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The invention relates to a container for storing recording media. A large number of such containers are known for commercial tape cassettes and compact cassettes, and reference should here be made to the following publications: DE-PS 22 48 408 and DE-PS 25 21 371.

The known containers have the features mentioned in the pre-characterising clause of Patent Claim 1.

In addition to the commercial tape cassettes, magnetic tape cassettes which are intended for recording picture and sound signals are coming into ever wider use and will be referred to hereinafter as video cassettes. No definitive type of construction has as yet come to the fore for such cassettes, and apart from their generally rectangular basic shape they differ considerably from one another, also with regard to their dimensions. It is true, however, that a common factor is that they are even more sensitive than compact cassettes to rough handling and dust. There is accordingly a need for a suitable storage container. As is fundamentally necessary for storage systems, in this case there is again a requirement that the container itself should take up as little space as possible, should have a low production cost, and should as far as possible be of modular construction, that is to say, similar containers should be combined with one another to form archives. A further requirement arises from the fact that such archives should make the best possible use of a given space, the depth of customary shelves corresponding to a great extent to the maximum length of video cassettes. Finally, it goes almost without saying that the manipulation of the container,

that is to say the removal and insertion of the cassettes, should be simple and convenient for the user; owing to the considerably larger dimensions of video cassettes compared with compact cassettes, this means among other things that the cassette should be capable of being grasped by its broad faces.

DE-A-27 29 492 describes a container for storing music cassettes in which a box as the outer housing accommodates an insert that can be moved out of the box for a certain distance. The open narrow side of the box can be closed by means of a lid which is hinged onto the box and is in turn coupled by way of a mechanism or the like to the insert in such a way that when the lid is opened the insert is also moved a short distance out of the box.

In addition to video recorders, many households also possess sound reproducing apparatuses, and a great future is to be expected for so-called "compact discs" or compact records owing to their considerably improved properties compared with conventional records or cassettes. Also for these media or record supports there is the problem of housing and handling, and since the two recording media especially referred to here will presumably be present not alternatively but additionally to each other, it would be desirable to have available containers which while outwardly of the same form can be adapted to one or the other recording medium system.

The problem on which the invention is based is to provide a container for magnetic tape cassettes, compact discs and, if required, further recording media, which takes into account the above requirements.

The features provided according to the invention in order to fulfill this aim are listed in the characterising clause of Patent Claim 1.

A container is thus produced which offers the

following advantages:

Unlike the two known containers, in the case of the embodiment according to the invention the cassette need not be lifted over the front plate of the slider member during insertion or removal; in the case of the relatively large dimensions of video cassettes this would in fact mean that either the containers would have to be thicker than necessary for the actual space taken up by the cassette, or the slider member would need to travel so far out of the housing that its stability could no longer be guaranteed. Nevertheless, sufficient protection against dust is provided by means of the preferably pivotably movable lid which is formed by the front wall. The cassette can be grasped by its broad faces, which is good from the ergonomic viewpoint, and several containers can be put together to form archives in such a way that the cassettes lie or stand in them. It is thereby of particular importance that the rectilinear guiding of the slider member is maintained; it is therefore cleanly guided over the whole travel distance so that the risk of jamming is minimal even if, as is preferred for reasons of cost, the parts sliding upon one another are made of plastics material.

Such a container is however also suitable for compact discs which can be stacked in a narrow space but can nevertheless be easily accessible for removal, particularly if, as is preferred, after the container has been opened and the slider member has been pushed out the previously closely packed discs are allowed to fan out.

Patent Claims 2 to 47 define suitable developments of the subject of Patent Claim 1, the significance of the individual features being revealed by the description of the embodiments.

Embodiments of the subject of the invention are

explained in greater detail below with reference to the accompanying drawings.

Fig. 1 shows in a schematic longitudinal section a first container when closed,

Fig. 2 shows the container in a similar view but opened,

Fig. 3 shows an exploded view of the container in perspective with parts cut away,

Fig. 4 shows, in a schematic sectional view, immediately before assembly, the position of components that are to be assembled,

Fig. 5 corresponds to Fig. 4, but shows a side view,

Fig. 6 shows a rear view of several containers stacked to form a block,

Fig. 7 shows a plan view of an edge region of one of the stacked containers,

Fig. 8 shows the corresponding mating element of the next container in a view from below,

Fig. 9 shows in section a detail of the mating element,

Fig. 10 shows a container housing according to the invention, in which several cassettes can be housed, in a view from the front,

Fig. 11 is an enlarged view of the area marked by "11" in Fig. 10,

Fig. 12 is a partial section along the line 12-12 in Fig. 10,

Fig. 13 is a sectional view along the line 13-13 in Fig. 10, but with the spring omitted in the middle compartment and the slider member omitted in the second compartment from the top,

Fig. 14 is a vertical section through a further embodiment of a container,

Fig. 15 is the corresponding horizontal section,

Fig. 16 is the corresponding front view, with the lid omitted,

Fig. 17 shows an alternative form of the lid from the front,

Fig. 18 is the corresponding side view,

Figs. 17a and 18a show a further form similar to Figs. 17/18,

Fig. 19 is a front view of a multiple block for several cassettes, showing three compartments with lid, one compartment with ejector spring, one compartment with slider member and one compartment empty,

Fig. 20 is a partial sectional view through several compartments in the front region to show the lid arrangement,

Figs. 21 to 24 are sectional or partial sectional views of a further embodiment,

Figs. 25, 26 and 27 show inserts for the first and/or second embodiment for adapting to smaller external dimensions of cassettes,

Fig. 28 shows in section a further embodiment of a container, the rear portion being cut away,

Fig. 29 shows in perspective from below the slider member for the embodiment according to Fig. 28, and

Fig. 30 shows in perspective a positive-acting guiding arrangement for the opening and closing of a container lid,

Figs. 31 to 45 refer to a preferrred embodiment,

Figs. 46 to 49 refer to a further embodiment,

Figs. 50 and 51 show a further embodiment,

Figs. 52 to 54 illustrate a further embodiment,

Figs. 55 to 60 show another type of construction of a container for adaptation to cassettes of different sizes,

Figs. 61 to 63 show schematically a "Mediotech",

Figs. 64 to 70 refer to containers to accommodate disc-shaped recording media, especially so-called "compact discs", and

Figs. 71 to 80 show an alternative type of container construction for flat, disc-shaped recording media, particularly for so-called "compact" discs.

Video cassette containers are dealt with first.

Figs. 1 to 13 relate to a first type of construction of the container. Fig. 1 shows a substantially block-like housing 30 with floor 32, top wall 34, rear wall 36 and side walls 38. A transport slider member 40 is housed in the housing so that it can slide. Fig. 3 shows that on the housing floor 32 guide ribs 42 are formed along which run guide ribs 44 formed on the slider member. Resting at one end against the rear wall 36 of the housing and at the other end against a rear plate 46 of the slider member there is an ejector spring 48 which in this case is constructed as a helical spring. It fits on projections 50 moulded onto the rear wall 36 of the

housing and during the ejection of the slider member is secured against buckling by means of supporting rails 52 which are formed on the top and bottom walls of the housing. The front region of the slider member is also guided on the bottom supporting rails, its bottom plate 54 being provided with notches 56 for this purpose. On the underside of the bottom plate 54 of the slider member two lug-like stop members 58 are provided which run in slots 60 of the housing floor 32 and limit the ejection movement of the slider member when they run up against the end 62 of the slots.

Over the greater part of its extension in the ejection direction, the bottom plate of the slider member is narrower than the inside of the housing, but it widens out towards the front of the housing with two wings 64 having at their outer edges cheeks 66 which extend upwards. Moulded onto each of the cheeks is a hollow cylindrical sleeve 68, and each cheek is provided with a short straight slot 70 and an arc-shaped slot 72, centred on the axis of the sleeve 68. The depth of the slots can be seen in Fig. 4.

The outer wall of the sleeve 68 forms the bearing pin for the lid 74, while at the same time it accommodates a helical torsion spring 76 with projecting ends, one leg of which engages in the slot 70. The lid has bearing sockets 78 complementary to the sleeves 68 with a further slot 80 projecting away to accommodate the other leg of the spring.

During assembly the arms 82 of the lid, which has a substantially U-shaped plan, are pushed apart so that the bearing sockets 78 can snap over the sleeves 68. The helical torsion spring 76, previously inserted into the sleeve, is thereby centred at the same time by means of the pin 84 in the centre of the bearing sockets. This

position is shown in Fig. 5. If the lid is now pivoted counter to the direction of the arrow 86 in Fig. 2, the stop pin 88 snaps into the slot 72, with the helical torsion spring at the same time receiving the required pre-tensioning, that is to say, into the position of the lid shown by dash-dotted lines in Fig. 2.

The main part of the lid 74 comprises a grip strip 90 which projects further forwards in relation to a front plate 92 so that a step 94 is produced. On this rests a transparent protective shield 96 for a label (not shown) during welding or adhesively securing,and the removal of the label is facilitated by means of a cut-away portion 98 of the front plate 92.

The arms 82 of the lid have hooks 100, which when the slider member is pushed into the housing slide along beneath the top wall 34 of the housing until the slider member has reached its inner end position. The user thereby presses the entire slider member assembly inwards against the bias of the ejector spring 48. To remove the cassette, the grip strip is pressed downwards, arrow 102 in Fig. 1, whereupon the hooks 100 are lifted out of the apertures 104 which extend through the top wall 34 of the housing and in which they had engaged when the housing was closed, under the influence of the helical torsion spring 76. In order that the cassette should not be catapulted out if the user releases the grip strip immediately after pressing it down, a brake pad 106 made of foam material is provided. For the rest, the housing, the slider member, the lid and the protective shield consist of plastics material.

Fig. 6 shows an example, in a rear view, of how several such containers can be stacked into a vertical block by providing stacking rails 108 and stacking grooves 110 on the top and bottom wall, 36 and 34 respectively, of

the housing. Corresponding elements 108' and/or 110' may also be provided at the sides. For aesthetic reasons, these elements do not project quite as far as the front (cf. Fig. 8). Fitting together during stacking is facilitated by means of the widening 112 of the grooves 110, and the holding together of the containers is ensured by means of the locking lugs 114 which snap resiliently into a depression 116.

As can be seen from Figs. 10 to 13, however, several slider members according to Figs. 1 - 5 can also be accommodated in a common housing. This consists of an outer frame 120, the floor 32' and top wall 34' of which correspond to the embodiment according to Figs. 1 - 3. Moulded onto the side walls 122 of the frame 120 are U-shaped retaining means 124 into each of which an intermediate plate 126 can be inserted. The intermediate plates correspond on the upper side to the floor and on their underside to the top wall in Figs. 1-3. The outer frame is provided at the front with edges 128 which spring inwards and on which the intermediate plates come to rest when there is placed and attached onto the rear of the frame 120 an end wall 130, the spring retaining projections 50' then also being formed thereon.

The embodiments described have the advantage that the sliding guide means for the slider member can be provided in the central region of the latter, thereby reducing the risk of jamming due to being in an inclined position (non-uniform pressure on the grip for example). Complementary elements of the guide means must of course then be provided on the housing in the central region, and this makes it difficult to injection-mould a block housing in one piece.

The embodiment according to Figs. 14 to 20 does not have these features, and can therefore be produced at a favourable cost.

Figs. 14 to 16 show a single container. The housing 200 in this case also has a top wall 202, floor 204, rear wall 206 and side walls 208. Unlike the illustration according to Figs. 1-13, in this case the cassettes are not stored so that they are "lying" on their broad face, but "standing" on one of their longer narrow sides, so that the side walls 208 here have the largest dimension.

A slider member 210 which is L-shaped in plan view is slidably guided in the housing. The limb 212 of the slider member L-shape which projects towards the opening of the housing has an inverted U-shaped cross-section (cf. Fig. 16) so that it can support itself against the side walls 208 and against the floor 204; in addition, lateral ribs 214 moulded onto the side walls 208 of the housing engage over this limb. Against the shorter limb 216 of the slider member there presses the ejection spring 218, resting against the rear wall 206 of the housing and secured against buckling by means of further ribs 220, which also engage in recesses 222 in the limb 216 of the slider member. An inserted cassette rests against the side of the limb 216 remote from the spring 218. The lug 224 on the limb 212 of the slider member fits on a resiliently springing tab 226, the shape of which is defined by a cut-out, so that the slider member can be introduced into the housing, whereupon the lug drops into the slot 228 in the floor 204 and secures the slider member so that it cannot drop out when it reaches the end of its ejection travel, by running up against the end edge 230.

The lid 232 is hinged on at the front end of the limb 212 of the slider member. The hinged attachment is

similar to that in the first embodiment, but the sleeve 234 is in this case cut out to approximately 90° in order to limit the angle of opening of the lid, and a snap catch indicated by 236 is provided between the slider member and the lid. The lid which is supported on only one side is stiffened by means of two ribs 238. The locking hook 240 moulded onto the lid engages in the hole 242 in the housing when the container is closed. The arrow 244 indicates where the user must press on the lid in order to release the locking system (cf. also Fig. 19); owing to the unilateral hinged attachment of the lid, the release is preferred at this point. Alternatively, a strut 246 may be raised from the limb 212 of the slider member to the top wall and thus provide a second hinge point 248 for the lid, shown in Figs. 17 and 18. The result of this is that the lid 232' has an improved resistance to warping.

With this embodiment, putting together several compartments in a common housing can be achieved even more simply than according to Figs. 10 to 13. This is shown in Figs. 19 and 20.

As revealed by the explanation for Figs. 14 to 16, the side walls 208 have functional parts only near the floor 204, so that in the case of the block housing the remainder of the walls may be omitted. Only separating ribs 250 are provided against which the inserted cassettes rest and the thickened portions 252 correspondingly carry the ribs 220,214 on the walls 208' remaining on the floor side. Spring 218, slider member 210 and lid 232 correspond to the preceding description, but the lid is stepped in profile (cf. Fig. 20) at 254 in order to leave free the deflection path for the unlocking operation, without however producing an ugly open slot. In the region 256, labels may be adhesively secured on or inserted behind a transparent window.

In order for it to be possible also to accommodate cassettes with smaller external dimensions, in all the compartments of the housing, or in the inside of a single container - shown in Figs. 14 to 16 - leaf springs 260 are attached, for example by clamping in a thickened end 262, as illustrated. At the free end of the leaf spring there is angled a hook 264 against which a shorter and narrower cassette comes to a stop. When a wider cassette is pushed in, however, it deflects the leaf spring already at its curvature 268, so that the hook becomes ineffective, as shown by dashed lines. In addition, the spring 260 also fulfills the function of the checking means 106 in Fig. 2.

Figs. 21 to 24a show a second embodiment. The housing 900 is again in this case divided into a receiving space for the cassette and a lateral channel; in Fig. 22 there can be seen the H-shaped cross-section of the ejector 902 which fills this channel and closes it at the front with a button 904. As can be seen from Fig. 21, the ejector has on the inside an ejector arm 906 and from this there extends towards the opening of the housing a longitudinal limb 910 which is guided by means of the lateral H-shaped limb 912. Against a second arm, the spring arm 914, there presses the helical compression spring 916 which is secured against buckling by means of ribs 918. The lid 920 is pivotably hinged at 922 onto the longitudinal limb of the ejector so that the front of the housing is also closed in the region of the cassette receiving space.

On the channel side of the limb 910 of the ejector a slide channel 924 is formed, the profile of which can be seen in Fig. 23. With the slide channel there cooperates a post 926 which is moulded onto the housing floor 928. When, as in the embodiment illustrated, the housing and the ejector as well as the lid are injection-moulded plastics

parts, it is advisable - as illustrated - to provide in the floor 928 an aperture 930 through which the corresponding die projects during injection moulding. The post 926 has a cross-section with a retaining edge 932 which catches in a complementary notch in the slide channel 924 when the ejector is locked in the housing.

To remove an inserted cassette, the button 904 is pressed, whereby the slide channel is displaced relative to the post 926. Its control edge 934 thereby pushes the resiliently deflectable post 926 away downwards in Fig. 23 until it can recoil into its rest position as soon as it is liberated by the slide channel. If the user now slackens the pressure on the button, the control surface 936 pushes the post aside again, in the opposite direction now, and the unnotched edge 938 of the slide channel slides past the post so that the ejector transports the cassette with it to the outside. During closing, the control edge 940 of the slide channel brings the post 926 back again into the position shown in Fig. 23.

Together with the cassette, the entire ejector, as well as the lid hinged onto it, is transported forwards. In the articulation of the lid a spring, preferably a helical torsion spring with projecting ends, is inserted in such a way that the lid is biased into the open position according to Fig. 24. During closing, the lid runs up against the end edge of the housing with its cheek 942 and is thereby closed, as illustrated by solid lines in Fig. 24a.

What has already been stated above for the embodiments with regard to stacking of individual housings or formation of block housings, limitation of the ejector travel, etc., may also be accordingly applied in the case of the embodiment last described.

Fig. 25 shows how an adaptor 400 placed onto the

slider member 40 according to Fig. 1-13 permits the adaptation to shorter cassettes. Similar in shape is the adaptor 400', which can be pushed with a tongue 402 into an aperture 404 in the shorter limb of the L-shape of a slider member 210 according to Figs. 14-16 and fixed by means of a push button 406 which engages in a hole 408 provided for this purpose in the slider member.

Figs. 17a and 18a show a further embodiment in a similar view to Figs. 17 and 18.

The housing 500 is again substantially rectangular in shape. Resting against its rear wall 502 is the ejector spring 504 which is in the form of a helical compression spring and acts on the transverse limb 506 of the transport slider member 508. The transverse limb 506 is narrower than the inside width of the housing, as can be clearly seen from Fig. 17a, and adjoining both its ends are longitudinal limbs 510 and/or 512. These serve to guide the slider member, for which purpose guide ribs 514 which engage behind the longitudinal limbs are moulded onto the housing. Owing to the narrower construction of the transverse limb, when the slider member slides out of the housing the transverse limb can slide past the guide ribs, and also the further ribs 516 which secure the spring 504 against buckling.

The lower longitudinal limb 512 - similarly to Figs. 17 and 18 - is constructed with a U-shaped cross-section, while the upper longitudinal limb 510 rests smoothly against the upper top wall. The basis for this different construction lies in the fact that when inserting a cassette the pivoted cheek 517 of the lid 518 would cause interference below, whereas this is not the case at the top. However, the longitudinal limb could also be constructed above as it is below. The lugs 524 correspond in function to the lugs 224 in Fig. 15, and the lug 526 on the upper longitudinal limb naturally turns out smaller.

The locking and unlocking system is constructed as in Fig. 14. Stiffening ribs 528 limit the deflection of the transverse limb 506 under the influence of the spring 504.

It may be advisable in the case of the container according to the embodiments described above to damp the cassette ejection movement, perhaps by providing a piston/cylinder arrangement with throttling of the passage of air.

In the embodiment according to Figs. 28 and 29, the slider member 600 and a lid assembly 602 are a one-piece injection moulded part, the articulation 604 also being moulded on at the same time. In a cutaway portion 606 in the central part of the articulation a helical torsion spring 608 with projecting ends is inserted in such a way that the lid assembly 602 is biased into the removal position for the cassette 610 shown in Fig. 29 (indicated by dashed lines in Fig. 28). The longitudinal plate 602' is locked by lugs 612 in recesses in the housing 614, and the locking system can be released by means of pressure on the button 616. Unlike the first embodiment described, in this case no floor plate is provided for the slider member, but the slider member is guided with a "top plate" 618 on the upper side of the housing. Otherwise there is a substantial similarity between the two embodiments.

In the Figures described hitherto, the lid was biased by means of a spring bias, in the region of its articulation, into the cassette removal position. Figure 30 shows that the spring bias of the ejector or main spring can also indirectly bring about the opening of the lid: the lid 704 hinged onto the slider member 700 at 702 by means of pins has an extension 706 which projects into the inside of the housing and on which a pin 708 is moulded. The latter engages in a groove 710 which is provided inside the housing in the narrow wall 712. In

the opening position illustrated, the end of the groove forms the stop to limit the angle of opening; if the cassette is now pushed in, the pin is guided along the groove and pivots the lid back into its closed position. For opening, the process is reversed. This type of lid actuation is particularly advantageous when the lid does not act simultaneously as unlocking member.

Figs. 31 to 45 refer to a further embodiment, and Figs. 33 and 37 to 39 show possible alternative forms.

In this embodiment, five cassettes are in each case housed in a common container. It is to be understood, however, that this number is not obligatory and that for other desired numbers a person skilled in the art can easily work out the slight modifications himself. The container is so constructed that it can be stacked with further similar containers.

Fig. 31 shows the container from the front. In the housing 800 five slider members 801 are guided, the lid 802 of which is divided into an upper section 803 which can accommodate a label, and a lower section with a button 804.

The housing 800 has a base 805 which can be seen as an edge strip running round in Fig. 32 and has in its rounded corners circular seats 806 for small non-slip feet 811 which can be pushed in or adhesively secured. In the parallel slots 807 of the housing floor run the stop lugs 808 of the slider members, which lugs limit the outward travel of the latter.

According to Fig. 33, the base 805 may be constructed as a lateral guide for a flat drawer 809 with handle 810; in such a drawer there can be placed informative material concerning the recordings on the inserted cassettes.

The curved recess 812 in the base serves as a centring means during stacking, for which purpose a complementary centring projection 813 is provided on the top of the

housing. Also formed on the housing 800 at the rear are lateral spacing projections 814 for the lateral juxtaposition of several similar containers. The front housing collar 815 is slightly higher than the top wall 816 of the housing which adjoins it at the back, as can be seen from Fig. 34, and into which a further container is set down. The housing collar 815 is a separately produced part which is snapped onto the housing 800, at several points on its periphery; such a snap connection can be seen in Fig. 36 at 817, with holding-down means 835 supporting the front edge of the housing from the other side.

The left-hand side of Fig. 35 shows a view of the rear wall 818 in a housing 800 that has been cut open. In the central area of the drawing it can be seen that for each slider member in the corresponding housing compartment a retaining and centring ring 819 for an ejector spring (as indicated in Fig. 34, this is a simple helical spring) is moulded onto the rear wall 818. The guide ribs 820 in each case engage between upper runners 821 and/or lower runners 822 of the slider member which in order to reduce friction have the smallest possible surface area; between the guide ribs further ribs 823 are provided on which the slider member - as will be explained below - is locked. In the left-hand compartment of the housing there is drawn a slider member in a sectional view approximately in the plane A-A in Fig. 40, in which it has vertical struts 824. In the compartment adjoining that one the slider member is drawn in section approximately in the plane B-B, and an inserted cassette 825 is indicated with its outline shown by dashed/dotted lines. A programme leaflet 826 or the like which may be inserted with it cannot hinder the movement of the neighbouring slider member since it is supported by the vertical strut 824.

Figs. 40 to 45 show the slider member in detail. It

comprises a rear frame 827 which has moulded onto its rear wall 828 on the side facing the rear wall 818 of the housing a centring ring 834 corresponding to the centring ring 819 of the latter and also a reinforcing cross ribbing 830. The two horizontal struts 831 have the H-shaped profile shown in Fig. 35, in which the transverse limbs are provided with weight-saving apertures 832. In the downward facing channel of the lower horizontal strut there is moulded a support 833 for the above-mentioned stop lug 808. The lateral ribbing of the vertical struts serves to provide stability of shape when the frame 827 is injection moulded from plastics material.

In extension of the transverse rib of the H-shaped profile of the horizontal struts 831 there extends in each case towards the front (therefore to the left in Fig. 40) a bearing eye 836 which is stepped towards the inside with a contour which is shown in Fig. 41 by dashed lines. Centred on the contour arc 837 there is moulded a bearing bore 838 - cf. Fig. 43 - through which projects a bearing pin 839 on the respective horizontal arm 840 of the lid 841, being held by the fact that it snaps in. The apertures 842 on the side of the arms 840 remote from the bearing permit the unmoulding of the lid during injection moulding.

The vertical end wall 843 of the lid carries a vertically movable button 804 with integral slider member latch 844, the construction being most clearly visible in Fig. 36.

The slider member latch 844, guided on the end wall 843, is pushed upwards by a compression spring 845 into a position in which the lug 846 of the button 804 rests against a step 847 of the end wall. The compression spring is supported at the bottom on an end wall extension 848 and acts at the top on a transverse arm 849 of the slider member latch, which finally carries the locking hook

850. As can be seen from Fig. 36, the locking hook 850, in the pushed in position, engages in an aperture 851 in the ribs 823. A pin 853 of the lid arm engages in a recess 852 in the transverse arm 849 and supports the transverse arm when the slider member is being pushed in, when the locking hook is pressed downwards by running up against the bevelled or rounded edge 854 of the housing collar. The housing aperture 855 covered by the housing collar permits the provision of the aperture 851 by injection moulding techniques.

In front of the slider member latch the lid 841 carries a label window 803 made of clear or matt transparent plastics material. This separately injection moulded component is shown in Fig. 45; it is anchored by hook projections 856 at its lateral edges 857 in corresponding apertures in the complementary receiving channels 858 of the end wall 843, and a similar hook extension 859 engages through an aperture in the end wall 843 about the size of a finger joint and, of course, also through an aperture of corresponding size in the slider member latch 844, and hooks behind that on the end wall. Fixing is effected by means of snap-in pins 860. These apertures make an inserted label accessible so that it can be pushed out in an upward direction.

It is to be understood that in the one bearing 838/839 there is inserted a helical torsion spring with projecting ends biasing the lid 841 into the position shown in Fig. 44, similar to the illustration in Fig. 3.

When the button 804 is pressed downwards, the locking hook disengages and the ejector spring conveys the slider member towards the outside until the lug 808 runs up against the end of the slot 807; in this position the bearing eyes project beyond the housing collar, and the lid is pivoted open by the helical torsion spring with projecting ends.

Figs. 37 to 39 show an alternative form of this embodiment in which a lock is associated with each container.

Into the button 904 there is inserted a miniature version of a commercial cylinder lock 888, and in the blocking position its blocking arm 961 is in front of a moulded-on finger 962 on the holding down means 835 so that the button cannot be pressed. In order that a single lock should suffice for all five compartments, beneath the finger 962, suppported towards the inside by a step 963 of the housing, there is a displaceable blocking member 964 in the form of a strip with raised teeth 965. In the locking position of the blocking member the teeth are exactly in front of complementary teeth 966, moulded onto a slider member underneath in each case, so that even when a button is pressed the slider member cannot be pushed out. Between a pair of teeth 967 there engages the blocking arm 961 of the cylinder lock. A compression spring 969 biases the blocking member into the opening position, in which it rests against the abutment 968. The line 970 indicates symbolically the lowest plane of the bearing eye, which can thus slide away over the teeth.

Figs. 46 to 49 show an alternative form in which the gate is articulated onto the slider member in a different manner. Extending upwards from the slider member base 1010 there is a cheek 1012 in which a lever arm 1014 of a gate, which is indicated generally by 1016, is pivotably supported about an axis 1018. In the region of the axis a helical torsion spring with projecting ends is provided which biases the gate 1016 into the position shown in Fig. 49. In the end position of the gate 1016, in which the helical torsion spring 1020 is substantially released from tension, the gate reaches the position shown in Fig. 49.

The gate itself comprises a viewing plate 1022 behind

the fully transparent front portion 1024 of which a label may be inserted. In the position shown in Figs. 46 and 47 this plate 1022 rests by means of a foot 1026 on the base 1010 of the slider member. The button 1028 is guided in the plate 1022 so that it can slide downwards and is biased by means of a spring, not shown in the drawings, into the position according to Fig. 47, from which it can be moved away downwards. During this movement a wedge-shaped latch 1030 is lifted out of the catch 1032 so that an ejector spring (not shown in the drawing) built into the housing 1034 pushes the slider member forwards into the removal position. If the user now lifts his finger and the pressure is therefore slackened (Fig. 48), the helical torsion spring 1020 with projecting ends now rotates the gate into the position according to Fig. 49, in which the video cassette 1036 can be pulled out forwards in alignment with the housing opening. To put away the cassette, the latter is pushed into the housing in the opposite direction until it reaches a stop (not shown) and the process takes place in reverse order, that is to say, in the order Fig. 49, Fig. 48, Fig. 47. Finally the user presses on the plate 1022, and the button 1028, by co-operation of the wedge surfaces on the wedge-shaped latch 1030 and the catch 1032, is locked again.

In an alternative form which is indicated only in Fig. 47, the lever arm 1014' is provided with an elongated hole 1040 so that it can secure the cassette by resting directly against the front 1042 of the cassette in the closed position. When the button is actuated, the slider member 1010 travels out of the housing and so also does the plate 1022 with the button 1028 along the elongated hole, so that the gate reaches a position in which it can tilt upwards over the front upper end edge of

the cassette.

In the embodiment according to Figs. 50 and 51 the gate pivots about another axis. The housing 1110 with three slider members 1112 can be seen. A slider member is in the extended position, but the button 1116 which is rotatable about the pin 1114 and at the same time forms the gate, is still in the locking position. The button has for example, for locking, a catch 1118, and the pin/pivot bearing 1114 has associated with it a spring (not shown), for example a helical torsion spring with projecting ends, which biases the button member, identical with the gate in this case, into the position shown by dashed lines in Fig. 50. This end position may be secured by means of stop members.

In the embodiment according to Figs. 52 to 54 the gate pivots about yet another axis.

On the left in the side view according to Fig. 52 can be seen the housing 1210 along which the slider member 1212 is slidably movable. Perpendicular to the sliding movement the slider member base has a pivot bearing 1214 about which the gate 1216 is rotatable after it has been unlocked out of the housing by relative displacement of the button 1218 against the action of the spring 1220 by means of latch 1222. The movement of the gate downwards into the horizontal is effected by gravity or by means of a built-in spring, if this is preferred.

Figs. 55 to 60 show an alternative type of construction of a video cassette container for different cassette formats. Fig. 55 is a section along the line 55-55 in Fig. 56, which in turn shows a vertical partial longitudinal section through the container. Fig. 57 corresponds to the lower part of Fig. 56, but in a different operating position, and Figs. 58-60 show details in perspective.

The slider 1310 is shown in cross section in Figure 55. It has an aperture 1312 in its rear wall 1314 so that a bottom slider 1316, which is shown in perspective in Fig. 58, can pass through. The lateral slots 1318 of the bottom slider are guided in corresponding ribs 1320 of the slider member floor; for assembly the ribs 1320 have at their free rear end lugs 1322 which are pushed to the side horizontally when the bottom slider 1316 is pushed in, and then prevent the bottom slider from falling out; the ends of the two ribs are shown in Figs. 59 and 60. The bottom slider has an upward-projecting tab 1324 which in each case comes to rest from behind against the rear end wall of an inserted cassette, as indicated in Fig. 56 by the dash/dotted line 1326. An auxiliary spring 1328 presses the bottom slider 1316 in the direction of the gate 1330. The auxiliary spring 1328 is so arranged that it is fully released from tension after a spring travel which is shown in Fig. 57. The bottom slider 1316 has a second tab 1334 against which the spring 1328 rests. Finally, there is also provided on the bottom slider a stop lug 1336 which engages in the slot 1338 in the floor of the cassette housing and represents the main stop member for the slider member. The stationary ribs 1340 ensure that the auxiliary spring 1328 cannot buckle sideways. Also to be observed are the support rails 1344 which stand up from the slider member floor at the side of the slot guides 1318 and on which the inserted cassette rests in each case, so that the bottom slider 1316 is relieved of the weight of the cassette itself.

Figs. 61-63 show a perspective view (Fig. 61) of a "Mediathek", that is to say, a series of similar containers which are assembled to form a unit and which can accept all video cassettes or, as will be explained hereinafter, other recording media as well.

The individual containers 1400 are here provided with housings which are cut out on both large side faces, since according to the embodiments described above no material is functionally necessary at these points; this measure serves to save on material. End plates 1402 can close off such series of cut out housings for aesthetic purposes.

On their top edges 1404 the housings of the container 1400 each have a rail 1405 with an undercut profile, possibly a T-profile as shown in Fig. 61, and a transverse member 1406 has cut-outs 1410 which are complementary to that profile in the free limbs of its U-shaped cross section. From the partial side view according to Fig. 63 it can be seen that inserted into the transverse member there is a leaf spring 1408 which extends over the entire length of the transverse member and ensures that the containers fit fairly firmly in spite of the free play, resulting from the tolerances, between the T-rails and the cut-outs 1410. Fig. 62 shows a modification of the transverse member, which is here completed by an angled section 1412 by means of which the transverse member can be screwed to the wall.

Figs. 64 to 70 show modifications in particular of the slider member to accept other recording media, namely so-called "compact discs". The slider member base 1510 has either a projection 1512 at the front and a projection 1514 at the back or, as shown as an alternative in Fig. 65, slot-like depressions 1516 having a contour which is dish- or trough-like in shape, as can be seen in Fig. 65. Between the projections 1512 and 1514 and/or the depressions 1516, channels 1518 are provided which make it easier to push in the compact discs. If a large number of compact discs are housed close together in the slider member, as is clearly shown in Fig. 67, it may be difficult for the user to grasp a desired disc with the

fingertips. For this reason the construction is such that the user can push away towards the back the discs adjacent to the one required (see Fig. 66). The distance between the rear wall and the position of projections 1514 and/or rear limitation of the slot 1516 is calculated so that the centre of gravity of the discs is still within the region defined by the projections 1512 and 1514 or within the region over the slot 1516, so that the discs that are pushed back can return again to their rest position under the influence of gravity. Alternatively, a spring can be provided on the rear wall 1520 which presses the discs back into their initial position: see schematic view in Fig. 69 in which the spring 1524 can be seen.

Figs. 67 and 70 show partial cross sections through containers having two different types of slider members, wherein Fig. 67 illustrates an embodiment in accordance with what has been explained insofar while in Fig. 70 separating lugs 1522 are provided instead of the guide channels 1518, pairs of projections 1512, 1514 or, respectively, indentations 1516, said lugs each defining a chamber for a storage box or sales package 1526 of an individual compact disc in each case. As before, it is also possible here to provide a spring which presses back into the storage position the package which is not to be removed, after the desired package has been removed; this spring, as in Fig. 69, is indicated in Fig. 70 by 1524.

Figs. 71 to 80 refer to further alternative forms of the container for storing disc-shaped data carriers, with reference again being made to compact discs for the sake

of simplicity.

Fig. 71 shows such a container, closed, in a schematic longitudinal sectional view. Accommodated in the housing 1601 so that it can slide is the slider member 1602 onto which a gate 1604 is pivotably hinged about an articulation 1603. As in the embodiments explained above, there is housed in the articulation a helical torsion spring with projecting ends which biases the gate into the opening position in which it is pivoted away, and the angular position of which is determined by means of a stop member 1605. The sliding coupling with the housing is effected by means of a telescopic guide means, so that the slider member can travel almost completely out of the housing; an intermediate rail 1606 is accordingly also provided on both sides. The maximum distance that the intermediate rail can be pulled out is determined by means of a stop projection 1616 which runs in a slot in the housing. Ribs 1615 of the housing engage round both rail outer edges and thus hold the rails in the housing, which rails in turn engage round the slider member with similar profiled hooks. This can best be seen from the cross sectional view according to Fig. 72.

Slider member 1602 and gate 1604 are pushed out of the housing by compression springs 1607 as soon as the locking hook 1610, by means of finger pressure on the button 1608 in the direction of the arrow 1609 (cf. Fig. 74) is lifted out of a catch which is in the form of an aperture in the housing.

The compact discs 1611 lie singly in plate portions 1612 which are linked to the slider member by means of pins 1613 and can thus pivot about axes 1614. An alternative articulated connection between the plate portions 1612 and the slider member 1602 is shown in plan view in Fig. 76 and in elevation in Fig. 77: the end edge of the plate portion has simply moulded-on snap claws

1623 which open out when placed onto pins 1622 moulded onto the slider member and afterwards form an articulation. While a first embodiment of such a plate portion can be seen in Fig. 71, Fig. 75 shows an alternative form which differs from it by a stiffening peripheral rim 1617 which is only omitted at the front removal side of the plate portion.

The plate portions have on the removal side a cut-out grip 1618 and in their centre a projection 1619 which, in the case of abrupt opening, therefore if the button 1608 is released after being pressed and the springs 1607 allowed to take their full effect, prevents the compact discs 1611 which have thus been accelerated from being thrown out. The depth of insertion of the discs is limited by means of a stop strip 1620.

Fig. 74 shows the opened container in a schematic side view. The plate portions are thereby fanned out by means of the pivoting gate 1604 co-operating with the plate portions. The gate in fact carries inwardly-projecting pins 1624 which push from beneath against tabs 1626 of the plate portions 1612 and lift them up. The tabs are long enough for the pins 1624 to be able, in spite of sliding along on the latter, owing to the different axis spacings, to remain constantly in engagement with them. When the gate pivots back, further pins 1625 also moulded onto the gate act from above on the tabs and bring them back into the parallel position, if gravity does not suffice or the container is not used in the position shown; the gate could then abut with its front plate 1627 against the plate portion lying next to it, or the plate portions could collide with one another. Alternatively, the resetting of the plate portions into their parallel position could also be brought about by means of bias springs or other means. The lowest plate

portion remains in any case in its initial position, supported on the stop members 1629.

Instead of the securing projection 1619, it would also be possible to provide non-slip coverings on the plate portions, as indicated at 1628 in Fig. 78. The plate portions shown therein also differ otherwise from the embodiment described previously; their front, on the removal side, is provided with angled inscription or label surfaces 1630 which cover one another in the storage position (Fig. 78) but are readily legible in the fanned out removal position, as can easily be seen.

The alternative form according to Fig. 79 represents an embodiment in which the plate portions fan out not upwards but downwards (always assuming that the position shown in the drawings is also the position in which it is used). A stop rim 1631 is provided so that the discs do not drop down. This embodiment offers the advantage that it can be easier to see into the compartments than in the case of the embodiment described previously, particularly with regard to the edge portions 1632 of the plate portions (Fig. 80) which are here conceived as inscription or label panels.

Apart from the components which are constantly resiliently biased, such as the springs 1607, all components are preferably constructed as injection moulded plastics parts. As is known per se, the outsides of the housings 1601 may be provided with projections and recesses of complementary profile so that similar containers can be interlocked to form larger units.



PATENT CLAIMS

1. A container for storing magnetic tape cassettes (610, 825, 1036), compact discs (1526, 1611) or other recording media, having a housing (30, 120, 200, 900, 500, 614, 800, 1110, 1210, 1601) open on one narrow side and a transport slider member (40, 210, 902, 508, 600, 700, 801, 1112, 1212, 1310, 1602) movably guided in the housing, and having an ejector spring (48, 218, 916, 504, 1607) which, after manual release, conveys the slider member into a removal position intended for the removal of the article being stored, wherein the container has a front plate (74, 232, 920, 518, 602, 704, 802, 841, 920, 1016, 1116, 1216, 1330, 1604) which closes the housing opening when the slider member is pushed in, characterised in that the front plate is connected to the slider member so that it is pivotable about an axis offset inwards into the housing with respect to the plane of the front plate, and that means 76, 608, 1020, 1114; 708, 710) are provided to exert on the front plate a turning moment which pivots the latter into a rotated position which permits the removal, in the direction of the outward movement of the slider member, of the article being stored.

2. A container according to Claim 1, characterised in that the front plate (74, 232, 920, 518, 602, 704, 802, 841, 920, 1016, 1116, 1216, 1330, 1604) is pivotable about an axis parallel to the longer side of the housing opening.

3. A container according to Claim 1, characterised in that adjoining the front plate (74, 232, 920, 518, 602, 704, 802, 841, 920, 1016, 1116, 1216, 1330, 1604) there are angled plate portions (82, 517, 942, 1014) which form with the latter an approximately U-shaped assembly and are hinged onto the slider member (40, 210, 902, 508, 600,

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700, 801, 1112, 1212, 1310, 1602).

4. A container according to Claim 1, characterised in that adjoining the front plate there is an angled plate portion (602') which forms with the latter an assembly which is approximately L-shaped in cross section and which has its end edge remote from the front plate hinged onto the slider member (600).

5. A container according to one or more of the preceding Claims, characterised in that the means comprise a spring (76, 608, 1020, 1114).

6. A container according to Claim 5, characterised in that the spring is in the form of a helical spring (76, 608, 1020, 1114).

7. A container according to one or more of the preceding Claims, characterised in that the end positions of the pivoting movement of the front plate are defined by means of stop members (72,88) provided on the one hand on the slider member and on the other hand on the front plate.

8. A container according to one of Claims 1 to 6, characterised in that the end positions of the pivoting movement of the front plate are defined by means of stop members (602' in Fig. 28) provided on the one hand on the housing and on the other hand on the front plate.

9. A container according to Claim 1, characterised in that the means are in the form of positive-acting control means which are arranged between the front plate and the housing (708, 710 in Fig. 30).

10. A container according to Claim 5 or 6, characterised in that the spring (76, 608, 1020, 1114) is arranged in the region of the pivoting axis of the front plate.

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11. A container according to one or more of the preceding Claims, characterised in that the front plate (602') and the slider member (600) are injection-moulded from plastics material and are connected to each other by means of an integral hinge (604) injection-moulded from plastics material.

12. A container according to Claim 3 or 4, characterised in that in the removal position of the slider member the pivot axis of the assembly is situated in front of the housing front.

13. A container according to Claim 12, characterised in that the assembly is guided inside the housing along the wall of the latter.

14 A container according to one or more of the preceding Claims, characterised in that the slider member removal position is defined by means of interlocking stop members and complementary stop members formed respectively on the housing and the slider member.

15. A container according to one or more of the preceding Claims, characterised in that the slider member is guided along side walls of the housing.

16. A container according to Claim 15, characterised in that the guides comprise rails (42, 214/220, 514, 820) moulded onto the housing.

17. A container according to Claim 15 or 16, characterised in that the guides comprise rails (44, 212, 512, 912, 822, 1604) moulded onto the slider member.

18. A container according to Claims 14 and 15, characterised in that the stop members and complementary stop members are formed in the region of the guides.

19. A container according to Claim 1, characterised in that a locking arrangement is moulded onto a front plate assembly which comprises a floor section connected to the front plate and extending parallel to the direction of outward movement of the slider member when the latter is pushed in.

20. A container according to Claim 19, characterised in that the locking arrangement comprises a resiliently deflectable latch.

21. A container according to Claim 19, characterised in that the locking arrangement comprises a latch assembly movable relative to the front plate.

22. A container according to Claim 21, characterised in that the latch assembly is movable at right-angles to the direction of movement of the front plate.

23. A container according to Claim 21 or 22, characterised in that on the front plate there is arranged an unlocking button which has an effective connection with a latch that can be engaged in a catch in the housing.

24. A container according to Claim 23, characterised in that the unlocking button is arranged near one end of the front plate.

25. A container according to one of Claims 19 to 24, characterised in that with the locking arrangement there is associated, in a side wall of the housing, a catch in which a latch can be engaged.

26. A container according to Claim 1 for compact discs and other flat-round recording media, characterised by

centring means to fix the position of the recording medium in the container (Fig. 65).

27. A container according to Claim 1, characterised by a damping element (106 in Fig. 2) resting with a frictional connection against the recording medium being stored.

28. A container according to one of the preceding Claims, characterised in that it can be stacked to interlock with further similar containers.

29. A container according to Claim 4, characterised in that the slider member has a floor surface extending over the full inside width of the housing opening.

30. A container according to Claim 16, characterised by guide rails for the slider member which are moulded onto the housing and with which lateral guide recesses in the slider member are associated (220, 222 in Fig. 16).

31. A container according to Claim 1, characterised by a locking arrangement which is so constructed that the slider member is automatically locked by being pushed into the housing and unlocked again by a further push (924, 926 in Figs. 21-23).

32. A container according to one of the preceding Claims, characterised in that the slider member has a wall supporting the storage carrier at the back.

33. A container according to Claim 9, characterised in that the front plate has control projections guided in a slide channel in the housing for positive-acting control of its movement relative to the slider member (708, 710 in Fig. 30).

34. A container according to Claim 11 and 20,

characterised in that the entire slider member, including the resiliently deflectable latch, is injection-moulded in one piece from plastics material.

35. A container according to Claim 39, characterised in that an unlocking button is also constructed in one piece with the slider member and the latch.

36. A container according to Claim 1, characterised in that the ejector spring is a leaf spring acting on the end edge, remote from the housing opening, of the recording medium and biasing it into a removal position.

37. A container according to Claim 36, characterised in that the leaf spring is fixed in at one end and is deflectable with its other, free end.

38. A container according to Claim 1, characterised in that the slider member (40, 210, 902, 508, 600, 700, 801, 1112, 1212, 1310, 1602) is frame-like, with plate portions (54, 212, 514, 831) which extend substantially over the depth of the housing (30, 120, 200, 900, 500, 614, 800, 1110, 1210, 1601) and are connected near the rear wall (36, 206, 502) of the housing situated opposite to the housing opening by means of a transverse plate (46, 216, 506, 828), and onto which there is hinged a front plate assembly (74, 232, 920, 518, 602, 704, 802, 841, 920, 1016, 1216, 1330, 1604).

39. A container according to Claim 1, characterised in that the front plate (74, 232, 518, 602, 1116, 1216, 1604) is constructed as an unlocking member for the slider member (40, 210, 508, 600, 1112, 1212, 1602).

40. A container according to one or more of the preceding Claims, characterised in that it has internal dimensions matched to the maximum dimensions of the article being stored and that compensating elements are

provided to support articles of smaller dimensions being stored (260-268 in Figs. 14-16; 400, 400' in Figs. 25/26; 1316 in Figs. 55-60).

41. A container according to one of the preceding Claims, characterised in that a common housing is provided (120 in Fig. 10; 130 in Fig. 13) for several slider members.

42. A container according to Claim 1, characterised in that on the outside, remote from the inside of the container, of the front plate an unlocking button (90, 244, 804, 1028) and a compartment to receive a label (96, 803, 1024) are arranged one above the other.

43. A container according to Claim 1 or 41, characterised in that a lock (888 in Fig. 37) is built into at least one of all the slider members accommodated in the housing.

44. A container according to Claim 1 or 41, characterised in that each slider member (1510, 1602) is constructed to receive several recording media (1526, 1611), it being possible to remove and reinsert the latter individually.

45. A container according to Claim 44, characterised in that the slider member (1510) has a number of compartments (1516, 1518) corresponding to the number of recording media that can be housed, from which compartments the recording media (1526) can be displaced during removal of one of them and into which they then return automatically.

46. A container according to Claim 44, characterised in that the slider member (1602) has a number of receiving members (1612) corresponding to the number of recording media (1611) that can be housed, which receiving members, when the front plate (1604) is moved away, in the position

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in which the slider member is pushed out, can be pushed apart from each other.

47. A container according to Claim 46, characterised in that the receiving members (1612) are plate-like in construction and are hinged onto the slider member, and that the front plate (1604) has connected to it control members (1624) which positively control a fanning-out of the plate-like receiving members which are closely packed together in the storage position.