Description

The invention relates to a container for accommodating data storage media having the features mentioned in the precharacterising clause of patent claim 1. DE-PS 22 48 408 discloses a container which is intended and used for compact cassettes. It has on the front face of the slider member a plate which closes the housing when the slider member is inserted and can serve at the same time as a carrier for a label. For compact cassettes, which are usually grasped by their edges, in the known container the slider member has free spaces so that the cassette can readily be lifted over the said front plate of the slider member when the slider member has been ejected by the spring arrangement.

Because their surface dimensions are greater than a hand span, other types of data storage media, for example video cassettes or compact discs, are best grasped by being gripped around their edges, with the fingers pressing on the large surfaces. It is then desirable to be able completely to remove the data storage medium in alignment with the outward movement of the slider member, in which case a front wall on the slider member could be troublesome.

DE-U-79 17 351 discloses a further container for magnetic tape cassettes which has the features mentioned in the precharacterising clause of patent claim 1. In the known container, the transporter slider member is in the form of a plate which presses an inserted cassette in the direction towards an opening in the housing opposite the slider member. If a detent, which is formed integrally with the housing and secures a door element articulated on the housing, is lifted manually, the transporter slider member displaces the cassette by an amount sufficient for the cassette to be grasped and removed completely. While, therefore, the removal of a cassette is relatively troublefree, this is in no way

true of the insertion of a cassette into the container. The user must with the cassette press back the transporter slider member against the bias of its spring until the door element - which is pivotable about an axis parallel with the short side of the opening in the housing - can be pivoted upwards at least to such an extent that it itself secures the cassette. This type of manipulation not only is inconvenient, because it can scarcely be carried out with only one hand, but also involves the risk of the user trapping his fingers.

Starting from the combination of features in the precharacterising clause of patent claim 1, the problem underlying the invention is to provide a container which is intended for operation with one hand and in which manipulation is particularly convenient, these being prerequisites when such a container is to be installed in motor vehicles for use by the driver.

The solution provided according to the invention lies in the combination with the features mentioned in the characterising clause of patent claim 1. This design not only allows convenient removal but also, especially, troublefree reinsertion into the container, since the displacement of the door elements takes place automatically when the transporter slider member is inserted.

The subsidiary claims define developments of the invention.

Preferred embodiments of the subject of the invention are shown in the accompanying drawings and are explained in detail in the following.

Figures 1 to 3 show a first embodiment:

Fig. 1 shows a largely schematic longitudinal section through a container according to the invention with the slider member inserted,

Fig. 2 shows a front view, partly broken away, of a

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portion of such a container, and

Fig. 3 shows a largely schematic cross-section through a portion of such a container illustrating different phases in the opening and closing operations.

Figures 4 to 8 show a second embodiment:

Fig. 4 is a sectional partial view similar to Fig. 1,

Fig. 5 is a front partial view similar to Fig. 2,

Fig. 6 is a cross-sectional partial view with the housing closed,

Fig. 7 is a corresponding cross-sectional partial view with the slider member ejected, and

Fig. 8 shows a perspective view of a component.

Figures 9 to 12 illustrate a third embodiment:

Fig. 9 shows a front partial view similar to Fig. 2,

Figs 10 and 11 show a horizontal sectional partial view of a closed and an open container, respectively, and

Fig. 12 shows a front partial view of a closed container.

Finally, Figures 13 to 15 show a fourth embodiment:

Fig. 13 shows a perspective view of the container when open,

Fig. 14 shows a front view of the container when open, and

Fig. 15 shows a detailed sectional view of the front region of the housing.

The substantially box-shaped housing 100 accommodates a predetermined number of transporter slider members 102 each of which is for, for example, one video cassette 104. At its front face the housing is surrounded by a frame 106, and each individual compartment is assigned a pair of door elements 108.

Ribs 110 are formed integrally with the housing 100 in the region of the top wall 112 of the housing, which ribs divide the compartments for the individual cassettes 104 from one another. Corresponding ribs 114 which

project upwards from the base wall 116 of the housing 100 are also provided. The lower ribs 114 do not extend as far as the opening at the front face of the housing, so that the upwardly directed surface of each transverse rib 118 is left free. This surface is provided with bores which serve as bearings for lower pivot pins 120 of the door elements. At the upper end the door elements have corresponding pivot pins 122 which are received in aligned U-shaped recesses 124 in the front edge of the top wall 112 and which are covered by the frame 106 which is put on after the door elements have been inserted.

The ribs 110, 114 and 118 extend perpendicularly to the open front face of the housing and the same is true of the support ribs 126 which are formed integrally between the transverse ribs 118 and the base wall 116 of the housing 100. The ribs 114 extend laterally beyond the transverse ribs 118, and in this way, these ribs, taken in pairs, define guide channels, there being a respective guide channel for the slider member assigned to each particular compartment.

The housing, the frame and the door elements are all moulded plastics parts. The slider member, which will now be described, is also a moulded plastics part.

The slider member comprises a base plate 130, which extends parallel to the base wall of the housing 100 and to which there are joined, perpendicularly thereto and parallel to the open front of the housing, a transport arm 132 and a pressure arm 134 extending upwards and downwards, respectively. The transport arm 132 is positioned at the rear end of the slider member and pushes the cassette 104 outwards. For this purpose there is used a helical compression spring 136 which is supported, on the one hand, against the rear wall 138 of the housing and, on the other hand, against the pressure arm 134. At the front end of the base plate 130 there is a button 140 which can be deflected resiliently downwards

and when so deflected lifts a detent 142 out of a catch constructed in the form of an opening in the rib 118, as a result of which the slider member is released for ejection by the spring 136. The deflectable region of the base plate 130 terminates at a support plate 144 which extends downwards perpendicularly from the base plate 130. The support plate is arranged off-centre as it is necessary to leave adjacent thereto space for a resetting spring 146. A pin 148 formed integrally with the base of the housing limits the outward travel, since the pressure arm 134 runs up against it.

On the upper side of the base plate, directly behind the door elements when the container is closed, control pins 150 are formed integrally which exert a torque on the door elements when the slider member is ejected (Fig. 3, top). The ejection path of the slider member is long enough for the cassette to be transported out of the housing until it is a considerable distance in front of the door elements and can easily be grasped (Fig. 3, bottom). When the slider member is re-inserted (Fig. 3, centre), the control pins 150 run up against stop tongues 152 on the door elements and then exert a torque in the closure direction, the slider member being pushed by means of the button. When the button is released, the slider member is locked again in the housing.

It should be mentioned that in the left-hand part of Fig. 2 the frame 106 is shown broken away and in the right-hand part of Fig. 2 the door elements and the button have been removed so that the construction of the slider member can be seen.

The embodiment according to Figures 4 to 8 differs from the first embodiment according to Figures 1 to 3 by the construction and arrangement of the door elements and the slider member whilst, unless otherwise indicated, the housing 201 corresponds essentially to that of the first embodiment.

The slider member again comprises a base plate 200, from which a support plate 202 projects downwards on each side. A helical compression spring 203 again acts on the pressure arm 204, and the transport arm 206 pushes the data storage medium - again assumed to be a video cassette - outwards when the slider member is unlocked. For this purpose there is used an upwardly movable unlocking button 208 which is formed integrally with the base plate of the slider member and can be resiliently deflected, the detent 210 being lifted out of a catch 212 formed as a recess in the base of the housing.

Vertical ribs 214 project upwards from the base of the housing. Between these ribs there is guided a carriage 216, shown in perspective in Fig. 8, which has a U-shaped cross-section and between the arms 218 of which the slider member is guided. The slider member 200 and the carriage 216 can be moved relative to one another in the manner of a telescope: the travel of the carriage is limited by its stop 222, which runs in a slot 220 in the base of the housing, running up against the edge 224 of the slot, and the slider member 200 for its part has stops 226, formed integrally with the support plates 202, which run up against the end edge 228 of the carriage. Resetting lugs 230, formed integrally with the underside of the button, push the carriage back into the starting position, shown in Fig. 6, when the slider member is reinserted.

The transverse ribs 232 on the housing, which engage over the slider member 200, and the retaining ribs 236, which support the cassette 234, extend forwards from the rear wall 238 of the housing just so far as to leave the forward area of the slider member and of the carriage, in the inserted position (Figs 4 and 6), supported at the sides only by the vertical ribs 214, a step 240 being taken out of each of the front edges thereof. The carriage 216 has outwardly directed bearing recesses 242

which, when the carriage is in the ejected position, are positioned next to the said steps 240. In these bearing recesses there are seated the bearing pins 244 of a door element 246, each door element being of an angle form in cross-section.

In the storage position, the door elements are kept shut by the vertical ribs 214. When the locking mechanism is released, the front edge 248 of the slider member 200 runs up against the internal sloping surfaces 250 of the door elements 246 and on so doing exerts both a pulling force on these, and therefore on the carriage, and a torque on the door elements. Initially the pulling forces are effective because the door elements cannot yield, so that the carriage 216 is moved along. It is only when its stop 222 runs up against 224 and, at the same time, the steps 240 allow the door elements to pivot, that the torque also becomes effective and the door elements open, as shown in Fig. 7. The process is reversed for closure, the resetting lugs 230 transferring the force to the carriage 216. The carriage 216 and door element 246 thus form a common assembly that is to be understood as the "door arrangement".

In the embodiment according to Figures 9 to 12, for each compartment of the container - and here too a video cassette 300 is shown as an example - only one door element 302 is provided which is mounted with bearing pins 304 in the top wall 306 of the housing and the base wall 308 of the housing in such a manner that it can pivot about a vertical axis. The slider member again has a base plate 310, a transport arm 312 and a pressure arm 314 having functions corresponding to those in the first embodiments. The base plate 310 is guided between rails 316 on vertical ribs 318 on the housing 301.

A control pin 320 projects downwards from the base plate of the slider member and into a control slot 322 of a lever 324 which can be pivoted about a bearing pin 326

formed integrally with the base wall of the housing. A helical tension spring 330 is suspended on a pin 328 attached to the internal side of the door element and is fastened by its other end, at 332, to the lever 324.

In the closed position (Fig. 10) the control pin 320 has pivoted the lever 324 in the clockwise direction, the spring 330 having transferred a torque to the door element 302 so that it has swung shut. When the slider member is released by actuation of the button 334 (Fig. 12), first of all the slider member presses against the door element and on so doing opens the container; the control pin 320, however, pivots the lever 324 in the counter-clockwise direction so that the bias of the spring 330 is reduced and it finally acts like a rod which completely opens the door element. This position of the lever 324 is defined by a stop 336. When the slider member is inserted the process proceeds in reverse order. It will be understood that the use of the spring involves fewer tolerance problems than if a rigid transfer rod were used, although this is, of course, quite possible in principle.

A fourth embodiment is shown in Figures 13 to 15. This container is designed for the storage of digital recording discs, that is to say, for example, the so-called compact discs or video discs. In a container of this type it is necessary that, on the one hand, the discs are housed in a stack as close together as possible in order to save space and, on the other hand, that each individual disc should be easy to find and remove. These requirements are satisfied by the container according to Figures 13 to 15 in that each individual disc 701 is accommodated in a holder 700 of which several are provided one next to the other in a common housing 702. All the holders are assigned a common slider member 708 which has, however, a selector mechanism - here in the form of a rotatable selector knob 706 - which ensures

that whenever the slider member is ejected only one of the holders is carried with it and the other holders remain in the housing.

All the holders 700 are guided so that they can slide, for example, by means of upper and lower rails 738 on the housing or slider member. There is formed integrally with the inner face, opposite the opening in the housing, of the rear wall of the housing a locking device 703 of comb-like construction into the locking openings of which the locking projections 705 of locking arms 704, which are deformable resiliently in an upward direction, on the holders can engage. The spring characteristic of the arms 704 and the locking sloping surface 707 of the projections 705 are so designed that, when the slider member is ejected from the housing, the holders are retained in the housing with the exception of the one holder that has been selected by means of the selector knob 706, which holder is coupled in positively-locking manner with the slider member and is therefore carried along when the slider member is ejected; the ejection spring arrangement 709 is so designed that the locking forces are overcome.

The selector knob 706 is pivotally mounted in the front wall 722 of the slider member and can be engaged in as many positions as there are holders 700. In the interior of the slider member the selector knob axis carries a radial coupling arm 710 which extends through a slot 711 in the upper side of the slider member and engages in a coupling cut-out portion 712 of a holder, according to the angular position of the selector knob, as a result of which the holder selected is coupled with the slider member and is carried along when the slider member is ejected. The disc can then be removed from the holder upwards or forwards, for which purpose the holder has cut-out portions 724 and 726 allowing access for the fingers.

In the inserted state, the slider member is held locked in the housing against the bias of the spring arrangement 709. For this purpose, on the rear face of the slider member there is provided a guide cage 720 which contains a displaceable and pivotable latch 716. The controlling and locking extension piece 718 of the latch 716 is guided into a locking position by a guide member 714, formed integrally with the base of the housing, when the slider member is inserted and is unlocked again when pressure is briefly applied to the knob 706. The slider member is guided both on the base of the housing and by means of an inwardly projecting bar 736. On the side of the housing opposite the bar there is pivotally mounted a door element 728 which is biased by a tension spring 730 towards its closed position shown by the solid lines in Fig. 15. The slider member carries on its upper side a bar 734 of which the end edge 732, which is set back towards the inside, strikes the door element when the slider member locking mechanism is released, the door element being held open by resting against the outer face of the bar 734.

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Patent Claims

1. Container for accommodating data storage media (104, 234, 300, 701) in the form of magnetic tape cassettes or discs, having a housing (100, 201, 301) that is open at one narrow face for accommodating at least one data storage medium-transporter slider member (102, 200, 310, 708), having a spring arrangement (136, 203, 709), acting between the housing and the slider member, for ejecting the slider member, which on ejection transports an inserted data storage medium through the opening in the housing into a position in which it can be grasped, having a door element (108, 246, 302, 728) for closing the space intended for the data storage media, which door element (108, 246, 302, 728) is pivotally mounted on the housing, and having a locking arrangement (142, 210, 718) for securing the inserted data storage medium against the bias of the spring and for keeping the door element closed, which locking arrangement (142, 210, 718) can be unlocked manually by means of an operating member (140, 208, 334, 706), characterised in that the slider member has an element (130, 202, 708) that extends into the opening in the housing and is provided with the operating member on its portion that is exposed at the front face and that is not covered by the door element, and the door element is positively guided into its open and closed position under the control of the movement of the slider member.

2. Container according to claim 1, characterised in that the housing has several transporter slider members (102, 200, 310) each having individually associated door elements (Figs 1-3, 4-8, 9-12).

3. Container according to claim 1 or 2, characterised in that each transporter slider member (102, 200) is

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associated with a pair of door elements (108, 246) that can be pivoted in opposite directions (Figs 1-3, 4-8).

4. Container according to any one of claims 1 to 3, characterised in that the slider member (102) has actuator members (150) for each door element (108) associated therewith, which actuator members are in operative connection with the door elements only at the beginning of the outward travel of the slider member and at the end of the inward travel of the slider member (Figs 1-3).

5. Container according to any one of claims 1 to 3, characterised in that the slider member (200, 310) is in operative connection with each door element (246, 302) associated therewith by way of a coupling element (216, 324) (Figs 4-8, 9-12).

6. Container according to claim 5, characterised in that the coupling element is arranged to transfer a part of the stroke of the slider member to the door elements at the beginning of ejection and at the end of insertion.

7. Container according to claim 5 or 6, characterised in that the coupling element is a carriage (216) that can be displaced parallel to the slider member (Figs 4-8).

8. Container according to claim 7, characterised in that the door elements are mounted in the carriage (216).

9. Container according to claim 5 or 6, characterised in that the coupling element is a transfer lever (324) (Figs 9-12).

10. Container according to claim 9, characterised in

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that the transfer lever is coupled resiliently with the door element.

11. Container according to claim 1, characterised in that the slider member (708) has a control bar (734) by means of which the door element (728) can be pushed open against the force of a spring (730) biasing it towards a closed position and can be supported in an open position (Figs 13-15).