

PATENT SPECIFICATION

(11)

1 460 393

1 460 393

- (21) Application No. 37865/74 (22) Filed 29 Aug. 1974
(31) Convention Application No. 2 427 106 (32) Filed 5 June 1974 in
(33) Germany (DT)
(44) Complete Specification published 6 Jan. 1977
(51) INT. CL.² B65D 85/672
(52) Index at acceptance
B8P 8U



(54) IMPROVEMENTS IN OR RELATING TO HOLDERS FOR TAPE CASSETTES

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

The invention relates to holders for the storage of tape cassettes, comprising a rectangular housing which has an entrance on one of its sides for the insertion of the cassette and wherein a cassette contained within the housing is movable, upon release of a cassette locking arrangement, into a convenient removal position by means of an ejection spring previously stressed when the cassette was inserted into the housing.

Holders of this type are known and are constructed after the manner of a drawer, the cassette being inserted into a slider which is subjected to pre-tension by the ejection spring. When the locking device is released, the slider slides with the cassette out of the housing and is arrested by stops. Several such containers may be positively joined to form stacking blocks, and the tape coils of the cassette may be secured by means of cams which are moulded onto the slider.

The object of the invention is to provide a holder which may be manufactured at lower cost than known holders.

The present invention provides a holder for a tape cassette, in the form of a rectangular housing which has an entrance along one of its narrow sides for the insertion of the cassette, said holder being provided with a releasable locking arrangement for holding the inserted cassette, and with a resilient ejection member positioned to be stressed by the insertion movement of the cassette and operable to move the

cassette into a convenient removal position upon release of the locking arrangement, in which the ejection member is so constructed and arranged in the housing that, on insertion of the cassette, the ejection member, co-operating with parts of the housing, automatically locks itself in a stressed position.

In particularly advantageous embodiments of the invention, the ejection member also takes over the function of clamping the cassette in its storage position. With a few uncomplicated parts it is thereby possible to create a cassette holder wherein the cassette can be conveyed by means of a slight finger pressure into a convenient removal position, thus offering the advantage of one-hand operation.

In one embodiment of the invention, described herein, the ejection member consists of a resilient member of U-shape, the free ends of the shanks of which are fixed to the housing, and which has inwardly extending sections on the shanks adapted to form rests for the cassette when it is inserted, there being a releasable locking member associated with the transverse section of the U-shaped member and located on an adjacent housing wall.

In another embodiment, the ejection member is of cantilever form being fixed by one end to the housing, and carries on its free end a control section which is movable resiliently at right-angles to the length of the member and is co-operable with a guide on a wall of the housing to lock the ejection member in the stressed position the member being releasable from the stressed position by a slight pressure on the inserted cassette.

In yet another embodiment, the ejection member is a leaf spring movable between the cassette removal position and the stressed position with an over centre action, the spring having a central section arched, in

the cassette removal position, towards the housing entrance and two symmetrically arranged lateral spring arms, there being tongues extending into the housing from the base thereof, which tongues have, at their free ends, apertures in which are located lugs set out from the leaf spring, and in which there is a bridge on the housing base co-operable with the central section of the spring to ensure the over centre action thereof.

In a further embodiment, the ejection member comprises a curved spring strip which is fixed at one end to the housing and carries a resilient lug engageable with a hook projecting from a wall of the housing, and in which the other end of the strip is formed into a claw for holding an inserted cassette.

By way of example only embodiments of the invention will now be described in greater detail with reference to the accompanying drawings of which:

Figures 1 and 2 show a first embodiment of the invention in section parallel to one of the large cassette surfaces with the individual parts being shown in the position in which the cassette is ready for removal (Figure 1) and is stored (Figure 2).

Figure 3 is a side view of the holder, seen in the direction of the arrow III in Figure 2.

Figure 4 is a view into the inside of the holder with the cassette removed.

Figure 5 is a section through a second embodiment of the invention.

Figure 6 is a similar section to Figure 5 but with the cassette pushed into the holder.

Figure 7 is a plan view of the ejection spring in its holding position, but with the cassette removed.

Figure 8 is a section along the line VIII-VIII in Figure 5.

Figure 9 is a section through a third embodiment of the invention, with the cassette pushed in.

Figure 10 shows the container in a similar manner to Figure 9 but with the cassette ready for removal.

Figure 11 is a plan view of the base of the holder from inside, (without spring).

Figure 12 is a section through a fourth embodiment of the invention with the cassette pushed in.

Figure 13 shows a side view in the direction of the arrow XIII of the holder shown in Figure 12.

Figure 14 is a section along the line XIV-XIV in Figure 12.

The holder comprises a rectangular housing 1 made of plastics material, which has an entrance along one of its long narrow sides through which the cassette is inserted, and has a base 4, end walls 6, 7

and side walls 8, 9. Moulded onto the side walls 8, 9 there are respectively, strips 10 of dovetail cross-section and grooves 11 corresponding thereto, which allow several similar holders to be stacked together.

In the embodiment shown in Figures 1 to 4 there is moulded, into the angle between base 4 and end wall 7 of the housing 1 a retaining means 16 for a curved spring 3 made of spring steel wire. The opposite end wall 6 has two slots 12 parallel to the side walls 8, 9 so that a flexibly deformable tongue 13 is produced. The tongue 13 has moulded onto it a laterally outwardly projecting finger grip 15 and an inwardly projecting lug 14. Finally, the end wall 6 is provided on both sides of the tongue 13 with stiffening strips 17 which also project inwards but for a smaller distance than the lug 14.

The spring 3 is curved approximately in a U-shape (Figure 4) and has inwardly facing sections 18. The shanks 19 of the spring are fixed in the retaining means 16. The transverse section 20 of the spring 3 assumes the position shown in Figure 1 when the spring is released from tension; it is also apparent from this Figure that the spring has a nominal bending point 21 at which it preferably bends with respect to the U-plane.

If a cassette 5 is now pushed into the holder, it first meets the sections 18 of the spring, and as the cassette is pushed in further it deforms the latter in such a way that it is curved into the position shown in Figure 2. The transverse section 20 of the spring thereby slides along the strips 17, which have oblique ramps 24, and the spring bends mainly at 21. Finally, the transverse section 20 of the spring comes within range of the oblique surface 22 on the lug 14, pushes the tongue 13 away in an outward direction and, on moving further downwards, allows the latter to spring back into its initial position.

If the insertion pressure on the cassette is now removed, the transverse section 20 of the spring 3 catches on the impact surface 23 of the lug 14. The cassette is thereby held in the housing 1 since on the one hand the shank sections of the spring 3 between the sections 18 and the transverse section 20 of the spring 3 rest with slight pre-tensioning against the side faces of the cassette, and since on the other hand the transverse section 20 engages over one of the lateral guide ribs 25 present on the cassettes.

A slight pressure on the finger grip 15 suffices to remove the cassette from the holder. The lug 14 then frees the spring 3 at its transverse section 20, and the sections 18 of the spring push the cassette out of the housing 1. Due to the fact that the spring shank sections between the sec-

tions 18 and the transverse section 20 rest against the cassette, as mentioned above, the latter is not catapulted out but is held in the position shown in Figure 1. The locking at the rib 25 is now moved, however, since the transverse section 20 of the spring 3 can now give way in the direction of the end wall 6.

In the embodiment shown in Figures 5 to 8, in the corner between base 4, end wall 6 and the side walls 8, 9 a leaf spring 30 is fixed, preferably rivetted as shown. The spring 30 has a first, wide ejector section 32 which is resilient in the direction of movement of the cassette 5, and a second, narrower control section 33 which is resilient at right-angles to the first section. The sections together form a one-piece element.

The length of the spring 30 is such that the free end of the control section 33 can project into a slide guide 36 which is moulded onto the inside of the narrow end wall 7. In the rest position, the spring 30 assumes the position shown in Figure 5; the free end of the control section 33 is thereby situated approximately at the point of the arrow 34 in Figure 8. If the spring 30 is now pressed downwards by the insertion of the cassette 5, the free end meets the oblique surface 35 of the guide 36 and is deflected in the direction of the side wall 9. When the cassette 5 is pushed in further, it follows the arrow 37 and reaches the position shown by dash-dotted lines in Figure 8. When the cassette is finally pushed in completely against the pre-tensioning of the ejector section 32 of the spring, the free end of the control section 33 passes under the base section 38 of the guide 36, springs back, and comes to rest against the stop cam 39. If the insertion pressure on the cassette 5 is now removed, the spring 30 pushes the cassette back a little under the influence of the action of the ejector section 32, so that the control section 33 is freed from the stop cam 39; however, since it now meets the stop surface 40 of the slide 36, the spring 30 cannot be further released from tension. The free end of the control section 33 of the spring 30 therefore comes to rest in the corner between the stop surface 40 and the base section 41 of the slide. This is the storage position. The cassette is thereby held by means of friction by two tongues 42 which are set out from the end walls 6, 7 and rest resiliently against the narrow sides of the cassette.

In order to remove the cassette it is sufficient to exert a slight inward pressure on the cassette towards the base 4. The control section 33 of the spring 30 is thereby pushed downwards along the base section 41, arrives behind the stop cam 39, and

can now spring back into its untensioned position, flush with the arrow 43. If the slight inward pressure on the cassette is now released, the spring 30 pushes it outwards, and the free end of the control section 33 follows the arrow 43, is deflected in the other direction on the deflecting path 44, and then returns again to the initial position according to Figure 1. In Figure 7 the insertion position of the spring 3 is indicated by solid lines, whilst the maximum deflections of the control section 33 are indicated by dash-dotted lines.

In the embodiment shown in Figures 9 to 11, the base 4 has two substantially U-shaped apertures 50, and the tongues 51 thus formed, are in turn provided with small rectangular apertures 52. In addition, the tongues 51, as can be seen from Figures 9 and 10, are curved into the inside of the housing 1.

Spring 49 is a leaf spring with a central section 53 which, in the cassette removal position, is arched towards the entrance of the holder, and with two symmetrically arranged lateral spring arms 54. Furthermore, the arched section 53 also has angled sections 55. Near the junctions between the arched section and the lateral spring arms, lugs 56 are set out from the spring and, as shown, are entered into the apertures 52 of the tongues 51.

When the spring 49 shown in Figure 10 is inserted in the housing, the spring arms 54 rest with slight pre-tension against the end walls 6, 7, whilst the arched section is kept tensioned by being suspended between the two apertures 52. In this position the cassette 5 can be pushed in, and the lateral tongues 57 which project inwards from the end walls 6, 7 simultaneously effect the guiding and braking of the cassette.

If a slight pressure is now exerted on the cassette, the spring is depressed over its arched section 53 and the tongues 51 are pressed downwards. The spring arms 54, resting only with slight pre-tension against the end walls, have already lifted away from the latter and then adopt the shape shown in Figure 9.

As soon as the arched section is fully depressed, further slight pressure on the cassette leads to the position shown in Figure 9; the arched section now points downwards and the spring arms 54 rest against the cassette so that the latter is held firmly. The spring thus acts as an over-centre spring.

Slight pressure on the cassette in the direction of the base 4 suffices to remove the cassette. The latter presses on the lateral angled sections 55, whilst the arched section 53 of the spring rests in the centre on a step 58 on the base 4 and is thus

curved upwards beyond the dead-centre point. When the cassette is released it is therefore ejected, since the spring arms 54 bend away laterally and the arched central section 53 tends to return to the position shown in Figure 10.

Securing means may be provided for the tape coils of the cassette in the usual manner, but are not shown here.

In the embodiment shown in Figures 12 to 14, the housing has substantially the shape of a box open on one of its short narrow sides to form an entrance, and along a plane "E" a corner is cut away near the entrance.

On the inside of the base 4 there are two guide strips 60, 61 with sliding sections 63 parallel to the base and adjacent wedge sections 64 which taper towards the entrance.

A hook 65 is moulded onto the end wall 7 and near the base 4 a spring 59 is attached to the end wall 7. Finally the partly cut-away guide wall 66 has a punched-out, inward-springing tongue 67.

The spring 59 is made from a piece of spring steel strip, curved into the shape shown in Figure 12; a lug 68 is punched out from the strip on a level with the hook 65 and angled in such a way that the spring lug 68 can be retained on the hook; in this position—which is shown in Figure 12—the spring is tensioned in the direction of the open side of the housing, but also in a downward direction towards the base 4, since the spring 59 has an approximately S-shaped curvature 69. A claw 70 is formed at the free end of the spring.

When the cassette 5 is pushed in along the guide strips 60, 61, the tongue 67 presses onto the opposite edge of the cassette and holds it approximately parallel to the base 4. Shortly before reaching its end position, the cassette meets the claw 70, since the spring 59 is free from the hook 65 and lies in front of the cassette in the untensioned rest position, which is shown by dash-dotted lines in Figure 12. The cassette is guided and supported by means of vanes 71 which are moulded onto the side walls 8, 9 so that the cassette 5 and spring 59 are always flush with one another. If the cassette is now pushed in further, the lug 68 slides along the oblique surface 72 of the hook 65, so that the spring is tensioned and the claw 70 engages on the top edge of the cassette. Finally, the lug 68 drops over the hook 65, so that the claw 70 comes forcefully to rest on the cassette and holds the latter firmly. This is indicated by solid lines in Figure 12.

In order to remove the cassette, pressure is exerted on the corner 73, which is accessible due to the fact that the corner of the housing is cut away, in the direction of the

base 4. The cassette is thereby tilted about a fulcrum 74 which lies at the junction between the sliding section 63 and the wedge sections 64 of the guide strips 60, 61. As a result, the rear end of the cassette is lifted away from the base 4, and the claw 70 of the spring 59 is also subjected to traction. As soon as the lug 68 is freed from the hook 65, the pre-tensioning of the spring 59 directed towards the left in Figure 12 acts on the cassette 5 and pushes it out, with the vanes 71 exerting a certain braking effect. In order not to hinder the movements of the spring claw 70, the tongue 67 has a corresponding aperture 75.

WHAT WE CLAIM IS:—

1. A holder for a tape cassette, in the form of a rectangular housing which has an entrance along one of its narrow sides for the insertion of the cassette, said holder being provided with a releasable locking arrangement for holding the inserted cassette, and with a resilient ejection member positioned to be stressed by the insertion movement of the cassette and operable to move the cassette into a convenient removal position upon release of the locking arrangement, in which the ejection member is so constructed and arranged in the housing that on insertion of the cassette, the ejection member, co-operating with parts of the housing, automatically locks itself in a stressed position.

2. A holder according to Claim 1, in which the ejection member consists of a resilient member of U-shape, the free ends of the shanks of which are fixed to the housing, and which has inwardly extending sections on the shanks adapted to form rests for the cassette when it is inserted, there being a releasable locking member associated with the transverse section of the U-shaped member and located on an adjacent housing wall.

3. A holder according to Claim 2, in which the locking member comprises a tongue punched out of the housing wall and formed with a locking lug which projects into the housing and a finger grip.

4. A holder according to Claim 2 or 3, in which the U-shaped member has, along its length, a point at which it can bend.

5. A holder according to Claim 1, in which the ejection member is of cantilever form being fixed by one end to the housing, and carries on its free end a control section which is movable resiliently at right-angles to the length of the member and is co-operable with a guide on a wall of the housing to lock the ejection member in the stressed position, the member being releasable from the stressed position by a slight pressure on the inserted cassette.

6. A holder according to Claim 5, including tongues pressed out of side walls



curved upwards beyond the dead-centre point. When the cassette is released it is therefore ejected, since the spring arms 54 bend away laterally and the arched central section 53 tends to return to the position shown in Figure 10.

Securing means may be provided for the tape coils of the cassette in the usual manner, but are not shown here.

In the embodiment shown in Figures 12 to 14, the housing has substantially the shape of a box open on one of its short narrow sides to form an entrance, and along a plane "E" a corner is cut away near the entrance.

On the inside of the base 4 there are two guide strips 60, 61 with sliding sections 63 parallel to the base and adjacent wedge sections 64 which taper towards the entrance.

A hook 65 is moulded onto the end wall 7 and near the base 4 a spring 59 is attached to the end wall 7. Finally the partly cut-away guide wall 66 has a punched-out, inward-springing tongue 67.

The spring 59 is made from a piece of spring steel strip, curved into the shape shown in Figure 12; a lug 68 is punched out from the strip on a level with the hook 65 and angled in such a way that the spring lug 68 can be retained on the hook; in this position—which is shown in Figure 12—the spring is tensioned in the direction of the open side of the housing, but also in a downward direction towards the base 4, since the spring 59 has an approximately S-shaped curvature 69. A claw 70 is formed at the free end of the spring.

When the cassette 5 is pushed in along the guide strips 60, 61, the tongue 67 presses onto the opposite edge of the cassette and holds it approximately parallel to the base 4. Shortly before reaching its end position, the cassette meets the claw 70, since the spring 59 is free from the hook 65 and lies in front of the cassette in the untensioned rest position, which is shown by dash-dotted lines in Figure 12. The cassette is guided and supported by means of vanes 71 which are moulded onto the side walls 8, 9 so that the cassette 5 and spring 59 are always flush with one another. If the cassette is now pushed in further, the lug 68 slides along the oblique surface 72 of the hook 65, so that the spring is tensioned and the claw 70 engages on the top edge of the cassette. Finally, the lug 68 drops over the hook 65, so that the claw 70 comes forcefully to rest on the cassette and holds the latter firmly. This is indicated by solid lines in Figure 12.

In order to remove the cassette, pressure is exerted on the corner 73, which is accessible due to the fact that the corner of the housing is cut away, in the direction of the

base 4. The cassette is thereby tilted about a fulcrum 74 which lies at the junction between the sliding section 63 and the wedge sections 64 of the guide strips 60, 61. As a result, the rear end of the cassette is lifted 70 away from the base 4, and the claw 70 of the spring 59 is also subjected to traction. As soon as the lug 68 is freed from the hook 65, the pre-tensioning of the spring 59 directed towards the left in Figure 12 acts on the cassette 5 and pushes it out, with the vanes 71 exerting a certain braking effect. In order not to hinder the movements of the spring claw 70, the tongue 67 has a corresponding aperture 75.

WHAT WE CLAIM IS:—

1. A holder for a tape cassette, in the form of a rectangular housing which has an entrance along one of its narrow sides for the insertion of the cassette, said holder being provided with a releasable locking arrangement for holding the inserted cassette, and with a resilient ejection member positioned to be stressed by the insertion movement of the cassette and operable to move the cassette into a convenient removal position upon release of the locking arrangement, in which the ejection member is so constructed and arranged in the housing that on insertion of the cassette, the ejection member, co-operating with parts of the housing, automatically locks itself in a stressed position.

2. A holder according to Claim 1, in which the ejection member consists of a resilient member of U-shape, the free ends of the shanks of which are fixed to the housing, and which has inwardly extending sections on the shanks adapted to form rests for the cassette when it is inserted, there being a releasable locking member associated with the transverse section of the U-shaped member and located on an adjacent housing wall.

3. A holder according to Claim 2, in which the locking member comprises a tongue punched out of the housing wall and formed with a locking lug which projects into the housing and a finger grip.

4. A holder according to Claim 2 or 3, in which the U-shaped member has, along its length, a point at which it can bend.

5. A holder according to Claim 1, in which the ejection member is of cantilever form being fixed by one end to the housing, and carries on its free end a control section which is movable resiliently at right-angles to the length of the member and is co-operable with a guide on a wall of the housing to lock the ejection member in the stressed position, the member being releasable from the stressed position by a slight pressure on the inserted cassette.

6. A holder according to Claim 5, including tongues pressed out of side walls

of the housing for holding an inserted cassette by friction.

7. A holder according to Claim 1, in which the ejection member is a leaf spring movable between the cassette removal position and the stressed position with an over centre action, the spring having a central section arched, in the cassette removal position, towards the housing entrance and two symmetrically arranged lateral spring arms, there being tongues extending into the housing from the base thereof, which tongues have, at their free ends apertures in which are located lugs set out from the leaf spring, and in which there is a bridge on the housing base co-operable with the central section of the spring to ensure the over centre action thereof.

8. A holder according to Claim 1, in which the ejection member comprises a curved spring strip which is fixed at one end to the housing and carries a resilient lug engageable with a hook projecting from a wall of the housing, and in which the

other end of the strip is formed into a claw for holding an inserted cassette.

9. A holder according to Claim 8, in which there are two cassette guide strips on the inside of the housing, which strips have sliding sections and adjoining wedge sections which taper towards the housing entrance.

10. A holder according to Claims 8 or 9, in which adjacent the entrance a corner of the housing is cut away to permit release of the cassette locking arrangement by pressure on the top corner of the cassette.

11. A cassette holder substantially as herein described with reference to and as illustrated by Figures 1 to 4, or Figures 5 to 8, or Figures 9 to 11 or Figures 12 to 15 of the accompanying drawings.

ABEL & IMRAY,
Chartered Patent Agents,
Northumberland House,
303-306 High Holborn,
London, WC1V 7LH.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1976.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

