

[54] **OPENABLE CARTRIDGE FOR FACILITATING EGRESS AND INGRESS OF STRIP MATERIAL**

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[51] Int. Cl.B65d 85/67, B65h 75/02

[58] Field of Search.....206/52, 52 F, 46 FM, 59 E, 206/59 C, 58; 242/71.1, 98; 95/31; 96/78

[56] **References Cited**

UNITED STATES PATENTS

1,322,180	11/1919	Crowell	206/52
2,502,417	4/1950	Byrd.....	206/59 C
2,552,200	5/1951	Mihalyi.....	242/71.1
2,822,084	2/1958	Eilertsen.....	206/52
3,147,681	9/1964	Sanderson	242/71.1

3,184,053	5/1965	Eldridge	206/52
3,234,024	2/1966	Leinonen.....	96/78
1,121,355	12/1914	Hargrave	206/52 S

FOREIGN PATENTS OR APPLICATIONS

410,071	5/1934	Great Britain.....	242/71.1
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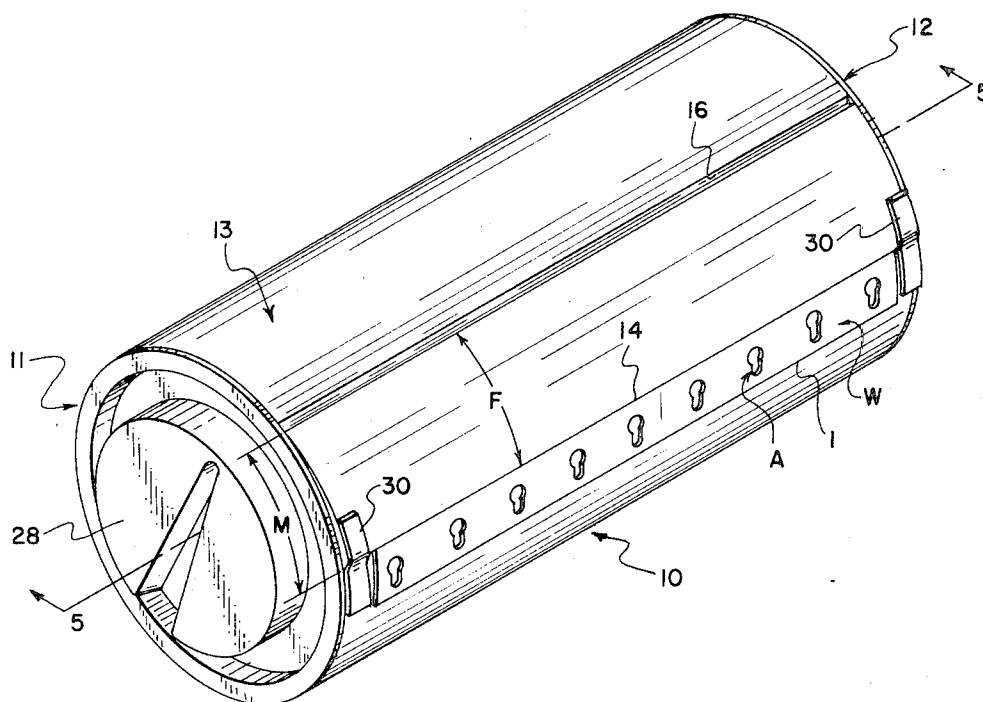
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[57] **ABSTRACT**

A cartridge for strip material is disclosed which includes a convolution of flexible sheeting wound around spaced, end members. The sidewall sheeting is attached to the end members in a manner providing a movable flap portion which is breakably sealed to an overlapped portion of the sheet convolution. The flap portion is movable to position which facilitates egress and ingress of a strip of web material. One end member is provided with an aperture through which a cartridge core can be connected to rotary drive and the other end member is provided with a surface construction adapted for connection to a separate rotary drive by which the entire cartridge can be moved for breaking the cartridge seal.

3 Claims, 11 Drawing Figures



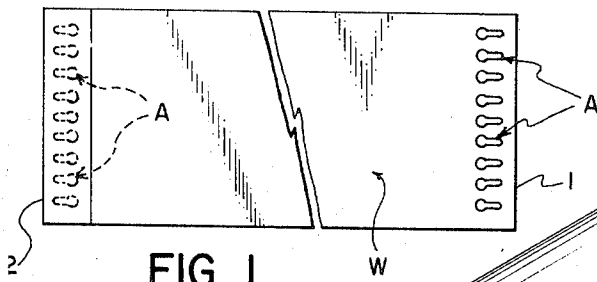


FIG. 1

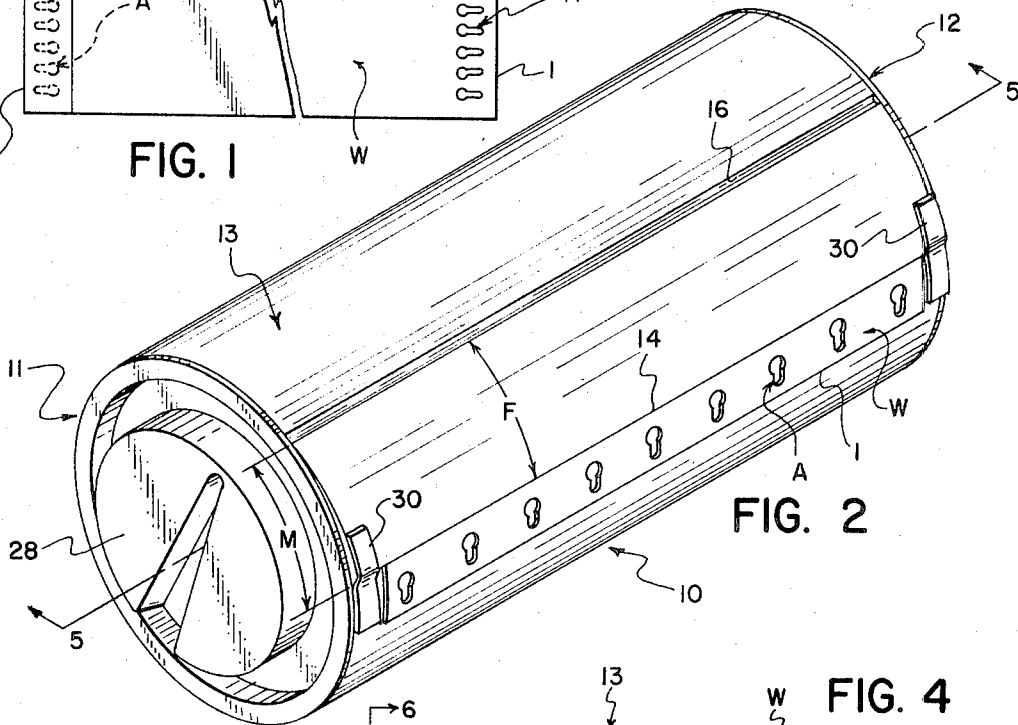


FIG. 2

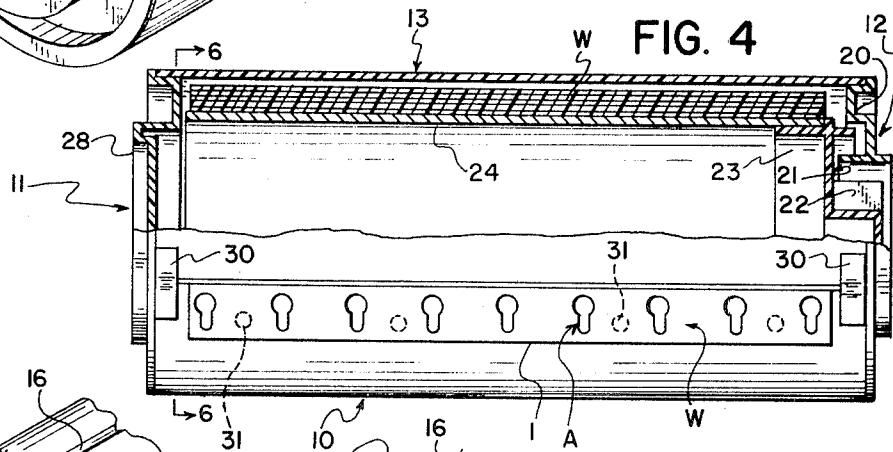


FIG. 4

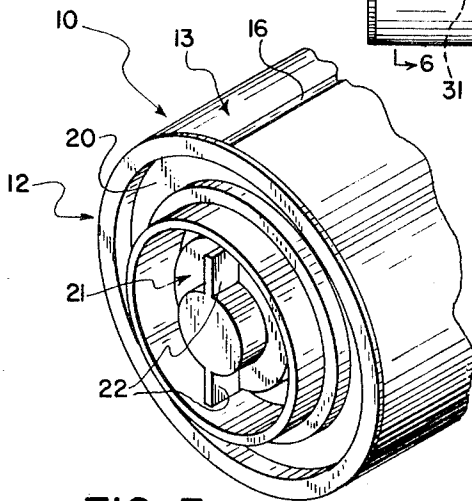


FIG. 3

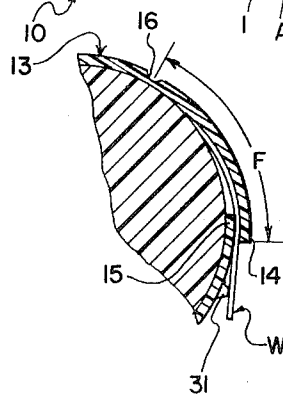
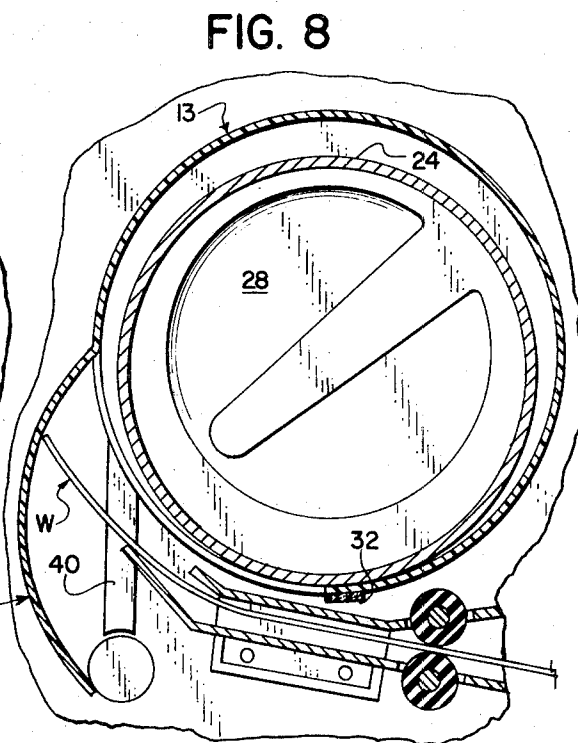
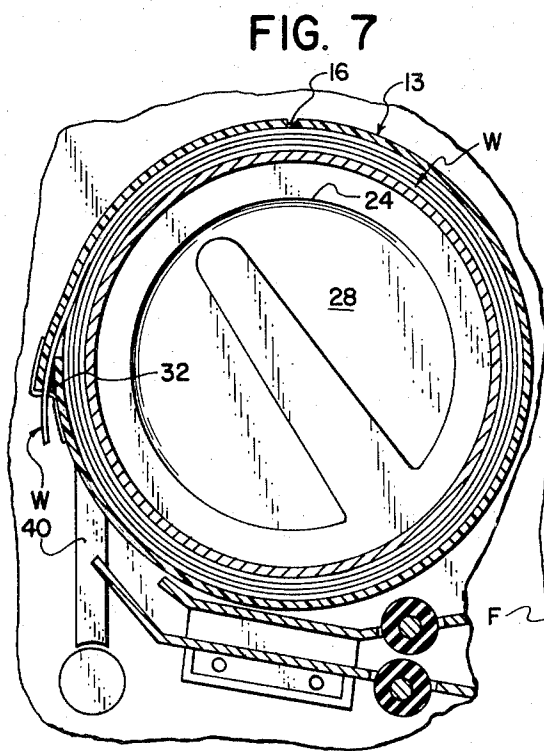
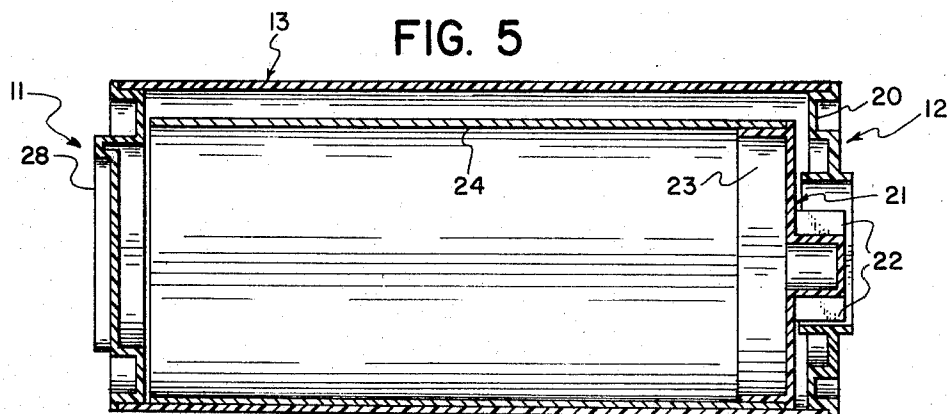


FIG. 6

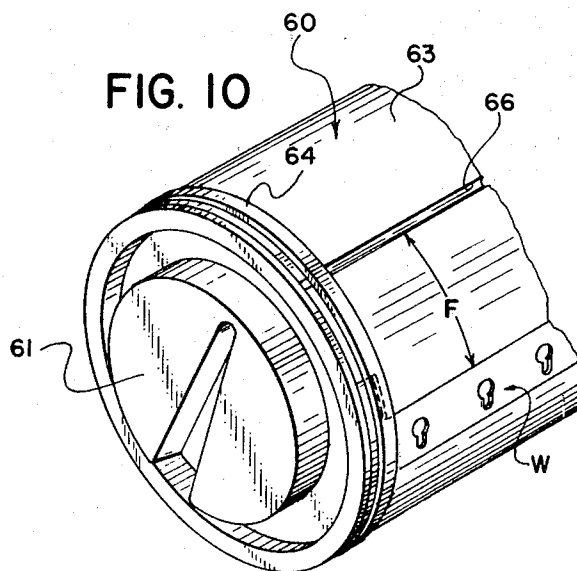
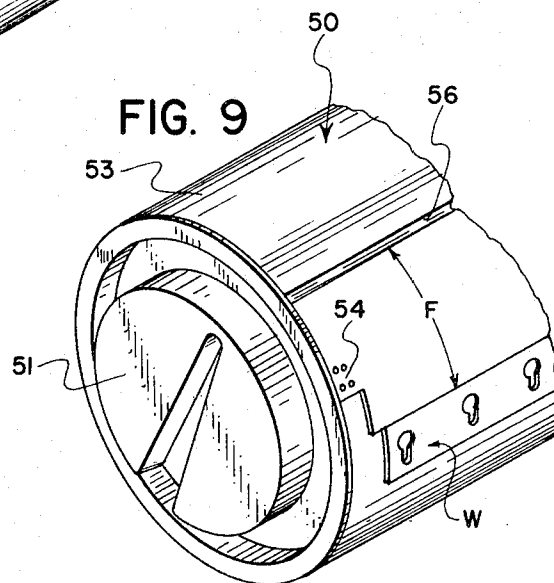
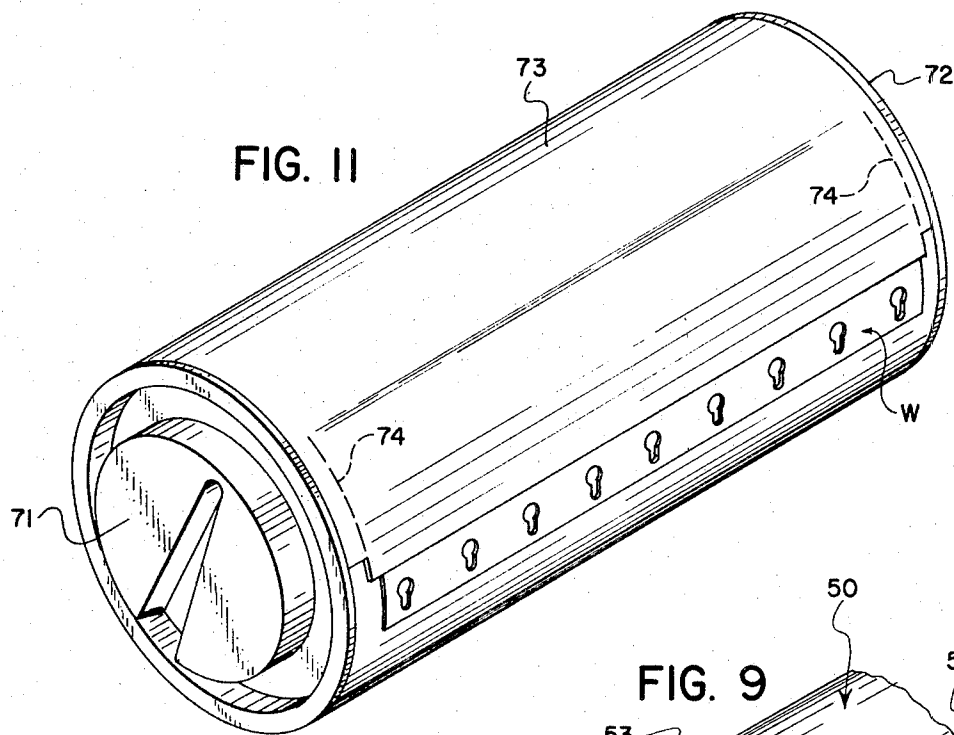
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OPENABLE CARTRIDGE FOR FACILITATING EGRESS AND INGRESS OF STRIP MATERIAL

CROSS-REFERENCE TO RELATED APPLICATIONS

Reference is made to U.S. Ser. No. 834,695, filed June 19, 1969, entitled "Web Handling Apparatus and Cartridge and Web Usable Therewith," by Thaddeus Swanke and U.S. Ser. No. 834,702, filed June 19, 1969, entitled "Web Take-Up Device," by Arthur C. Rissberger, Jr.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a cartridge of the type for containing a coiled length of web material and more particularly to a cartridge for containing a length of electrophotosensitive web material and having a movable closure member which can be retained in a closed position by a breakable seal.

2. Description of the Prior Art

The use of cartridges to contain a coiled strip of web material is well known in the art relating to light sensitive materials. Such cartridges are desirable substantially lighttight to protect the materials and constructed in an inexpensive manner so as to be disposable after use of the material stored therein.

Most prior art cartridges of this type are provided with either a cover member which can be removed completely to provide access to the material therein or with a lighttight opening from which the material can be withdrawn as used.

It is not the usual practice to utilize such cartridges to store the previously contained material after use. For this reason the access openings in known cartridges are not adapted to facilitate the feed back of the material into the cartridge.

In accordance with the novel apparatus and method for inserting and removing the electrophotosensitive web members of electrophotographic apparatus which apparatus and method are disclosed in U.S. application Ser. No. 834,695, entitled "Web Handling Apparatus and Cartridge and Web Usable Therewith," filed June 19, 1969, in the name of Thaddeus Swanke, it has been found desirable to utilize the same cartridge for storing an unused web before insertion and for receiving the soiled web after use in the apparatus. It is highly desirable that such a cartridge be adapted to store web material in a substantially lighttight manner prior to opening, be constructed to facilitate mechanized opening and, after removal of the web material, be adapted to facilitate feed back of the used web into the cartridge so that disposal of the soiled web can be accomplished by an operator without the necessity of handling the web.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide for a length of web material a cartridge which is adapted to store the material in a substantially lighttight manner, is easily openable to present the web material for withdrawal and use and after opening and withdrawal of the web, is adapted to facilitate feed back of a used web into the cartridge for disposal of the web without handling.

It is another object of the present invention to provide improved cartridge structure which can be easily and inexpensively fabricated.

Yet another object of the present invention is to provide an improved cartridge for protectively storing web material and which is adapted to receive the web material when fed back after use.

Still another object of the present invention is to provide a substantially lighttight cartridge which is readily openable to provide access to the material stored therein and which when opened is adapted to facilitate both withdrawal and feed back of the material stored therein.

The above objects are accomplished in accordance with the teachings of the present invention disclosed herein by provision of a cartridge having opposed end walls around which is wrapped a slightly overlapping convolution of substantially opaque sheeting. The overlapping portions of the sheeting are

coupled by a frangible seal and it is a feature of the invention that the cartridge includes a cover flap portion which is movable when the seal is broken and facilitates both egress and ingress of the strip with respect to the cartridge. The cartridge can include a rotatable core and in such an embodiment one end wall is provided with an opening to facilitate connection of rotary drive to the core while the other end is provided with a surface construction adapted for connection to a separate rotary drive utilized to open the cartridge.

In a preferred embodiment of the invention, the sheeting forming the cartridge sidewalls is attached to the end walls of the cartridge around only a major portion of the end wall peripheries. The edges of the overlapping portions of the convoluted sheet are not secured to the end wall peripheries over a small distance extending past the overlapped end of the sheet, thereby providing a movable flap portion that extends over an ingress and egress opening in the cartridge. When the seal coupling the overlapped portions of the sheeting is broken, the flap portion can be moved to dispose the cartridge egress and ingress opening for use.

BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and advantages will be readily apparent to one skilled in the art from the subsequent detailed description of illustrative embodiments of the present invention with reference to the drawings in which like characters denote like parts and wherein:

FIG. 1 is a top view of a web member of a type with which the present invention is adapted for use;

FIG. 2 is a perspective view of a cartridge having therein a web member such as shown in FIG. 1 and illustrating one embodiment of the present invention;

FIG. 3 is a perspective view of the cartridge shown in FIG. 2 but showing the opposite end of the cartridge;

FIG. 4 is a front view of the cartridge shown in FIG. 2 with a portion removed showing a web mounted therein;

FIG. 5 is a longitudinal cross-sectional view of the cartridge shown in FIG. 2, taken along the lines 5—5 but with the web removed therefrom;

FIG. 6 is a transverse cross-sectional view of a portion of the cartridge embodiment shown in FIG. 2 with the cartridge in its closed condition;

FIGS. 7 and 8 are transverse cross-sectional views of the slightly modified embodiments of the cartridge shown in FIG. 2 mounted in apparatus for use, FIG. 7 showing the cartridge in a closed and full condition and FIG. 8 showing the cartridge an open and empty condition ready to receive a used web; and

FIGS. 9—11 are perspective views showing other cartridge embodiments in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

By referring to FIGS. 1, 2 and 4, a web member W can be seen in a withdrawn condition and as it is stored inside one embodiment in accordance with the present invention. The web W is in this instance an electrophotosensitive member which is provided with apertures A along its leading and trailing ends 1 and 2 respectively. The apertures A are provided in the web W for use in mounting the web in electrophotographic apparatus such as in the manner disclosed in the aforementioned copending U.S. application of Thaddeus Swanke. However, it will be appreciated that the cartridge features of the present invention are applicable for use with other web members which are desirably stored in a protective container before use. Further, the features of the present invention are particularly advantageous in applications in which it is desirable to utilize a cartridge to receive a web member after use of the web. In the case of the electrophotosensitive web W, these features prove important because used electrophotosensitive webs are soiled with developer and very difficult for the operator to handle directly without becoming extremely dirty.

The cartridge embodiment 10 shown in FIG. 2 comprises a pair of end wall members 11 and 12 having generally circular

edge peripheries of substantially equal circumference. The end wall members desirably can be formed of plastic, metal, wood or other readily fabricated and inexpensive material.

Around the peripheries of the end walls 11 and 12 is wrapped a length of flexible sheeting 13. The width of the sheet 13 desirably is selected to be sufficiently greater than the width of the web material to be stored in the cartridge so that a small distance is provided between a web in the cartridge and the cartridge end walls. The length of the sheet 13 is selected in proportion to the circumference of the end walls 11 and 12 so that when wrapped around the end walls in the manner shown in FIG. 2, the ends of the sheet overlap slightly providing a top end 14 and bottom end 15, see the cross-sectional views in FIGS. 6 and 7. The sheet 13 can be formed of plastic sheeting, heavy paper, thin metal or other flexible, durable and relatively inexpensive sheet material. In certain instances it may be desirable to have a preformed sheet with a hinged or movable portion. In use with the particular web member W it is desirable that the material selected for both the end walls 11 and 12 and the side wall sheet 13 of the cartridge be formed of relatively opaque material in order to make the cartridge substantially lighttight.

In the embodiment shown in FIG. 2 the longitudinal edges of sheet 13 are secured to the circular periphery of each end member 11 and 12 around a major portion of the end wall peripheries. This may be accomplished by adhesive or by soldering, welding, ultrasonic sealing or such other known procedures for joining as are appropriate with the materials chosen for the ends and sheet. Also the ends can be designed to interfit with a preformed sheet or can be joined to the sheet 13 by staples, rivets, nails, or similar fasteners.

In FIG. 2 it can be seen that the sheet 13 is not affixed to a minor portion M of the peripheries of ends 11 and 12 and that therefore a portion of sheet 13 extending from the overlapping end 14 thereof forms a flap F which can be moved away from the end walls 11 and 12. Referring to FIGS. 6 and 7 it can be seen more clearly that flap portion F includes the top end portion 14 of the sheet 13 and also a longitudinal segment of sheet 13 extending further around the periphery of the end walls away from overlapped sheet end 15. Therefore, when the flap portion F of sidewall sheet 13 is moved away from the end walls as shown in FIG. 8, a web ingress and egress opening is provided in the container. As shown in FIGS. 2 and 6, a notched or indented transverse groove 16 can be provided across sheet 13 to facilitate the bending of the flap portion F away from the end walls 11 and 12. It will be appreciated that such a groove 16 on the sheet 13 desirably should coincide with location at which the seal of the edges of sheet 13 to the major portions of end wall peripheries terminate.

By referring to FIGS. 3, 4 and 5 it can be seen that end wall 12 of the cartridge 10 includes a first wall portion 20 having a generally centrally located opening into the container in which is mounted a rotatable drive plug 21. The plug 21 includes drive flanges 22 formed on the exterior surface and a circular connecting flange 23 on the inside surface which is connected to a cylindrical drive core 24 extending inside the cartridge. The drive plug 21 and core 24 are desirable with particular embodiments of cartridges in accordance with the present invention for purposes described in U.S. Application Ser. No. 834,702, entitled "Web Take-Up Device," filed June 19, 1969, in the name of Arthur C. Rissberger, Jr.

The end wall member 11 is provided with a protruding portion 28 which can desirably be formed to include a bearing surface to support the cartridge in apparatus for use.

With a cartridge in a condition such as shown in FIG. 8, i.e., with the flap F spaced from the overlapped portion 15 of sheet 13, the web W can be fed into the cartridge trailing end 2 first. The web W will be directed into the cartridge by flap F and into a coiled condition by the inner surface of sheet 13. When the web W has been coiled within the cartridge to the extent that the leading end 1 of the web has reached a location just outside the cartridge, the web feed into the cartridge is stopped. The flap F then is moved to the closed position

shown in FIGS. 2, 4, 6 and 7 and a frangible means such as breakable tabs 30 are applied to couple the flap F to the overlapped portion 15 of sheet 13, thereby holding the flap F in a closed position in the manner shown in FIG. 2. It will be noted that the tabs 30 couple the overlapping sheet portions at edge locations so as not to contact the web W. The tabs 30 desirably can be formed of readily breakable tape material or other easily breakable or severable joining material.

The bottom portion 15 of the sheet 13 can be provided with raised dimples 31 to reduce any electrostatic adherence of the web W to the cartridge and to position the leading portion 1 of the web for easy withdrawal from the cartridge. If desired light seal material such as a strip of frictional material 32 (See FIG. 7) can be provided on the sheet 13 extending transversely across the sheet between overlapping ends 14 and 15. This strip can desirably be formed of a plastic foam material such as a polyurethane foam which is slightly compressible and when compressed between the overlapping ends of the side wall and web therebetween will frictionally retain the web end as well as provide a light seal for the cartridge.

It will now be appreciated that when a loaded and sealed cartridge is supported in apparatus at its ends and moved against members in the apparatus located to contact and break seals 30, such as for example, members 40 shown in FIGS. 7 and 8, the flap F will be broken free of the seals 30 for movement to the open position. Further, the leading end of a web W in the cartridge will be released from the retaining force applied between ends 14 and 15 of the sheet 13 and free to move for withdrawal from the cartridge. It will also be understood that after the cartridge has been opened and a web W has been withdrawn, the flap F in its open position provides means for directing a used web back into the cartridge through the egress and ingress opening presented when the flap F is in the open position, see FIG. 8. A used web can therefore be fed back into the cartridge 10 in the manner shown in FIG. 8 and disposed of without necessity of the operator touching the web.

Referring now to the cartridge embodiment 50 shown in FIG. 9 it can be seen that the end member 51 has a circular periphery adapted to have a longitudinal edge of sidewall sheet 53 affixed thereto in the manner described with respect to cartridge embodiment 10. The opposite longitudinal edge of sheet 53 is attached in the same manner along an opposite end member (not shown). In cartridge 50 a drive plug and core are not utilized. It can be seen that in cartridge 50 the flap F of the sheet 53 defined by groove 56 is attached to the overlapped sheet portion by a spot seal 54, such as by adhesive or ultrasonic sealing. This coupling between the overlapping sheet portions is again formed so as to be easily breakable to release flap F and provide egress and ingress to the cartridge 50 in a manner such as described above with respect to cartridge 10. It will be appreciated that the opposite end of the cartridge is held closed in the same manner.

The cartridge embodiment 60 shown in FIG. 10 is like that shown in FIG. 9 with exception that a frangible band 64 is utilized to retain the cartridge flap portion F defined by groove 66 in sheet 63 in a closed position. The band 64 can be broken in the manner described or removed by slipping it over end 61 and the flap F moved to the open position to facilitate egress and ingress of the web W. It will be appreciated that again an opposite end of the cartridge, not shown, is constructed and held closed in the same manner as the end shown in FIG. 10.

The cartridge shown in FIG. 11 is similar to the previously described embodiments; however, in this embodiment the sidewall sheet 73 is attached to the peripheries of end walls 71 and 72 along the entire length of its longitudinal edges. In this embodiment weakened portions 74 are provided in the sheet near each end wall of the cartridge and extend generally longitudinally from the top overlapping end of the sheet 73 a distance sufficient to form a flap portion F which can be broken from the secured edge portions of sheet 73. When the perforated or otherwise weakened portions 74 are broken by movement of the flap portion F away from the cartridge an

egress and ingress is provided for the web in the cartridge 70 and the flap portion F is in position to guide feed of the web.

It will be appreciated that although the embodiments of the present invention have been described with respect to applica- 5 bility for use in electrophotographic apparatus, cartridges in accordance with the teachings of the present invention will find utility in conjunction with other types of web handling apparatus because of the unique opening feature and the feature facilitating feedback of web material.

The invention has been described in detail with particular reference to preferred embodiments thereof but it will be under- 10 stood that variations and modifications can be effected within the spirit and scope of the invention.

I claim:

1. A cartridge comprising:

a. first and second end walls of generally circular peripheral 15 configuration, said end walls being generally parallel and aligned along a longitudinal axis of said cartridge, each end wall including a bearing surface for supporting said cartridge for rotation on said longitudinal axis, said first end wall having a central aperture extending therethrough to the cartridge interior and said second end wall having slot means on the outer surface thereof for 20 connecting said cartridge to a first source of rotary drive in a predetermined angular orientation on its longitudinal axis;

b. a length of sheet material extending between said end walls and attached to each of said end walls around the 25 major portion of the peripheral outlines thereof, the area

between the portions of end wall outlines to which said sheet is not attached defining a passage to and from the space between said end walls;

c. a cover flap extending from said sheet over said passage;

d. a core located between said sidewalls and including 30 means, formed on one core end and extending through said central aperture, for connecting said core to a second source of rotary drive and facilitating rotation of said core independent of a rotary source connected to said slot means;

e. a coil of web material wound on said core, a leading end of said coil extending through said passage, between said cover flap and said sheet, to a location outside said car- 35 tridge; and

f. means for frangibly coupling said cover flap to the overlapped portion of said sheet.

2. The invention defined in claim 1 wherein said cover flap is formed as an integral extension of one end of said sheet and overlaps the opposite end of said sheet.

3. The invention defined in claim 1 wherein said web of material is of lesser width than the width of said sheet and located within said cartridge substantially equidistant between said end walls and wherein said means for frangibly coupling said cover flap to the overlapped sheet portion are located 40 near each end wall of said cartridge so that the leading web portion extending from said cartridge is not contacted by said coupling means.

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