

DRUM FOR MAGNETIC TAPE RECORDING
AND REPLAY SYSTEM

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5 The present invention relates to magnetic tape recording and replay systems such as video recorders, camcorders or other similar systems. It relates more particularly to the drum used in such a system.

10 In the currently known magnetic tape recording and replay systems, the magnetic tape is wound over a tape guide drum so as to guide it during the recording or the replaying of video and/or audio information. In a known way, the drum consists of two parts, namely a fixed or static drum also called "lower drum" and a rotary drum called "upper drum". The static drum has
15 the function of guiding the magnetic tape around the drum while the rotary or upper drum is mounted so as to rotate on a rotary shaft fixed to a drive motor. The rotary drum includes the various replay heads which, according to the models produced, may number 2, 3, 4 or
20 6 video heads and also include two audio heads as well as 1 or 2 erase heads in the case of HiFi models. The replay heads are fixed rigidly to the rotary drum so as to turn at the same speed as it. Moreover, the drums currently available on the market include a rotary
25 transformer mounted within the drum. In a known way, the rotary transformer consists of a rotor part fixed to the rotary drum close to the replay heads and of a stator part situated within the static drum and linked to a signal amplifier which makes it possible to
30 amplify the video signals and/or the audio signals coming from the various replay heads.

The drums currently used for top-of-the-range recording and replay system [sic] exhibit a certain number of drawbacks. The rotary transformers used are
35 relatively bulky parts which are expensive to produce, as they have to be able to transfer the signals coming from different replay heads. Moreover, upon detection of the signals, problems of interference and of cross talk are observed, which are due to the use of a single

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rotary transformer.

The object of the present invention is to remedy these drawbacks by proposing a novel structure for the drum.

5 A further object of the present invention is to reduce the costs of drums for top-of-the-range models by using pieces which are already used in the production of drums for bottom-of-the-range models, particularly drums for video models with 2 or 4 heads
10 and without an audio replay head.

 Thus the object of the present invention is a drum for a magnetic tape recording and replay system including a static drum, a rotary shaft fixed to a drive motor and coaxial with the static drum, a rotary
15 drum mounted on the shaft and at least one pair of video replay heads and one pair of audio replay heads which are fixed rigidly to the rotary drum, characterized in that it includes a first rotary transformer mounted within the drum and linked either to the video
20 heads or to the audio heads and a second rotary transformer mounted outside the drum on the same axis as the first transformer and linked either to the audio heads or to the video heads.

 According to one particular embodiment, the
25 first rotary transformer includes a rotor part fixed to the rotary drum close to the replay heads and a stator part situated within the static drum and linked to an amplifier. For preference, the amplifier is mounted within the drum. In an advantageous way, the amplifier
30 is fixed to the face of the stator part of the transformer which is not face-to-face with the rotor part of the transformer. This characteristic allows better detection of the signals coming from the replay heads, which in fact are signals of very low amplitude taken
35 directly to the input of the amplifier without any significant length of connecting wire.

 Moreover, the second rotary transformer includes a rotor part fixed to the outside of the rotary drum on the latter so as to pick up the signals

coming from the replay heads and a stator part connected via a rigid means to the static drum, the stator being linked to an amplifier. In this case, the rotor part is connected to the audio or video heads by
5 a connection system passing through the rotary drum.

According to one embodiment, the rigid means consists of a bracket fixed to one face of the static drum or to the metalwork which supports the drum. In this case, the bracket can be equipped with a setting-
10 up means allowing adjustment of the gap between the rotor part and the stator part of the second rotary transformer.

According to a second embodiment, the rigid means consists of a mechanical assembly carrying a
15 screening, the said assembly being linked to the bracket. In this case, the mechanical assembly is mounted on the rotary shaft in such a way as to be able to set the gap between the rotor part and the stator part of the second rotary transformer. In this case,
20 the amplifier associated with the second transformer is mounted on the said mechanical assembly.

Other characteristics and advantages of the present invention will emerge on reading a preferred embodiment, given with reference to the attached
25 drawing in which:

- Figure 1 is a view in axial section of a drum in accordance with the present invention;

- Figure 2 is an enlarged view in section showing the connections between the first rotary trans-
30 former and the associated replay heads and the rotary amplifier respectively, and

- Figure 3 is an enlarged view in section showing the connections between the second rotary transformer and its replay heads and the rotary
35 amplifier.

Figure 1 represents a drum for a top-of-the-range magnetic tape recording and replay system, that is to say, for example, a drum for a video recorder including 4 video heads and two audio heads used for

HiFi.

As represented in Figure 1, in a known way, the drum is mounted on a rotary shaft 2 driven by a motor only the rotor 1 of which has been represented. This drum therefore includes a static drum 3 also called "lower drum". This static drum is not driven in rotation. It is therefore mounted around the shaft 2 by means of bearings, such as ball bearings 4 in the embodiment represented. Above this lower drum is mounted a rotary drum 5 called "upper drum". This upper drum 5 is fixed to the shaft 2 in such a way as to be driven in rotation with it above the lower drum 3. In a recess provided between the lower drum 3 and the upper drum 5 is mounted a first rotary transformer 6. This rotary transformer is preferably produced in the technology of rotary minitransformers, that is to say that it has a diameter which is markedly less than the diameter of the two upper and lower drums. The rotary transformer 6 consists of a stator part 61 fixed to the lower drum 3 and a rotor part 62 fixed to the upper drum 5 so as to be driven in rotation with it. Moreover, as represented in Figure 1, the upper drum 5 supports the video and audio replay heads referenced 7 in the embodiment represented. As mentioned above, the upper drum 5 supports four video replay heads and two audio replay heads for HiFi.

Moreover, in the embodiment represented, in order to reduce the losses of the signals coming from the transformer, the amplifier is mounted within the lower drum 3 so as to be as close as possible to the stator part 61 of the first transformer. The connection between the stator part 61 and the printed circuit on which the amplifier 8 is mounted is formed by a known connection system 9 as represented on a larger scale in Figure 2. Likewise, on this Figure 2, it is seen that the rotor 62 of the rotary transformer is placed within the upper drum 5 not far from the replay head, so as to shorten the connection between this transformer and the replay head from which it picks up the signals. In the

case of Figure 2, only the four video heads 7, for example, are connected to the stator 62 of the rotary transformer 6 mounted within the drum.

5 In accordance with the present invention, for detecting the signals coming from the audio replay heads, another rotary transformer is used mounted on the shaft 2 but outside the drum. This type of layout confers a certain number of advantages. In particular, it is possible physically to separate the audio signals
10 from the video signals within the transformers, which reduces the problems of cross talk. There is also separation of the signals within the amplifiers, since one amplifier is associated with each transformer, which also reduces the problems of interference between
15 the video and audio signals. Moreover, it is possible, as is seen clearly in the figure, to use mini transformers which are considerably less expensive than the large transformers usually used in this type of top-of-the-range system. Moreover, the parts described
20 above can also be used in bottom-of-the-range models such as the models with only two, three or four video heads without an audio head, which allows standardization of the parts between the bottom-of-the-range models and the top-of-the-range models, which results
25 in a reduction of the price of the assembled parts.

Thus, in accordance with the present invention, for detecting the audio signals, a second rotary transformer 10 is used, including a rotor part 101 mounted on the upper part of the rotary drum 5 and
30 fixed to it in such a way as to be driven in rotation at the same speed as the upper drum 5, and a stator part 102 which is fixed to a mechanical assembly linked to the lower drum 3 as will be described below.

According to one embodiment represented in
35 Figure 1, the mechanical assembly consists of a T-shaped part 11 which is mounted above the shaft 2 without being driven in rotation with the shaft 2. On the lower part of this metal T-shaped part 11 is fixed the stator 12. Moreover, this metal part 11 is extended

over its whole periphery by an annular plate 111 onto which a printed circuit can be fixed and which makes it possible to accommodate the amplifier 12. The signals coming from the amplifier are sent to external processing circuits by a connection system 13. Moreover, the rotor 101 is connected to the audio heads 7 by passing through a slot 5' formed in the upper part of the rotary drum 5.

The two connection systems described above are represented on a larger scale in Figure 3.

Moreover, in the embodiment represented, the T-shaped part 11 is secured to a metal element 15 in the shape of a cup the role of which is to form screening of the rotary transformer 10. Moreover, this assembly consisting of the part 11 and of the screening 15 is held in position above the shaft 2 by means of a bracket 16 the lower end of which is fixed onto the drum by any known fixing means 17 such as screws and rivets onto the lower drum 3. In that way, the stator 102, the T-shaped part 11, the metal element 15 and the bracket are fixed with respect to the lower drum 3. In order to allow setting up of the gap between the rotor part 101 and the stator part 102 of the second rotary transformer, the position of the mechanical element 11 supporting the stator part 102 can be adjusted vertically by means of a system of the setting-screw type 18. Other setting-up means can be envisaged, in particular the height of the bracket could be set up by using a system of the slider type with locking means.

In the embodiment described above, it was mentioned that the video heads were connected to the first rotary transformer while the audio heads were connected to the second rotary transformer. However, it is obvious to the person skilled in the art that it is possible to perform a reversal of the connections without departing from the scope of the present invention. Moreover, a system may be envisaged in which the amplifier contained within the drum is fixed directly to the stator part of the rotary transformer

on the side which is not face-to-face with the rotor part of this rotary transformer. Other variants can be envisaged without departing from the context of the present invention.



CLAIMS

1. Drum for a magnetic tape recording and replay system including a static drum (3), a rotary shaft (2) fixed to a drive motor (1) and coaxial with the static drum, a rotary drum (5) mounted on the shaft and at least one pair of video replay heads (7) and one pair of audio replay heads (7) which are fixed rigidly to the rotary drum, characterized in that it includes a first rotary transformer (6) mounted within the drum and linked either to the video heads or to the audio heads and a second rotary transformer (10) mounted outside the drum on the same axis as the first transformer and linked either to the audio heads or to the video heads.

2. Drum according to Claim 1, characterized in that the first rotary transformer (6) includes a rotor part (61) fixed to the rotary drum close to the replay heads and a stator part (62) situated within the static drum and linked to an amplifier.

3. Drum according to Claim 2, characterized in that the amplifier (8) is mounted within the drum.

4. Drum according to any one of Claims 2 and 3, characterized in that the amplifier is fixed to the face of the stator part of the transformer which is not face-to-face with the rotor part of the transformer.

5. Drum according to any one of Claims 1 to 4, characterized in that the second rotary transformer (10) includes a rotor part (101) fixed to the outside of the rotary drum (5) on the latter so as to pick up the signals coming from the replay heads and a stator part (102) connected via a rigid means to the static drum (3), the stator being linked to an amplifier (12).

6. Drum according to Claim 5, characterized in that the rotor part (101) is connected to the audio or video heads via a connection system passing through (5') the rotary drum (5).

7. Drum according to Claims 5 and 6, characterized in that the rigid means consists of a fixed bracket (6)

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on one face of the static drum (3) or on the metalwork supporting the drum.

8. Drum according to Claim 7, characterized in that the rigid means consists of a mechanical assembly
5 (11) carrying screening (15), the assembly being linked to the bracket (16).

9. Drum according to Claim 8, characterized in that the mechanical assembly is mounted on the rotary axis in such a way (18) as to be able to set the gap
10 between the rotor part (102) and the stator part (101) of the second rotary transformer (10).

10. Drum according to Claims 8 and 9, characterized in that the amplifier (12) associated with the second transformer is mounted on the mechanical assembly.

15 11. Drum according to Claim 7, characterized in that the bracket is equipped with a setting-up means allowing adjustment of the gap between the rotor part and the stator part of the second rotary transformer.

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