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(56) Documents cited
WO A 8102804
GB A 2070565
GB A 2053849
GB A 2013160
GB 1536712
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GB 1372514
GB 0712536
GB 707855
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(54) **Tape cassettes and cassette type tape recorders.**

(57) A tape cassette comprising a cassette body 3, which is provided with a pair of capstan insertion holes 16 penetrating it from top to bottom, a positioning hole 17 through which a positioning pin 41' provided on a tape recorder body is inserted, and five openings 18, 19, 20, 21, 22 formed at the front for the insertion of magnetic heads 42, 43, 47 and pinch rollers 46. The cassette body 3 is further provided adjacent to the front side and at a position corresponding to the central opening 20 with a substantially rectangular opening 23 for receiving a guide post 44 provided on the tape recorder and penetrating the opening 23 from top to bottom. The friction of the guide post 44 provides back tension on the tape.

FIG.7

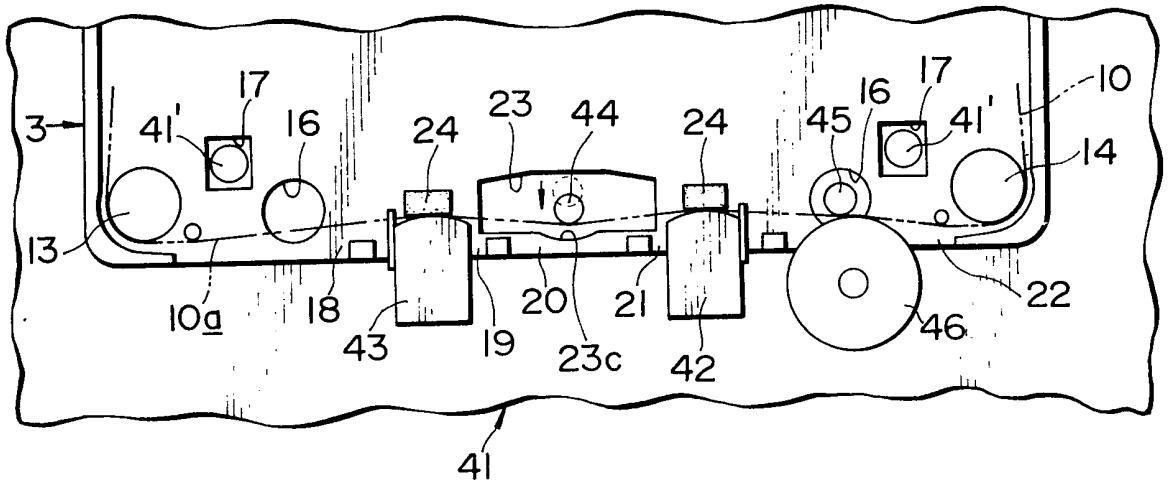

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FIG.1

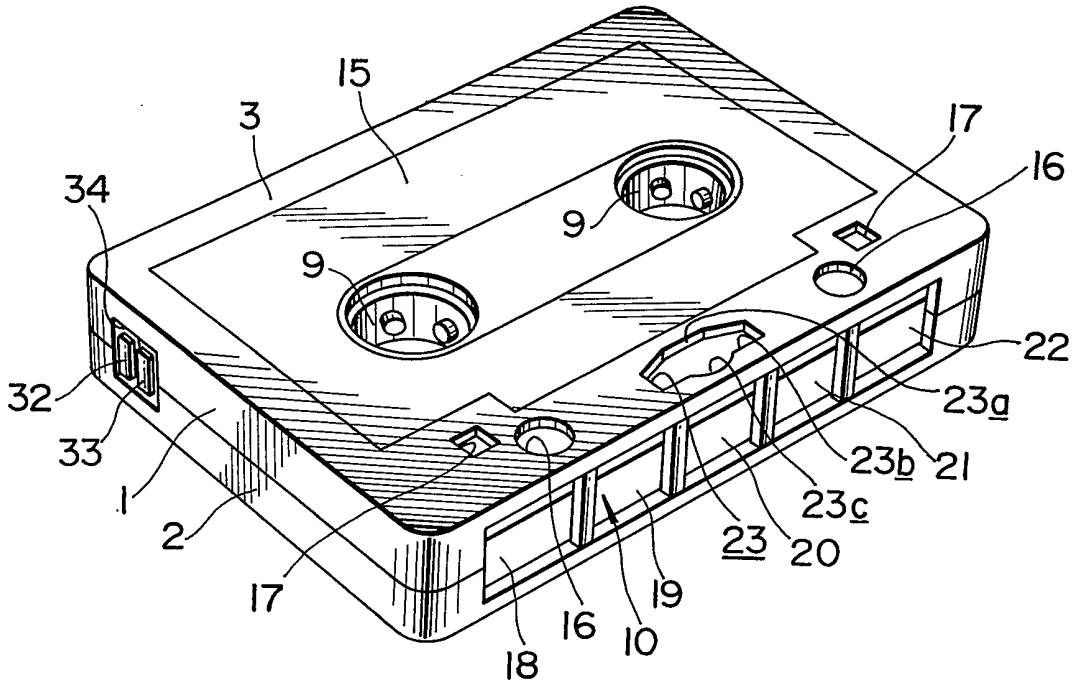

15
3
17
16
34
9
9
22
32
23a
33
23b
21
1
23c
2
23
20
17
19
16
10
18

FIG.2

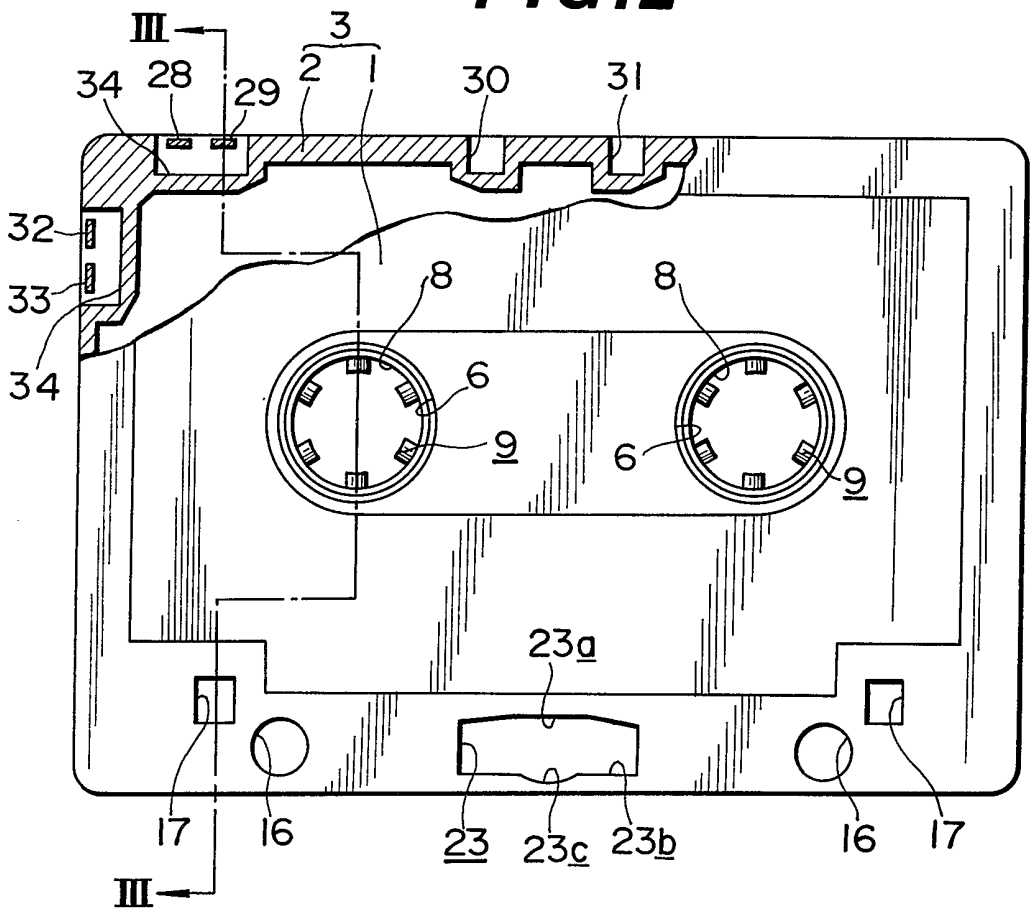

III
3
2
1
34
28
29
30
31
32
33
34
8
8
6
6
9
9
23a
17
16
23
23c
23b
16
17
III

FIG.3

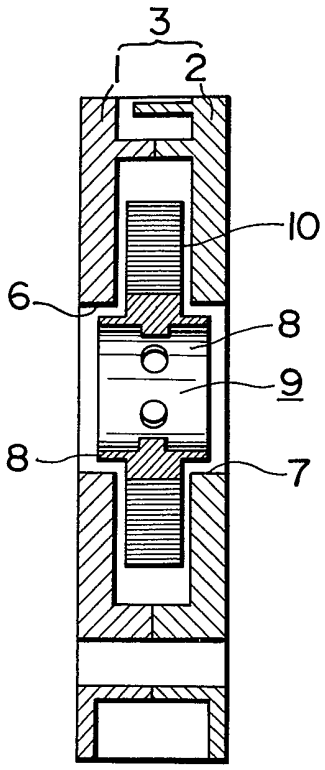

3
1
2
10
6
8
9
8
7

FIG.4

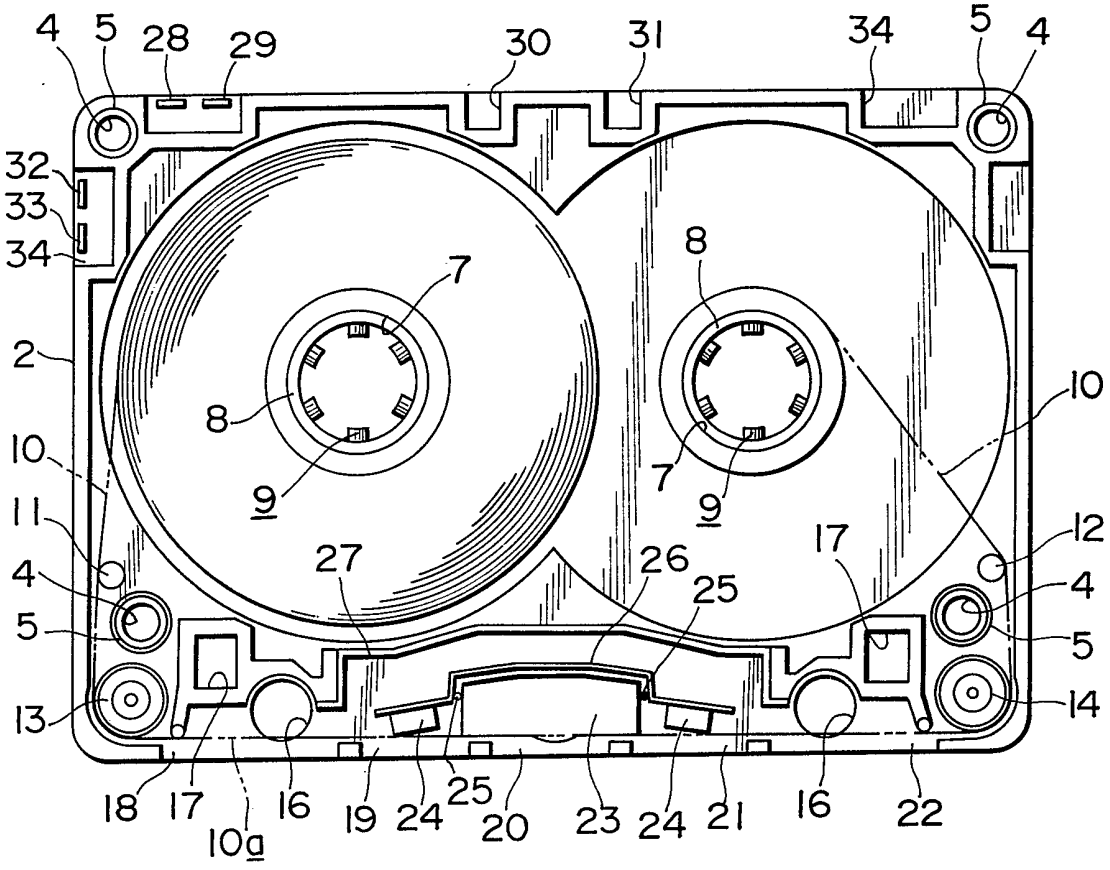

4
5
28
29
30
31
34
5
4
32
33
34
2
7
8
8
9
10
10
11
4
5
13
27
26
25
17
12
4
5
14
18
17
10a
16
19
24
25
20
23
24
21
16
22

FIG.5

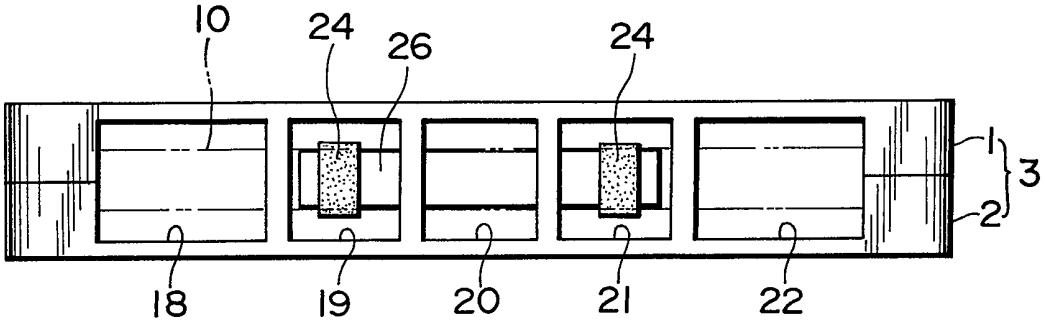


FIG.6

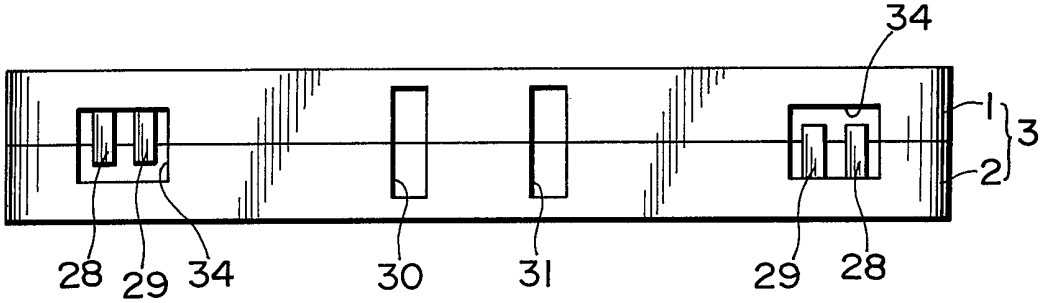


FIG.7

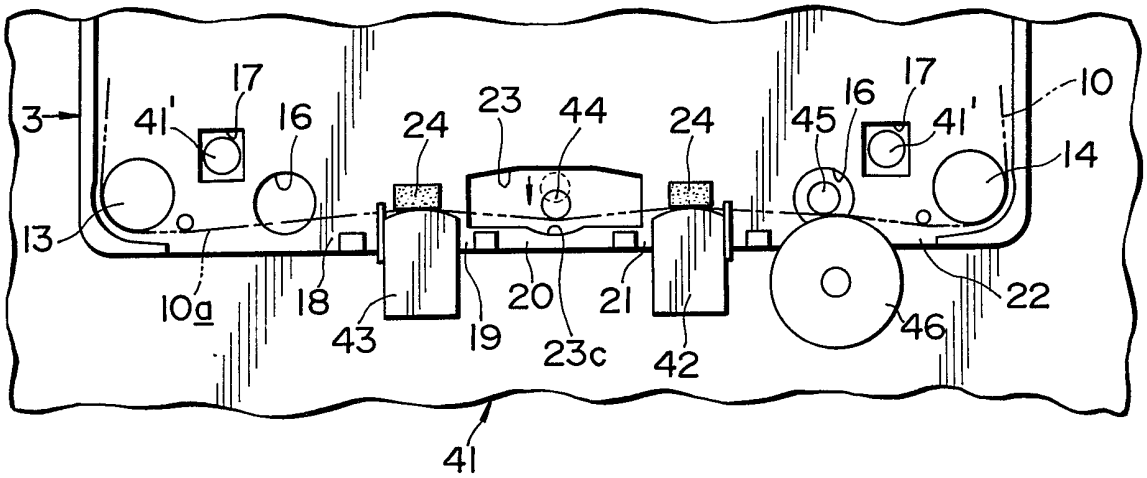


FIG.8

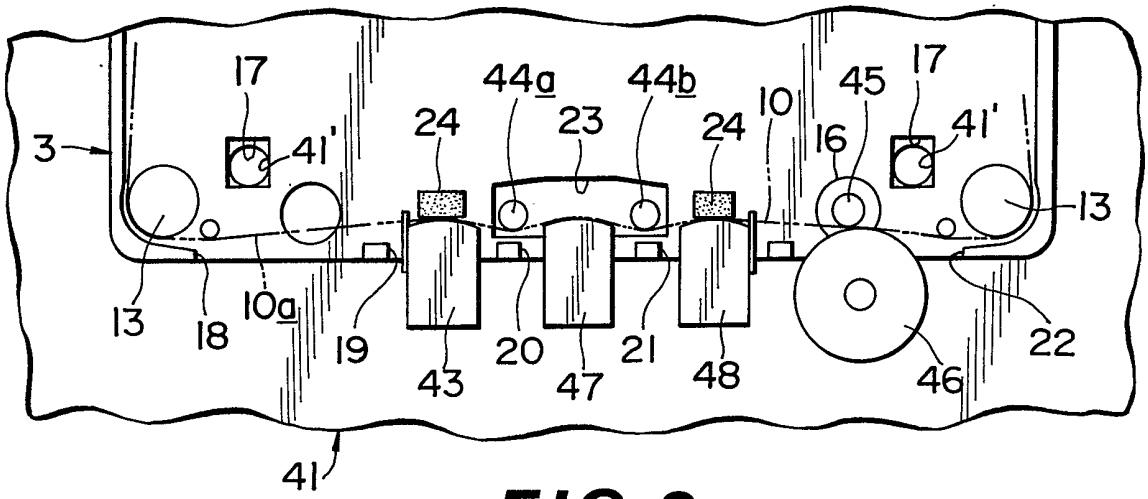


FIG.9

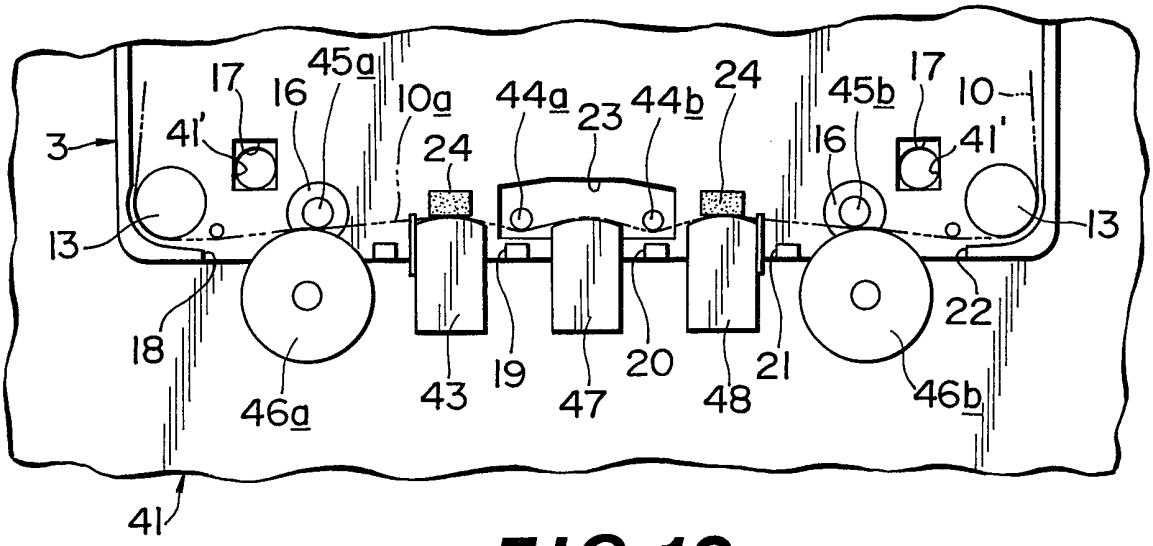
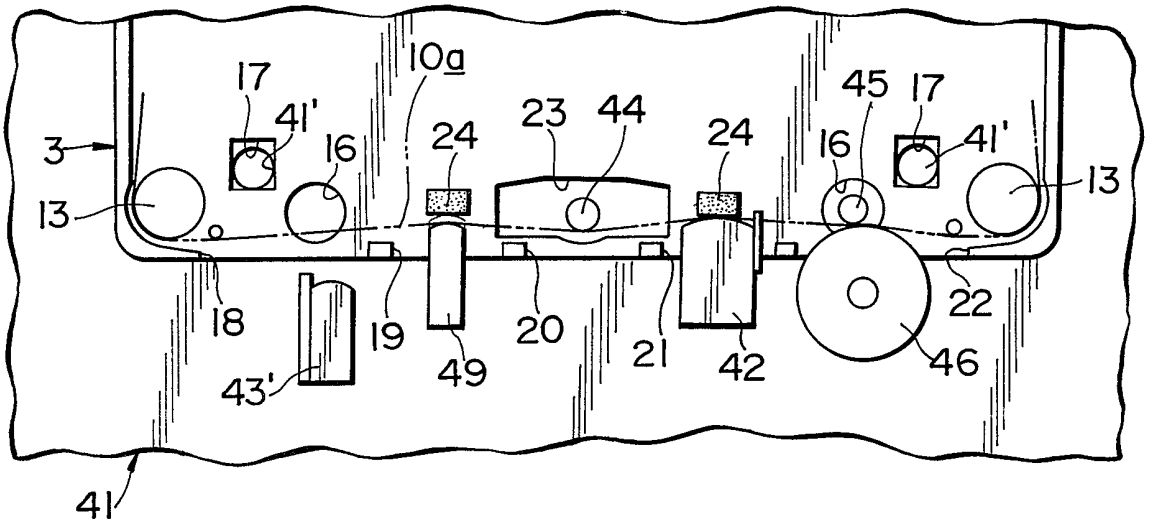


FIG.10



SPECIFICATION

Tape cassettes and cassette type tape recorders

This invention relates to tape cassettes and to cassette type tape recorders.

A tape cassette which is smaller in size than the compact size tape cassette has been used to achieve miniaturization of cassette type tape recorders.

With a tape cassette of this kind, when the tape cassette is loaded into a tape recorder, the magnetic tape is run at a constant speed while clamped between a capstan and pinch roller for recording or reproduction. A magnetic head is inserted into the cassette through an opening at the front of the cassette body, and the magnetic tape is thereby brought into contact with a guide post forming a tape guide means and fixed inside the cassette body at a position ahead of the magnetic head in the direction of tape run. By bringing the magnetic tape into frictional contact with the guide post in this way, the moving magnetic tape is given back tension, with the intention of ensuring stable tape run and regulating the tape running position such that the tape is in frictional contact with the magnetic head at a fixed position.

In the tape cassette of this kind, however, the guide post for stabilizing the tape run is formed integrally with the cassette body, which is a moulding of synthetic resin. Therefore, if the cassette body is distorted, the guide post is also distorted, so that it is difficult to ensure precision of the guide post in each tape cassette. Moreover, because the cassette body is a moulding of a synthetic resin, it is difficult to maintain precision of the verticality and circularity of the guide post. As a result, it is difficult to stabilize the tape run and obtain satisfactory recording and reproducing properties.

According to the present invention there is provided a tape cassette comprising:

a cassette body including upper and lower halves;

a pair of reel hubs rotatably mounted inside said cassette body, a magnetic tape being wound on said hub reels;

a plurality of openings on the front side of said cassette body, and a tape run path along which the magnetic tape passes between said pair of hub reels being formed on the inner side of said front openings;

at least a pair of capstan insertion holes penetrating the upper and lower halves of the capstan body from top to bottom; and

an opening penetrating the upper and lower halves of the capstan body on the front side thereof adjacent to said tape run path for receiving a tape guide means to be inserted in said opening.

According to the present invention there is also provided a tape comprising a cassette body including upper and lower halves, said cassette body being formed with a pair of capstan insertion holes penetrating said body from top to bottom and also with a positioning pin provided on a tape recorder, said cassette body being further formed on the front side with five openings through which magnetic heads and pinch rollers are advanced, said cassette body being further formed at a position corresponding to the central one of said five openings with a substantially rectangular opening penetrating said body from top to bottom for inserting a guide post provided on the tape recorder, pads being provided on opposite sides of said central opening.

According to the present invention there is also provided a cassette type tape recorder comprising:

a recording and/or reproducing head;

a capstan for insertion into a capstan insertion hole of a tape cassette for driving a magnetic tape of said tape cassette;

a pinch roller for insertion into the tape cassette from the front side thereof to pinch the magnetic tape against the capstan; and

guide means for insertion into the tape cassette for regulating the running of the magnetic tape.

The invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view showing an embodiment of tape cassette according to the invention;

Figure 2 is a plan view, partly broken away, of the embodiment of tape cassette;

Figure 3 is a sectional view showing a hub reel of the embodiment of tape cassette;

Figure 4 is a plan view showing the embodiment of tape cassette with an upper half of the cassette body removed to show the internal construction;

Figure 5 is a front view of the embodiment of tape cassette;

Figure 6 is a back view of the embodiment of tape cassette; and

Figures 7 to *10* are fragmentary plan views showing respective different embodiments of cassette type tape recorder according to the invention in which the embodiment of tape cassette is loaded.

Referring to Figure 1, the embodiment of tape cassette comprises a cassette body 3 formed of upper and lower halves 1 and 2 which are, for example, mouldings of a synthetic resin. More particularly, the cassette body 3 is formed by abutting the upper and lower halves 1 and 2 and securing them to each other by fitting screws or pins through screw insertion holes 4 formed in boss portions 5 of them. As shown in Figure 3, a pair of hub reels 9 are rotatably mounted inside the cassette body 3 by loosely fitting angular projections 8 in respective pairs of through holes 6 and 7 formed in the upper and lower halves 1 and 2. As shown in Figure 4, a predetermined length of magnetic tape 10 is wound on the hub reels 9. The magnetic tape 10 is guided past guide pins 11 and 12 projecting from the bottom wall of the lower half 2 and also around guide rollers 13 and 14 provided at the opposite corners of the front side of the cassette body 3 as it passes from one hub reel 9 to the other.

As shown in Figure 1, the upper and lower surfaces of the cassette body 3 are provided with labels 15 for printing or other display matter.

The cassette body 3 is provided adjacent to its front side with a pair of circular capstan insertion holes 16 such that they penetrate the cassette body 3 from the top to the bottom. The cassette body 3 is also provided near the capstan insertion holes 16

with positioning through holes 17, into which positioning pins 41' (Figure 7) provided on a tape recorder body are inserted. As shown in Figure 5, the front side of the cassette body 3 is provided with five openings 18, 19, 20, 21 and 22 through which magnetic heads and pinch rollers can enter.

The cassette body 3 is formed adjacent to the front and at a position corresponding to the central opening 20 with a substantially rectangular opening 23 penetrating the cassette body 3 from the top to the bottom such that a guide post provided on the tape recorder chassis can be inserted through it. The substantially rectangular opening 23 extends in the longitudinal direction of the cassette body 3, with its side 23a on the rear side of the cassette body 3 defined by inclined surfaces such that the central portion extends slightly inwardly so that the operation of inserting the aforementioned guide post can be smoothly effected. The side 23b of the opening 23 opposite to the side 23a is formed substantially at the central portion with a recess portion 23c acting as an escapement zone for the guide post when it is inserted.

Pads 24 are provided to correspond to the openings 19 and 21 on the opposite sides of the central opening 20 which corresponds to the opening 23 through which the guide post is inserted as described above. The pads 24 are attached to the opposite ends of a shield plate 26 having elasticity and supported by support pins 25 provided inside the cassette body 3. Provided inwardly of the front side of the cassette body 3 is a partition wall 27 serving to protect the magnetic tape 10 wound on the reel hubs 9.

As shown in Figure 6, the rear side of the cassette body 3 is provided with erroneous erasion prevention pawls 28, tape speed detection pawls 29 and tape type detection recesses 30 and 31 for identifying the kind of magnetic tape 10 accommodated in the cassette body 3. As shown in Figure 2, one side of the cassette body 3 is provided with a noise reduction selection pawl 32 and a spare pawl 33. The individual pawls 28, 29, 32 and 33 are provided integrally with the upper and lower halves 1 and 2 such that when the upper and lower halves 1 and 2 are assembled together they are disposed in receiving holes 34 formed in the individual halves 1 and 2 of the cassette body 3.

A cassette type tape recorder in which the embodiment of tape cassette as described above can be loaded for recording and/or reproduction and the manner of loading will now be described. Figure 7 shows part of a cassette type tape recorder 41, which include a capstan 45, a recording/reproducing head 42 and an erasing head 43. When the embodiment of tape cassette is loaded in the tape recorder 41 a guide post 44 provided on the chassis of the tape recorder 41 a guide post rectangular opening 23 of the tape cassette. Also, the recording/reproducing head 42 and the erasing head 43 are advanced into the respective openings 19 and 21 towards the pads 24 and urge the magnetic tape 10 into frictional contact with the guide post 44. The front run 10a of the magnetic tape 10 is clamped between the capstan 45 inserted into the capstan insertion hole 16 and a pinch roller 46 advanced into the opening 22, so as to be driven at a constant speed.

Figure 8 shows the embodiment of tape cassette loaded into a three-head cassette type tape recorder 41 in which a recording head 47 and a reproducing head 48 are independently provided. With such a tape recorder 41, two guide posts 44a and 44b are provided and inserted into the substantially rectangular opening 23 of the tape cassette, and these guide posts 44a and 44b are inserted such that they are located on opposite sides of the opening 23. The erasing head 43 and the reproducing head 48 are advanced into the openings 19 and 20 faced by the pads 24, and the recording head 21 is advanced into the central opening 20 and positioned between the guide posts 44. The front run 10a of the magnetic tape 10 is thus brought into frictional contact with the guide posts 44. With this tape recorder 41 also, the magnetic tape 10 is clamped between the capstan 45 and the pinch roller 46 and is driven at a constant speed.

Figure 9 shows the embodiment of cassette tape loaded into a cassette type tape recorder 41 of a so-called double capstan three-head cassette type having two capstans 45a and 45b. In this tape recorder 41, two pinch rollers 46a and 46b are advanced into the opposite end openings 18 and 22 of the tape cassette to clamp the magnetic tape 10 in cooperation with the capstans 45a and 45b, and to drive the magnetic tape 10 at a constant speed. In this case again, like the case shown in Figure 8, two guide posts 44 are inserted into the substantially rectangular opening 23, and the recording head 47, the reproducing head 48 and the erasing head 43 are advanced to bring the magnetic tape 10 into forced contact with the guide posts 44.

Figure 10 shows the embodiment of tape cassette 100 loaded into a pole type cassette type tape recorder 41. With this tape recorder 41, the recording/reproducing head 42, the erasing head 43 and a tape guide 49 are provided. The recording/reproducing head 42 and the tape guide 49 are advanced into the openings 19 and 21 faced by the pads 24, and the erasing head 43 is advanced into the end opening 18. Thus, with this tape recorder 41, like the tape recorder 41 of Figure 7, a single guide post 44 is inserted into the substantially rectangular opening 23 and is brought into frictional contact with the magnetic tape 10.

In either one of the aforementioned cassette type tape recorders 41, the guide post 44 is inserted into the substantially rectangular opening 23, for example, in an interlocked relation to the tape cassette or in an interlocked relation to the advancement of the recording/reproducing head 42, the recording head 47 and the reproducing head 48 into the respective openings 19, 20 and 21. More particularly, as the tape cassette is inserted, the guide post 44 is moved in the direction of the magnetic tape 10 and is correctly positioned with respect to the tape cassette, in frictional contact with the magnetic tape 10, whereby back tension is provided and the tape running position is regulated.

Moreover, because the guide post 44 is provided on the tape recorder 41, it can be constructed with

and mounted with very high precision, so that the magnetic tape 10 can be run with very high stability, and stable contact with the magnetic heads 42, 43 and 48 can be obtained.

Consequently, even if a tape cassette is constructed to be smaller in size than the compact size tape cassette, recording and reproduction can be obtained with satisfactory recording and reproducing properties, even if the signal involved covers a very high frequency band like a musical tone signal.

CLAIMS

1. A tape cassette comprising:

a cassette body including upper and lower halves;

a pair of reel hubs rotatably mounted inside said cassette body, a magnetic tape being wound on said hub reels;

a plurality of openings on the front side of said cassette body, and a tape run path along which the magnetic tape passes between said pair of hub reels being formed on the inner side of said front openings;

at least a pair of capstan insertion holes penetrating the upper and lower halves of the capstan body from top to bottom; and

an opening penetrating the upper and lower halves of the capstan body on the front side thereof adjacent to said tape run path for receiving a tape guide means to be inserted in said opening.

2. A tape cassette according to claim 1 wherein said opening for inserting the tape guide means has an elongate shape extending in the direction of said tape run path.

3. A tape cassette according to claim 2 wherein said opening for inserting the tape guide means is formed with a recess on the side of said tape run path.

4. A tape comprising a cassette body including upper and lower halves, said cassette body being formed with a pair of capstan insertion holes penetrating said body from top to bottom and also with a positioning hole also penetrating said body from top to bottom for inserting a positioning pin provided on a tape recorder, said cassette body being further formed on the front side with five openings through which magnetic heads and pinch rollers are advanced, said cassette body being further formed at a position corresponding to the central one of said five openings with a substantially rectangular opening penetrating said body from top to bottom for inserting a guide post provided on the tape recorder, pads being provided on opposite sides of said central opening.

5. A cassette type tape recorder comprising:

a recording and/or reproducing head;

a capstan for insertion into a capstan insertion hole of a tape cassette for driving a magnetic tape of said tape cassette,

a pinch roller for insertion into the tape cassette from the front side thereof to pinch the magnetic tape against the capstan; and

guide means for insertion into the tape cassette for regulating the running of the magnetic tape.

6. A tape recorder according to claim 5 wherein said guide means is fixed to a chassis of the tape recorder.

7. A tape recorder according to claim 5 wherein said guide means is movable in the direction of the magnetic tape when inserted into the tape cassette.

8. A tape recorder according to claim 5 wherein said guide means comprises a pair of guide posts.

9. A tape recorder according to claim 8 wherein a recording and/or reproducing head is positioned between said guide posts.

10. A tape cassette substantially as hereinbefore described with reference to Figures 1 to 6 of the accompanying drawings.

11. A cassette type tape recorder substantially as hereinbefore described with reference to Figure 7 of the accompanying drawings.

12. A cassette type tape recorder substantially as hereinbefore described with reference to Figure 8 of the accompanying drawings.

13. A cassette type tape recorder substantially as hereinbefore described with reference to Figure 9 of the accompanying drawings.

14. A cassette type tape recorder substantially as hereinbefore described with reference to Figure 10 of the accompanying drawings.

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