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(54) CONTAINER FOR TAPE CASSETTE

(71) We, MACENPAT G.m.b.H., a Swiss Body Corporate, of Nidelbadstrasse 96, 8803 Ruschlikon, 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:—

The invention relates to a container for a magnetic tape cassette located therein.

Such containers are known which comprise a rectangular casing, a push-in slide which is movable along a narrow side of the casing and which receives the tape cassette, and a compression spring which engages between the rear wall of the push-in slide and the rear side of the casing. After unlocking a holding device, the compression spring propels the push-in slide together with the tape cassette by a certain distance out of the casing into an open position in which the tape cassette can be removed from the container without hindrance. Tape cassette containers of this type for music tape cassettes have the advantage that they allow a quicker and simpler removal of the cassette, as compared with containers which have a hinged cover hood and which are commercially available as standard boxes (as in the PHILIPS system) or are designed, for example, in accordance with United States Patent No. 3,532,211 (GELLERT). Thus, for example, the cassette cannot be removed from these known boxes using one hand. Furthermore, these hinged boxes exclude the possibility of assembling several boxes into a stable stack, since indeed it would be necessary to dismantle the stack each time in order to be able to open a desired box. For ordered storage and stowing, however, stacking is frequently desirable.

Therefore, containers have been proposed in the past, which consist of a casing which has a drawer, which can be longitudinally moved therein, for receiving the tape cassette, for example in United States Patents Nos. 3,642,337 (MANHEIM),

3,836,222 (KUNTZE), 3,899,229 (ACKERET) and 4,046,255 (ACKERET). Since, however, the drawer itself requires space in the casing, all these containers with drawers have the disadvantage that the external dimensions of their casings exceed the standardised dimensions of the hinged standard casings mentioned in at least one edge direction. Since, however, tape cassettes with recorded music have hitherto been sold in large numbers above all in standard casings of this type, the displays in the shops are accordingly fitted out for the dimensions thereof so that the known push-in containers do not fit these racks, and this represents a considerable disadvantage.

Another disadvantage of the known containers having a drawer-like push-in slide is that, due to its unsymmetrical shape, the tape cassette can always be stowed in the container in one defined and prescribed orientation only. For example, in the container described in United States Patent No. 3,899,229, the tape cassette must first be placed in the transverse format into the projecting slide-like drawer in such a way that its thicker part points towards the opening of the casing, before the drawer can be pushed into the casing. This deposition of the tape cassette into the drawer proves to be involved since the user is forced to turn the cassette in the hand until it has the correct orientation.

A further construction of known containers for tape cassettes has individual compartments and makes it possible to store many tape cassettes in a confined space and to remove them with only one hand, as described, for example, in United States Patent No. 3,677,396 (STAAR) as well as Nos. 3,994,550, 3,994,551, 3,995,737, 3,995,921 and 4,030,601 (all by ACKERET). These constructions of containers have, however, an open front; thus, the tape cassettes are not protected against dust in storage.

Finally, there has been a proposal for a container in United States Patent No. 3,904,259 (HOFFMANN), in which one

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narrow side of the container is designed as a cover. In this container, it would indeed be possible to adhere to the standardised dimensions, and it is likewise possible to remove the cassette with one hand. It is, however, disadvantageous that, on the one hand, the cassette is completely ejected out of the casing under the pressure of a spring after the cover has been opened and, on the other hand, it is not possible, in the closed position, to lock the reel cores of the cassette located in the casing.

According to the present invention there is provided a container for an interchangeable tape cassette comprising a rectangular casing which comprises a base, two parallel narrow sides, an upper flat side, a rear wall and an open front; a push-in open slide which is movable through the front of the casing and arranged to receive the tape cassette, the slide being in the form of a four-sided frame having two side parts extending along the narrow sides of the casing, the frame being open towards the base of the casing and being arranged to at least partially surround the tape cassette when the former is lying on the base of the casing; a compression spring arranged to engage between the rear wall of the frame and the rear wall of the casing to urge the frame, with the tape cassette when received therein, a predetermined distance out of the casing into an open position, the arrangement being such that, in the open position of the frame, at least that part of the frame which protrudes from the container extends obliquely of the casing to leave the part of the cassette protruding from the casing parallel to the base of the casing and at least partially released by the frame; and a holding device which is releasable to enable the spring to urge the frame to the open position.

Embodiments of the present invention can have outer dimensions which meet the standardised norm specifications. In addition, the casing can be arranged to allow the tape cassette to be stowed in four different orientations. In the preferred embodiment, the tape cassette is enclosed on all sides within the casing so that it is protected from dust, each reel hub is locked against spontaneous turning, and removal or stowing of the tape cassette can be carried out with one hand. During stowing, the disadvantageous step of placing the tape cassette onto a projecting part of the push-in slide can be eliminated. On the other hand, when the cassette is removed, after release of the holding device, the cassette protrudes from the casing, without dropping out, by an amount such that it automatically slides into the hand when gripped. Finally, both flat sides of the container can be labelled and the container can be manu-

factured as a cheap mass-produced article.

The invention will be further described with reference to the accompanying drawings in which:—

Figure 1 is, in a simplified diagrammatic representation, a plan view onto the frame of an embodiment of a cassette container for a tape cassette, the casing being shown in section;

Figure 2 is, in a simplified diagrammatic representation, a section through the frame of Figure 1 along the line A—A of Figure 1;

Figure 3 is, in a simplified diagrammatic representation, a section through the container according to Figure 1, in the closed position, along the line A—A of Figure 1;

Figure 4 is the same section as in Figure 3, but in the open position of the container; and

Figure 5 is a simplified perspective view, partly broken away, of an illustrative embodiment of container which conforms for the most part with the embodiment of Figures 1 to 4, in the open position.

The tape cassette containers to receive music tape cassettes shown in Figures 1 to 5 comprise essentially three parts: a casing 1; a push-in slide 2; and a compression spring 3. The outlines of a standardised magnetic tape cassette 4 of the type on the market are also indicated in Figures 1 and 3 in dots and dashes. All the components of the container, except the spring 3, preferably consist of a thermoplastics material, for example polystyrene.

The rectangular flat casing 1 of the container has external dimensions, for example, of $1.7 \times 7 \times 10.9$ cm and thus the same size as standard containers on the market. Accordingly, the container can be displayed or stowed in all existing racks and can be labelled on all sides. The casing 1 consists of a pair of relatively long narrow sides 6 and 7, rear wall 8, upper flat side 9 and a lower flat side which is designated as the base 10 of the casing in the following text. The designation as the base of the casing and the orientation of the casing in Figures 1 to 5 are intended to be illustrative only and is not to be taken as meaning that the container will not work in other orientations. The container can for example be used in a similar manner when standing on the rear wall 8 or held vertically in the hand. Alternatively, a container stack assembled by means of the flat sides 9 and 10 can take up any desired spatial orientation; this applies likewise to the individual container held in the hand. The end face of the casing 1 which is opposite the rear wall 8 is open and forms the entrance 11 for the push-in slide 2.

The successful operation of the device is essentially based on the special design of the

push-in slide 2 and on the guiding thereof in the casing 1. This push-in slide 2 is designed as a four-part frame and has two parallel side parts 21 and 22, a rear side 23 and a front wall 24, which together form the rectangular frame. With respect to its dimensions, the frame 2 matches the outline of the cassette, so that the narrow sides of the cassette rest against the four frame sides, as Figure 1 makes clear. In the pushed-in position of the frame 2, designated in the following text as the closed position, the side parts 21 and 22 of the frame rest against the narrow sides 6 and 7 of the casing. The rear wall 8 of the casing and the rear side 23 of the frame are opposite one another, in parallel and provide a space 25 in which the compression spring 3 is located. Moreover, in the closed position, the front wall 24 of the frame forms the closure of the entrance 11 of the casing. An advantage of the frame 2, as compared with conventional drawer-like push-in slides, is its small space requirement in the casing 1. The tape cassette 4 on the base 10 of the casing or on longitudinal ribs 12 thereof, the position of which is merely indicated in Figure 1 and which support the flat part of the cassette 4. The frame 2 thus does not exert any supporting action on the tape cassette 4 since it leaves the base 10 of the casing free.

The container in the present illustrative embodiment is designed for the reception or removal of the cassette 4 in an elongate format in any of its four possible orientations. Figures 1 and 3 show the closed position of the container in which the cassette 4 is stored so that it is protected from dust, shake-proof and locked against turning of its reel hubs. Figures 4 and 5 illustrate the open position of the container in which the front part of the frame projects from the entrance 11 of the casing and takes up an oblique position relative to the base 10 of the casing. The frame is urged into the open position under the pressure of the spring 3 and this is initiated by unlocking a releasable holding device on the front wall 24 of the frame and which responds to finger pressure.

This holding device comprises a notch 30 in the upper flat side 9 and which forms a stop for a tooth 31 which engages therein and is located on the frame 2 above the front wall 24 of the frame. The notch 30 and the tooth 31 form the holding device and can be unlocked in order to open the container. For this purpose, the front part of the frame 2, carrying the front wall 24 and the tooth 31, is partially separated from the remainder of the frame by the slots 32 in the side parts 21 and 22. The front part which is isolated in this way, is thus suspended on the narrow strips 33 which are elastically

deformable. Accordingly, when pressed by a finger on the front wall 24, the tooth 31 reacts with a downward movement until the holding device is completely unlocked.

The frame 2 possesses two lugs 27 and 28 which are arranged one behind the other longitudinally of the frame and which, as shown in Figures 1 to 3, reach from above into the reel hubs 13 of the cassette 4 and are fastened on the frame 2 in a manner which is further described below. The tape cassettes 4 of the type which can be used have reel hubs 13 which are arranged asymmetrically to the central axis of the cassette, and this has restricted push-in slides hitherto known to storage in only two orientations of the cassette. In the present case, however, the lugs 27 and 28 are positioned and dimensioned so that they make all the four orientations of the cassette in the frame 2 possible. The flat lugs 27 and 28 lie on the longitudinal axis of the frame 2 and thus also on the longitudinal axis of the cassette and are mirror-symmetric with respect to the latter. However, when a cassette is turned by 180° about its longitudinal axis, the two hole positions 13 and 13' each overlap by a common zone 13" as Figure 1 shows. For this reason, the lugs 27 and 28 are positioned and dimensioned in such a way that they protrude into the capstan holes 13 only in the overlapping zone 13" and, without exceeding the latter, are in engagement with the toothed rim 14 of the tape reel hubs. The lugs 27 and 28 effect the desired locking in the overlapping zone 13" because of the position of the cassette 4 between the sides 21 to 24 of the frame.

As Figure 4 makes clear, the frame 2, when in its open position, takes up an oblique position with respect to the base 10 of the tape casing, the entrance 11 of the casing being unblocked on all sides. The part of the frame remaining in the interior of the casing when in the open position should have a greater length than the protruding part of the frame, i.e. the front part in the following text, in order to prevent the cassette 4 dropping out of the casing 1. During its advance to the open position, the frame 2 is guided in such a way that it first carries out a longitudinal movement and, subsequent thereto, a tilting movement into the oblique position mentioned. The longitudinal movement pushes the cassette 4 out of the casing 1 by a desired distance, whilst the tilting movement both unblocks the entrance 11 of the casing and the front part of the cassette 4 and removes the lugs 27 and 28 from the reel hubs 13.

In the open position, the frame 2 is pushed forward as far as is permitted by the distance of the rear side 23 of the frame in the closed position from a casing stop 35

located in front thereof. This casing stop 35 protrudes like a tooth from the upper flat side 9 of the casing into the interior of the casing and is located immediately in front of and above the rear lug 28. The distance of advance of the frame is thus slightly greater than the distance from the rear side 23 of the frame to the rear lug 28. Since this distance also corresponds to the spacing between the front wall 24 of the frame and the front lug 27, the frame 2 is pushed forward only until the front lug 27 emerges from the entrance 11 of the casing. The essential point is that on the base 10 of the casing there is no stop corresponding to the casing stop 35. Therefore, under the force of the spring, a torque is exerted on the rear side 23 of the frame when its upper edge 38 is in contact with the stop 35. Thus, the casing stop 35 forms a hinge for the frame 2.

However, the torque acting on this hinge swivels the frame 2 into the described oblique position only after the advance has ended, that is to say after the front lug 27 has emerged from the entrance 11 of the casing. The part of the frame which remains in the casing when in the open position, must be suitably designed so that it is capable of swivelling. In the present case, this is accomplished by chamfered sections 36 and 37 of the upper edges of the side parts 21 and 22 of the frame. The chamfered edge sections 36 and 37 start at the level of the front lug 27 and extend in a rising straight line up to the upper edge 38 of the rear side 23 of the frame. In the open position, the edge sections 36 and 37 are in contact with the upper flat side 9 of the casing, that is to say their angle of inclination corresponds to the swivelling angle of the frame 2. This swivelling angle is of such a magnitude that the rear lug 28 in the interior of the casing unblocks the capstan hole 13, when in the open position. For this purpose, the rear lug 28 is mounted on a triangular bracket 40 which extends downwards from the upper edge 38 of the rear side 23 of the frame at the same angle of inclination as the edge sections 36 and 37. In the closed position, the bracket 40 presses resiliently onto the cassette 4 and, advantageously, effects shake-proof contact of the cassette 4 with the base 10 of the casing. The bracket 40 is also provided with a recess 41 which is located in front of the rear side 23 of the frame and through which the casing stop 35 protrudes during the advance. The front lug 27 is mounted on a tie 43 extending transversely between the upper edges of the frame 2.

The frame 2, which carries out the swivelling movement described above, and the provisions required to enable the rear lug 28 to disengage from the capstan hole 13 virtually do not require any extra space in

the casing 1 so that it is possible to adhere to the standard dimensions mentioned of the container. It should also be pointed out that the cassette 4 is not ejected from the casing 1 by, for example, inertia. The frame 2, and with it the cassette 4 come to a standstill as soon as the longitudinal advance is followed by the tilting movement and in particular even before the frame 2 swivels into its oblique position and laterally frees the tape cassette 4. The user is, however, at liberty to hold the container, with the entrance 11 of the casing pointing obliquely downwards, in such a way that the cassette 4 automatically slides into the open hand. Such removal with one hand is frequently desirable, for example in motor vehicles. The frame construction, which clears the entrance 11 of the casing, also permits particularly simple stowing of the cassette 4. It is merely necessary to insert the cassette 4 in any desired longitudinal orientation into the casing 1 and subsequently to tilt the frame like a cover over the projecting end of the cassette and to push the frame in. During both removal and stowing, lifting-off or placing-down, respectively, of the cassette, which is necessary with conventional push-in containers, from or onto the base plate of the push-in slide is thus eliminated.

A further advantage is that all the six container walls are plane on the outside and are suitable for the application of labelling so that inscribed container packages are superfluous.

The above container is also suitable for releasably fastening several like containers to one another, either side-by-side along the narrow sides 6 and 7 or stacked above one another along the flat sides 9 and 10. Examples of possible connecting means are groove connections which are provided on the sides 6, 7, 9 and 10 of the container. In Figure 5, such groove-like complementary dove-tail connections 48 and 49 are indicated on the narrow sides 6 and 7. When several containers of this type are connected together along their narrow sides, their upper flat sides 9 form a plane surface on which a common picture with text can be mounted to indicate a work of music which requires several cassettes. Grooves which correspond to the groove connections 48 and 49 and are not shown here, can also be provided on the flat sides 9 and 10 so that several containers can be pushed together to form a stack in which all the inlets 11 of the containers are arranged one above the other. Since container stacks are known in themselves, a detail explanation or a graphic representation are superfluous. It can be seen at once that, in a stack built up from the containers described above, each individual container is accessible for stowing a cassette or

removing a cassette, and the cassette can also be removed unhindered from the lowest container.

Various modifications of the above embodiment are possible. For example, the casing stop 35 can be replaced by a pin at each of the points 50 (Figure 5) on the narrow sides 6 and 7 of the casing. The holding device can comprise a pushbutton and can be located in the rear space of the casing instead of in the entrance of the casing. Any suitable design of spring can be used and it can be accommodated in any desired manner between the rear walls 8 and 23. With respect to general configuration, the container of the illustrative embodiment can also be modified in such a way that it is able to receive the tape cassette in all four broadside orientations. Although the container has been described with reference to music tape cassettes, it is likewise suitable for any type of tape cassettes, in particular if it is important to adhere to container sizes which are already standardised. Thus, the container of the illustrative embodiment can be modified in such a way that it is suitable for stowing and removing video tape cassettes, in which case the components for locking the reel hubs may then be unnecessary. With an appropriate adaptation, if necessary, the container can be used for tape cassettes with digital information thereon.

WHAT WE CLAIM IS:—

1. A container for an interchangeable tape cassette comprising a rectangular casing which comprises a base, two parallel narrow sides, an upper flat side, a rear wall and an open front: a push-in open slide which is movable through the front of the casing and arranged to receive the tape cassette, the slide being in the form of a four-sided frame having two side parts extending along the narrow sides of the casing, the frame being open towards the base of the casing and being arranged to at least partially surround the tape cassette when the former is lying on the base of the casing: a compression spring arranged to engage between the rear wall of the frame and the rear wall of the casing to urge the frame, with the tape cassette when received therein, a predetermined distance out of the casing into an open position, the arrangement being such that, in the open position of the frame, at least that part of the frame which protrudes from the container extends obliquely of the casing to leave the part of the cassette protruding from the casing parallel to the base of the casing and at least partially released by the frame; and a holding device which is releasable to enable the spring to urge the frame to the open position.

2. A container according to claim 1, wherein the frame comprises a front wall arranged to close the front of the casing, the lower edges of the frame being shaped so as to support the frame parallel to the casing when pushed fully home and having inclined portions for contacting the casing in the open position of the frame whereby the frame can be inclined out of the plane of the casing and the arrangement being such that in the open position the part of the frame protruding from the casing is smaller than the part remaining in the interior of the casing.

3. A container according to claim 2, wherein the frame comprises a part capable of carrying out a pivoting motion in the interior of the casing, the casing comprises at least one stop located in a zone above the direction of the force of the spring, the rear wall of the frame resting against the stop when in the open position.

4. A container according to claim 3, wherein the casing stop is located on the upper flat side of the casing and the rear wall of the frame rests by its upper edge thereagainst when in the open position and thus takes up an oblique position under the action of the spring force, and wherein the frame has chamfered sections of the upper edges of its side parts of the frame in the zone of the part of the frame which remains in the said interior of the casing in the open position of the frame which chamfered sections rest, when in the open position of the frame, against the upper flat side of the casing and define the angle of inclination of the frame relative to the base of the casing.

5. A container according to any one of claims 1 to 4, and adapted to receive an elongate cassette in any of the four orientations of the latter.

6. A container according to claim 5, wherein the frame has, on its central axis, two lugs one behind the other such that their distance corresponds to the distance between centres of the capstan holes of tape cassettes, which lugs extend perpendicular to the base of the casing when in the closed position and are arranged to protrude into reel hubs of the cassette to prevent them from turning.

7. A container according to claim 6, wherein the rear one of the lugs is arranged to be lifted clear of the corresponding reel hub in the open position of the frame.

8. A container according to claim 7, wherein a stop is provided to limit the distance the frame can protrude from the casing, the stop being mounted in front of the rear lug, and the lug being mounted on a bracket fixed to the rear wall of the frame arranged to rest resiliently on the cassette in the zone of the capstan hole.

9. A container according to any one of

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removing a cassette, and the cassette can also be removed unhindered from the lowest container.

5 Various modifications of the above embodiment are possible. For example, the casing stop 35 can be replaced by a pin at each of the points 50 (Figure 5) on the narrow sides 6 and 7 of the casing. The holding device can comprise a pushbutton and can be located in the rear space of the casing instead of in the entrance of the casing. Any suitable design of spring can be used and it can be accommodated in any desired manner between the rear walls 8 and 23. With respect to general configuration, the container of the illustrative embodiment can also be modified in such a way that it is able to receive the tape cassette in all four broadside orientations. Although 20 the container has been described with reference to music tape cassettes, it is likewise suitable for any type of tape cassettes, in particular if it is important to adhere to container sizes which are already standardised. Thus, the container of the illustrative embodiment can be modified in such a way that it is suitable for stowing and removing video tape cassettes, in which case the components for locking the reel hubs 25 may then be unnecessary. With an appropriate adaptation, if necessary, the container can be used for tape cassettes with digital information thereon. 30

WHAT WE CLAIM IS:—

35 1. A container for an interchangeable tape cassette comprising a rectangular casing which comprises a base, two parallel narrow sides, an upper flat side, a rear wall and an open front; a push-in open slide 40 which is movable through the front of the casing and arranged to receive the tape cassette, the slide being in the form of a four-sided frame having two side parts extending along the narrow sides of the casing, the frame being open towards the base of the casing and being arranged to at least 45 partially surround the tape cassette when the former is lying on the base of the casing; a compression spring arranged to engage between the rear wall of the frame and the rear wall of the casing to urge the frame, with the tape cassette when received therein, a predetermined distance out of the casing into an open position, the arrangement being such that, in the open position of the frame, at least that part of the frame which protrudes from the container extends obliquely of the casing to leave the part of the cassette protruding from the casing 50 parallel to the base of the casing and at least partially released by the frame; and a holding device which is releasable to enable the spring to urge the frame to the open position. 60

2. A container according to claim 1, 65 wherein the frame comprises a front wall arranged to close the front of the casing, the lower edges of the frame being shaped so as to support the frame parallel to the casing when pushed fully home and having inclined portions for contacting the casing in the 70 open position of the frame whereby the frame can be inclined out of the plane of the casing and the arrangement being such that in the open position the part of the frame protruding from the casing is smaller than the part remaining in the interior of the casing. 75

3. A container according to claim 2, 80 wherein the frame comprises a part capable of carrying out a pivoting motion in the interior of the casing, the casing comprises at least one stop located in a zone above the direction of the force of the spring, the rear wall of the frame resting against the stop when in the open position. 85

4. A container according to claim 3, wherein the casing stop is located on the upper flat side of the casing and the rear wall of the frame rests by its upper edge thereagainst when in the open position and thus takes up an oblique position under the action of the spring force, and wherein the frame has chamfered sections of the upper edges of its side parts of the frame in the zone of the part of the frame which remains in the said interior of the casing in the open position of the frame which chamfered sections rest, when in the open position of the frame, against the upper flat side of the casing and define the angle of inclination of the frame relative to the base of the casing. 90 95 100

5. A container according to any one of claims 1 to 4, and adapted to receive an elongate cassette in any of the four 105 orientations of the latter.

6. A container according to claim 5, wherein the frame has, on its central axis, two lugs one behind the other such that their distance corresponds to the distance between centres of the capstan holes of tape cassettes, which lugs extend perpendicular to the base of the casing when in the closed position and are arranged to protrude into reel hubs of the cassette to prevent them from turning. 110 115

7. A container according to claim 6, wherein the rear one of the lugs is arranged to be lifted clear of the corresponding reel hub in the open position of the frame. 120

8. A container according to claim 7, wherein a stop is provided to limit the distance the frame can protrude from the casing, the stop being mounted in front of the rear lug, and the lug being mounted on a bracket fixed to the rear wall of the frame arranged to rest resiliently on the cassette in the zone of the capstan hole. 125

9. A container according to any one of

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claims 1 to 8, wherein the casing is provided with connecting means to facilitate releasable interconnection of the container with a like container.

- 5 10. A container for a tape cassette, such cassette being constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings.

11. A container according to any one of the preceding claims in combination with a cassette received therein. 10

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