

TAPE REEL ELEMENT

The present device relates to a tape reel element.

Tape reels used in home video tape recorders
5 vary somewhat in configuration, depending on the system
used, but they are of the same basic construction
including side plates which hold the tape between the
two surfaces, tape winding core, shaft and power
transmission part which receives power from the video
10 deck. In this construction of the tape reel, especially
for the side plate on which the shaft and the power
transmission part are integrally formed, one requires
flatness to ensure trouble-free winding of tape and the
non-deformability essential for maintaining the flatness
15 for as long as possible.

Hitherto in manufacturing such a tape reel
element made of a synthetic resin, to meet the
requirements for high dimensional accuracy, stability,
durability and frictional characteristic, one side
20 plate, tape winding core, shaft and power transmission
part have been integrally formed of polyacetal resin
capable of giving relatively good balance with regard
to various characteristics, and the other side plate
for which transparency is required has been molded of
25 a styrene base resin, and these two plates are then
put together.



A conventional reel having a flat side plate with a definite thickness is practically trouble-free with regard to flatness (sinuosity, deformation).

However with some improvements in devices or mechanisms, 5 the winding speed of the tape becomes greater and since the surface of the reel is not completely flat vertical movement occurs when it is rotated. There is therefore a call for reels involving less surface shift.

We have found that deformation of the flat sur- 10 face part can be remarkably reduced by modifying the configuration of the reel side plate by providing a thick outer circumferential part thereon.

Thus the present device provides a tape reel 15 element comprising a side plate, tape winding core, shaft and power transmission part integrally formed from a synthetic resin, the outer circumference of the surface of the side plate opposite to that on which the tape winding core extends having a rim formed integ- 20 rally therewith, the total thickness of the rim itself and the side plate at the rim being 1.8-2.6 times the thickness of the minimal thickness of the rest of the plate and the inside wall of the rim being tapered.

The invention is illustrated in the accompanying drawings, in which:

25 Fig. 1 is a plan view of the conventional tape reel part,

Fig. 2 is a sectional view along the line A A; 4

designating a side plate; 5 a boss; 6 a projection used as the shaft of the tape reel; 7 an inner cylinder with cover and provided on its inside surface with teeth (not shown) to mesh with the shaft of the machine; 8 an outer cylinder on which tape is wound; and 9 a reinforcing rib.

Fig. 3 is a rear view of the tape reel element according to the invention having an enlarged outer circumferential portion 10 including a rim on the surface of the side plate 4 opposite to that on which tape winding core 8 is provided and Fig. 4 is a sectional view along line B-B.

Fig. 5 is an enlarged view of the side plate part P shown in Figure 4. "a" denotes the thickness of the minimal thickness part of the side plate; "b", the thickness of the enlarged outer circumferential part i.e. the total thickness of the rim itself and the side plate at the rim; and "d", the thickness of the side plate at outer circumferential rim 11 of cylinder 8. The minimum thickness part is shown in this Figure at the outer-most position, but it can be at any position onwards of the enlarged part. The range of thickness "a" is preferably run from 0.6 mm - 1.4 mm, and the thickness "d" is balanced in relation to the thickness "a", its preferable range being 1.1 mm - 1.8 mm. Of course, a plate in which "a" and "d" have the same dimensions but in which "b" is greater than "a" is usable. According to this invention a tape reel which undergoes only slight deformation may

be obtained by setting the ratio "b"/"a" at 1.8-2.6, preferably 2.0-2.2.

It is to be noted that, as shown in Fig. 5, an inside portion of the outer circumferential part 10 is tapered as at 12, and on the outside, a clutch may be mounted. The outer circumferential part 10 may, for example, have a width "c" of generally 1.5 mm - 5 mm, preferably 2 mm - 3 mm. The size of the reel is preferably 50 mm - 100 mm in diameter, but it may not be limited to this range.

The invention is further illustrated in the following Example.

Example

Using the polyacetal resin Duracon VC-10 manufactured by Polyplastics Co., Ltd as the stock material, a tape reel in the shape as shown in Fig. 5 was molded. The ratio of the thickness of the outer circumferential part to the thickness of the minimal thickness part of the side plate ("b"/"a") was varied widely; the mold temperature was set at 50-60°C, and the injection and cooling time period was 30 seconds.

The experimental results are as shown in the Table below:

	"b"/"a"	Deformation (mm)
25	1.00	0.17
	1.15	0.10

1.60

0.08

2.00

0.05

Results obtained by carrying out a similar test with another mold are set out in the Table below:

5	"b"/"a"	Deformation (mm)
	1.00	0.24
	1.38	0.16
	2.00	0.07
	2.25	0.05

10 The measurements of deformation were made using a surface roughness measuring instrument (type SE-4) manufactured by Kosaka Laboratory. The numeral indicates the difference between the maximum and the minimum of the deformation respectively toward the upper and the

15 lower side of the side plate part.

CLAIMS

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1. A tape reel element comprising a side plate,
tape winding core, shaft and power transmission part
integrally formed from a synthetic resin, the outer
5 circumference of the surface of the side plate opposite
to that on which the tape winding core extends having
a rim formed integrally therewith, the total thickness
of the rim itself and the side plate at the rim being
10 1.8-2.6 times the thickness of the minimal thickness of
the rest of the plate and the inside wall of the rim
being tapered.

2. A tape reel element according to claim 1
in which the ratio is 2.0-2.2.

3. A tape reel element as claimed in claim 1
and substantially as herein described with reference to
15 and as illustrated in Figures 3 to 5 of the accompanying
drawings.

4. A tape reel including an element as claimed
in any of claims 1 to 3.

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typescript. It may contain a few amendments which are difficult to read. The original
typescript containing these amendments may be inspected on the premises of the Patent Office



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