

PATENT SPECIFICATION (11)

1 478 821

1 478 821

- (21) Application No. 48188/75 (22) Filed 24 Nov. 1975 (19)
 (31) Convention Application No. 2 521 371
 (32) Filed 14 May 1975 in
 (33) Fed. Rep. of Germany (DT)
 (44) Complete Specification published 6 July 1977
 (51) INT. CL.³ B65D 85/671 B65D 11/12
 (52) Index at acceptance
 B8P 8A 8J 8U



(54) IMPROVEMENTS IN OR RELATING TO CONTAINERS FOR MAGNETIC TAPE CASSETTES

(71) We, IDN INVENTIONS AND DEVELOPMENT OF NOVELTIES A.G., a Swiss Company, of CH-7078 Lenzerheide, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

As is known, in tape recorders in the field of entertainment electronics sales of the cassette type machine have increased substantially since manufacturers have agreed on a uniform design of the cassette. This widely available cassette will be referred to hereinafter as "standard magnetic tape cassette" or, for short, "cassette". This cassette is substantially a parallelepiped in shape but on the upper and under sides there is a thicker section which is approximately trapezoidal in shape and starts from the longitudinal edge of the cassette where the magnetic tape is exposed or "open". On the market, cassettes of this kind are offered for sale in different sorts of packages in most cases made of a plastics material. Containers for accommodating cassettes are also known. German Patent Specification No. 22 48 408 describes a container for this purpose which may also be stacked.

The known container consists of a housing with five walls, whilst one longer narrower side is open. In the housing there is arranged a carrier slide having a front plate against which the "open" longitudinal edge of the cassette lies. Into the housing there extends a supporting surface for the cassette which carries projections over which the cores of the tape reels of the cassette are placed. The supporting surface, in turn, has guide grooves which co-operate with guide rails shaped in a complementary manner and which project inwards from the base of the housing.

A spring is tensioned between the rear wall of the housing and a rear plate of the slide. If the slide is pushed into the housing then the spring is tensioned. The slide is held in the housing by means of a locking arrangement which may be released manually.

When release is effected the relieved spring pushes the slide outwards until it is in an open position, the movement being restricted by a stop arrangement. In the open position the cassette may be inserted and removed. A number of similar containers may be stacked up into blocks of containers using groove and spring combinations.

Although these types of container are very easy to manipulate they have the disadvantage that the space required for a number of containers is unnecessarily large. The internal dimensions of the container are co-ordinated with the thickness of the cassette in the region of the thicker areas on the cassette, and the appropriate external dimension of the container is calculated by adding to this internal dimension, the thickness of the supporting surface of the carrier slide, the thickness of the guide rail, the thickness of the cover of the housing and finally the thickness of the base of the housing.

It is an object of the present invention to provide a container for accommodating a standard magnetic tape cassette in which the thickness measurement discussed above is reduced.

The present invention provides a container for accommodating a standard magnetic tape cassette which is substantially a parallelepiped in shape and has on its upper and underside a thicker section approximately trapezoidal in shape starting from one longitudinal edge, which container comprises a housing with at least three walls, that is, one lying facing the top or base of the cassette upper or underside and two side walls, and a carrier slide having a front wall for protecting the longitudinal edge of the cassette and a supporting surface for receiving the cassette, the container including guide means located outside the region of the container which is shaped to receive the thicker section of the cassette which guide means serve to guide sliding movement of the carrier slide from a closed position in the housing, in which the carrier slide is held by means of a locking arrangement into an open position by the force of resilient means which is

stressed during closing, and the top wall and/or the base wall of the housing and/or the supporting surface of the carrier slide have a free space to receive the thicker section(s) of the cassette.

In embodiments of the invention, those parts of the container adjacent the top or base of the cassette lie closely against the surface of the cassette where this is not of the thicker section. At those points where the thicker section does occur, the container is broken away. In one particular embodiment, the thicker sections of the cassette are free on both sides and the thickness of which container is only larger than the cassette in the area of the thickenings by an amount sufficient to ensure that when a block is constructed from several cassettes, the cassettes lying directly adjacent to each other do not rub against each other in the region of their thicker section.

By way of example only, embodiments of the invention will now be described with reference to the accompanying drawings of which:—

Fig. 1 is a perspective view of a first embodiment part of the surface being cut away.

Fig. 2 is a section on the line II—II of Figs. 1 and 3,

Fig. 3 is a section on the line III—III of Figs. 1 and 2,

Fig. 4 is a section on the line IV—IV of Figs. 1 and 2,

Fig. 5 is a perspective view of a second embodiment, part of the surface being cut away.

Fig. 6 is a view in the direction of arrow 6 in Fig. 5,

Fig. 7 is a perspective view of a third embodiment, part of the surface being cut away,

Fig. 8 is a section on the line VIII—VIII of Fig. 7,

Fig. 8a is a section similar to Fig. 8 but with certain parts in a different position,

Fig. 9 is a perspective view of a fourth embodiment,

Fig. 10 is a perspective view of a fifth embodiment,

Fig. 11 is a perspective view of a sixth embodiment, and

Fig. 12 is a plan view of a component of the embodiment shown in Fig. 11.

Fig. 1 is a perspective view of a first embodiment of the invention. The embodiment comprises a container having a housing 101 which is a parallelepiped having a top wall 102, a base wall 103, side walls 104 and 105, respectively, and a rear wall 106.

In the housing 101, a carrier slide 107 is movably guided and consists of front 108, base 109, rear 110 and sides 111, 112. The base 109 supports two uprights 113 on to which tape reel cores of a cassette (not shown) may be placed. A spiral spring 114

is located between the rear wall 106 of the housing and the rear 110 of the slide and is constrained from flexing sideways by ribs 115 which are disposed on the inner side of the top wall 102 of the housing. Stops to limit the outward movement of the slide are provided on the base surface thereof by two projections 116 which engage in slots 117 in the base wall 104 of the housing. The sides 111, 112 have notches 118 so that it is easy to grip the cassette without inhibiting the guiding function of these sides. From the rear 110 of the slide there projects a spring arm 119 with an angled end 120, whilst on the side wall 104 of the housing a rocker arm 121 is disposed. The base of the slide 107 has an opening 122 which is substantially the same size as the thicker section of the cassette. Fig. 3 shows that in this manner the thickness of the housing is equal to the maximum thickness of the cassette, increased in this area by the very thin sections of the top and base 102 and 104, respectively, of the housing.

The housing and slide are made of a plastics material and are preferably produced by injection-moulding processes. Although in the embodiment shown in Figs. 1—4, the spring arm 119 is of metal, it could alternatively be made of a plastics material and could then be shaped simultaneously with the slide.

To insert a cassette into the housing the tape reel cores are placed on the uprights 113 and the front 108 of the slide is subjected to pressure to move the slide into the housing 101. During movement, the slide is guided by the sides 111 and 112, and the spring 114 is compressed. In the last part of the movement of the slide the end 120 of the spring arm 119 strikes against the inclined surface 123 of the rocker arm 121 and is deflected upwards, after which it slides over the step 124 of the rocker arm and snaps downwards against the rear edge of a U-shaped slot 125.

If the pressure on the front 108 of the slide is now reduced, the spiral spring 114 pushes the slide forward but this movement is limited by the spring arm end 120 which is located in the U-shaped slot 125 of the rocker arm 121. To remove the cassette, pressure is again exerted on the front 108 so that the end 120 of the spring arm disengages the end of the U-shaped slot 125 of the rocker arm 121 and slides down and outwards. The spiral spring 114 is now able to push the slide outwards into the position shown in Fig. 1, once the front 108 is released. The spring arm 119 being deflected somewhat downwards when its end 120 slides along underneath the inclined surface 123. Fig. 4 shows the position of the spring arm in the locked position.

The embodiment shown in Figs. 5 and 6

again comprises a housing 201 with top and base wall 202, 203 respectively, side walls 204, 205, rear wall 206, and also a carrier slide 207. The slide comprises a front 208 with a base 209 secured at right angles to the front 208. As in the first embodiment, the base carries two projections 213, on to which the cores of the tape reels of the cassette (not illustrated) may be placed. Furthermore, the slide 207 has a rudimentary rear 210, against which a spiral spring 214 acts. The spiral spring 214 is constrained against flexing by ribs 215. Slots 217 co-operate with projections 216 to limit outward movement of the slide 207.

The rear 210 has a cut-away section in the area around the ribs 215. The base 209 of the slide also has an opening 222 which matches the shape and dimensions of the thicker section of the cassette. The guide means for the slide are disposed outside the areas of the housing and slide which receive the thicker section of the cassette. The outer edges 226 and 227 of the base 209 are each guided in a groove formed between ridges 228 and 229 and the base wall 203. The ridges 228 and 229 are shaped on the side walls 204 and 205 respectively. The ridge 228 is at a greater distance from the base wall 203 than is the ridge 229, although the base 209 of the slide is of a uniform thickness. The reason for this lies in the type of slide locking used in the second embodiment. Next to the edge 226, the base 209 has a projection 230 pointing downwards whilst on the outside of the front plate there is a shaped projection 231. When the slide is fully home, the projection 230 engages behind the locking edge 232 of an opening 233 provided in the base wall 203 and thus holds the slide in a fully home, locked position.

To open the container it is unlocked by pressing lightly against the projection 231 from below. Since the edge 226 has a certain amount of play within the groove, the slide is lifted up by an amount sufficient to disengage the projection 230 from the locking edge 232. In contrast, the groove beneath the ridge 229 is so dimensioned that the edge region 227 is accurately guided and does not jam.

The embodiment shown in Fig. 7 comprises a housing 301 with top wall 302, base wall 303, side walls 304 and 305, a rear wall 306 and carrier slide 307 having a front 308 and a rear 310.

The spiral spring 314 corresponds with the spring 114 of the first embodiment and is guided in a similar manner. Slots 317 with co-acting projections 316 are again provided as stop arrangement to limit outward movement of the slide. Furthermore, sides 311 and 312 of the slide serve to guide the slide in conjunction with ledges 309a.

The base wall 303 is of shorter length than

the top wall 302 to accommodate a stop for locking the slide. The base 309 of the slide 307 is of a length equal to that of the base wall 303 and has an extension to which the front 308 of the slide is joined. The extension is stepped with respect to the base 309 as is indicated at 320. In this way, there is formed a recess 321 to receive the thicker section of the cassette. A catch 322 is separated from the front 308 and the extension by a slot 332 and has on its upper side a projection 223 with which there is associated a locking edge 224 in the top wall 302 of the housing.

As in the case of the previous embodiments, the housing and the slide of the embodiment of Figs. 7, 8, 8a are in each case injection-moulded parts of a plastics material each formed in one piece. The position of the cassette in the container is shown in Fig. 8. The functions of opening and closing of the container will be evident to the expert from the above explanation. The removal of the cassette is shown in Fig. 8a at three different stages each shown by broken lines. The ledges 309a also prevent the slide from tipping.

It should be noted that in the previously described embodiments the base of the carrier slide lies closely against the surface of the cassette, where this is not of the thicker section. In the area of the thicker section the base is stepped or cut away to accommodate that section. However, on the opposite side, the housing wall does not lie directly against the less thicker section of the cassette, because it is necessary to provide space for the guide ribs which prevent the spiral spring from flexing sideways. This may be seen most clearly from Fig. 3. As a result, although the container is reduced by a wall thickness of the housing or of the slide with respect to the known construction and also additionally by the thickness of the guide means which is present in the area of the thicker section of the cassette, it will be shown that it is possible to reduce the thickness even further.

In the fourth embodiment, shown in perspective in Fig. 9, both faces of the container, which lie closely against the less thick part of the cassette have a free space to receive the thicker section of the cassette.

This container comprises a housing 401 with a top wall 402, a rear wall 406 and side walls 403, 404. A base wall is not provided. The carrier slide 407 has a front 408, a base 409, a rear 410 and sides 411, 412, which impart a drawer-like configuration to the slide. The base 409 carries the usual projections 413. To the rear plate 410 there is secured by, for example rivetting, a flat spring 414, which is stressed inside the housing 401 against the rear wall 406 thereof. To guide the slide in the housing each side 411,

412 of the slide has a guide groove 420 which is associated with a corresponding guide rib 419 on the inner side of the corresponding side walls 403 and 404 of the housing. A slot 417 in one or both side walls 403, 404 forms a limit stop arrangement with a corresponding projection 416 on the side plate/plates 411/412, the function of this stop arrangement being obvious. A locking tongue 421 with a catch 423 serves as the locking mechanism. The tongue may be deflected resiliently from the side wall 403 because of incisions 422. In its relaxed state, the catch 423 engages the outer side of the front 408.

Both the base 409 of the slide 407 and the top wall 402 of the housing 401 are cut away as at 426 and 424 respectively to accommodate the thicker section of the cassette. There is thus an opening 424 in the base 409 of the slide 407 and a slot or a notch 426 in wall 402 of the housing. When the slide is fully home within the housing, the cassette is protected at its most sensitive points, that is, in the area of the cores of the tape reels and in the area of the front side which lies on the inside against the front 408. The front 408 engages the edges 426a appropriately set back, of the wall 402. The thicker sections of the cassette are free and the total thickness of the container need not be any larger than that of the cassette in this area. However, if it is desired to stack the cassette containers, which is frequently the case, then the thickness will be selected to be one or two tenths of a millimetre larger so that the thickened areas of the cassette do not lie directly adjacent. The stacking of individual containers is known.

Similar cut-aways 425 and 526 are also provided in the embodiment shown in Fig. 10. In place of the flat spring 414 in the fourth embodiment just described, there are arranged two resilient tongues 530 extending inwardly from the rear plate of the carrier slide 507. The resilient tongues 530 have the same function as the flat spring 414, namely, to push the slide out of the closed position in the housing 501 into the open position. The slide is guided in the housing in a manner analogous to that described in Figs. 5 and 6. The locking mechanism lies outside the area of greatest thickness of the cassette, as in the case of all the other embodiments. A catch 533 with a projection 534 on the base is separated by the slot 532, the housing having a corresponding recess 521 with a locking edge 520. Projections 516 limit the movement of the slide in conjunction with slots 517 in the base 509. The reference numerals 501—509, and 513 identify components that correspond to those components with the same final numbers in the previous embodiments.

Figs. 11 and 12 show an embodiment in

which the carrier slide 607 consists of an open frame only, the frame having a front 608, sides 611, 612, resilient arms 630 in place of a rear (as in the fifth embodiment) and also two tabs 631 which are arranged at right angles to the front inside the slide and support the cassette outside its thickened areas. The carrier slide is rigid enough to be guided by the housing 601. The housing also is cut away as at 633 to provide a free space for the thicker section of the cassette. The housing has top and base walls 602, and 603 respectively, side walls 604 and 605 and a rear wall 609.

As a stop arrangement the side wall 604 of the housing has a slot 606 in which a projection 615 on the side 611 of the slide is guided. For the purpose of locking the slide in the housing this side 611 carries a projection 617 which is associated with a locking edge 618 in an opening 619 of the side wall 604. To release the locking mechanism the catch 620 is pushed with a finger to the left (according to Fig. 12 which shows the slide in plan view), so that the entire slide is tilted in the housing and the projection 617 disengages the opening. The space required for the tilting is provided by making the housing 601 somewhat wider than the distance between the side plates 611, 612 of the slide; however, in this the left-hand side plate 612 has an angular supporting surface 640 which does not quite extend as far as the front plate 608.

As provided in all the other embodiments, the housing and slide of the embodiment shown in Figs. 11 and 12 are made of plastics material and are preferably one-piece injection-moulded parts.

WHAT WE CLAIM IS:—

1. A container for accommodating a standard magnetic tape cassette which is substantially a parallelepiped in shape and has on its upper and underside a thicker section approximately trapezoidal in shape starting from one longitudinal edge, which container comprises a housing with at least three walls, that is, one lying facing the top or base of the cassette and two side walls, and a carrier slide having a front wall for protecting the longitudinal edge of the cassette and a supporting surface for receiving the cassette, the container including guide means located outside the region of the container which is shaped to receive the thicker section of the cassette, which guide means serve to guide sliding movement of the carrier slide from a closed position in the housing, in which the carrier slide is held by means of a locking arrangement into an open position by the force of resilient means which is stressed during closing, and the top wall and/or the base wall of the housing and/or the supporting surface of the carrier slide have a

412 of the slide has a guide groove 420 which is associated with a corresponding guide rib 419 on the inner side of the corresponding side walls 403 and 404 of the housing. A slot 417 in one or both side walls 403, 404 forms a limit stop arrangement with a corresponding projection 416 on the side plate/plates 411/412, the function of this stop arrangement being obvious. A locking tongue 421 with a catch 423 serves as the locking mechanism. The tongue may be deflected resiliently from the side wall 403 because of incisions 422. In its relaxed state, the catch 423 engages the outer side of the front 408.

Both the base 409 of the slide 407 and the top wall 402 of the housing 401 are cut away as at 426 and 424 respectively to accommodate the thicker section of the cassette. There is thus an opening 424 in the base 409 of the slide 407 and a slot or a notch 426 in wall 402 of the housing. When the slide is fully home within the housing, the cassette is protected at its most sensitive points, that is, in the area of the cores of the tape reels and in the area of the front side which lies on the inside against the front 408. The front 408 engages the edges 426a appropriately set back, of the wall 402. The thicker sections of the cassette are free and the total thickness of the container need not be any larger than that of the cassette in this area. However, if it is desired to stack the cassette containers, which is frequently the case, then the thickness will be selected to be one or two tenths of a millimetre larger so that the thickened areas of the cassette do not lie directly adjacent. The stacking of individual containers is known.

Similar cut-aways 425 and 526 are also provided in the embodiment shown in Fig. 10. In place of the flat spring 414 in the fourth embodiment just described, there are arranged two resilient tongues 530 extending inwardly from the rear plate of the carrier slide 507. The resilient tongues 530 have the same function as the flat spring 414, namely, to push the slide out of the closed position in the housing 501 into the open position. The slide is guided in the housing in a manner analogous to that described in Figs. 5 and 6. The locking mechanism lies outside the area of greatest thickness of the cassette, as in the case of all the other embodiments. A catch 533 with a projection 534 on the base is separated by the slot 532, the housing having a corresponding recess 521 with a locking edge 520. Projections 516 limit the movement of the slide in conjunction with slots 517 in the base 509. The reference numerals 501—509, and 513 identify components that correspond to those components with the same final numbers in the previous embodiments.

Figs. 11 and 12 show an embodiment in

which the carrier slide 607 consists of an open frame only, the frame having a front 608, sides 611, 612, resilient arms 630 in place of a rear (as in the fifth embodiment) and also two tabs 631 which are arranged at right angles to the front inside the slide and support the cassette outside its thickened areas. The carrier slide is rigid enough to be guided by the housing 601. The housing also is cut away as at 633 to provide a free space for the thicker section of the cassette. The housing has top and base walls 602, and 603 respectively, side walls 604 and 605 and a rear wall 609.

As a stop arrangement the side wall 604 of the housing has a slot 606 in which a projection 615 on the side 611 of the slide is guided. For the purpose of locking the slide in the housing this side 611 carries a projection 617 which is associated with a locking edge 618 in an opening 619 of the side wall 604. To release the locking mechanism the catch 620 is pushed with a finger to the left (according to Fig. 12 which shows the slide in plan view), so that the entire slide is tilted in the housing and the projection 617 disengages the opening. The space required for the tilting is provided by making the housing 601 somewhat wider than the distance between the side plates 611, 612 of the slide; however, in this the left-hand side plate 612 has an angular supporting surface 640 which does not quite extend as far as the front plate 608.

As provided in all the other embodiments, the housing and slide of the embodiment shown in Figs. 11 and 12 are made of plastics material and are preferably one-piece injection-moulded parts.

WHAT WE CLAIM IS:—

1. A container for accommodating a standard magnetic tape cassette which is substantially a parallelepiped in shape and has on its upper and underside a thicker section approximately trapezoidal in shape starting from one longitudinal edge, which container comprises a housing with at least three walls, that is, one lying facing the top or base of the cassette and two side walls, and a carrier slide having a front wall for protecting the longitudinal edge of the cassette and a supporting surface for receiving the cassette, the container including guide means located outside the region of the container which is shaped to receive the thicker section of the cassette, which guide means serve to guide sliding movement of the carrier slide from a closed position in the housing, in which the carrier slide is held by means of a locking arrangement into an open position by the force of resilient means which is stressed during closing, and the top wall and/or the base wall of the housing and/or the supporting surface of the carrier slide have a



14

5

1,478,821

5

- free space to receive the thicker section(s) of the cassette.
2. A container according to claim 1 in which the guide means are formed by side plates of the carrier slide and side walls of the housing.
3. A container according to claim 1 in which the edge regions of the supporting surface of the carrier slide are guided in grooves in the side walls of the housing.
4. A container according to claim 1 in which the carrier slide has slide plates with guide grooves into which ribs on the side walls of the housing engage.
5. A container according to claim 1 in which a base plate of the housing is constructed as a guide surface for a section of the supporting surface of the carrier slide.
6. A container according to any one of claims 1 to 5 in which the carrier slide has a stepped profile matched to the height of the thicker section, and the housing has a free space for the section of the supporting surface of the carrier slide in the area of the thicker section.
7. A container according to any one of claims 1 to 5 in which the housing has a rear wall, a top wall and two side walls, the top wall having a notch which matches the trapezoidal outline of the thickened part of the cassette, and in which the supporting surface of the carrier slide provides the container base wall and has an opening matching said trapezoidal outline.
8. A container according to any one of the preceding claims in which the locking arrangement is manually releasable.
9. A container as herein described with reference to and as illustrated by Figs. 1—4, or Figs. 5 and 6, or Figs. 7, 8 and 8a, or Fig. 9, or Fig. 10, or Figs. 11 and 12 of the accompanying drawings.
- ABEL & IMRAY,
Northumberland House,
303—306 High Holborn,
London, WC1V 7LH.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1977.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.

