

## [54] DISPOSABLE DISPENSER

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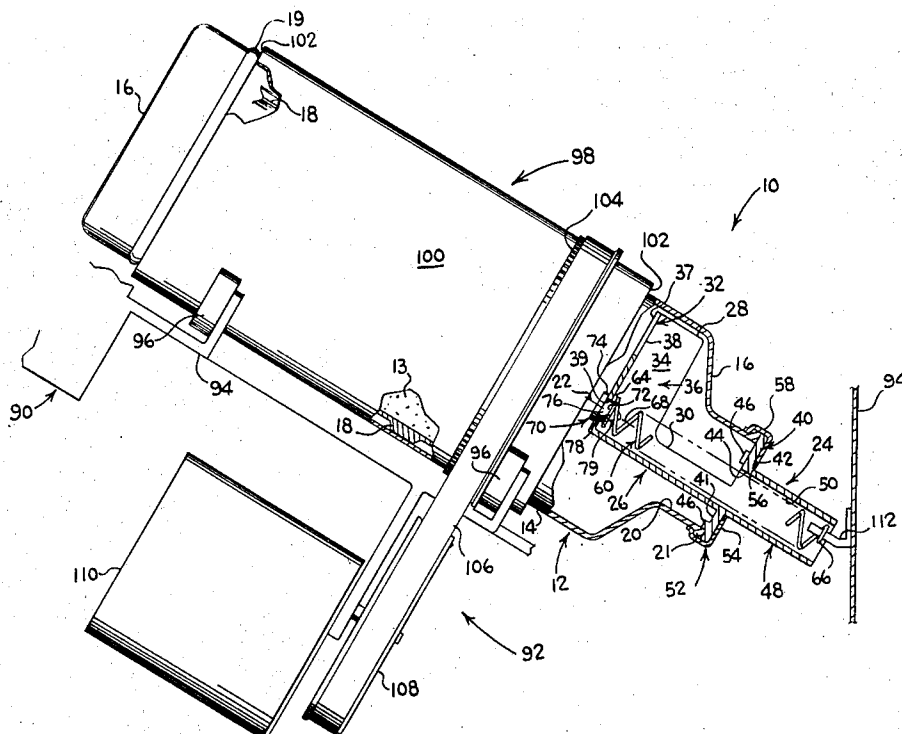
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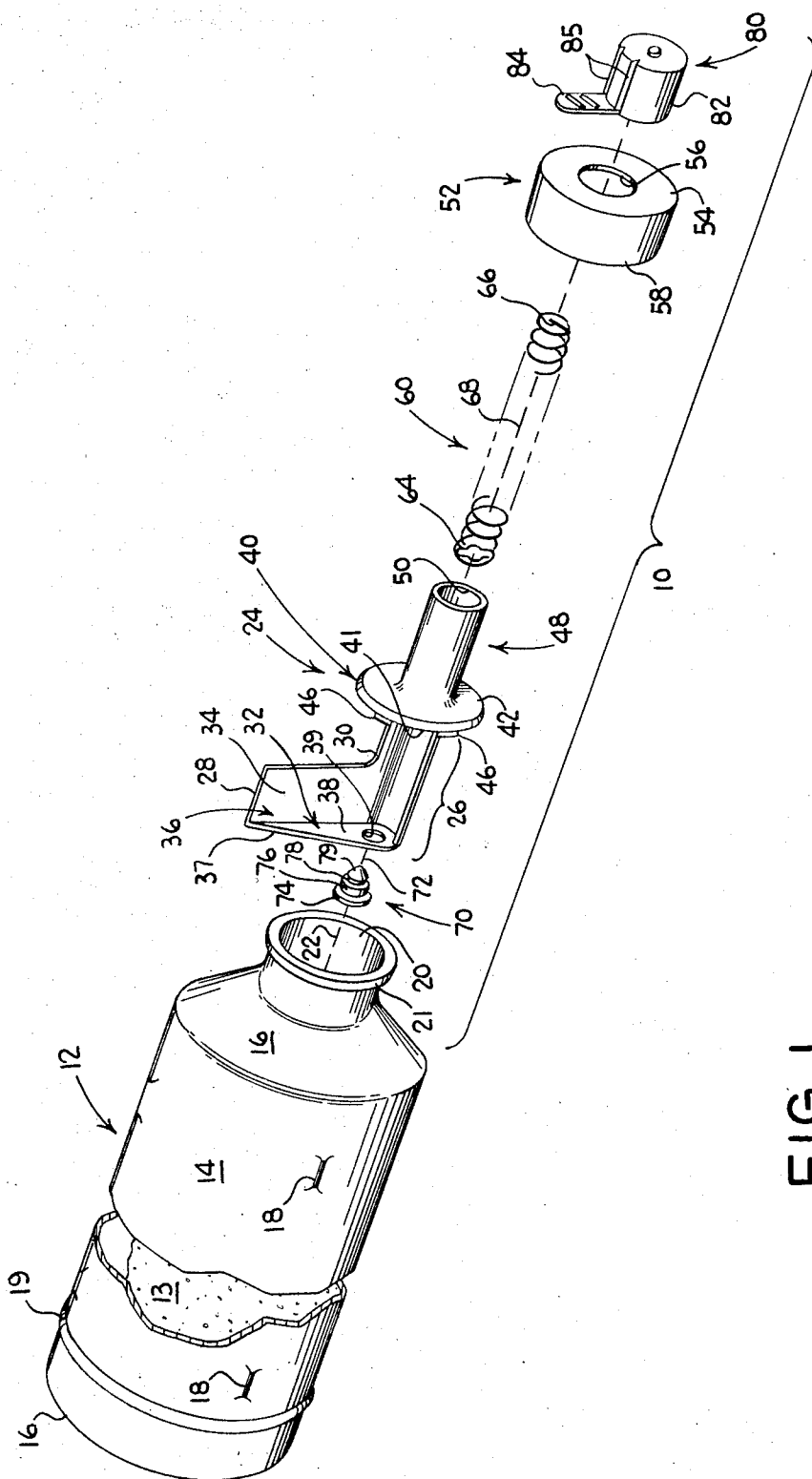
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## ABSTRACT

A disposable non-refillable dispenser for carrying a replenishing supply of developer material for use in an electrostatic copier of the type which has dispenser actuating apparatus for angularly disposing and rotating the dispenser to discharge the supply from the dispenser. The dispenser includes an elongated receptacle adapted for angular disposition and rotation. To assist the gravity flow of developer material from the dispenser the dispenser includes a transporting member and a metering member. The transporting member directs the flow of developer material substantially axially of the dispenser, and the metering member meters the flow and discharge of the developer material. To discourage disassembly of the dispenser for refilling purposes, the transporting member is fixedly secured to the receptacle for rotation with the receptacle, and the metering member is interlocked to the transporting member utilizing a button-like member which allows for rotation of the transporting member about the metering member.

7 Claims, 2 Drawing Figures







## DISPOSABLE DISPENSER

## BACKGROUND OF THE INVENTION

Electrostatic copying machines, of the type which use dry developers in processes for developing electrostatic latent images, are typically provided with a supply of developer which includes a toner material and a carrier material. In the course of each operating cycle of the machine, a developable image is contacted by the developer so as to cause some of the toner material to be transferred from carrier material to the image for rendering the image visible. To prevent the developer from becoming gradually useless due to wear and tear of the carrier material content and continuous dissipation of the toner material content, the supply of developer is rejuvenated from time-to-time by adding toner material or both toner and carrier material to the developer. For the sake of simplicity the added materials will hereinafter be referred to as developer material.

To add developer material to the developer in the copying machine, the machine is provided with a refillable dispenser adapted to hold a replenishing supply of developer material. Despite the fact that consumers utilizing a particular copying machine are normally repeatedly informed that they should only use a developer material which has the same or equivalent characteristics as that of the developer material recommended by the manufacturer of the machine, many consumer's haphazardly refill their replenishing dispensers with a different developer material. When used in their particular machine, the different developer material often fails to produce well-developed images, contaminates the developer already in the machine and/or damages various components of the machine. Further, since the toner material is a finely divided black substance which easily adheres to one's fingers and clothes, and the refillable dispensers are generally refilled with developer material by inexperienced personnel, the refilling activity can become a rather messy chore if the person engaged in doing so fails to exercise sufficient care to avoid spillage of the developer material.

Accordingly, an object of the present invention is to provide an improved dispenser for developer material.

Another object is to provide a disposable, non-refillable, dispenser for carrying a replenishing supply of developer material for use in a copying machine.

Yet another object is to provide a non-refillable dispenser for developer material, including means for preventing disassembly of the dispenser for refilling purposes.

## SUMMARY OF THE INVENTION

The disposable dispenser according to the invention is adapted to carry a replenishing supply of developer material for use in a copying machine. The dispenser includes an elongated receptacle adapted for angular disposition and rotation to permit developer material within the receptacle to flow under the influence of gravity from the dispenser. The dispenser also includes gravity flow assisting means, including a transporting member rotatable with the receptacle for carrying developer material longitudinally of the rotating dispenser, and a stationary member for metering the longitudinal flow of developer material for gradual dis-

charge from the dispenser. To discourage disassembly of the dispenser for refilling purposes, the dispenser includes structure for fixedly securing the transporting member to the receptacle, and means for interlocking the metering member to the transporting member while permitting relative rotation between them.

## BRIEF DESCRIPTION OF THE DRAWINGS

As shown in the drawings, wherein like reference numerals designate like or corresponding parts throughout the several figures:

FIG. 1 is a fragmentary, exploded perspective view of a disposable, non-refillable dispenser, adapted to carry a replenishing supply of developer material; including means for preventing disassembly of the dispenser for refilling purposes; and

FIG. 2 is an enlarged, fragmentary elevational view of the dispenser of FIG. 1, disposed in a copying machine including means for automatically actuating the dispenser to discharge developer material from the dispenser.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIG. 1 a disposable dispenser 10, according to the invention, includes an elongated receptacle 12 made of a suitable material for carrying a replenishing supply of developer material 13. The receptacle 12 has a substantially cylindrically shaped longitudinally extending sidewall 14 and opposed end walls 16. The sidewall 14 has a plurality of rectangularly shaped ridges 18 and a circumferentially extending rim 19 formed therein. One of the end walls 16 has an outlet orifice 20, including a circularly shaped lip 21, formed therein. The receptacle 12 has a longitudinal axis 22, extending centrally through the outlet orifice 20. The ridges 18 radially extend outwardly from sidewall 14, and are located at suitably longitudinally and circumferentially spaced intervals in the sidewall 14 to facilitate gripping the receptacle 12 for angular disposition and rotation (FIG. 2) about axis 22. With the receptacle 12 thus disposed and rotating, the developer material 13 (FIG. 1) tends to flow under the influence of gravity to the outlet orifice 20.

The dispenser 10 also includes an elongated developer material transporting member 24 extending through the receptacle outlet orifice 20 (FIG. 2). The transporting member 24 (FIG. 1) is made of a suitable molded plastic material and includes a generally L-shaped scoop portion 26 located inside the receptacle 12 (FIG. 2). The scoop portion 26 (FIG. 1) has a pair of legs, designated 28 and 30. Leg 28 extends transverse to the longitudinal axis 22 of the receptacle 12 and includes a triangularly shaped wall 32 merging with a rectangularly shaped wall 34. The wall 32 and 34 form a cavity 36 within which developer material 13 may be easily carried. Wall 32 has an outer surface 37 and an inner surface 38. In addition, wall 32 has a circularly shaped aperture 39 formed therein, near the intersection between legs 28 and 30. Leg 30 extends parallel to the longitudinal axis 22 of the receptacle 12 and is semi-circularly shaped in transverse cross-section. Leg 30 acts as a trough for directing the gravity flow of developer material 13 longitudinally of the leg 30 and thus substantially axially of the receptacle 12 (FIG. 2) to the outlet orifice 20.

The transporting member 24 (FIG. 1) also includes a collar portion 40 located at the outlet orifice 20 (FIG. 2). The collar portion 40 (FIG. 1) is an annularly shaped flange integrally formed with the remainder of the transporting member 24. The collar portion 40 has an inner surface 41, an outer surface 42, a centrally disposed opening 44 (FIG. 2) and a plurality of equidistantly arcuately spaced projections 46. The opening 44 is located in developer-material flow communication with the trough-like leg 30 of the scoop portion 26, to promote the gravity flow of developer material 13 substantially centrally through the collar opening 44 and thus substantially axially through the receptacle outlet orifice 20. The projections 46 extend inwardly of the receptacle outlet orifice 20 and are equidistantly radially spaced from the rotational axis 22 of the receptacle 12. The projections 46 locate the collar portion 40 at the receptacle outlet orifice 20 with the center of the collar opening 44 disposed substantially coincident with the rotational axis 22 of the receptacle 12. As thus disposed, the collar portion 40 locates leg 30 of the scoop portion 26 parallel to axis 22. And, in doing so, locates the center of aperture 39 of leg 28 substantially coincident with axis 22.

In addition, the transporting member 24 (FIG. 1) includes an elongated spout portion 48 located outside of the receptacle 12 (FIG. 2). The spout portion 48 is a cylindrically shaped conduit integrally formed with the remainder of the transporting member 24, which defines a passageway 50 in developer-material flow communication with the collar opening 44. The passageway 50 (FIG. 1) thus receives developer material 13 passing through the receptacle outlet orifice 20 for discharge from the dispenser 10.

To fixedly secure the transporting member 24 (FIG. 1) to the receptacle 12 for rotation with the receptacle 12, in a manner which prevents disassembly of the dispenser 10 for refilling purposes, the dispenser 10 includes an annularly shaped receptacle cap 52. The cap 52 has an annular wall 54 including a central aperture 56, and has a skirt wall 58 extending from the annular wall 54. The cap 52 (FIG. 2) is disposed in abutment with the outer surface 42 of the collar portion 40, with the spout portion 48 extending through the cap aperture 56, and with the skirt wall 58 disposed to cover the receptacle outlet orifice 20. As thus disposed, the skirt wall 58 is fixedly secured to the receptacle 12 at the receptacle orifice 20 by crimping the skirt wall 58 into partially surrounding contact with the receptacle lip 21. Crimping the cap 52 in place tends to jam the inner surface 41 of the collar portion 40 against the lip 21 and rigidly join both the transporting member 24 and the cap 52 to the receptacle 12 for rotation therewith.

To meter the flow of developer material 13 (FIG. 1) longitudinally of the dispenser 10 for discharge therefrom, the dispenser 10 includes an elongated metering member 60. Member 60 (FIG. 2) extends lengthwise of the trough-like leg 30, through the collar portion opening 44 and at least partially through the spout portion passageway 50. The metering member 60 also extends substantially axially through the receptacle outlet orifice 20. Preferably, the metering member 60 is made of a suitable plastic or metal material of circular cross-section, such as a length of plastic or a metal wire. Accordingly, in a preferred form, member 60 is a longitudinally extending, circularly helically wound wire body

having opposed ends, designated 64 and 66, and a longitudinal axis 68. The ends 64 and 66 (FIG. 1) respectively include transversely extending portions of the wire body. End portion 64 is shaped to form a partial loop surrounding the longitudinal axis 68; whereas end portion 66 is shaped to extend substantially through axis 68.

To interlock the metering member 60 (FIG. 1) to the transporting member 24 with provision for rotation of the transporting member 24 about the metering member 60, the dispenser 10 includes a button-like member 70. Member 70 is preferably made of a suitable molded plastic material and is a generally conically shaped member having a longitudinally extending axis 72. The member 70 includes a circularly shaped flange portion 74, a circularly shaped bearing portion 76, a circumferentially extending channel portion 78 and a conically shaped head portion 79. Member 70 (FIG. 2) longitudinally extends through the scoop portion aperture 39, with the flange portion 74 bearing against the outer surface 37 of wall 32 and with the bearing portion 76 slidably engaging aperture 39, to facilitate rotation between the member 70 and scoop portion 26. The channel and flange portions 78 and 74 extend into the scoop portion cavity 36, where the loop end portion 64 of the metering member 60 is forced over the head portion 79 and into the channel portion 78. Since the head portion 79 of the button-like member 70 obstructs subsequent removal of the loop end portion 64 from the channel portion 78, the button-like member 70 effectively interlocks the metering member 60 to the scoop portion 26 so as to prevent longitudinal displacement of the metering member 60 relative to the transporting member 24. Thus removal of the metering member 60 for refilling the receptacle 12 through the spout portion 48 of the dispenser 10 is effectively discouraged. The loop end portion 64 (FIG. 1) of the metering member 60 and the channel portion 78 of the button-like member 70 are preferably relatively dimensioned such that the loop end portion 64 resiliently grasps the button-like member 70 and is rotatable within the channel portion 78. This arrangement ensures providing for relative rotational movement between the metering member 60 (FIG. 2) and transporting member 24 in the event that the button-like member 70 does not remain stationary within the rotating scoop leg aperture 39.

To prevent spillage of developer material 13 (FIG. 1) from the dispenser 10 during shipment and handling, the dispenser 10 includes a disposable cap 80. The cap 80 is made of a suitable plastic material, and includes a cup portion 82 and a tab portion 84. The cup portion 82 is dimensioned for frictional engagement with the spout portion 48 of the transporting member 24 to permit the cap 80 to be removably attached to the spout portion 48. As thus attached, the tab portion 84 extends transverse to the spout portion 48. To facilitate manual removal of the cap 80 prior to discharging developer material 13 from the dispenser 10, the cup portion 82 includes a pair of parallel, longitudinally extending, tab-tearable grooves 85.

As shown in FIG. 2, the dispenser 10 is normally used in an electrostatic copier machine 90 of the type which includes suitable automatically operable dispenser actuating means 92. The machine 90 includes suitable framework 94 for supporting the actuating means 92. The actuating means 92 includes a plurality of rollers 96 and a canister 98. The canister 98 has a cylindrically

shaped wall 100 and an opposed open ends 102 suitably dimensioned to receive the dispenser receptacle 12 in a manner such that the receptacle rim 19 bears against one of the ends 102 of the canister wall 100 and the receptacle ridges 18 are disposed in frictional engagement with the canister wall 100. The dispenser 10 is thus frictionally gripped by the canister 88 for holding the dispenser 10 in place within the canister 88. The rollers 96 are mounted on the framework 94 for angularly disposing and rollably supporting the canister 98. In addition, the actuating means 92 includes an annularly shaped driven member 104, which encircles and engages the canister 98 for rotation of the canister 98. And, to drive member 104, the actuating means 92 includes a driven belt 106 looped around and disposed in driving engagement with member 104, a belt driving member 108 disposed in driving engagement with belt 106, and a motor 110 engaging the driving member 108. The motor 110 is suitably operable in response to well-known means for rotating the angularly disposed canister 98. Still further, the actuating means 92 includes a suitably dimensioned finger member 112 extending from the framework 94 and into the dispenser spout portion 48 for engaging the holding the end portion 66 of the metering member 60 against rotation.

Having disposed of the cap 80 (FIG. 1), the dispenser 10 may be mounted within the canister 98 (FIG. 2). Assuming the actuating means motor 110 is operating, the rotating canister 98 transmits rotational movement to the container receptacle 12 via the receptacle ridges 18. The receptacle 12, in turn, transmits the rotational movement to the transporting member 24 via the receptacle cap 52 and the collar portion 40 of member 24. At the same time, the actuating means finger member 112 engages and holds the end portion 66 of the metering member 60 within the spout portion 48, to hold the metering member 60 in place against rotation. As the transporting member 24 rotates, the loop end portion 64 of the metering member 60 holds the button-like member 70 against rotation within the scoop leg aperture 39 of the transporting member 24, and/or the button-like member 70 is rotated by the transporting member 24 within the loop end portion 64 of the metering member 60. In either event, the transporting member 24 may be easily rotated about the metering member 60 by the receptacle 12. Of course, the rotational axis 22 of the receptacle 12 is coincident with axis 68 of the metering member 60 and is coincident with the axis of rotation of the transporting member 24. As the receptacle 12 and transporting member 24 rotate, developer material 113 falls under the influence of gravity into the scoop portion leg cavity 36 and into the trough-like leg 30 of the transporting member 24; for gravity flow longitudinally of the receptacle 12, to and through the collar portion opening 44, and thus substantially axially through the receptacle outlet orifice 20; and then through the spout portion passageway 50 for discharge from the dispenser 10. At the same time the metering member 60 hinders the longitudinal flow of developer material 13 within the trough-like leg 30 and spout portion passageway 50, so as to provide for a gradual discharge of developer material 13 from the dispenser 10.

In accordance with the objects of the invention there has been described an improved dispenser for a replenishing supply of developer material, for use in a copying machine; the improved dispenser being a disposable,

non-refillable device which includes means for preventing disassembly of the same for refilling purposes.

Inasmuch as certain changes may be made in the above described invention without departing from the spirit and scope of the same, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted in an illustrative rather than limiting sense. And, it is intended that the following claims be interpreted to cover all the generic and specific features of the invention herein described.

What is claimed is:

1. A disposable dispenser adapted to carry a replenishing supply of developer material in a copier having means for actuating the dispenser to discharge developer material from the dispenser, said dispenser comprising:

- a. a receptacle having an axis of rotation and an outlet orifice; means adapting the receptacle for cooperation with the actuating means for angular disposition of the receptacle and for rotation of the receptacle about said axis to permit the developer material to flow under the influence of gravity to the outlet orifice;
- b. means for assisting the flow of developer material to and through the outlet orifice for discharge from the dispenser, said flow assisting means including a transporting member and a metering member, said transporting and metering members respectively being elongated members extending through the outlet orifice;
- c. means for fixedly securing the transporting member to the receptacle for rotation therewith, the metering member adapted to be held stationary against rotation thereof by the actuating means as the actuating means rotates the receptacle; and
- d. means for interlocking the metering member to the transporting member to permit relative rotation therebetween, said interlocking means including a button-like member having a flange portion and a channel portion, the flange portion engaging the transporting member, and the channel portion engaging the stationary metering member to maintain the flange portion in engagement with the rotating transporting member.

2. The dispenser according to claim 1, wherein said transporting member includes an L-shaped portion disposed inside of the receptacle, said L-shaped portion having one leg extending parallel and the other leg transverse to the axis of rotation of the receptacle, the transversely extending leg including an aperture adapted to receive the button-like member, the flange portion of the button-like member slidably engaging the transverse leg, the button-like member extending partially through the aperture, and the channel portion engaging one end of the metering member to interlock said stationary metering member to said rotating transporting member such that the metering member holds the button-like member stationary.

3. The dispenser according to claim 1, wherein the transporting member has a longitudinally extending axis of rotation, and includes a collar portion, the collar portion including a plurality of projections extending into the receptacle outlet orifice for locating the collar portion at the outlet orifice and disposing the axis of rotation of the transporting member in coincidence with the axis of rotation of the receptacle, and said means

for fixedly securing the transporting member to the receptacle includes a cap fixedly securing the collar portion of the transporting member to the receptacle outlet orifice.

4. The dispenser according to claim 3, wherein the receptacle outlet orifice includes a circularly shaped lip, the transporting member including a spout portion extending from the collar portion of the transporting member, said cap including an annularly shaped wall and a skirt wall, the annularly shaped wall having a centrally disposed opening through which the spout portion of the transporting member extends outside of the receptacle for discharging developer material from the dispenser, and the skirt wall of the cap fixedly secured to the outlet orifice as to partially surround the outlet orifice lip.

5. The dispenser according to claim 1, wherein said metering member comprises a longitudinally helically wound wire body, the respective ends of said metering member including transversely extending portions of the wire body, and one end of the metering member including a loop disposed within the channel portion of the button-like member so as to grasp said button-like

member to prevent longitudinal movement of said stationary metering member relative to said rotating transporting member.

6. The dispenser according to claim 5, wherein the channel portion of the button-like member and said one end loop of the metering member are relatively dimensioned to permit the button-like member to be rotated by the transporting member relative to the stationary metering member to facilitate rotation of the transporting member about the metering member.

7. The dispenser according to claim 1, wherein said transporting member includes a spout portion disposed outside of the receptacle, and said dispenser includes a disposable cap removably attached to the spout portion for normally preventing discharge of developer material from the dispenser during handling and shipment; said attached cap including a tab extending transverse to the spout portion of the container, and said cap including tab-tearable means to facilitate manual removal of the cap from the spout portion prior to discharging developer material from said dispenser.

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