Oct. 10, 1967 W. H. CARSTENSEN ETAL 3,346,210

CARTRIDGE FOR LIGHT-SENSITIVE STRIP

Filed March 24, 1966 3 Sheets-Sheet 1

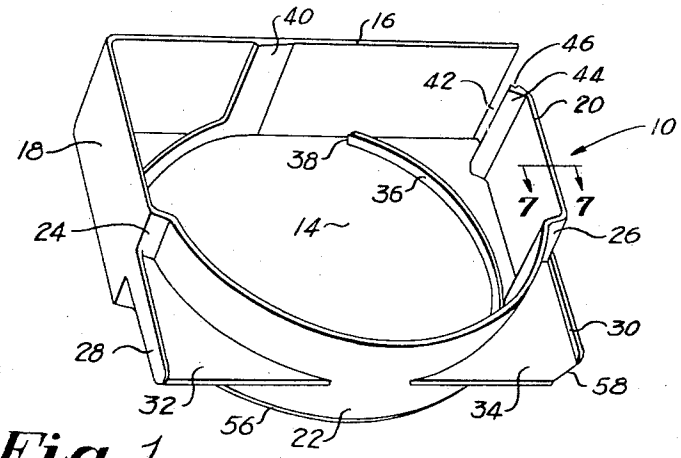


Fig. 1

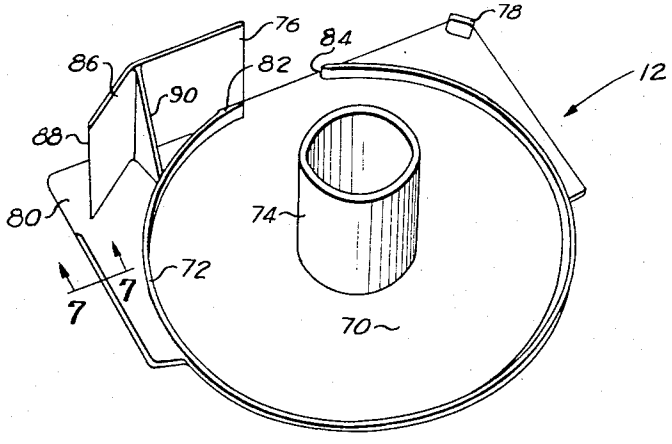


Fig. 2

INVENTORS.
WILLIAM H. CARSTENSEN
CHARLES G. OTT
JOHN J. VAN ACKER
BY Russell L. Root
ATTORNEY.

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CARTRIDGE FOR LIGHT-SENSITIVE STRIP

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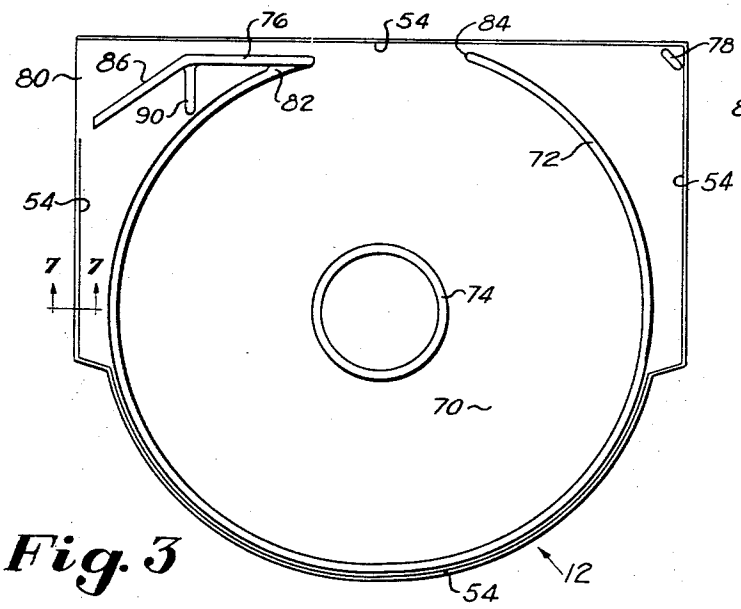


Fig. 3

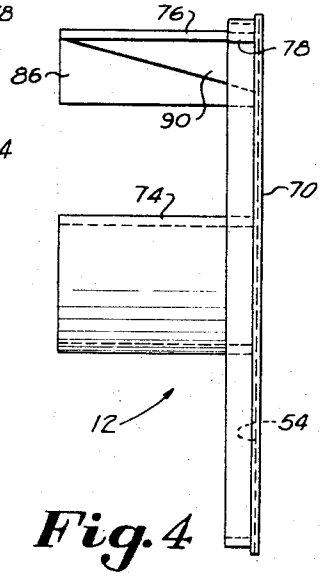


Fig. 4

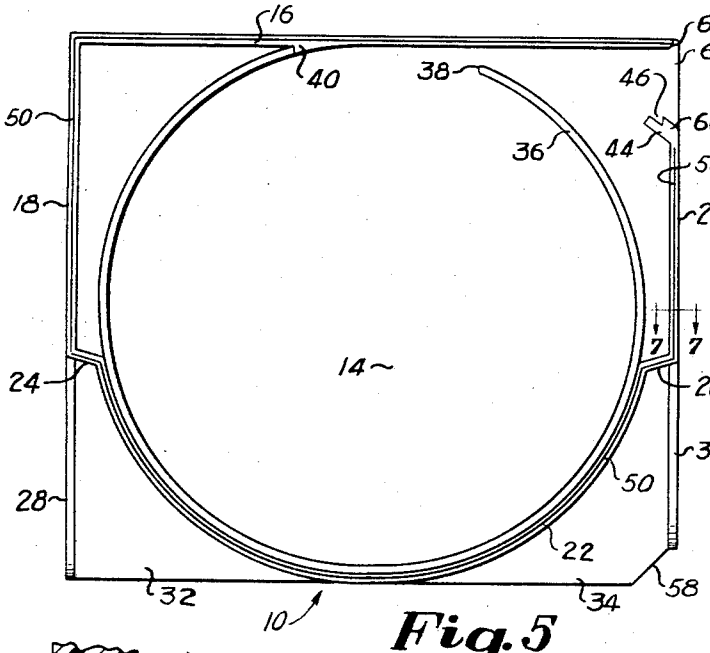


Fig. 5

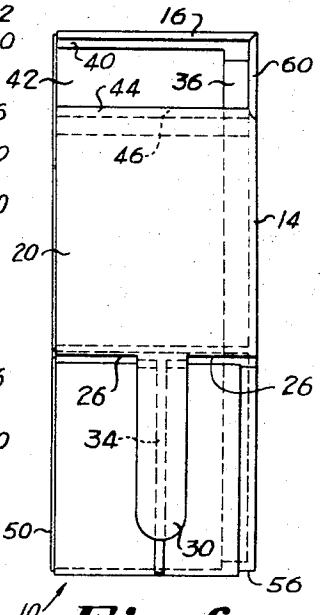


Fig. 6

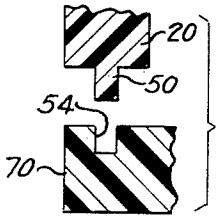


Fig. 7

INVENTORS.
WILLIAM H. CARSTENSEN
CHARLES G. OTT
JOHN J. VANACKER
BY Russell L. Root
ATTORNEY.

Oct. 10, 1967 W. H. CARSTENSEN ETAL 3,346,210

CARTRIDGE FOR LIGHT-SENSITIVE STRIP

Filed March 24, 1966 3 Sheets-Sheet 3

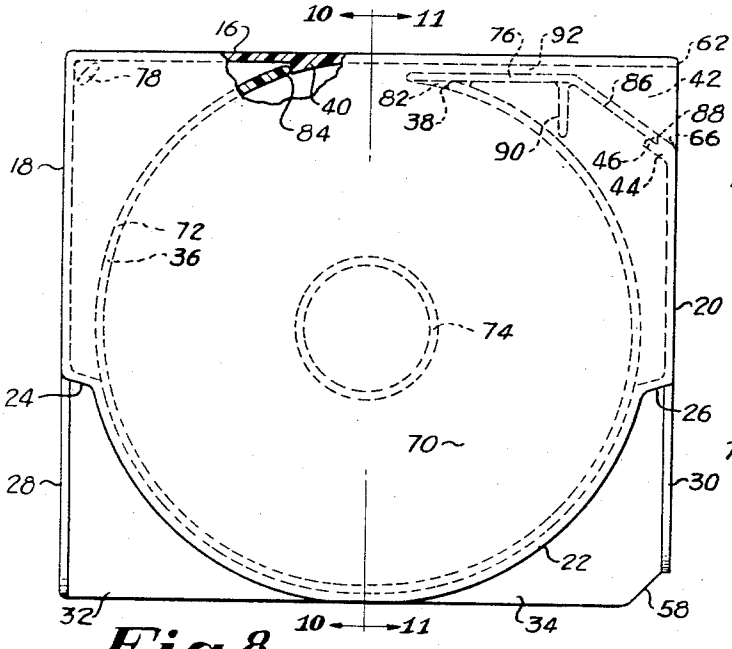


Fig.8

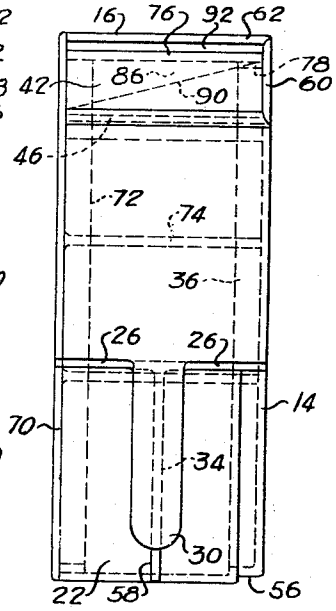


Fig.9

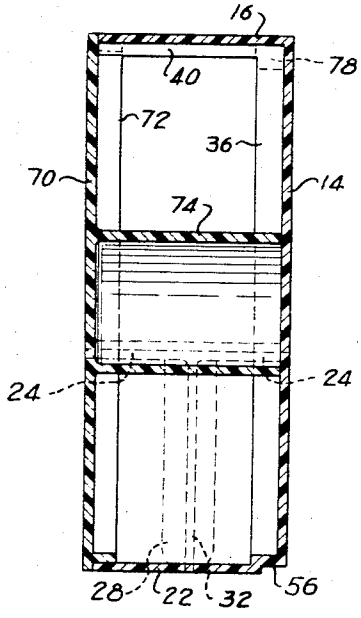


Fig.10

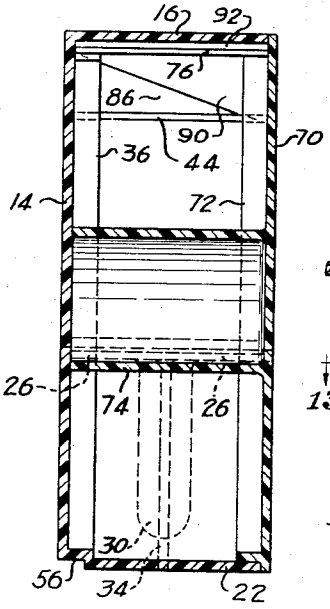


Fig.11

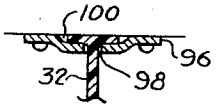


Fig.13

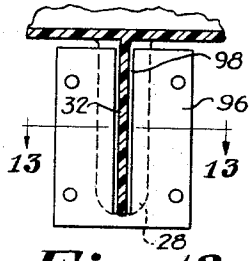


Fig.12

INVENTORS.
WILLIAM H. CARSTENSEN
CHARLES G. OTT
JOHN J. VAN ACKER
BY Russell L. Root
ATTORNEY.

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3,346,210

CARTRIDGE FOR LIGHT-SENSITIVE STRIP

William H. Carstensen, Short Hills, and Charles G. Ott, West Caldwell, N.J., and John J. Van Acker, Chesterland, Ohio, assignors to Varityper Corporation, Newark, N.J., a corporation of Delaware

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8 Claims. (Cl. 242—71.1)

ABSTRACT OF THE DISCLOSURE

A two-piece, thin-walled plastic cartridge for light proof storage and dispensing of photosensitive strip material comprises a male section and a female section, each molded as a unit. The male section carries a central post and a lower guide member or shelf. The female section includes the peripheral wall, a portion of which is closely and accurately spaced from the lower guide member when the parts are assembled to provide a light-excluding entry and exit dust for the strip. Each part carries a circular guide rib for contact with the margins only of the photosensitive strip. The parts of the female member which abut the male member carry a fine rib which permits forming a permanent fused connection by means of sonic energy. Locating and guide portions molded on the female section lead the thin-walled guide member into accurate relationship with the peripheral wall during assembly.

Nature and objects of invention

The present invention relates to a container or cartridge for storing coiled material and, more particularly, to a plastic cartridge for storing a roll of light sensitive paper or film for insertion into a photocomposing machine.

The cartridge currently in use is a paper box provided with a central post onto which the rolled strip of sensitive material is placed and having an opening at one corner through which the material is dispensed. In order to standardize on the boxes, the same size of box is used for storing either photographic paper or the usual plastic-base photographic film. However, paper can be coiled much more tightly than film, and in order to provide maximum capacity, the paper is wound in rolls of greater length than the film rolls, with only a small center opening sized to just fit over the post in the box. On the other hand, because the film is stiffer and cannot be coiled as tightly as the paper, the roll of film must have a center opening considerably larger than the paper roll. Therefore, due to using the boxes interchangeably for both paper and film, the post which is placed in the box is made small enough to enter the small opening of the paper roll and hence fits quite loosely within the center of the film roll. The film roll is therefore allowed to drop to a point such that the working surface of the full roll can rub against the bottom of the box as it is being dispensed therefrom.

To prevent this, there is sometimes provided a special insert to support the film roll on the post and prevent it from being damaged as a result of rubbing against the bottom of the box. However, the special insert adds cost, both in material and labor, and departs from the desired goal of standardizing the boxes for use with either paper or film.

In addition to the foregoing disadvantages of present day boxes, perhaps a more significant drawback is that because the boxes are made of paper they are subject to being easily torn and/or crushed, which could result in unusable boxes and damage to or exposure of the sensitive material.

In view of the above, it is an object of the present invention to provide an improved strong, light-tight, plastic container or cartridge for storing a roll of sensitive material for use with photocomposing or other photographic machines, which cartridge can be inexpensively manufactured and assembled.

Another object of the invention is to provide a cartridge which can also be used as a receiving cartridge for exposed paper or film in those instances, for example, where developing is performed outside of the machine.

Another object of the invention is to provide a cartridge which can accommodate either a coil of paper or a coil of film in such manner that the film does not rub against the bottom of the cartridge in a deleterious manner as it is being dispensed therefrom.

Another object of the invention is to provide a cartridge which is attractive in appearance, and relatively simple and inexpensive to produce so as to be acceptable from a cost standpoint as a replacement for paper boxes.

These and other objects and advantages are attained in accordance with the practice of the present invention by providing a molded plastic cartridge comprising two complementary molded sections, herein referred to as a female section and a male section, adapted to be sonically sealed together to form a light-tight enclosure.

So as to minimize the weight and cost of the improved cartridge, the parts are made with thin walls whose position, when unsupported, may be subject to some degree of unpredictable deviation upon being withdrawn from a mold. However, the design is such that the complementary portions, as they approach assembly, guide and brace each other to maintain the tolerances and positioning necessary to insure light-tight security at the point of film egress. Thus assembly of the parts, each somewhat flexible and positionally indeterminate by itself, also produces a strong, rigid whole whose parts are dimensionally stable and in closely controlled positions with relation to each other.

Other objects, features and advantages of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a bottom perspective view looking at the inside of the female section of a cartridge constructed in accordance with the present invention;

FIG. 2 is a bottom perspective view looking at the inside of the male section of the cartridge;

FIG. 3 is a side elevation of the male section showing the inside thereof;

FIG. 4 is a right hand edge view thereof;

FIG. 5 is a side elevation of the female section showing the inside thereof;

FIG. 6 is a right hand edge view thereof;

FIG. 7 is a greatly enlarged section taken on the lines **7—7** in FIGS. 1, 2, 3 and 5;

FIG. 8 is a side elevation of the cartridge assembly partially in section;

FIG. 9 is a right hand edge view thereof;

FIG. 10 is a section taken on the line **10—10** of FIG. 8;

FIG. 11 is a section taken on the line **11—11** of FIG. 8;

FIG. 12 is a front elevation of a mounting bracket for the cartridge and shows a fragment of the cartridge mounted therein; and

FIG. 13 is a section taken on the line **13—13** of FIG. 12.

Description of the preferred embodiment

The cartridge of the present invention comprises a female section preferably of molded plastic indicated

generally at **10** in FIGS, 1, 5 and 6, and a male section also of molded plastic indicated generally at **12** in FIGS. 2, 3 and 4. Referring first to the female section **10**, it will be seen that it includes a side wall **14** which is substanially surrounded by upstanding edge walls comprising a top wall **16**, a rear wall **18**, a front wall **20** and an arcuate bottom wall **22** which merges at its ends into short flare walls **24** and **26** which blend in smoothly with the back and front walls **18** and **20** respectively. The front and back are each also provided with a narrow leg (**28** and **30** respectively) which is flush with the outside surface of the respective wall and extends downwardly from the outer limit of the flare wall **24** and **26**. The legs **28** and **30** are connected to the bottom wall **22** by webs **32** and **34** respectively, and the legs and the webs afford means for mounting the cartridge in a photocomposing machine as will be further explained hereinafter. The bottom edges of the webs **32** and **34** also cooperate with the curved bottom wall **22** to provide a stable base for the cartridge when it is desired to stand the same erect on the flat surface.

Still referring to FIGS. 1, 5 and 6, the inside surface of the side wall **14** is provided with a raised rib or ledge **36** of circular configuration conforming to the arcuate shape of the bottom wall **22** for guiding and supporting a margin of the strip material. The ledge **36** forms a substantially complete circle starting from its end **38** (FIG. 5) slightly spaced from the top wall **16** and, following in a clockwise direction, terminates in a wedge member **40** provided on the inside surface of the top wall and extending across the full width thereof. The wedge **40**, as shown in FIGS. 1 and 5, is provided, with an inner surface which blends smoothly with the ledge **36** and the top wall **16**. This arrangement of the wedge **40** affords a guide surface for the sensitive material as it is fed into or dispensed from the cartridge, and also serves as a positioning and stabilizing means for the male section **12** as will be described below.

Front wall **20** is also spaced from the top wall **16** to provide therebetween an opening **42** as shown in FIGS. 1, 5 and 6 which serves as an entrance-exit opening for the film, and the upper end of the front wall **20** is provided with a inwardly formed lip **44** provided at its free end with a longitudinal V-notch **46** as best shown in FIG. 5. As will be explained below, the lip **44** and the notch **46** coact with a portion of the male section **12** and afford a stable light-tight joint when the female and male sections are assembled.

With reference now to FIGS. 5, 6 and 7, the free edge surfaces of the walls **16**, **18**, **20** and **22**, as well as the flare walls **24** and **26**, are provided with a thin continuous bead or tongue **50**, disposed centrally with respect to the thickness of the walls which, because of its thinness, is indicated as a single line in FIG. 5. This bead, as shown in FIG. 7, cooperates with a complementary groove **54** provided in the male section **12** to permit sonically sealing the female and male sections together to produce a light-tight cartridge. Additionally, the bead and the groove serve to properly align and stabilize the two sections for the sealing operation as will be further explained below.

In order to facilitate the molding of the female section **10**, it is desirable, of course, to maintain the wall thicknesses uniform. Accordingly, the outer surface of the side wall **14** is preferably recessed along the peripheral margin of the bottom wall **22**, as shown at **56** in FIGS. 1, 6, 9, 10 and 11, to a depth and a height corresponding to the thickness and the height respectively of the ledge **36**. In this way, the thickness of the bottom wall **22** in the area surrounding the ledge **36** is of the same thickness as all other wall sections of the cartridge.

Other features of the female section including providing the web **34** with a diagonally cut corner **58** as shown in FIGS. 1, 5 and 8, to prevent the cartridge from being improperly positioned in the photocomposing machine.

Additionally, all corners in the area of film travel are smoothly rounded to prevent the strip from snagging and to minimize abrasive contact therewith as the strip enters the cartridge or exits therefrom. These rounded corners are shown in FIGS. 5 and 6 and include the inner rounded corner at an edge **60** of the side wall **14**, a lower rounded corner at an edge **62** of the top wall **16**, and an upper rounded corner **66** on the lip **44**, all of which are in the area of the strip entrance-exit opening **42**.

The male section **12** of the cartridge is shown in FIGS. 2, 3 and 4 and comprises a side wall **70** having integrally molded therewith an internal raised rib or ledge **72** of circular configuration, complementary to the ledge **36** of the top section **10**, for guiding and supporting the other margin of the strip, and upstanding central post **74** for mounting the strip material, a cantilevered guide member **76** and a lug or locator **78**. As mentioned above and shown in FIGS. 3, 4 and 7, the inside surface of the side wall **70** of the male section is also provided with the groove **54** which, except for a short span **80** adjacent the guide member **76**, extends completely around the peripheral margin of the side wall **70**. The inner corner of the side wall **70** within the span **80**, complementary to the corner **60** described above, is rounded to permit smooth travel of the strip without damage thereto. The groove **54**, like the bead **50** with which it cooperates, is also extremely narrow in cross section and, therefore, is also shown as a single line in the drawings, see FIG. 3.

From the description thus far, it will be understood that the female and male sections **10** and **12** respectively are complementary, i.e., the periphery of side will **70** of the male section conforms identically with the periphery of the female section afforded by the walls **16**, **18**, **20**, **22**, **24** and **26**, and, when the two sections are placed with their inside surfaces in face-to-face relation, the bead **50** of the female section is positioned within the groove **54** of the male section to permit the sections to be sonically sealed as will be further explained hereinafter.

The ledge **72** of the male section (see FIGS. 2 and 3), at its end **82**, is integrally formed with the guide member **76** and extends in an anticlockwise direction therefrom terminating in a rounded end **84** slightly spaced from the top edge of the side wall **70** of the male section. The guide member **76** is also spaced from the top edge of the side wall and extends leftwardly from the end **82** and parallel to the top edge as viewed in FIG. 3, then downwardly to provide an inclined surface **86** terminating in an angled lead edge **88** slightly spaced from the front edge of the male section. The guide member **76** has a width equal to the width of the cartridge and is supported and held against flexing in part by providing a triangular web **90** on the underside of the guide.

The hollow post **74** is disposed centrally of the male section and has a wall thickness equal to the thickness of all other sections of the cartridge. The locator **78** is positioned diagonally to the top and rear edges of the side wall **70** of the male section, and cooperates with the inside corner surfaces formed by the top and rear walls **16** and **18** respectively of the female section to aid in positioning the two sections in assembled relationship prior to the sealing operation.

In the assembly of the cartridge of the present invention, a roll of sensitive material is placed on the post **74** and the lead end of the material is trained over the guide member **76** such that it extends beyond the front edge of the male section. Subsequently, the female section **10** is placed on the male section **12** with the bead **50** positioned within the groove **54**. The positioning of the two sections is facilitated by the lug **78** as mentioned above, and also by the angled edge **88** of the guide member **76** which is slidably received by the V-notch **46** to form a stable light-tight joint between the lip **44** and the inclined surface **86** of the guide member as shown in FIG. 8. Additionally, the rounded end **84** of the ledge **72** is positioned in abutting relation with the rear face of the wedge **40**

of the section **10** to provide further stability to the cartridge and a smooh arcuate surface for the travel of the strip material since the inner surface of the rib end and the wedge member are in substantially continuous surface relationship. In addition, as the parts slide together, the end **38** of the rib **36** slides beneath the distal postion of the guide **76** (see FIG. 8). In this position, it supports the guide **76** and braces it against downward deflection so that the spacing between the guide and the top wall **16** cannot exceed the specified amount, and will at all times be small enough to insure light tightness as the film leaves or enters the container. This provides an efficient light trap for the film opening without the necessity for assembling plush inserts or the like to the container parts.

With the sections of the cartridge in the above described mating relations, the cartridge is permanently sealed utilizing conventional ultra sonic sealing methods. Briefly, this method of sealing as applied to the cartridge utilizes a metal member, roughly conical, having a peripheral shape corresponding to the outline of the bead **50**. The cartridge assembly is placed on a flat surface in the position shown in FIG. 8, wherein the outside face of the male section **12** is facing upwardly, and the cone is positioned in pressure engagement with the cartridge such that it engages the cartridge only in the areas of the bead **50**. Thereafter, the cone is vibrated on the order of 20,000 cycles per second to generate heat in the areas of the bead and the groove to cause the bead **50** to fuze in the groove **54** and produce a permanent bond or seal of the male and female section. This method has been found to provide a neat seal which eliminates any unsightly joints, and also provides a light-tight assemblage which is not apt to work loose or come apart.

With reference to FIGS. 8 and 9, it will be seen that the assembled or sealed cartridge provides a narrow elongate duct **92** between the guide member **76** and the top wall **16**, and the entrance-exit opening **42** is now funnel shaped as afforded by the inclined surface **86** and the top wall **16**. The funnel opening **42** provides finger clearance for grasping the lead end of the strip for withdrawal from the cartridge, and also facilitates insertion of the strip in those instances wherein the cartridge is utilized as a receiving cartridge. The narrow duct **92** permits feeding of the strip into and out of the cartridge while excluding light from the interior of the cartridge which would cause exposure of the sensitive material.

Although the means for mounting the cartridge in a photo-composing machine may take on any of several different forms, one convenient arrangement is shown in FIGS. 12 and 13 and comprises a pair of slotted brackets **96** for receiving the legs **28** and **30** of the cartridge. Since the brackets are alike, only one is shown and described herein. The bracket **96** is provided with an elongate vertical slot **98** extending from the top edge of the bracket to a position slightly spaced from the bottom edge, and further includes an outwardly formed offset at each side of the slot to provide a pocket **100** therebehind as shown in FIG. 13. The brackets are securely fastened in the machine in opposed spaced apart relation, and the cartridge is retained by the brackets by positioning the webs **32** and **34** within the slots **98**, and the legs **28** and **30** within the pockets **100**. In this position, the webs of the cartridge rest on the bottom of the slots **98** and support the cartridge at the proper level for feeding of the strip through the machine, and the legs are securely retained in the pockets to hold the cartridge in place. It will be appreciated, this arrangement provides for ready removal and accurate replacement of cartridges without the need of any adjustments or the use of tools.

From the foregoing, it will be seen that the present invention provides an improved light-tight cartridge for storing and dispensing coiled sensitive material. The internal ledges **36** and **72** of the cartridge jointly serve to guide and support the margins of the strip material to prevent the working surface of the material from rubbing contact with adjacent cartridge surfaces in a deletrious manner as the strip is being fed into or dispensed from the cartridge. Additionally, because the complementary portions of the female and male sections guide and brace each other to maintain the tolerances and positioning necessary to insure light-tight construction, the cartridge permits thin wall design which minimizes the weight and the cost of the cartridge.

The integrally molded legs **28** and **30**, including their supporting webs **32** and **34** respectively, afford a simple and yet positive arrangement for mounting the cartridge in a photocomposing machine in accurate register with respect to the travel of the strip from the cartridge to the exposure station. Also, because the cartridge is made of durable molded plastic construction, it is not easily crushed or damaged and, at the same time, provides a cartridge that is attractive in appearance, relatively inexpensive to produce and which, because of its light-proof qualities, affords long shelf life to the sensitive material.

While a preferred embodiment of the invention has been described and illustrated, it is to be understood that is capable of variation and modification. Accordingly, the aim in the appended claims is to cover all such variations and modifications as may fall within the true spirit of the invention.

What is claimed is:

1. A cartridge of flat box configuration for holding large rolls of light sensitive strip material consisting essentially of:

an integrally molded plastic female section comprising a side wall and narrow peripheral edge walls having a combined length to be substantially coextensive with the margin of the side walls;

an integrally molded plastic male section including a side wall, a short center post and a cantilevered guide member projecting from the male section side wall a distance substantially equal to the width of the peripheral edge walls; and

said two sections being assemblable by placing the male section within the female section in a direction axially of said post, and sealing solely the edges of the peripheral edge walls to the male section side wall in the plane of said male section side wall, the parts being thus asembled and the edges being thus sealed;

one end of said guide member and the adjacent end of the proximate peripheral edge wall having cooperating interfitting parts so arranged as to mesh in an axial sliding relationship during the assembly of the sections whereby to form a light-excluding relationship therebetween; and

said guide member having one portion positioned so as to be in a position face-to-face with, parallel to, and slightly spaced from a peripheral edge wall when the parts are assembled to thereby provide a narrow elongate exit or entry duct for the strip.

2. A cartridge as set forth in claim **1** in which the guide member includes another portion diverging sharply from the peripheral wall to which the said one portion is parallel to provide an entry funnel for leading an entering strip into the duct.

3. A cartridge as set forth in claim **1** in which the male and female sections are of thin-wall construction and somewhat flexible material so that the distal portion of the guide member, when disasembled, has a somewhat indeterminate location, and in which there is also provided:

a thin-wall stiffening web molded integrally with said guide member; and

locating means integrally molded on said female section for guiding into place and accurately locating the distal portion of the guide member as the sections are placed in assembled relationship.

4. A cartridge as set forth in claim 3 in which the extreme edges of the peripheral wall portions on the one hand and the cooperating marginal inner face portions of the male member side wall on the other are referred to as mating parts, in which one of said mating parts has a fine integrally molded rib and the other has a corresponding complementary locating groove, and in which the sealed cartridge is the result of a sonic sealing treatment locally applied to said rib through the side wall of said male member.

5. A cartridge as set forth in claim 1 in which the peripheral edge wall is planar, and includes the portion which opposes the guide member when assembled, and the upper portions of the side walls have a rectangular outline.

6. A cartridge as set forth in claim 5 in which the lower portions of the cartridge are cylindrical, and in which a central outwardly projecting web is provided at each end of the cartridge, the lower edges of the webs being tangent to the lower cylindrical portion of the cartridge to provide a stable base for the cartridge when erect on a continuous flat surface.

7. A cartridge as set forth in claim 5 in which the side

wall of each section has integrally molded on its inner face a circular rib for guiding the margins of an incoming strip into a smooth coil.

8. A cartridge as set forth in claim 7 in which the peripheral edge wall adjacent the inner end of the light-excluding entrance duct formed cooperatively therewith by the guide member, has an integrally molded wedge member extending thereacross whose surface is integrally molded with the end of the rib on the female section and is so located as to merge smoothly with the surface of rib on the male section when the sections are assembled.

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FRANK J. COHEN, *Primary Examiner.*

N. L. MINTZ, *Assistant Examiner.*