply zone 5 in such a manner that the receiving plate 2 is located below and the fitting end 24 of the receiving plate 2 is located ahead. At the time of insertion of the receiving plate, the fitting and attaching side edges 22a (22b) of the receiving plate 2 slide between the upper frame 54 and the sealing member 56 of the lower frame 55 to effect fitting and insertion, and the positioning engagement projection 60 is engaged with the engagement hole 28 of the receiving plate 2, whereby the receiving plate 2 is attached to the developer supply zone 5 in the correctly positioned state. As shown in Fig. 8-(a), in this positioned state, the opening tab film 3 is kept sealed to the supporting surface 21 of the receiving plate 2, but the grip portion 34 of the opening tab 3 protrudes outward (front side) from the sealing member 56 of the lower frame 55.

At the time of opening, as shown in Fig. 8-(b), the grip portion 34 of the opening tab 3 is gripped by the

fingers and pulled toward an operator. By this pulling, the lapel portion 32 of the opening tab 3 is allowed to slide between the supporting surface 21 and the sealing member 56 toward the operator and the sealed portion 31 of the opening tab 3 is gradually peeled from the fitting end 24 toward the opposite end 25 to effect opening of the opening 23. At this time, the sealing member 56 allows peeling of the opening tab 3 but always presses the opening tab 3 by an elastic pressure to prevent scattering of the developer powder 61. Thus, the developer powder 61 is discharged to the developer-receiving portion 52 through the opening 23 and is fed to the developing mechanism through the developer-delivering mechanism 53. The receiving plate 2 of the developer vessel is intermittently hit by the hammer 59 to give vibrations to the receiving plate 2, whereby discharge of the developer 61 can be performed smoothly so far as the developer is present in the vessel.

When the developer is consumed, the grip portion 29 of the receiving plate 2 is gripped, lifted up slightly and pulled toward the operator, whereby the engagement between the positioning engagement projection 60 of the developer supply zone 5 and the engagement hole 28 of the receiving plate 2 is released and the fitting side edges 22a (22b) of the receiving plate 2 are slid between the upper frame 54 and the sealing member 56 of the lower frame 55 to detach the entire developer vessel from the developing device. If the shutter 4 is engaged with the fitting side edges 22a (22b) of the receiving plate 2 through the concave groove 43 of the engagement portion 41 and the vessel is taken out in such manner that the receiving plate 2 gradually overlaps the shutter 4, as shown in Fig. 9, scattering of a very slight amount of the developer powder left adhering to the developer vessel can be completely prevented.

Various modifications can be made to the above-mentioned vessel of the present invention without departing from the spirit set forth in the appended claims.

For example, if the vessel proper 1 is prepared by blow forming and the receiving plate 2 is prepared by injection forming and both the members are assembled, as shown in Figs. 1 through 9, there can be attained various advantages. Namely, the vessel proper can be manufactured at a relatively low cost and the amount used of the resin can be reduced. Furthermore, if a plurality of kinds of the vessel proper are prepared for one kind of the receiving plate, various combinations coping with a variety of copying machines and a variety of amounts filled of the developer can be provided.

In order to prevent scattering of the developer powder at the time of detachment of the developer vessel, it is preferred that the shutter 4 should have a structure as shown in Fig. 1. However, it must be understood that in order to protect the opening tab 3 attached to the receiving plate 2, the shutter 4 can preferably have an engagement part to be fitted to the periphery of the receiving plate.

Referring to Figs. 10, 11 and 12 illustrating still another embodiment of the developer vessel of the present invention, the vessel proper 1 has a tapered short cylindrical neck 14A on the top end of the inclined portion 13, and a plurality of projections 63 extending outward of the radius is formed on the outer periphery of the neck 14A (see Fig. 10). A sealing O-ring 64 is arranged on the outer periphery of the tapered neck 14A.

The receiving plate 2 has a connecting part 26 having a shape corresponding to the outer periphery of the neck 14A of the vessel proper 1 on the side opposite to the flat supporting surface 21, and an engagement part (shoulder) 65 to be engaged with the above-mentioned projections 63 is formed on the top end (minimum diameter portion) of this connecting part 26. By pushing the neck 14A of the vessel proper into the connecting part 26, the projections 63 are engaged with the engagement part 65, whereby the vessel proper 1 and the receiving plate 2 are integrated with each other. Moreover, since the O-ring 64 is disposed, the sealing can be attained between the inner circumference of the connecting part 26 and the outer periphery of the neck 14A even if a certain clearance or dimensional error is present between them.

In order to prevent intrusion of moisture into the developer, it is preferred that the vessel proper 1 and receiving plate 2 be composed of a moisture-resistant resin, especially an olefin resin such as polyethylene, polypropylene or an ethylene/propylene copolymer.

The developer vessel of the present invention has double actions. That is, the developer vessel of the present invention is used not only as a packaging vessel for containing the developer in the sealed state but also as a developer hopper attached to the developing device. This developer vessel can be opened after it has been attached to the developing device as the developer hopper, and the developer vessel can be opened and attached without scattering the developer in the environment. Accordingly, prominent advantages can be attained by the present invention.

Claims

1. A developer vessel for containing a developer therein, said developer vessel comprising a vessel proper (1) having a closed top (11), a barrel (12) and a tapered inclined portion (13) continuous to the barrel, recited from the top in the state where the vessel is attached to the developing device, a receiving plate (2), which has a substantially flat supporting surface (21), substantially straight two side edges (22a,b) and an opening (23) communicating with the vessel proper (1), an

fingers and pulled toward an operator. By this pulling, the lapel portion 32 of the opening tab 3 is allowed to slide between the supporting surface 21 and the sealing member 56 toward the operator and the sealed portion 31 of the opening tab 3 is gradually peeled from the fitting end 24 toward the opposite end 25 to effect opening of the opening 23. At this time, the sealing member 56 allows peeling of the opening tab 3 but always presses the opening tab 3 by an elastic pressure to prevent scattering of the developer powder 61. Thus, the developer powder 61 is discharged to the developer-receiving portion 52 through the opening 23 and is fed to the developing mechanism through the developer-delivering mechanism 53. The receiving plate 2 of the developer vessel is intermittently hit by the hammer 59 to give vibrations to the receiving plate 2, whereby discharge of the developer 61 can be performed smoothly so far as the developer is present in the vessel.

When the developer is consumed, the grip portion 29 of the receiving plate 2 is gripped, lifted up slightly and pulled toward the operator, whereby the engagement between the positioning engagement projection 60 of the developer supply zone 5 and the engagement hole 28 of the receiving plate 2 is released and the fitting side edges 22a (22b) of the receiving plate 2 are slid between the upper frame 54 and the sealing member 56 of the lower frame 55 to detach the entire developer vessel from the developing device. If the shutter 4 is engaged with the fitting side edges 22a (22b) of the receiving plate 2 through the concave groove 43 of the engagement portion 41 and the vessel is taken out in such manner that the receiving plate 2 gradually overlaps the shutter 4, as shown in Fig. 9, scattering of a very slight amount of the developer powder left adhering to the developer vessel can be completely prevented.

Various modifications can be made to the above-mentioned vessel of the present invention without departing from the spirit set forth in the appended claims.

For example, if the vessel proper 1 is prepared by blow forming and the receiving plate 2 is prepared by injection forming and both the members are assembled, as shown in Figs. 1 through 9, there can be attained various advantages. Namely, the vessel proper can be manufactured at a relatively low cost and the amount used of the resin can be reduced. Furthermore, if a plurality of kinds of the vessel proper are prepared for one kind of the receiving plate, various combinations coping with a variety of copying machines and a variety of amounts filled of the developer can be provided.

In order to prevent scattering of the developer powder at the time of detachment of the developer vessel, it is preferred that the shutter 4 should have a structure as shown in Fig. 1. However, it must be understood that in order to protect the opening tab 3 attached to the receiving plate 2, the shutter 4 can preferably have an engagement part to be fitted to the periphery of the receiving plate.

Referring to Figs. 10, 11 and 12 illustrating still another embodiment of the developer vessel of the present invention, the vessel proper 1 has a tapered short cylindrical neck 14A on the top end of the inclined portion 13, and a plurality of projections 63 extending outward of the radius is formed on the outer periphery of the neck 14A (see Fig. 10). A sealing O-ring 64 is arranged on the outer periphery of the tapered neck 14A.

The receiving plate 2 has a connecting part 26 having a shape corresponding to the outer periphery of the neck 14A of the vessel proper 1 on the side opposite to the flat supporting surface 21, and an engagement part (shoulder) 65 to be engaged with the above-mentioned projections 63 is formed on the top end (minimum diameter portion) of this connecting part 26. By pushing the neck 14A of the vessel proper into the connecting part 26, the projections 63 are engaged with the engagement part 65, whereby the vessel proper 1 and the receiving plate 2 are integrated with each other. Moreover, since the O-ring 64 is disposed, the sealing can be attained between the inner circumference of the connecting part 26 and the outer periphery of the neck 14A even if a certain clearance or dimensional error is present between them.

In order to prevent intrusion of moisture into the developer, it is preferred that the vessel proper 1 and receiving plate 2 be composed of a moisture-resistant resin, especially an olefin resin such as polyethylene, polypropylene or an ethylene/propylene copolymer.

The developer vessel of the present invention has double actions. That is, the developer vessel of the present invention is used not only as a packaging vessel for containing the developer in the sealed state but also as a developer hopper attached to the developing device. This developer vessel can be opened after it has been attached to the developing device as the developer hopper, and the developer vessel can be opened and attached without scattering the developer in the environment. Accordingly, prominent advantages can be attained by the present invention.

Claims

1. A developer vessel for containing a developer therein, said developer vessel comprising a vessel proper (1) having a closed top (11), a barrel (12) and a tapered inclined portion (13) continuous to the barrel, recited from the top in the state where the vessel is attached to the developing device, a receiving plate (2), which has a substantially flat supporting surface (21), substantially straight two side edges (22a,b) and an opening (23) communicating with the vessel proper (1), an

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opening tab (3) composed of a film (31,32) which covers the opening of the receiving plate (2) and is peelably bonded to the flat supporting surface (21), and a shutter (4) composed of a plate (42) having, on both the sides, engagement portions (43) to be engaged with both the side edges (22a,b) of the receiving plate (2), wherein said film (31,32) has a width smaller than the distance between both the attachment side edges (22a,b) of the receiving plate (2), and said film (31,32) has such a length that the film is folded on the fitting and inserting end of the receiving plate (2) and the lapel (32) of the folded film is protruded from the other end of the receiving plate (2), characterized in that the vessel proper (1) has a short cylindrical neck (14) having a screw (15) formed on the outer periphery thereof on the bottom end of the inclined portion (13) and is integrally blow-formed from a plastic material, that the receiving plate (2) has, on the side opposite to the supporting surface (21) and around the opening (23), a short cylindrical connecting portion (26) having a screw (27) formed on the inner circumference thereof and is integrally injection-formed from a plastic material, in which the screw (15) of the neck (14) and the screw (27) of the connecting portion (26) are engaged with each other to integrate the vessel proper (1) and the receiving plate (2) with each other, and that the developer vessel forms a developer hopper for the developing device of an electrophotographic copying machine.

2. A developer vessel for containing a developer therein, said developer vessel comprising a vessel proper (1) having a closed top (11), a barrel (12) and a tapered inclined portion (13) continuous to the barrel, recited from the top in the state where the vessel is attached to the developing device, a receiving plate (2), which has a substantially flat supporting surface (21), substantially straight two side edges (22a,b) and an opening (23) communicating with the vessel proper (1) an opening tab (3) composed of a film (31,32) which covers the opening of the receiving plate (2) and is peelably bonded to the flat supporting surface (21), and a shutter (4) composed of a plate (42) having, on both the sides, engagement portions (43) to be engaged with both the side edges (22a,b) of the receiving plate, wherein said film (31,32) has a width smaller than the distance between both the attachment side edges (22a,b) of the receiving plate (2) and said film (31,32) has such a length that the film is folded on the fitting and inserting end of the receiving plate (2), and the lapel (32) of the folded film is protruded from the other end of the receiving plate (2), characterized in that the vessel proper (1) has, on the bottom of the inclined portion (13), a short cylindrical neck (14A) having a plurality of projections (63) extending outward of the radius on the outer periphery thereof and is integrally blow-formed from a plastic material, that the receiving plate (2) has, on the side opposite to the supporting surface (21) and around the opening (23), a short cylindrical connecting portion (26) having an engagement part (65) and is integrally injection-formed from a plastic material, in which the projections (63) of the neck (14A) are engaged with the engagement part (65) of the connecting portion (26) to integrate the vessel proper (1) and the receiving plate (2) with each other, and that the developer vessel forms a developer hopper for the developing device of an electrophotographic copying machine.

3. A developer vessel as set forth in claim 2, further characterized in that an O-ring (64) is disposed between the outer surface side of the vessel proper (1) and the inner surface side of the cylindrical connecting portion (26) of the receiving plate (2) to attain sealing between them.

4. A developer vessel as set forth in claim 1 or 2, further characterized in that the shutter (4) has, as an engagement part, a concave groove (43) slidably engaged with both the side edges (22a,b) of the receiving plate (2), and when the developer vessel is dismounted from the developing device, dismounting is effected by sliding the developer vessel in the state where both the side edges (22a,b) are fitted and inserted in the concave groove (43).

Patentansprüche

1. Ein Entwicklerbehälter zur Aufnahme von Entwickler, wobei der Entwicklerbehälter selbst ein Gefäß (1) mit einen geschlossenen oberen Teil (11), einem trommelförmigen Teil (12) und einem sich verjüngend ausgebildeten Teil (13) aufweist, der in den trommelförmigen Teil übergeht, wobei diese Teile in Reihenfolge von oben her in demjenigen Zustand wiedergegeben sind, in dem der Behälter an der Entwicklungseinrichtung befestigt ist, ferner aufweisend eine Aufnahmeplatte (2) mit einer im wesentlichen flach ausgebildeten Stützfläche (21), die zwei im wesentlichen geradlinig ausgerichtete Seitenkanten (22 a, b) und eine Öffnung (23) aufweist, die mit dem eigentlichen Gefäß (1) verbunden ist, einen Öffnungsvorsprung (3), der aus einer Folie oder aus einem Film (31, 32) zusammengesetzt ist, welcher die Öffnung der Aufnahmeplatte (2) abdeckt und abnehmbar an der flachen Stützfläche (21) befestigt ist, und eine Blende (4), die aus einer Platte

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(42) zusammengesetzt ist, die an beiden Seiten Eingriffsabschnitte (43) aufweist, die mit beiden Seiten (22 a, b) der Aufnahmeplatte (2) in Eingriff bringbar sind, wobei der Film (31, 32) eine Breite hat, die kleiner ist als der Abstand zwischen beiden Befestigungsseitenkanten (22 a, b) der Aufnahmeplatte (2) und wobei der Film (31, 32) eine solche Länge hat, daß der Film am Paß- und Einsatzende der Aufnahmeplatte (2) gefaltet ist und der Faltteil (32) des gefalteten Films von dem anderen Ende der Aufnahmeplatte (2)vorsteht, dadurch gekennzeichnet, daß das eigentliche Gefäß (1) einen kurzen zylindrischen Hals (14) mit einem Gewinde (15) an seinem Außenumfang an dem unteren Ende des nach unten sich verjüngenden Teils (13) aufweist und aus einem Kunststoffmaterial einstückig blasgeformt ist, daß die Aufnahmeplatte (2) an der der Stützfläche (21) gegenüberliegenden Seite und um die Öffnung (23) herum einen kurzen zylindrischen Verbindungsteil (26), der mit einem Gewinde an seinem Innenumfang ausgebildet ist, und aus Kunststoffmaterial einstückig gespritzt ist, wobei das Gewinde (15) des Halses (14) und das Gewinde (27) des Verbindungsteils (26) miteinander in Eingriff sind, um das Gefäß (1) mit der Aufnahmeplatte zu integrieren, und daß der Entwicklungsbehälter eine Entwicklerrutsche für die Entwicklungseinrichtung einer elektrophotographischen Kopiermaschine bildet.

2. Ein Entwicklerbehälter zur Aufnahme von Entwickler, wobei der Entwicklerbehälter selbst ein Gefäß (1) mit einem geschlossenen oberen Teil (11), einem trommelförmigen Teil (12) und einem sich verjüngend ausgebildeten Teil (13) aufweist, der in den trommelförmigen Teil übergeht, wobei diese Teile in Reihenfolge von oben her in demjenigen Zustand wiedergegeben sind, in dem der Behälter an der Entwicklungseinrichtung befestigt ist, ferner aufweisend eine Aufnahmeplatte (2) mit einer im wesentlichen flach ausgebildeten Stützfläche (21), die zwei im wesentlichen geradlinig ausgerichtete Seitenkanten (22 a, b) und eine Öffnung (23) aufweist, die mit dem eigentlichen Gefäß (1) verbunden ist, einen Öffnungsvorsprung (3), der aus einer Folie oder aus einem Film (31, 32) zusammengesetzt ist, welcher die Öffnung der Aufnahmeplatte (2) abdeckt und abnehmbar an der flachen Stützfläche (21) befestigt ist, und eine Blende (4), die aus einer Platte (42) zusammengesetzt ist, die an beiden Seiten Eingriffsabschnitte (43) aufweist, die mit beiden Seiten (22 a, b) der Aufnahmeplatte (2) in Eingriff bringbar sind, wobei der Film (31, 32) eine Breite hat, die kleiner ist als der Abstand zwischen beiden Befestigungsseitenkanten (22 a, b) der Aufnahmeplatte (2) und wobei der Film (31, 32) eine solche Länge hat, daß der Film am Paß- und Einsatzende der Aufnahmeplatte (2) gefaltet ist und der Faltteil (32) des gefalteten Films von dem anderen Ende der Aufnahmeplatte (2) vorsteht, dadurch gekennzeichnet, daß das eigentliche Gefäß (1) an dem Bodenende des sich verjüngenden Teils (13) einen kurzen zylindrischen Hals (14 A) mit einer Mehrzahl von Vorsprüngen (63) aufweist, die sich von dem Radius seines äußeren Umfanges nach außen erstrecken und aus Kunststoffmaterial einstückig blasgeformt sind, daß die Aufnahmeplatte (2) an der Seite, die der Stützfläche (21) gegenüberliegt und die Öffnung (23) umgibt einen kurzen zylindrischen Verbindungsteil (26) aufweist, der einen Eingriffsteil (65) aufweist und aus Kunststoffmaterial einstückig gespritzt ist, wobei die Vorsprünge (63) des Halses (14A) mit dem Eingriffsteil (65) des Verbindungsteils (26) im Eingriff angeordnet sind, um das Entwicklergefäß (1) und die Aufnahmeplatte (2) miteinander zu integrieren, und daß das Entwicklergefäß eine Entwicklerrutsche für die Entwicklungseinrichtung einer elektrophotographischen Kopiervorrichtung bildet.

3. Ein Entwicklerbehälter nach Anspruch 2, weiterhin dadurch gekennzeichnet, daß ein O-Ring (24) zwischen der äußeren Oberfläche des eigentlichen Entwicklergefäßes (1) und der inneren Oberfläche des zylindrischen Verbindungsteils (26) der Aufnahmeplatte (2) angeordnet ist, um zwischen diesen Teilen eine Dichtung zu bewerkstelligen.

4. Ein Entwicklerbehälter nach einem der Ansprüche 1 oder 2, weiterhin dadurch gekennzeichnet, daß die Blende (4) als ein Eingriffsteil eine konkave Nut (43) aufweist, die mit beiden Seitenkanten (22a, b) der Aufnahmeplatte (2) verschiebbar in Eingriff angeordnet ist, und wenn der Entwicklerbehälter von der Entwicklungseinrichtung entfernt worden ist, die Abnahme durch Verschieben des Entwicklerbehälters in denjenigem Zustand bewerkstelligt wird, in dem beide Seitenkanten (22 a, b) angepaßt und in die konkave Nut (43) eingesetzt sind.

Revendications

1. Récipient à révélateur comprenant un récipient proprement dit (1) ayant, à partir du haut lorsque le récipient est fixé au dispositif de développement, un haut fermé (11), un fût (12) et une partie conique inclinée (13) faisant suite à celui-ci, une plaque réceptrice (2) ayant une surface de support sensiblement plane (21), deux bords latéraux sensiblement droits (22a,22b) et une ouver-

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ture (23) communiquant avec le récipient proprement dit (1), une patte d'ouverture (3) constituée d'un film (31,32) qui couvre l'ouverture de la plaque réceptrice (2) et est attachée, de façon à pouvoir être arraché, à la surface de support plane (21), et un volet (4) constitué d'une plaque (42) ayant sur ses deux côtés des parties de mise en prise (43) destinées à être mises en prise avec les deux bords latéraux (22a,22b) de la plaque réceptrice (2), le film (31,32) ayant une largeur inférieure à la distance entre les deux bords latéraux de fixation (22a,22b) de la plaque réceptrice (2) et une longueur telle qu'il soit plié sur l'extrémité d'ajustement et d'introduction de la plaque réceptrice (2) et que le revers (32) du film plié fasse saillie de l'autre extrémité de cette plaque réceptrice (2), caractérisé par le fait que le récipient proprement dit (1) a un col cylindrique court (14) ayant un filetage (15) sur son pourtour extérieur à l'extrémité inférieure de la partie inclinée (13) et est fabriqué d'une seule pièce, par moulage par soufflage, en matière plastique, que la plaque réceptrice (2) a, sur sa face opposée à la surface de support (21) et autour de l'ouverture (23), une courte partie cylindrique de jonction (26) ayant un filetage (27) sur sa circonférence intérieure et est fabriquée d'une seule pièce par moulage par injection en matière plastique, le récipient proprement dit (1) et la plaque réceptrice (2) étant assemblés par mise en prise mutuelle du filetage (15) du col (14) et du filetage (27) de la partie de jonction (26), et que le récipient à révélateur forme une trémie à révélateur pour le dispositif de développement d'une copieuse électrophotographique.

2. Récipient à révélateur comprenant un récipient proprement dit (1) ayant, à partir du haut lorsque le récipient est fixé au dispositif de développement, un haut fermé (11), un fût (12) et une partie conique inclinée (13) faisant suite à celui-ci, une plaque réceptrice (2) ayant une surface de support sensiblement plane (21), deux bords latéraux sensiblement droits (22a,22b) et une ouverture (23) communiquant avec le récipient proprement dit (1), une patte d'ouverture (3) constituée d'un film (31,32) qui couvre l'ouverture de la plaque réceptrice (2) et est attachée de façon à être pouvoir arraché à la surface de support plane (21), et un volet (4) constitué d'une plaque (42) ayant sur ses deux côtés des parties de mise en prise (43) destinées à être mises en prise avec les deux bords latéraux (22a,22b) de la plaque réceptrice (2), le film (31,32) ayant une largeur inférieure à la distance entre les deux bords latéraux de fixation (22a,22b) de la plaque réceptrice (2) et une longueur telle qu'il soit plié sur l'extrémité d'ajustement et d'introduction de la plaque réceptrice (2) et que le revers (32) du film plié fasse saillie de l'autre extrémité de cette plaque réceptrice (2), caractérisé par le fait que le récipient proprement dit (1) a, en bas de la partie inclinée (13), un court col conique (14A) ayant sur son pourtour extérieur une série de saillies (63) s'étendant à l'extérieur du rayon et est fabriqué d'une seule pièce par moulage par soufflage en matière plastique, que la plaque réceptrice (2) a, sur sa face opposée à la surface de support (21) et autour de l'ouverture (23), une courte partie conique de jonction (26) ayant une partie de mise en prise (65) et est fabriquée d'une seule pièce par moulage par injection en matière plastique, le récipient proprement dit (1) et la plaque réceptrice (2) étant assemblés par mise en prise des saillies (63) du col (14A) avec la partie de mise en prise (65) de la partie de jonction (26), et que le récipient à révélateur forme une trémie à révélateur pour le dispositif de développement d'une copieuse électrophotographique.

3. Récipient à révélateur selon la revendication 2, caractérisé en outre par le fait qu'un joint torique (64) est placé entre la face extérieure du récipient proprement dit (1) et la face intérieure de la partie conique de jonction (26) de la partie réceptrice (2) pour assurer l'étanchéité entre les deux.

4. Récipient à révélateur selon l'une des revendications 1 et 2, caractérisé en outre par le fait que le volet (4) a, comme partie de mise en prise, une gorge (43) en prise avec possibilité de coulissement avec les deux bords latéraux (22a,22b) de la plaque réceptrice (2), et qu'on démonte le récipient à révélateur du dispositif de développement en le faisant coulisser dans l'état où les deux bords latéraux (22a,22b) sont ajustés et introduits dans la gorge (43).

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