Description

This invention relates to a tape cassette including upper and lower halves secured to each other to define a space for receipt of a pair of tape reels and, more particularly, to a tape cassette having a window opening provided in the upper half above one of the tape reels and a transparent window plate covering the window opening, the window plate being produced through a molding process using a gate for spouting a fused synthetic resin into a molding cavity.

Generally, tape cassettes include upper and lower halves secured to each other to define a space containing a pair of tape reels. In order to provide a visual indication of rotation of the tape reels, the upper half has a semicircular window opening above one of the tape reels, the window opening being covered with a transparent window plate having a semicircular shape conforming to the window opening. It is normal practice to produce such a transparent window plate through a moulding process using a gate through which a fused synthetic resin is spouted into a molding cavity. Through such a molding process, however, a gatemark is made on the produced window plate near its center, degrading the appearance. Another disadvantage with conventional tape cassettes is that some technique is required in molding a semicircular window plate having acute-angled corners. In addition, great stess concentration occurs at the acute angles corners during the molding process, reducing the service life of the produced window plate.

A typical prior art tape cassette is disclosed in EP—A—0073010.

It is a main object of the invention to provide a tape cassette which exhibits good appearance.

Another object of the invention is to provide a tape cassette having a transparent window plate which is simple, durable, and easily produced.

There is provided, in accordance with the invention, a tape cassette comprising an upper and a lower half secured to each other to define a space between them for holding a pair of tape reels therein, the upper half being provided with a window opening above one of said tape reels and a transparent window plate therefore made in a molding process using an injection gate to inject a fused transparent synthetic resin, and a label affixed to the cassette, characterized in that said upper half is formed with a depression in its upper surface and in that said transparent window plate has a first portion having a shape conforming to said window opening and a second portion extending a substantial length from said first portion over said depression, whereby the gate mark produced on said second portion by said molding process is hidden by the label affixed on said depression.

The invention may be best understood by reference to the following description taken in conjunction with the accompanying drawings, in which like reference numerals identify like elements in several figures and in which:

Fig. 1 is an exploded perspective view showing one embodiment of a tape cassette made in accordance with the invention;

Fig. 2 is a perspective view of the upper half of the tape cassette;

Fig. 3 is a plan view of the tape cassette with no label sticked on the depression;

Fig. 4 is a plan view of the tape cassette with a label sticked on the depression; and

Fig. 5 is a fragmentary sectional view taken along the line V—V of Fig. 3.

Detailed Description of the Preferred Embodiment

With reference to the drawings, wherein like reference numerals refer to like parts in the several views, there is shown one embodiment of a tape cassette made in accordance with the invention. Although the invention will be described in connection with a small-sized tape cassette for use with so-called 8 mm video tape recorders or players, it is to be noted that the invention is not limited in any way to such a tape cassette.

Referring to Fig. 1, the tape cassette, designated generally by the numeral 1, includes a casing 4 which comprises lower and upper halves 2 and 3. The lower half 2 has a surrounding wall 7 with left and right protruded portions 5a and 5b near the opposite sides of the front face thereof. The upper half 3 has a surround wall 8 with left and right protruded portions 6a and 6b near the opposite sides of the front face thereof. The lower and upper halves 2 and 3 are bolted each other in a manner to define a space 9 for receipt of a pair of tape reels 12 and 13 along with right and left protruded tape guides 10 and 11.

The tape reel 12, which is referred to as a supply reel, is a synthetic-resin formed one-piece member having a cylindrical hollow hub 15 and lower and upper flanges 16 and 17 secured in parallel-spaced relation on the circumferential surface of the reel hub 15 near its opposite ends. The supply reel 12 carries a magnetic tape 14 wound around the reel hub 15 between the lower and upper reel flanges 16 and 17. The reel hub 15 has its top end closed by an opaque top plate 21 secured on the upper end thereof. The top plate 21 has a center projection 22 formed at the center thereof and a plurality of equally spaced circumferential projections 24 arranged circumferentially of the center projection 22. The upper flange 17 is formed with a center hole 25 and a plurality of circumferential holes 26 at positions corresponding to the circumferential projections 24. The upper flange 17 is secured by the techniques, such as bonding, fusing, or the like, on the top plate 21. The center projection 22 extends through the center hole 25 and the respective circumferential projections 24 extend through the circumferential holes 26 to provide accuracy required in positioning the upper flange 17 on the top plate 21. The supply reel 12 is positioned for rotation within the tape receipt space 9 with its reel hub 15 being in loose engagement with a circular opening 20 formed in the bottom surface

of the casing 4. The reel hub 15 is formed in its bottom surface with a hole (not shown) for engagement with a reel shaft when the tape cassette 1 is placed in position on a tape recorder or player.

Similarly, the tape reel 13, which is referred to as a take-up reel, is a synethetic-resin formed one-piece member having a cylindrical hub 15 and lower and upper flanges 17 and 18 secured in parallel-spaced relation on the circumferential surface of the reel hub 15 near its opposite ends. The take-up reel 13 carries the magnetic tape 14 taken from the supply reel 12 and wound around the reel hub 15 between the lower and upper reel flanges 16 and 17. The reel hub 15 has a top plate 21 secured on the upper end thereof. The top plate 21 has a center projection 22 formed at the center thereof and a plurality of equally spaced circumferential projections 24 arranged circumferentially of the center projection 22. The upper flange 17 is formed with a center hole 25 and a plurality of circumferential holes 26 at positions corresponding to the circumferential projections 24. The upper flange 17 is secured by techniques, such as bonding, fusing, or the like, on the top plate 21. The center projection 22 extends through the center hole 25 and the circumferential projections 24 extend through the respective circumferential holes 26 to ensure accurate positioning of the upper flange 17 with respect to the top plate 15. The take-up reel 13 is positioned for rotation within the tape receipt space 9 with its reel hub 15 being in loose engagement with another circular opening 20 formed in the bottom surface of the casing 4. The reel hub 15 is formed in its bottom surface with a hole (not shown) for engagement with another reel shaft when the tape cassette 1 is placed in position on the tape recorder or player.

The magnetic tape 14 extends from the supply reel 12 to the exterior through the right protruded tape guide 10 and hence through the left protruded tape guide 11 to the take-up reel 13. Therefore, the magnetic tape 14 has a portion placed outside the casing 4 between the right and left protruded tape guides 10 and 11.

In order to provide effective protection for the magnetic tape exposed portion, outer and inner tape covers 31 and 32 are provided. The outer tape cover 31 is pivoted at 31a on the opposite side surfaces of the upper half 3. The outer tape cover 31 is resiliently urged to its closed position covering the front side of the magnetic tape 14 between the right and left protruded tape guides 10 and 11. The outer tape cover 31 moves to its open position exposing the magnetic tape 14 automatically when the tape cassette 1 is placed in position on the tape recorder. The inner tape cover 32 is pivoted at 33 on the rear surface of the outer tape cover 31. The inner tape cover 32 has extensions 36 extending from the opposite ends thereof. The extensions 36 are in engagement with S-shaped guide grooves 34 and 35, respectively, which permit movement of the inner cover 32 with movement of the outer tape cover 31. When the outer tape cover 31 is at its closed position, the inner tape cover 32 is at its closed position covering the rear side of the magnetic tape 14. As the outer tape cover 31 moves toward its open position, the distance between the lower edges of the outer and inner tape covers 31 and 32 increases. When the outer tape cover 31 is at its open position, the inner tape cover 32 is at its open position exposing the rear side of the magnetic tape 14. It is, therefore, apparent that the outer and inner tape covers 31 and 32 close to cover the front and rear sides of the magnetic tape 14 except when the tape cassette 1 is placed in position on the tape recorder or player.

The numeral 47 designates a lock slider which is placed for sliding movement in a lock guide 48. The lock slider 47 is resiliently urged into a lock position where it is in engagement with the teeth formed circumferentially in the lower flanges of the supply and take-up reels 12 and 13. When the tape cassette 1 is placed in position on the tape recorder or player, the lock slider 47 moves to an unlocked position where it is out of engagement with the reel teeth to permit rotation of the supply and take-up reels 12 and 13.

Referring to Fig 2, the reference numeral 30 designates a pair of leaf springs. The first leaf spring has an end secured on the rear surface of the upper half 3 and a free end placed in abutment on the center projection 22 to resiliently urge the supply reel 12 downward, as best shown in Fig. 5. Similarly, the second leaf spring has an end secured on the rear surface of the upper half 3 and a free end placed in abutment on the center projection 22 to resiliently urge the take-up reel 13 downward. These leaf springs 30 are effective to stabilize rotation of the tape reels 12 and 13.

Referring back to Fig. 1, the upper half 3 has a shallow depression 43 formed in the upper surface thereof for affixing an index label 44 on the cassette. The supply reel 12 has a plurality of equally spaced small through-holes 23 formed in the top plate 21 circumferentially of the center projection 24. Therefore, a light beam, which is applied upward toward the bottom of the reel hub 15 when the tape cassette 1 is placed in position on the tape recorder, can pass through the small through holes 23 to provide a light indication of rotation of the supply reel 12.

For this purpose, the upper half 3 is provided with a semicircular window opening 41 through which the right half of the supply reel can be viewed. The window opening 41 is covered with a transparent window plate 38 which has a semicircular portion 39 conforming to the window opening 41 and a rectangular portion 40 extending a substantial length over the depression 43. The window plate semicircular portion 39 is secured on the semicircular edge of the window opening 41 and the window plate rectangular portion is secured on the depression 43. The window plate 38 may be secured on the upper half 3 by techniques, such as dichromatic molding or bonding. The transparent window plate 38 is produced through a molding process using a gate

through which a fused transparent synthetic resin is spouted into a molding cavity. Therefore, a gate mark 42 is made on the window plate 38 at a position corresponding to the position at which the gate had been placed. According to the invention, the window plate rectangular portion 40 extends over the depression 43 a substantial length allowing placement of the gate on the rectangular portion 40 so that the gate mark 42 is made on the window plate rectangular portion 40, as best shown in Fig. 3. Consequently, the gate mark is hidden under a label sticked on the depression, as best shown in Fig. 4, so as to improve the appearance of the tape cassette. In addition, since the window plate 38 has no acute-angled corner, it is durable and easily produced. It is to be noted that the transparent window may have a bow shape somewhat smaller than a semi-circular shape so as to permit the depression to hide the leaf spring 30. This is effective to further improve the tape cassette appearance.

Claims

1. A tape cassette comprising an upper and a lower half (2, 3) secured to each other to define a space (9) between them for holding a pair of tape reels (12, 13) therein, the upper half being provided with a window opening (41) above one of said tape reels and a transparent window plate (38) therefore made in a molding process using an injection gate to inject a fused transparent synthetic resin, and a label (44) affixed to the cassette, characterized in that said upper half is formed with a depression (43) in its upper surface and in that said transpaent window plate (38) has a first portion (39) having a shape conforming to said window opening (38' and a second portion (40) extending a substantial length from said first portion over said depression, whereby the gate mark (42) produced on said second portion (40) by said molding process is hidden by the label (44) affixed on said depression (43).

2. A tape cassette as claimed in claim 1, wherein said window opening (41) has a substantially semicircular shape defined by an arc and a chord, and said second portion (40) has a rectangular shape extending from said chord over said depression (43).

Patentansprüche

1. Bandkassette mit einer oberen und einer unteren Gehäusehälfte (2, 3), die miteinander verbunden sind und zwischen sich einen Raum (9) begrenzen, im den zwei Bandspulen (12, 13) gehalten sind, wobei die obere Gehäusehälfte eine über einer der Bandspulen liegenden Fensteröffnung (41) und eine dieser Fensteröffnung zugeordnete transparente Fensterscheibe (38) aufweist, die in einem Spritzgießvorgang unter Verwendung eines Einspritzeinlaufs zum Einspritzen eines geschmolzenen transparenten Kunstharzes hergestellt ist, und wobei auf der Bandkassette ein Etikett (44) befestigt ist, dadurch gekennzeichnet, daß auf der Oberseite der oberen Gehäusehälfte eine Vertiefung (43) ausgebildet ist und daß die transparente Fensterscheibe (38) einen ersten Abschnitt (39) besitzt, die eine der genannten Fensteröffnung (41) entsprechende Form hat, sowie einen zweiten Abschnitt (40), der sich von dem ersten Abschnitt über einen wesentlichen Teil der Länge der genannten Vertiefung erstreckt, derart daß die durch den Spritzgeißvorgang in dem zweiten Abschnitt erzeugte Angußstelle (42) durch das auf der Vertiefung befestigte Etikett (44) verborgen ist.

2. Bandkassette nach Anspruch 1, bei der die Fensteröffnung (41) im wesentlichen die Form eines Halbkreises hat, der von einem Bogen und einer Sehne begrenzt ist, und bei der der zweite Abschnitt (40) der Fensterscheibe (38) Rechteckform besitzt und sich von der genannten Sehne aus über die Vertiefung (43) erstreckt.

Revendications

1. Cassette de bande comprenant une moitié supérieure et une moitié inférieure (2, 3) fixées l'une à l'autre afin qu'elles délimitent entre elles un espace (9) destiné à contenir deux bobines (12, 13) d'enroulement de bande, la moitié supérieure ayant une ouverture (41) pour le logement d'une fenêtre au-dessus de l'une des bobines et un plaque transparente (38) formant une fenêtre réalisée au cours d'une opération de moulage à l'aide d'un canal d'injection d'une résine de synthèse transparente et fondue, et une étiquette (44) fixée à la cassette, caractérisée en ce que la moitié supérieure est réalisée avec une cavité (43) à sa face supérieure, et en ce que la plaque transparente de fenêtre (38) a une première partie (39) ayant une configuration correspondant à celle de l'ouverture (38) de fenêtre et une seconde partie (40) disposée sur une longueur notable à partir de la première partie et au-dessus de la cavité, si bien que la marque du canal de coulée (42) formée sur la seconde partie (40) par l'opération de moulage est cachée par l'étiquette (44) fixée dans la cavité (43).

2. Cassette de bande selon la revendication 1, dans laquelle l'ouverture (41) de fenêtre a une forme pratiquement semi-circulaire délimitée par un arc de cercle et une corde, et la seconde partie (40) a une forme rectingulaire disposée depuis la corde au-dessus de la cavité (43).

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2. A tape cassette as claimed in claim 1, wherein said window opening (41) has a substantially semicircular shape defined by an arc and a chord, and said second portion (40) has a rectangular shape extending from said chord over said depression (43).

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