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Cartridge for recording media in tape form

The present invention relates to a cartridge for recording media in tape form in particular a single-reel cartridge having a plastic housing, comprising at least two housing parts with bottom and top and side walls, at least the side walls being welded to one another.

A magnetic tape cartridge for data applications in which the upper part and lower part of the housing are connected to each other by ultrasonic welding is known. The welding was performed in this case by means of what are known as energy flow directors, which are provided as triangular ribs of small height on one of the welded faces, but are difficult to produce with a reproducible height by injection molding. Poorly shaped energy flow directors caused inhomogeneities of the weld points, with the effect that welding was poor or did not take place at all. In addition, welding dust can get into the cartridge space.

The housing parts of liquid-tight and/or gas-tight containers are connected by means of pinched-edge ultrasonic welding. This type of welded joint is more likely to compensate for unevennesses and deviations of the welding geometry from the ideal geometry of the container to be produced. If the pinched-edge contact faces touch, welding dust likewise occurs which, in the case of a cartridge, can result in functional faults during operation.

It is an object of the present invention to provide a cartridge which is improved compared with known cartridge embodiments.

We have found that this object is achieved with a cartridge of the type defined at the beginning by the present invention if a tongue-and-groove formation of the walls to be welded is provided and the tongue-and-groove regions of the walls are welded to one another by the pinched-edge principle.

As a result, the problems discussed above of the

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known data cartridge are avoided and the strength of the weld is increased by the additional support of the welded region. Moreover, an additional centering of the side walls to be welded is achieved at the same time as
5 complete encapsulation of the space inside the housing against welding dust. In addition, all visible points where the welding material may ooze out are avoided from the outset.

In a further development, the insertion region of
10 the groove part of the walls to be welded may be designed with rounded-off edges, whereby a smoother uniting of the housing parts is achieved, to avoid abrasion.

If the tongue part of the walls to be welded is designed with a bevelled surface, the occurrence of dust
15 can be additionally restricted greatly.

Additional ejector elevations on the housing parts can be expediently saved if the parts are produced by injection molding, since thinner wall thicknesses by virtue of the more stable welding permit larger demolding
20 inclines.

The invention can be applied particularly favorably in the case of a single-reel cartridge, since these are subjected to special, very demanding fracture tests.

25 Exemplary embodiments are represented in the drawing in comparison with the prior art and are described below.

In the drawing:

30 Figure 1 shows a section through the outer wall according to the invention of a single-reel data cartridge according to Figure 5

Figure 2 shows a section through the inner wall according to the invention of a single-reel data cartridge according to Figure 5

35 Figures 3A, 3B show diagrammatic sectional representations through an energy-edge weld point according to the prior art



Figures 4A, 4B show diagrammatic sectional representations through a pinched-edge weld point according to the prior art

5 Figure 5 shows a known data cartridge in opened, perspective representation.

Figure 5 shows a magnetic tape data cartridge M as a housing, comprising the bottom and top parts 2 and 1, which usually contains a reel (not shown) with a wound-up magnetic tape (not shown). The outer side walls 3 to 6 of the bottom part 2 are welded to corresponding side walls 7 to 10 (including the two not-visible side walls 8 and 9) by means of ultrasound (US).

Such weldings of the outer walls of a cartridge can also be used with advantage in the case of any other type of cartridge.

15 In the case of the present cartridge M, the wall parts 11A - 11D of the inner ring are additionally welded to one another with the corresponding wall parts of the top part 1.

20 Figures 3A and 3B show the energy-edge weld points and Figures 4A and 4B show the pinched-edge weld points, in each case before and after, in diagrammatic representation.

Figure 3A shows the energy edge 12, for example on the outer side wall 7 of the top part 1, or of one of its not-visible wall parts of the inner ring. The counterpiece is then the outer side wall 3 of the bottom part 2 or of one of the inner ring wall parts 11A - 11D.

30 Figure 3B shows the inhomogeneous cross section of the weld point 13 and the oozing out of welding material, in each case after the welding operation.

A pinched-edge profile 15, for example of the outer side wall 10 of the top part 1 and of the corresponding outer side wall 6 of the bottom part 2 is shown in Figure 4A before the welding operation and in Figure 4B thereafter. It is clear that the weld point 16 must be of better quality and strength, but the faces



assigned to one another are very large.

Figures 1A and 1B then show the side wall configurations according to the invention, in section through one of the side walls 3 to 6 of the bottom part 2 and the corresponding side walls 7 to 10 of the top part 1. Denoted by way of example are the side walls 4 and 8. In this case, Figure 1B shows the enlarged cutout I with the welded joint of Figure 1A. It is clearly evident that a tapered part 17, which has on its end face a bevelled surface 18 to reduce the abrasion, is provided on the lower edge of the side wall 8 as a tongue. Part 17 is already in welding engagement with the upper edge of the side wall 4, which has a stepped channel 19 as a groove. The channel walls in the insertion region of the channel 19 are of a rounded-off design to avoid unnecessary abrasion during the uniting of the tongue-and-groove parts 17 and 19.

Figures 2A and 2B show the corresponding wall part configurations of the inner ring welded joint.

Therein, the wall part 11A of the bottom part 2 is connected to the corresponding wall part 20, drawn by dashed lines in the top part 1. Figure 2B shows the enlarged cutout II with the welded joint of Figure 2A.

The wall part 20 has as a tongue on its lower edge a part 21 which is tapered in the form of a wedge and engages a stepped channel 22 as a groove on the upper edge of the wall part 11A. The end face 25 is bevelled-off, as are the bevelled surfaces 23 and 24 of the parts 21 and 22. Rounded-off portions are further provided, in particular in the insertion region of the channel walls of the stepped channel 22.

It could be demonstrated in practice that the strength and fracture resistance of the described cartridge wall connections according to the invention are extremely good. The cartridges M according to the prior art were damaged, in some cases considerably, in 95 out of 100 cartridges in the fracture test (drop from



2 meters height onto the corner E of the cartridge M). Welds of the known cartridge cracked at one point and these cracks continued into the remaining welds. With the cartridges according to the present invention, the incidence of damage among 100 cartridges in the fracture test decreased to zero, which is to be regarded as an enormous improvement. Moreover, fabrication of the injection-molded parts was simplified and they could also be produced more cost-effectively, since an increase in stability was achieved by the better welding, allowing partial wall thickness reductions to be accomplished. As a result, material savings of up to 6% were achieved.

A cartridge comprising at least two parts for recording media is distinguished by high fracture resistance if the walls of the parts to be connected are connected by means of pinched-edge welding with additional tongue-and-groove formation of the welded regions.

The invention can be used advantageously in the case of every type of cartridges for recording media, such as cartridges with magnetic tape, film, ink ribbon and other types.





We claim:-

1. A cartridge for recording media in tape form, in particular a single-reel cartridge, having a plastic housing, comprising at least two housing parts (1, 2) with bottom and top and side walls (3-6 and 7-10), at least the side walls being welded to one another, wherein a tongue-and-groove formation (17 and 19, 21 and 22) of the walls (3-6 and 7-10, 11A and 20) to be welded is provided and the tongue-and-groove regions (17 and 19, 21 and 22) of said walls to be welded (3-6 and 7-10, 11A and 20) are welded to one another by the pinched-edge principle.
2. A cartridge as claimed in claim 1, wherein the insertion region of the groove part (19, 22) of said walls (3-6, 7-10, 11A, 20) to be welded is designed with rounded-off edges.
3. A cartridge as claimed in claim 1 or 2, wherein the tongue part (17, 21) of said walls (3-6, 7-10, 11A, 20) to be welded is designed with a bevelled surface (18, 25) on the end face.
4. A cartridge as claimed in claim 1 and one or more of claims 2 and 3, wherein there are no additional ejector elevations on the housing parts (1, 2).
5. A cartridge as claimed in claim 1 and one or more of claims 2 to 4, wherein the cartridge is a single-reel cartridge (M).

