

Description

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to cassettes, and more particularly to a light-tight cassette for handling and dispensing a roll of photosensitive web material, such as phototypesetting paper and film.

Description of the Prior Art

Cassettes for holding and dispensing a roll of light-sensitive photosensitive web material, such as phototypesetting paper and film, are well known in the art. In the Research Disclosure No. 150, October 1976, reference No. 15033 (Havant, GB), W.P. Boyd at al., "Web Dispensing Cassette" (pages 26,27) a cassette is disclosed in the form of a rectanguloid box-like casing comprising four side walls formed from a single sheet of material in which the ends thereof define a pair of faceted tubes. When the cassette is erected, a narrow web exit passageway is defined by two opposed facets of the respective tubes. A pair of end closure caps close the side edges of the side walls, and further have central hub portions for rotatably supporting the roll within the cassette. At least one of the detachable end caps of such known cassettes has spaced inner and outer peripheral wall portions defining a peripheral channel for receiving the side edges of the side walls.

A problem with such known cassettes is that the exit passageway thereof does not have a substantially constant gap width extending from one of the side edges of the side walls of the cassette to the opposite side edges. This is particularly a problem with cassettes designed to handle and dispense web materials of a width in excess of 12 inches (30,48 centimeters). In such cassettes, the gap width in the portion of the passageway intermediate the side edges of the side walls is enlarged, resulting in possible light leakage in that portion of the passageway, and in unequal pressure being exerted on the exiting web material from one side edge of the web to the opposite side edge thereof.

DISCLOSURE OF THE INVENTION

It is therefore an object of the present invention to provide a light-tight cassette for housing and dispensing a roll of web material, wherein the gap width of the exit passageway is more even, the pressure distribution on the exiting web material is more equal from one side edge to the opposite

side edge, thereby resulting in a cassette of improved light-lock integrity.

According to the present invention, there is provided a light-tight cassette as defined in claim 1.

Essentially, the light-tight cassette according to the present invention is characterized by first and second side walls having convexly outwardly curved cross sections, whereby when the curved side edges of the first and second side walls are inserted into the complementary straight channels of the end caps, forces are developed within the first and second curved side walls causing the first and second facets of the faceted tubes to define the exit passageway with a substantially constant gap width from one of the side edges to the opposite side edges of the first and second side walls.

A preferred embodiment of the light-tight cassette is described in the detailed description with reference to the accompanying drawings and claimed in the subclaims.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a light-tight cassette in which a preferred embodiment of the invention is embodied;

Fig. 2 is an enlarged exploded perspective view of the light-tight cassette of Fig. 1;

Fig. 3 is an enlarged end elevational view of the sheet member forming the side walls of Fig. 2 shown in an open position;

Fig. 4 is a section view taken substantially along line 4-4 of Fig. 1 with the web roll omitted for purposes of clarity; and

Fig. 5 is an enlarged segmental view of the living hinge portion of the side walls of Fig. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Because light-tight cassettes for handling and dispensing a roll of photosensitive photographic material are well known, the present description will be directed in particular to elements forming part of, or cooperating more directly with, apparatus in accordance with the present invention. It is to be understood that elements not specifically shown or described may take various forms well known to those skilled in the art.

Referring to Figs. 1 and 2, a preferred embodiment of a light-tight cassette 10 of this invention is in the form of a rectanguloid box comprising a shell 12 formed from a single sheet of material having first, second, third, and fourth side walls 14, 16, 18, and 20 respectively. The shell 12 houses a roll of web material 22, such as phototypesetting film or

paper, coated with a light-sensitive emulsion. The web material is wound upon a cylindrical tubular web winding core 24 having open ends, only one of which is shown in Fig. 2. A pair of identical end caps 26 are provided to close the cassette ends and to support the web roll and core 24 for unwinding rotation.

The ends of the sheet of material forming the side walls are folded back upon themselves in triangular configurations to form a pair of faceted tubes 28, 30. When cassette 10 is assembled, a narrow web exit passageway 32 is defined by first and second opposed facets 34, 36 carried by the respective tubes 28, 30. The tubes 28, 30 lend structural stability, or beam strength, to the first and second side walls 14, 16 respectively, so as to resist flexing or other deformation of the side walls and passageway formed thereby.

As best shown in Fig. 3, the first facet 34 defines an angle relative to first side wall 14 of substantially 30° to minimize its influence on the force required to extract the web material 22 from the cassette. The second facet 36 forms an angle of substantially 60° relative to second side wall 16 to maximize the structural stability, or beam strength, of tubes 28, 30 and sidewalls 14, 16 respectively. The first and second facets 34, 36 respectively are provided with resilient light-lock strips of plush material 38, for example, which when cassette 10 is in an assembled condition, as seen in Figs. 1 and 4, cooperate to form an effective light-lock to prevent light from entering the cassette through passageway 32.

The cassette shell 12, as best seen in Figs. 2-5, is provided with a pair of rigid corners 40, 42 of substantially 90° angle joining first curved side wall 14 to third side wall 18, and second curved side wall 16 to fourth side wall 20. A pair of gussettes 44 span corners 40, 42 and connect the first and third side walls 14, 18 together and the second and fourth side walls 16, 20 together to form a rigid support for the first and second curved side walls 14, 16 and to increase their beam strength. The third and fourth side walls 18, 20 respectively are joined by a living hinge 46 which allows the side walls 14, 16, 18, 20 to be moved from the Fig. 3 position to the Fig. 4 position, and allows the cassette shell 12 to be flexed into a "W" shape, not shown, for stacked storing, thereby minimizing storage space and increasing transporting convenience.

The pair of end caps 26 serve both to close side edges 48, 50, 52, 54 of the cassette shell and to support the roll of web material 22 and core 24 for unwinding rotation. Each end cap 26 has an outer peripheral wall 56 having a continuous inner peripheral surface 58 opposed by a continuous slanted wall member 60. The inner surface 58 and

wall member 60 cooperate to define straight channels 62 sized to receive, in closely fitted relation, side edges 48, 50, 52, and 54 of side walls 14, 18, 20, and 16, respectively, when cassette 10 is assembled, and to define triangularly shaped corner relief areas 65 to freely receive shell corners 40, 42 and the ends of tubes 28, 30. The tube ends are unsupported, allowing facets 34, 36 to mate more freely and thereby enhance light-lock integrity.

In order to provide structural rigidity to end caps 26 and to thereby support adequately the roll of web material 22, a series of raised ribs 64 extend generally radially outwardly from an outer hub end 66 and effectively interconnect the hub end with slanted wall member 60. Each end cap 26 has a central, generally cylindrical and axially extending hub member 68 which is sized and positioned to receive an open end of core 24. The hub member 68 essentially comprises a laterally extending cylindrical tube member 70 having radially outwardly extending fins 72 having arcuate segments 74 at the ends thereof cooperating to form hub member 68.

The end caps 26 and side walls 14, 16, 18, 20 preferably may be formed from a 20% talc-filled Tenite (trademark) polypropylene resin material. The addition of the talc to the resin material serves as a stiffening medium. Opacity is provided by the addition of carbon black to the clear resin base. The end caps 26 preferably may be formed from a flat sheet of the thermoplastic material by known vacuum-forming or injection-molding techniques. The side walls preferably are formed by extruding the thermoplastic material through a suitably designed extrusion die.

The cassette 10 of this invention is compatible with mechanical cassette assembly and loading operations. One possible method of assembly may comprise the steps of extruding thermoplastic material in a web form, severing the web into sheets of material forming the cassette sidewalls 14, 16, 18, 20 having tubes 28, 30 at the ends thereof, applying strips of light-lock material 38 to opposed facets 34, 36 of the side wall tubes, bending the cassette side walls into the form of shell 12 shown in Fig. 4, placing an end cap 26 on one end of the shell, inserting a prewound roll of photosensitive web material 22 into the opposite, open end of the shell with the free web end threaded through exit passageway 32, and applying the second end cap 26 to the shell to complete the cassette assembly. The end caps 26 may be secured to the side walls by, for example, ultrasonic sealing, adhesive, or mechanical attachment, such as by stapling.

The invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the scope of

the invention.

Claims

1. A light-tight cassette (10) for housing and dispensing a roll of web material (22), said cassette comprising:

a plurality of side walls (14; 16, 18, 20) formed from a single sheet of material, including first and second side walls (14, 16) having first and second faceted tubes (28, 30) formed at opposite ends of the sheet material corresponding to free edges of said first and second side walls, wherein said first and second tubes have first and second opposed facets (34, 36) defining a narrow web exit passageway (32), the side walls (14, 16, 18, 20) further having complementary side edges (48, 54, 50, 52); and

a pair of end caps (26) for supporting ends of the roll of web material (22) and for closing said complementary side edges (48, 54, 50, 52) of the side walls (14, 16, 18, 20), each end cap (26) having a plurality of straight channels (62) for receiving said complementary side edges; said cassette being characterized in that

said first and second side walls (14, 16) have convexly outwardly curved cross sections, whereby when the curved side edges (48, 54) of the first and second side walls (14, 16) are inserted into the complementary straight channels (62), forces are developed within the first and second curved side walls (14, 16) causing the first and second facets (34, 36) to define the exit passageway (32) with a substantially constant gap width from one of the side edges (48, 54) to the opposite side edges (48, 54) of the first and second side walls (14, 16).

2. A light-tight cassette (10) according to claim 1, further characterized in that the opposed facets (34, 36) are provided with light-lock strips of plush material (38).
3. A light-tight cassette (10) according to claim 2, further characterized in that the first facet (34) defines an angle of substantially 30° with the first side wall (14), and in that the second facet (36) defines an angle of substantially 60° with the second side wall (16).
4. A light-tight cassette (10) according to claim 1 or 3, further characterized in that the first side wall (14) has a curvature of a substantially 30,48-centimeter (12-inch) radius, and in that the second side wall (16) has a curvature of a

substantially 60,96-centimeter (24-inch) radius.

5. A light-tight cassette (10) according to claim 4, further characterized in that the side walls (14, 16, 18, 20) further comprise third and fourth side walls (18, 20) connecting the first side wall (14) to the second side wall (16), and in that a living hinge (46) connects the third side wall (18) to the fourth side wall (20).
6. A light-tight cassette (10) according to claim 5, further characterized in that the first side wall (14) is connected to the third side wall (18) by a rigid corner (40) of substantially 90°, in that the second side wall (16) is connected to the fourth side wall (20) by a rigid corner (42) of substantially 90°, and in that gussettes (44) are provided extending across the corners (40, 42) from the first side wall (14) to the third side wall (18) and from the second side wall (16) to the fourth side wall (20) to increase the beam strength of the first and second side walls (14, 16) from one of the side edges (48, 54) thereof to their opposite side edges (48, 54).
7. A light-tight cassette (10) according to claim 6, further characterized in that each end cap (26) has a corner relief area (65) for receiving side edges of the first and second faceted tubes (28, 30) for allowing said first and second tubes (28, 30) to seek a predefined light-tight mating position.

Patentansprüche

1. Lichtdichte Kassette (10) zur Aufnahme und Abgabe einer Rolle eines bandförmigen Materials (22), mit
einer Vielzahl von Seitenwänden (14, 16, 18, 20), die aus einem einzigen blattförmigen Element bestehen, wobei die Seitenwände eine erste und zweite Seitenwand (14, 16) mit einem ersten und zweiten eckigen Kanal (28, 30) umfassen, der an den entgegengesetzten Enden des blattförmigen Elements ausgebildet ist, die den freien Kanten der ersten und zweiten Seitenwand entsprechen, wobei der erste und zweite Kanal erste und zweite, einander gegenüberliegende Abschrägungen (34, 36) umfaßt, die eine enge Durchlaßöffnung (32) für das Band bilden, und wobei die Seitenwände (14, 16, 18, 20) außerdem mit komplementären Seitenkanten (48, 54, 50, 52) versehen sind, und mit
zwei Endkappen (26) zum Lagern der Rollenenden des bandförmigen Materials (22) und zum Abschließen der komplementären Seitenkanten (48, 54, 50, 52) der Seitenwände

the invention.

Claims

1. A light-tight cassette (10) for housing and dispensing a roll of web material (22), said cassette comprising:

a plurality of side walls (14; 16, 18, 20) formed from a single sheet of material, including first and second side walls (14, 16) having first and second faceted tubes (28, 30) formed at opposite ends of the sheet material corresponding to free edges of said first and second side walls, wherein said first and second tubes have first and second opposed facets (34, 36) defining a narrow web exit passageway (32), the side walls (14, 16, 18, 20) further having complementary side edges (48, 54, 50, 52); and

a pair of end caps (26) for supporting ends of the roll of web material (22) and for closing said complementary side edges (48, 54, 50, 52) of the side walls (14, 16, 18, 20), each end cap (26) having a plurality of straight channels (62) for receiving said complementary side edges; said cassette being characterized in that

said first and second side walls (14, 16) have convexly outwardly curved cross sections, whereby when the curved side edges (48, 54) of the first and second side walls (14, 16) are inserted into the complementary straight channels (62), forces are developed within the first and second curved side walls (14, 16) causing the first and second facets (34, 36) to define the exit passageway (32) with a substantially constant gap width from one of the side edges (48, 54) to the opposite side edges (48, 54) of the first and second side walls (14, 16).

2. A light-tight cassette (10) according to claim 1, further characterized in that the opposed facets (34, 36) are provided with light-lock strips of plush material (38).
3. A light-tight cassette (10) according to claim 2, further characterized in that the first facet (34) defines an angle of substantially 30° with the first side wall (14), and in that the second facet (36) defines an angle of substantially 60° with the second side wall (16).
4. A light-tight cassette (10) according to claim 1 or 3, further characterized in that the first side wall (14) has a curvature of a substantially 30,48-centimeter (12-inch) radius, and in that the second side wall (16) has a curvature of a

substantially 60,96-centimeter (24-inch) radius.

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7. A light-tight cassette (10) according to claim 6, further characterized in that each end cap (26) has a corner relief area (65) for receiving side edges of the first and second faceted tubes (28, 30) for allowing said first and second tubes (28, 30) to seek a predefined light-tight mating position.

Patentansprüche

1. Lichtdichte Kassette (10) zur Aufnahme und Abgabe einer Rolle eines bandförmigen Materials (22), mit
einer Vielzahl von Seitenwänden (14, 16, 18, 20), die aus einem einzigen blattförmigen Element bestehen, wobei die Seitenwände eine erste und zweite Seitenwand (14, 16) mit einem ersten und zweiten eckigen Kanal (28, 30) umfassen, der an den entgegengesetzten Enden des blattförmigen Elements ausgebildet ist, die den freien Kanten der ersten und zweiten Seitenwand entsprechen, wobei der erste und zweite Kanal erste und zweite, einander gegenüberliegende Abschrägungen (34, 36) umfaßt, die eine enge Durchlaßöffnung (32) für das Band bilden, und wobei die Seitenwände (14, 16, 18, 20) außerdem mit komplementären Seitenkanten (48, 54, 50, 52) versehen sind, und mit
zwei Endkappen (26) zum Lagern der Rollenenden des bandförmigen Materials (22) und zum Abschließen der komplementären Seitenkanten (48, 54, 50, 52) der Seitenwände



(14, 16, 18, 20), wobei jede Endkappe (26) eine Vielzahl gerade verlaufender Kanäle (62) für die Aufnahme der komplementären Seitenkanten besitzt, dadurch gekennzeichnet, daß

die erste und zweite Seitenwand (14, 16) einen konvex nach außen gekrümmten Querschnitt besitzt, so daß sich beim Einsetzen der gekrümmten Seitenkanten (48, 54) der ersten und zweiten Seitenwand (14, 16) in die komplementären geraden Kanäle (62) innerhalb der ersten und zweiten gekrümmten Seitenwand (14, 16) Kräfte entwickeln, die bewirken, daß die erste und zweite Abschrägung (34, 36) die Durchlaßöffnung (32) so bilden, daß zwischen einer der Seitenkanten (48, 54) und den gegenüberliegenden Seitenkanten (48, 50) der ersten und zweiten Seitenwand (14, 16) ein Spalt von im wesentlichen konstanter Breite entsteht.

2. Lichtdichte Kassette (10) nach Anspruch 1, dadurch gekennzeichnet, daß die einander gegenüberliegenden Abschrägungen (34, 36) mit als Lichtschleuse dienenden Bändern aus einem samtartigen Material (38) versehen sind.
3. Lichtdichte Kassette (10) nach Anspruch 2, dadurch gekennzeichnet, daß die erste Abschrägung (34) mit der ersten Seitenwand (14) einen Winkel von im wesentlichen 30° und die zweite Abschrägung (36) mit der zweiten Seitenwand (16) einen Winkel von im wesentlichen 60° bildet.
4. Lichtdichte Kassette (10) nach Anspruch 1 oder 3, dadurch gekennzeichnet, daß die erste Seitenwand (14) einen Krümmungsradius von im wesentlichen 30,48 cm und die zweite Seitenwand (16) einen Krümmungsradius von im wesentlichen 60,96 cm besitzt.
5. Lichtdichte Kassette (10) nach Anspruch 4, dadurch gekennzeichnet, daß die Seitenwände (14, 16, 18, 20) außerdem eine dritte und vierte Seitenwand (18, 20) umfassen, die die erste Seitenwand (14) mit der zweiten Seitenwand (16) verbinden, und daß ein Scharnier (46) die dritte Seitenwand (18) mit der vierten Seitenwand (20) verbindet.
6. Lichtdichte Kassette (10) nach Anspruch 5, dadurch gekennzeichnet, daß die erste Seitenwand (14) über eine starre Ecke (40) von im wesentlichen 90° mit der dritten Seitenwand (18) verbunden ist, daß die zweite Seitenwand (16) über eine starre Ecke (42) von im wesentlichen 90° mit der vierten Seitenwand (20)

verbunden ist und daß Stützbleche (44) vorgesehen sind, die sich über die Ecken (40, 42) von der ersten Seitenwand (14) bis zur dritten Seitenwand (18) und von der zweiten Seitenwand (16) bis zur vierten Seitenwand (20) erstrecken und so die Festigkeit der ersten und zweiten Seitenwand (14, 16) von einer der Seitenkanten (48, 54) dieser Wände bis zu deren gegenüberliegenden Seitenkanten (48, 54) erhöhen.

7. Lichtdichte Kassette (10) nach Anspruch 6, dadurch gekennzeichnet, daß jede Endkappe (26) einen freien Eckenbereich (65) umfaßt, der Seitenkanten des ersten und zweiten eckigen Kanals (28, 30) aufnimmt, so daß der erste und zweite Kanal (28, 30) in einer vorbestimmten lichtdichten Stellung darin Platz findet.

20 Revendications

1. Cassette étanche à la lumière (10) pour contenir et délivrer un rouleau de matériau en bande (22), cassette comprenant
des parois latérales (14, 16, 18, 20) formées à partir d'une feuille unique d'un matériau, comprenant une première et une deuxième parois latérales (14, 16) terminées par un premier et un second tubes facettés (28, 30) disposés aux extrémités opposées de la feuille de matériau, extrémités correspondant aux bords libres de la première et la seconde parois latérales ; les premier et second tubes ayant une première et une seconde facettes opposées (34, 36) définissant un passage de sortie étroit pour la bande (32) ; les parois latérales (14, 16, 18, 20) comprenant de plus des bords latéraux (48, 54, 50, 52) ; et
une paire d'embouts (26) pour supporter les extrémités du rouleau de matériau en bande (22) et pour fermer les bords latéraux (48, 54, 50, 52) des parois latérales (14, 16, 18, 20), chaque embout (26) ayant des encoches rectilignes (62) pour recevoir les bords latéraux ; la cassette étant caractérisée en ce que
les première et seconde parois latérales (14, 16) ont des sections transversales incurvées convexes vers l'extérieur, de ce fait lorsque les bords latéraux incurvés (48, 54) de la première et de la seconde parois latérales (14, 16) sont insérés dans les encoches rectilignes (62), des forces sont développées à l'intérieur de la première et de la seconde paroi latérale recourbée (14, 16) telles que la première et la seconde facette (34, 36) forment un passage de sortie (32) avec une largeur de fente pratiquement constante de l'un des bords latéraux (48, 54) à l'autre des bords latéraux (48, 54)



de la première et de la seconde parois latérales (14, 16).

2. Cassette étanche à la lumière (10) selon la revendication 1, caractérisée en outre en ce que les facettes opposées (34, 36) sont garnies de bandes de matériaux pelucheux (38) qui arrêtent la lumière. 5
3. Cassette étanche à la lumière (10) selon la revendication 2, caractérisée en outre en ce que la première facette (34) définit un angle de pratiquement 30° avec la seconde paroi latérale (16). 10
4. Cassette étanche à la lumière (10) selon la revendication 1 ou 3, caractérisée en outre en ce que la première paroi latérale (14) a un rayon de courbure de pratiquement 30, 48 cm (12 inch), et en ce que la seconde paroi latérale (16) a un rayon de courbure de pratiquement 60, 96 cm (24 inch). 15 20
5. Cassette étanche à la lumière (10) selon la revendication 4, caractérisée en outre en ce que les parois latérales (14, 16, 18, 20) comprennent une troisième et une quatrième paroi latérale (18, 20) reliant la première paroi latérale (14) à la seconde paroi latérale (16), et en ce qu'une articulation relie la troisième paroi latérale (18) à la quatrième paroi latérale (20). 25 30
6. Cassette étanche à la lumière (10) selon la revendication 5, caractérisée en outre en ce que la première paroi latérale (14) est reliée à la troisième paroi latérale (18) par un coin rigide (40) de pratiquement 90°, en ce que la seconde paroi latérale (16) est reliée à la quatrième paroi latérale (20) par un coin rigide (42) de pratiquement 90°, en ce qu'elle comprend des goussets (44) en travers des coins (40, 42) de la première paroi latérale (14) à la troisième paroi latérale (18) et de la seconde paroi latérale (16) à la quatrième paroi latérale (20) pour renforcer la rigidité de la première et de la seconde paroi latérale (14, 16) de l'un des bords latéraux (48, 54) à son bord latéral respectif opposé (48, 54). 35 40 45
7. Cassette étanche à la lumière (10) selon la revendication 6, caractérisée en outre en ce que chaque embout comprend une partie de coin (65) en relief pour recevoir les bords latéraux du premier et du second tube facetté (28, 30) pour permettre au premier et au second tube (28, 30) de prendre une position de raccordement prédéfinie étanche à la lumière. 50 55

