



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 274 864 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: 09.10.91 (51) Int. Cl.⁵: **G11B 23/037**

(21) Application number: 87310747.8

(22) Date of filing: 07.12.87

(54) Tape reel for tape cassette.

(30) Priority: 12.12.86 JP 191243/86 U

(43) Date of publication of application:
20.07.88 Bulletin 88/29

(45) Publication of the grant of the patent:
09.10.91 Bulletin 91/41

(84) Designated Contracting States:
DE ES FR GB IT NL

(56) References cited:
DE-A- 2 952 350
DE-A- 3 108 585

RESEARCH DISCLOSURE, no. 255, July 1985,
no. 25552, pages 369-371, Emsworth Hamp-
shire, GB

(73) Proprietor: **SONY CORPORATION**
7-35 Kitashinagawa 6-Chome Shinagawa-ku
Tokyo 141(JP)

(72) Inventor: Iwahashi, Yuji **SONY MAGNETIC**
PRODUCTS INC
5-6 Kitashinagawa 6-chome
Shinagawa-ku Tokyo(JP)

(74) Representative: **Ayers, Martyn Lewis Stanley**
et al
J.A. KEMP & CO. 14 South Square Gray's Inn
London, WC1R 5EU(GB)

EP 0 274 864 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

Description

The present invention relates generally to a tape reel structure for a tape cassette and more specifically, to a tape reel structure of a tape cassette with an improved reel flange supporting structure. More particularly, the invention relates to a tape reel structure of a tape cassette with an inner cylindrical boss section and an outer cylindrical reel section coaxially arranged in spaced apart relationship and connected by radially extending ribs.

A magnetic tape cassette, such as a video tape cassette for a video tape recorder (VTR), have been disclosed in Japanese Utility model Second (examined) Publication (Jikko) Showa 57-56382. The disclosed magnetic tape cassette employs tape reels, each of which has upper and lower reel flanges. The tape reels also have coaxially arranged inner and outer sections in spaced apart relationship to each other. The inner cylindrical section serves as a boss for drivingly receiving a reel shaft of an associated tape recording and/or reproducing apparatus. The outer cylindrical section forms reel body so that a magnetic tape as a recording medium is wrapped or wound therearound. Radially extending ribs are provided between the inner and outer cylindrical sections.

Such tape reels are formed of a synthetic resin by injection moulding, in which molten resin is injected into moulding dies. In this case, when the radially extending ribs extend through the overall length of the inner and outer cylindrical sections, flows of the molten resin injected through the radial centre of the reel converge at about the axial intermediate portion of the outer cylindrical section. Confluence of the molten resin flows at this position tends to form waving on the outer periphery of the outer cylindrical section. During injection moulding process, two molten resin flows are formed. The first resin flow flows radially through the portion of the die to form the lower reel flange. The second resin flow is through the upper end wall of the portion for forming the upper end wall of the inner cylindrical section and through the upper end wall of the inner cylindrical section and through the upper end portion of the rib. Part of the resin in the first flow flows along the inner and outer cylindrical sections and the ribs toward the upper end. On the other hand, part of the molten resin in the second flow flows through the inner and outer cylindrical sections and the ribs toward the lower flange. Due to the opposite flow directions of the molten resin in the first and second flows at their confluence at the axial intermediate portion, stress is created in the resin. This stress causes formation of the waving unevenness at the confluencing portion. When waving of the outer periphery of the

outer cylindrical section is caused, wrinkles tend to be formed on the tape which may cause disturbance of the signal or data to be recorded on the tape. Such disturbance of the recorded signal or data will cause disturbance of reproduced image in the case of a video tape.

Formation of waving unevenness on the outer periphery of the outer cylindrical section can be prevented by shortening the length of rib so as to interrupt the second flow by a discontinuity between the inner and outer cylindrical sections at the upper end thereof. In this case, however, another problem is encountered in resilient deformation at the discontinuity of the outer cylindrical section toward the inner cylindrical section when the tape is tightly wound therearound. Namely, by shortening the ribs, the upper end portion of the outer cylindrical section becomes free from inward or radial bending. This causes radially inward bending of the portion where it is not restricted by the ribs. As a result of radially inward bending at the upper portion of the outer cylindrical section, the tape wound therearound may constantly subject uneven force in the direction of the width thereof. When the stress exerted by the unevenness of the force in the transverse direction of the tape becomes significant, wrinkles may be formed on the tape and cause disturbance of the signal or data to be recorded on the tape.

DE-A-3,108,585 discloses a tape reel in which ribs supporting the outer reel section extend only half the height of the inner reel hub and which therefore suffers from the problem discussed above.

Therefore, it is an aim of the present invention to provide a tape reel which can alleviate the aforementioned drawbacks in the background art.

Another object of the invention is to provide a tape reel for a magnetic tape cassette, which will not form wrinkles of a tape.

A further object of the invention is to provide a tape reel structure for a tape cassette which will never form wave-form unevenness on a tape reel section.

According to a first aspect of the invention, there is provided a tape reel structure for a tape cassette comprising:

a tape reel including an inner cylindrical reel shaft boss section defining at its lower end an open recess for engaging a reel shaft of a recording and/or reproducing apparatus and an outer cylindrical tape reel section, said inner and outer cylindrical sections being coaxially arranged to each other in mutually spaced relationship and a plurality of radially extending ribs extending between said inner and outer cylinder section, said ribs each having a first portion joining with the inner periphery of said outer cylindrical section and a second

portion joining with the outer periphery of said inner cylindrical section;

an upper reel flange to be mounted on said tape reel; and

a lower flange section formed integrally with said tape reel; characterised in that

said first joining portions of said ribs extend substantially through the overall height of said outer cylindrical section and have first upper ends and said second joining portions of said ribs extend substantially through the overall height of said inner cylindrical section and have second upper ends, said second upper ends being at a lower elevation than said first upper ends, and at a higher elevation than the upper end of said open recess.

This axial height difference of the joining portions between the ribs and the outer cylindrical section, and between the ribs and the inner cylindrical section, may prevent resin flows from confluencing at the axial intermediate portion of the outer cylindrical section and thus prevent the flows from creating stress for causing waving unevenness on the outer periphery of the outer cylindrical section.

According to a second aspect of the invention, there is provided a tape cassette including a tape reel according to the first aspect.

In practice, the tape reel structure set forth above is particularly applicable for a tape reel which is formed of a synthetic resin by moulding, such as an injection moulding process.

In the preferred construction, each of the ribs has an upper end including a first upper end plane lying on a first horizontal plane extending through the first upper end of the first joining portion and a second upper end plane lying on a second horizontal plane which extends through the second upper end of the second joining portion and at lower elevation than the first horizontal plane. The upper flange has a downwardly projected section having a circumferential edge substantially conforming to the upper end plane of the rib.

In an alternative, each of the ribs has an upper end plane substantially lying on a horizontal plane extending through the first upper end of the first joining portion, and has the second upper end of the section joining portion at a vertical intermediate position at a lower elevation than the horizontal plane.

The upper flange defines a space for receiving the upper end portion of the outer cylindrical section and the ribs. The space is defined by through openings formed through the upper reel flange.

The present invention will be understood more fully from the detailed description given herebelow and from the accompanying drawings of the preferred embodiment of the invention, which, however, should not be taken to limit the invention to

the specific embodiments, but are for explanation and understanding only.

In the drawings:

Fig 1 is an exploded perspective view of a tape reel to which the tape reel structure according to the present invention is applicable;

Fig 2 is a cross-section of the preferred embodiment of a tape reel structure according to the invention;

Fig 3 is an enlarged section of the tape reel of fig 2; and

Fig 4 is a section of another embodiment of the tape reel structure.

Referring now to the drawings, particularly to figs 1 and 2, a tape reel of a magnetic tape cassette, such as a VTR tape cassette, is made of a synthetic resin. The tape reel 10 has a lower reel flange 10 integrally formed with tape reel section 10a. The tape reel section 10a comprises an outer cylindrical tape reel section 11 and an inner cylindrical boss section 12. The inner cylindrical section defines a lower end opened recess 13, into which extend engaging claws 14 for drivingly engaging with a reel shaft of an associated recording and/or reproducing apparatus, eg VTR. The head of the reel shaft is inserted into the recess 13 of the inner cylindrical section 12 when the tape cassette is loaded in the recording and/or reproducing apparatus.

The inner cylindrical section 12 has an upper wall 15 with a centre positioning projection 26. A plurality of pins 16 disposed around a circle coaxial with the reel project from the upper surface of the upper wall 15. An upper reel flange 17 is mounted on the upper end of the tape reel section 10a. The upper reel flange 17 has a central portion 18 which is downwardly depressed so as to be projected downwardly from the lower surface of the general plane of the upper reel flange. A plurality of through holes 19 are formed in the central portion 18 of the upper reel flange 17. The pins 16 pass through the holes 19. The top end of the pins 16 are clamped by head clamping so that the upper reel flange 17 can be fixedly fastened on the top of the tape reel section 10a.

As shown in fig 2, the outer and inner cylindrical sections 11 and 12 are coaxially arranged in spaced apart relationship to each other to define therebetween an annular space 20. Between the outer and inner cylindrical sections 11 and 12, a plurality of radially extending ribs 21 are formed. Each of the ribs extends radially across the annular space 21. The ribs 21 extend through substantially the overall height of the outer and inner cylindrical sections 11 and 12. The rib 21 joins to the inner periphery of the outer cylindrical section 11 at its outer vertical edge. The joining section between the inner periphery of the outer cylindrical section

11 and the outer vertical edge of the rib 21 will be hereafter referred to as the first joining section 23a. On the other hand, the inner vertical edge of the rib 21 joins with the outer periphery of the inner cylindrical section 12. The joining portion between the inner vertical edge of the rib 21 and the outer periphery of the inner cylindrical section 12 will be hereafter referred to as the second joining section 24a. The top end 23 of the first joining section 23a lies on a horizontal plane extending through the upper end of the outer cylindrical section 11. Similarly, the top end 24 of the second joining section 24a lies on a horizontal plane extending through the upper general surface of the upper wall 15 of the inner cylindrical section 12. The top ends 23 and 24 of the rib 21 are connected by a sloped section 25. The inclination of the sloped section 25 is determined so as to match with the inclination of the circumferential tapered edge of the centre portion 18 of the upper reel flange 17. As seen from fig 3, the heights of the top ends 23 and 24 of the first and second joining sections 23a and 24a are different from each other. Namely, the top end 23 of the first joining section 23a is higher than that of the top end 24 of the second joining section 24a.

The outer cylindrical section 11 is discontinuous at a gap portion 30. The gap portion 30 allows communication between the outside of the tape reel section 10a and the annular space 20 so that one of a tape such as VTR tape can be inserted into the annular space. The gap portion 30 is closed by a clamber 31. The clamber 31 is designed to fixedly engage with the edges of the gap portion 30 to form part of the outer cylindrical section 11 with the outer periphery thereof circumferentially aligned with the outer periphery of the general section of the outer cylindrical section 11. When installed, the clamber grips the associated end of the tape.

With the construction set forth above, the tape reel of the shown embodiment will never form the wave-form unevenness on the outer periphery of the outer cylindrical section 11 during the moulding process. Namely, during the moulding process, the flow of the molten resin which flows from the portion constituting the upper wall of the inner cylindrical section, is restricted by difference in the height of the top ends 23 and 24 of the first and second joining sections. This causes a reduction of the flow velocity of the molten resin. As a result, the outer cylindrical section 11 is formed by the resin flowing from the portion forming the lower flange. This prevents the molten resin from confluencing at the axial intermediate portion of the outer cylindrical section. Therefore, moulding stress which might otherwise form the wave-form unevenness on the outer periphery of the outer cylindrical section is avoided.

in addition, since the ribs extend over substantially the overall heights of the outer and inner cylindrical section, they may successfully prevent the inner cylindrical section 11 from bending radially inward so as not to cause stress in the tape wound around the tape reel section. Therefore, even in use, wrinkles will never form on the tape.

Fig 4 shows another embodiment of the tape reel structure according to the invention. In this embodiment the ribs 21 have their top edges 27 oriented at the same height as the top edge of the outer cylindrical section 11. In this embodiment, the top end 23 of the first joining section 23a resides on the top edge 27. On the other hand, the top 24 of the second joining section resides on the inner vertical edge of the rib. In the construction of fig 4, the upper end portion of the ribs 21 project at the level of the upper portion of the outer cylindrical section 11. In order to accept the upper end sections of the ribs 21, through openings 28 are formed through the upper reel flange.

Similarly to the foregoing first embodiment, formation of the wave-form unevenness on the outer periphery of the cylindrical section 11, during moulding process may be successfully prevented by the height difference of the top ends 23 and 24 of the first and second joining sections. In addition, the ribs 21 also prevent the outer cylindrical section 11 from radially and inwardly bending by the pressure exerted from the tape wound therearound.

Therefore, the present invention fulfills all of the objects and advantages sought therefor.

While the present invention has been discussed in terms of the preferred embodiments of the invention. However, the invention may be implemented in various embodiments other than the shown embodiments and the shown embodiments can be modified in various forms. Therefore, the invention should be appreciated to include all of possible embodiments and modifications which can be implemented without departing from the scope of the appended claims.

Claims

1. A tape reel structure for a tape cassette comprising:
 - a tape reel including an inner cylindrical reel shaft boss section (12) defining at its lower end an open recess for engaging a reel shaft of a recording and/or reproducing apparatus and an outer cylindrical tape reel section (11), said inner and outer cylindrical sections (11, 12) being coaxially arranged to each other in mutually spaced relationship and a plurality of radially extending ribs (21) extending between said inner and outer cylinder section, said ribs each having a first portion (23a) joining with

the inner periphery of said outer cylindrical section (11) and a second portion (24a) joining with the outer periphery of said inner cylindrical section (12);

an upper reel flange (17) to be mounted on said tape reel; and

a lower flange section (10) formed integrally with said tape reel; characterised in that

said first joining portions (23a) of said ribs (21) extend substantially through the overall height of said outer cylindrical section (11) and have first upper ends (23) and said second joining portions (24a) of said ribs (21) extend substantially through the overall height of said inner cylindrical section (12) and have second upper ends (24), said second upper ends (24) being at a lower elevation than said first upper ends (23), and at a higher elevation than the upper end of said open recess.

2. A tape reel structure as set forth in claim 1, which is formed of a synthetic resin by moulding.
3. A tape reel structure as set forth in claim 2, which is formed through an injection moulding process.
4. A tape reel structure as set forth in claim 1, 2 or 3, wherein each of said ribs (21) has an upper end including a first upper end plane lying on a first horizontal plane extending through said first upper end (23) of said first joining portion (23a) and a second upper end plane lying on a second horizontal plane which extends through said second upper end (24) of said second joining portion (24a) and at lower elevation than said first horizontal plane.
5. A tape reel structure as set forth in claim 4, wherein said upper flange (17) has a downwardly projected section (18) having a circumferential edge (25) substantially conforming to an upper end plane of said ribs.
6. A tape reel structure as set forth in anyone of the preceding claims, wherein each of said ribs (21) has an upper end plane substantially lying on a horizontal plane extending through said first upper end (23) of said first joining portion (23a), and has said second upper end (24) of said second joining portion (24a) at a vertical intermediate position of lower elevation than said horizontal plane.
7. A tape reel structure as set forth in claim 6, wherein said upper flange (17) defines spaces for receiving the upper end portion of said

outer cylindrical section (11) and said ribs (21),

8. A tape reel structure as set forth in claim 7, wherein said spaces are defined by through openings formed through said upper reel flange (17).
9. A tape cassette incorporating a tape reel according to any one of the preceding claims.

Revendications

1. Structure de bobine pour cassette de bande, comprenant :

une bobine d'enroulement de bande comprenant un tronçon cylindrique interne (12) de saillie d'arbre de bobine formant, à son extrémité inférieure, une cavité débouchante destinée à coopérer avec un arbre d'entraînement de bobine d'un appareil d'enregistrement et/ou de lecture et un tronçon cylindrique externe (11) de bobine de bande, les tronçons cylindriques interne et externe (11, 12) étant disposés coaxialement l'un par rapport à l'autre à distance l'un de l'autre, et plusieurs nervures radiales (21) disposées entre les tronçons cylindriques interne et externe, les nervures ayant chacune une première partie (23a) se raccordant à la périphérie interne du tronçon cylindrique externe (11) et une seconde partie (24a) se raccordant à la périphérie externe du tronçon cylindrique interne (12),

une joue supérieure (17) de bobine destinée à être montée sur la bobine de bande, et

un tronçon (10) de joue inférieure formé en une seule pièce avec la bobine de bande, caractérisée en ce que

les premières parties (23a) de raccordement des nervures (21) sont disposées pratiquement sur toute la hauteur du tronçon cylindrique externe (11) et ont des premières extrémités supérieures (23) et les secondes parties de raccordement (24a) des nervures (21) sont disposées pratiquement sur toute la hauteur du tronçon cylindrique interne (12) et ont des secondes extrémités supérieures (24), les secondes extrémités supérieures (24) étant placées à une hauteur inférieure à celle des premières extrémités supérieures (23), et à une hauteur supérieure à celle de l'extrémité supérieure de la cavité débouchante.

2. Structure de bobine de bande selon la revendication 1, qui est formée par moulage de résine de synthèse.
3. Structure de bobine de bande selon la revendication 2, qui est formée par une opération de

moulage par injection.

4. Structure de bobine de bande selon la revendication 1, 2 ou 3, dans laquelle chaque nervure (21) a une extrémité supérieure comprenant un premier plan d'extrémité supérieure se trouvant sur un premier plan horizontal passant par la première extrémité supérieure (23) de la première partie de raccordement (23a) et un second plan d'extrémité supérieure se trouvant dans un second plan horizontal qui passe par la seconde extrémité supérieure (24) de la seconde partie de raccordement (24a) et qui est à une hauteur inférieure à celle du premier plan horizontal.
5. Structure de bobine de bande selon la revendication 4, dans laquelle la joue supérieure (17) a un tronçon (18) dépassant vers le bas et ayant un bord circonférentiel (25) qui correspond pratiquement à un plan d'extrémité supérieure des nervures.
6. Structure de bobine de bande selon l'une quelconque des revendications précédentes, dans laquelle chacune des nervures (21) a un plan d'extrémité supérieure qui se trouve pratiquement sur un plan horizontal passant par la première extrémité supérieure (23) de la première partie de raccordement (23a) et a une seconde extrémité supérieure (24) de la seconde partie de raccordement (24a) à une position verticale intermédiaire de hauteur inférieure à celle du plan horizontal.
7. Structure de bobine de bande selon la revendication 6, dans laquelle la joue supérieure (17) délimite des espaces destinés à loger la partie d'extrémité supérieure du tronçon cylindrique externe (11) et des nervures (21).
8. Structure de bobine de bande selon la revendication 7, dans laquelle les espaces sont délimités par des ouvertures débouchantes formées dans la joue supérieure (17) de la bande.
9. Cassette de bande comprenant une bobine de bande selon l'une quelconque des revendications précédentes.

Patentansprüche

1. Bandspulen-Aufbau für eine Bandkassette, mit einer Bandspule, die einen inneren zylindrischen Spulenwellennaben-Teil (12), der an seinem unteren Ende eine offene Ausnehmung zum Ineingrifftreten mit einer Spulenwelle einer Aufzeichnungs- und/oder Wiedergabeeinrich-

tung definiert, und einen äußeren zylindrischen Bandspulen-Teil (11) enthält, wobei die inneren und äußeren zylindrischen Teile (11, 12) koaxial und in einer gegenseitigen Abstandsbeziehung zueinander angeordnet sind und wobei sich eine Vielzahl von radial verlaufenden Rippen (21) zwischen den inneren und äußeren zylindrischen Teilen erstrecken, welche Rippen jeweils einen ersten Teil (23a), der mit dem inneren Umfang des äußeren zylindrischen Teils (11) verbunden ist, und einen zweiten Teil (24a) haben, der mit dem äußeren Umfang des inneren zylindrischen Teils (12) verbunden ist,

einem oberen Spulen-Flansch (17), der auf der Bandspule zu montieren ist, und

einem unteren Flanschteil (10), der einstückig mit der Bandspule ausgebildet ist, dadurch **gekennzeichnet**, daß

sich die ersten verbindenden Teile (23a) der Rippen (21) im wesentlichen durch die gesamte Höhe des äußeren zylindrischen Teils (11) erstrecken und erste obere Enden (23) haben und sich die zweiten verbindenden Teile (24a) im wesentlichen durch die gesamte Höhe des inneren zylindrischen Teils (12) erstrecken und zweite obere Enden (24) haben, wobei die zweiten oberen Enden (24) auf einer geringeren Höhe als die ersten oberen Enden (23) und auf einer größeren Höhe als das obere Ende der offenen Ausnehmung liegen.

2. Bandspulen-Aufbau nach Anspruch 1, der durch Gießen eines synthetischen Harzmateri- als gebildet ist.
3. Bandspulen-Aufbau nach Anspruch 2, der durch einen Spritzgießprozeß gebildet ist.
4. Bandspulen-Aufbau nach Anspruch 1, 2 oder 3, bei dem jede der Rippen (21) ein oberes Ende aufweist, das eine erste obere Endebene, die auf einer ersten horizontalen Ebene liegt, welche sich durch das erste obere Ende (23) des ersten verbindenden Teils (23a) erstreckt, und eine zweite obere Endebene hat, die auf einer zweiten horizontalen Ebene liegt, welche sich durch das zweite obere Ende (24) des zweiten verbindenden Teils (24a) und bei einer geringeren Höhe als die erste horizontale Ebene erstreckt.
5. Bandspulen-Aufbau nach Anspruch 4, bei dem der obere Flansch (17) einen abwärts vorstehenden Teil (18) hat, der einen Umfangsrand (25) aufweist, welcher sich im wesentlichen an eine obere Endebene der Rippen anpaßt.

6. Bandspulen-Aufbau nach einem der vorhergehenden Ansprüche, bei dem jede der Rippen (21) eine obere Endebene hat, die im wesentlichen auf einer horizontalen Ebene liegt, welche sich durch das erste obere Ende (23) des ersten verbindenden Teils (23a) erstreckt, und das zweite obere Ende (24) des zweiten verbindenden Teils (24a) bei einer vertikalen Zwischenposition geringerer Höhe als derjenigen der horizontalen Ebene hat.
7. Bandspulen-Aufbau nach Anspruch 6, bei dem der obere Flansch (17) Räume zum Aufnehmen des oberen Endteils des äußeren zylindrischen Teils (11) und der Rippen (21) definiert.
8. Bandspulen-Aufbau nach Anspruch 7, bei dem die Räume durch Öffnungen definiert sind, die durch den oberen Spulen-Flansch (17) gebildet sind.
9. Bandkassette, die in sich eine Bandspule nach einem der vorhergehenden Ansprüche aufnimmt.

5

10

15

20

25

30

35

40

45

50

55

7

FIG. 1

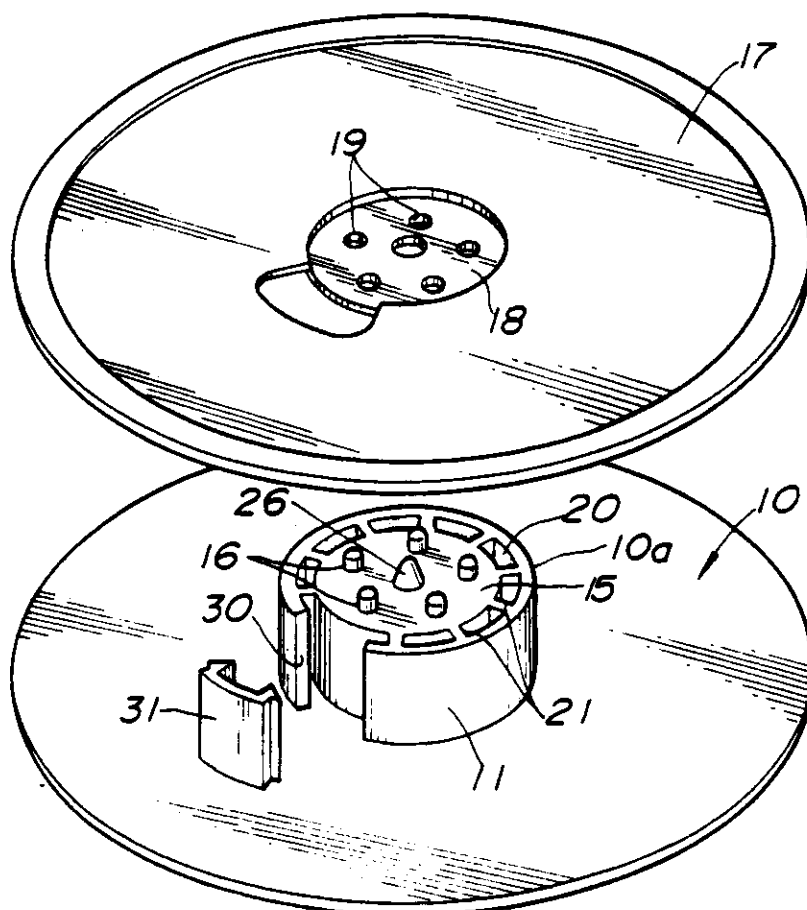


FIG. 2

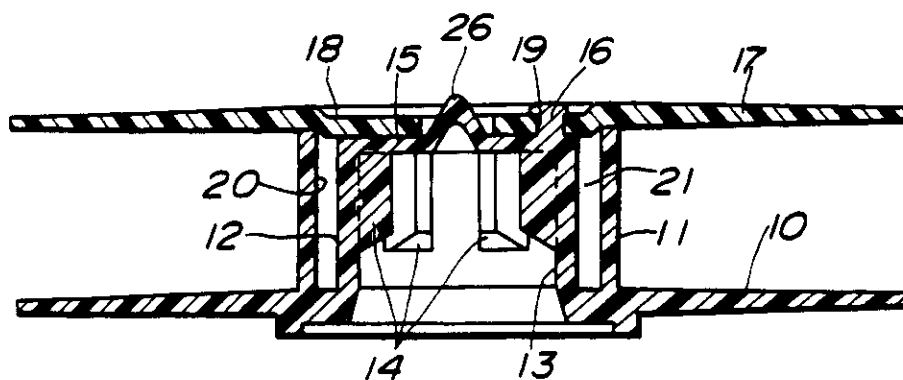


FIG.3

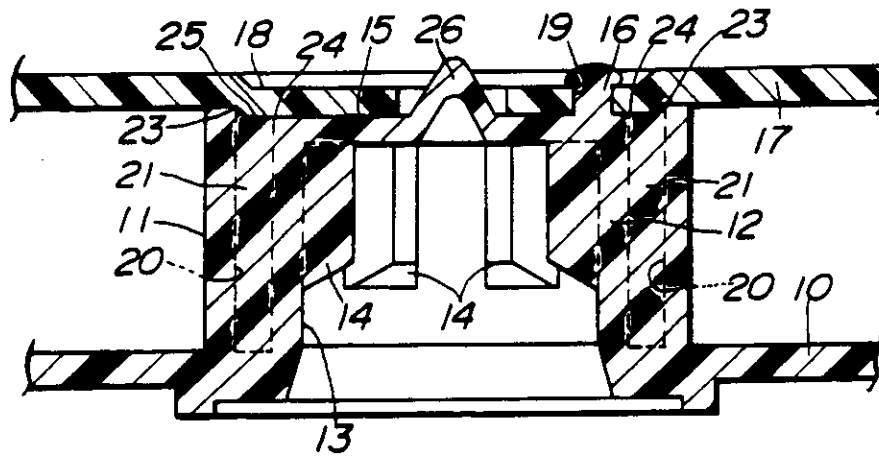
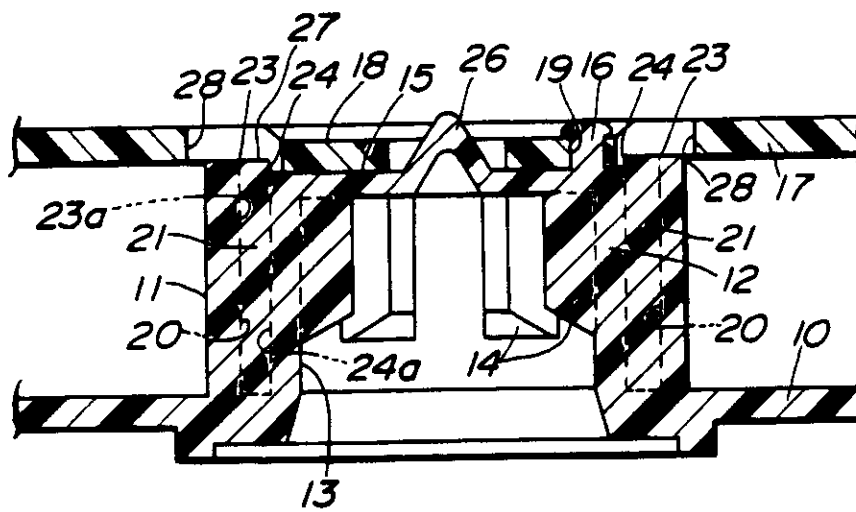


FIG.4



REGISTER ENTRY FOR EP0274864

European Application No EP87310747.8 filing date 07.12.1987

Priority claimed:
12.12.1986 in Japan - doc: 35191243U

Designated States DE ES FR GB IT NL

Title TAPE REEL FOR TAPE CASSETTE

Applicant/Proprietor
SONY CORPORATION, 7-35 Kitashinagawa 6-Chome Shinagawa-ku, Tokyo 141,
Japan [ADP No. 50025071001]

Inventor
YUJI IWAHASHI, Sony Magnetic Products Inc, 5-6 Kitashinagawa 6-chome,
Shinagawa-ku Tokyo, Japan [ADP No. 55815468001]

Classified to
G11B

Address for Service
MARTYN LEWIS STANLEY AYERS, J.A. KEMP & CO. 14 South Square Gray's Inn,
London, WC1R 5EU, United Kingdom [ADP No. 50349927001]

EPO Representative
MARTYN LEWIS STANLEY AYERS, J.A. KEMP & CO. 14 South Square Gray's Inn,
London, WC1R 5EU, United Kingdom [ADP No. 50349927001]

Publication No EP0274864 dated 20.07.1988
Publication in English

Examination requested 07.12.1987

Patent Granted with effect from 09.10.1991 (Section 25(1)) with title TAPE
REEL FOR TAPE CASSETTE.

**** END OF REGISTER ENTRY ****

OA80-01
EP

OPTICS - PATENTS

05/03/92 09:17:56
PAGE: 1

RENEWAL DETAILS

PUBLICATION NUMBER EP0274864

PROPRIETOR(S)

SONY CORPORATION, 7-35 Kitashinagawa 6-Chome Shinagawa-ku, Tokyo
141, Japan

DATE FILED	07.12.1987
DATE GRANTED	09.10.1991
DATE NEXT RENEWAL DUE	07.12.1992
DATE NOT IN FORCE	
DATE OF LAST RENEWAL	26.11.1991
YEAR OF LAST RENEWAL	05
STATUS	PATENT IN FORCE