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(54) MAGNETIC TAPE CASSETTE

- (71) We, NIPPON VICTOR KABUSHIKI KAISHA, of No. 12, 3-Chome, Moriya-Cho, Kanagawa-Ku, Yokohama-City, Kanagawa-Ken, Japan, a Japanese Corporation, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- 10 The present invention relates generally to magnetic tape cassettes, and more particularly to a magnetic tape cassette adapted to be used in a magnetic recording and/or reproducing apparatus provided with detecting means for detecting the ends of a magnetic tape in the magnetic tape cassette when the entire magnetic tape has been wound on a takeup reel or a supply reel and cannot travel further.
- 20 There are known several types of tape-end detection device for detecting the completely wound state of a magnetic tape. In a magnetic tape cassette adapted to be used with one type of tape-end detection device known heretofore, respective hubs of reels are formed from a transparent material and adapted to hold a photocell. The tape end detection depends upon whether or not light is received from a lamp positioned within the cassette. However, the construction of the reels and cassette become complicated, since the photocell mounted on the side of the recording and/or reproducing apparatus must be fitted relatively into the cassette together with means for driving the reels. Moreover, since light must be detected after it has been transmitted through a relatively thick reel hub, the tpe end detection is inaccurate and unreliable.
- 40 In another known tape-end detection device, a photocell is disposed outside of the reel in a magnetic tape cassette. The light from a lamp is shut off by the magnetic tape roll wound up on the hub of the reel. When the magnetic tape has been completely unwound and paid out, the light from the lamp reaches the photocell. However, since the megnetic tape is very thin, there is difficulty in positively detecting whether or not the magnetic tape has been wound around the hub of the reel.
- 50 Furthermore, the magnetic tape cassette used in this known detection device is provided in the vicinity of the central part of its side walls with openings (windows) for permitting light from a lamp to reach a photocell. These windows are always open, even when the cassette is not being used, and the magnetic tape within the cassette is exposed through these windows to the outside. This is a disadvantageous feature of this cassette since dust can readily enter into the cassette through these windows and adhere to the magnetic tape. Adhesion of dust on the magnetic tape gives rise to signal drop-out at the time of recording and reproducing, leading to a serious condition wherein good recording and reproducing cannot be accomplished.
- 70 In addition, there are cases wherein these windows become clogged by dust, grime, or like foreign matter. In other instances, labels with the recorded contents of the cassettes printed or written thereon have been stuck on the side walls of the cassette cases, thereby closing the windows, either because of carelessness of the users or because users, in general, do not fully understand the construction of the cassette. In such a case, the passage of the light from the lamp is obstructed, and this gives rise to a serious disadvantage in that tape-end detection becomes impossible.
- 85 In still another known tape-end detection device a so-called compact type cassette, wherein an audio signal is recorded on or reproduced from a magnetic tape in a state in which it is accommodated within the cassette, is used, and light from light-emitting means inserted in the cassette passes through a transparent leader tape fixed to the tape end part when the tape end is reached and is projected onto light-receiving means provided on the outside of the front face of the cassette in a position to confront the light-emitting means.
- 95 This magnetic tape cassette, however, is adapted to carry out recording and repro-

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ducing of only an audio signal with the magnetic tape always in a state wherein it is accommodated within the cassette. For this reason, this magnetic tape cassette cannot be applied to an apparatus for recording and/or reproducing a video signal by drawing the magnetic tape out through the front face of the cassette and passing it in wrapping contact around a guide drum having rotating heads. The reason for this is that, in an apparatus of this character for recording/reproducing video signals, means for drawing the magnetic tape out of the cassette through the front face thereof is provided, and, for this reason, if light-receiving means were to be provided to confront the cassette front face, this light-receiving means would interfere with the operation of the tape drawing out means. Furthermore, since it is necessary to provide a pair of light-emitting means respectively in separate positions to confront a pair of light-receiving means, one for each end of the tape, the construction becomes complicated.

According to one aspect of the present invention, there is provided a magnetic tape cassette adapted to be used in a magnetic recording and/or reproducing apparatus provided with means for detecting the ends of magnetic tape in the cassette, said detector means comprising at most two light-emitting means and first and second light-receiving means disposed for operation in response to the light-emitting means, said magnetic tape cassette comprising: a cassette case; a first reel having a first hub and accommodated within said case, and a second reel having a second hub and accommodated within the case in side by side relationship with said first reel; and an opaque magnetic tape being connected at respective ones of the opposite ends thereof to respective first ends of a first and a second transparent leader tape, the respective second ends of said first and second leader tapes being connected to said first and second hubs, respectively, said cassette case having two side walls spaced apart with said first and second reels interposed therebetween, spaced apart front and rear face parts terminated at opposite ends thereof by said side walls, and upper and bottom parts covering the upper and lower portions of a space enclosed within and by the side walls and the front and rear face parts, said cassette case further having a lid hinged on hinge means disposed on the side walls in the vicinity of the front face part thereby to be swingable between closed and opened positions respectively to cover and expose a part of the magnetic tape exposed on the front face part and to cover and expose parts of the sidewalls in the vicinity of the hinge means, a hole for accommodating said light-emitting means being provided in said

bottom part at a position substantially intermediate between the first and second reels, and near the front face part, the two side walls having respective ones of a first and a second window formed therein at positions near said hinge means, so that the two light-receiving means can be placed thereadjacent, for passing therethrough light from said light-emitting means when permitted by the first or second transparent leader tape and being opened and closed by said lid respectively in the opened and closed positions thereof.

According to another aspect of the present invention, there is provided a magnetic tape cassette adapted to be used in a magnetic recording and/or reproducing apparatus provided with detecting means for detecting the ends of a tape in the tape cassette, said detecting means comprising at most two light-emitting means and first and second light-receiving means respectively disposed opposite said light-emitting means, said magnetic tape cassette comprising: a first reel having a first hub and a second reel having a second hub; an opaque magnetic tape being connected at respective ones of the opposite ends thereof to respective first ends of a first and second transparent leader tape, the respective second ends of said first and second leader tapes being connected to said first and second hubs, respectively; a cassette case for receiving and accommodating said first and second reels, said cassette case having a first and a second side wall respectively having a first and a second window formed therein, said first and second reels being interposed between said first and second side walls, a part of said magnetic tape and said leader tapes being exposed through said first and second windows, a front face part terminated at opposite ends by said side walls, and a bottom face part having a hole for receiving said light-emitting means; and a lid hinged on said cassette case to swing between a closed position where said lid covers said front face part and said first and second windows and an opened position where said lid exposes said front face part and said first and second windows, said first window being formed in the first side wall at a position where the first window permits light passed through the first leader tape, when fully unwound from said first reel, from the light-emitting means to reach the first light-receiving means disposed, in use, adjacent the first window when said lid is in the opened position, and said second window being formed in the second side wall at a position where the second window permits light passed through the second leader tape, when fully unwound from the second reel, from the light-emitting means to reach the second light-receiving means disposed,

in use, adjacent the second window when said lid is in the opened position.

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

Fig. 1 is a perspective view of the bottom of one embodiment of a magnetic tape cassette according to the present invention;

Fig. 2 is a plan view of the magnetic tape cassette illustrated in Fig. 1, which is shown with a part cut away, in a state wherein it has been loaded in an example of a magnetic tape recording and/or reproducing apparatus provided with a tape-end detection device;

Figs. 3A and 3B are fragmentary plan views respectively showing the manner in which the cover of the magnetic tape cassette is locked and unlocked; and

Figs. 4A and 4B are plan views of the magnetic tape cassette, with the upper half of its case removed, respectively showing the magnetic tape end upon completion of the fast-forward and remind modes of operation.

One embodiment of a magnetic tape cassette of the present invention for cooperating with a device for detecting an end of a magnetic tape has a construction as shown in Figs. 1 and 2. The magnetic tape cassette 10 has an outer housing structure comprising a cassette case 11 and a lid 12. The lid 12 is freely and openable and closable on the front face of the case 11. The cassette case 11 has side walls 11a and 11b, spaced apart front and rear face parts 11c and 11d terminated at opposite ends thereof by the side walls, and upper and bottom parts 11e and 11f covering the upper and lower portions of a space enclosed within and by the side walls and the front and rear face parts. The cassette case 11 accommodates therewithin, a freely rotatable tape supply reel 14 and a tape takeup reel 15 each for winding an opaque magnetic tape 13, side by side between the side walls. The bottom part 11f of the cassette case 11 has two shaft holes 17 and 18 for receiving reel drive spindles or shafts on the recording and/or reproducing apparatus 16. These shafts fit into the hubs of the respective reels 14 and 15 when the cassette 10 is inserted into its loaded position in the recording and/or reproducing apparatus.

As shown in Figs. 4A and 4B, one end of the magnetic tape 13 is connected to the outer end of a transparent leader tape 20 which is fixed at its inner end to a hub 19 of the supply reel 14. The other end of the magnetic tape 13 is connected to the outer end of a transparent leader tape 22 which is fixed at its inner end to a hub 21 of the takeup reel 15. The magnetic tape 13 is guided by guide poles 23, 24, and 25 from the supply reel 14 to the takeup reel 15 during normal recording, reproducing, or

fast-forwarding mode, operations, and from the takeup reel 15 to the supply reel 14 during rewinding.

Within the cassette case 11, a hole 26 for receiving a lamp is formed in the bottom part 11f at a substantially intermediate position between the two reels 14 and 15 and near the front face side of the case. This position is advantageous in that it is in a relatively clear and ample space within the cassette case. For this reason, there is no necessity of providing an additional space especially for the provision of the lamp fitting hole 26, and the cassette case need not be made large merely for this purpose. This lamp fitting hole 26 is defined and bordered by a cylindrical wall 27 in which openings 27a and 27b are formed. Furthermore, at specific positions of wall structures within the case 11, cutouts or openings 28, 29, 30 and 31 are formed.

Windows 32 and 33 are respectively provided in the side walls 11a and 11b of the cassette case 11 at positions near the front face, that is, at the front parts of the side walls near their parts adjacent the front face.

The above mentioned openings 27a and 27b are provided at positions where straight lines joining the space (chamber) within the cylindrical wall 27 and the windows 32 and 33, respectively, intersect the cylindrical wall 27. The configurations of the parts of the cassette interior are so designed that the above mentioned straight lines (i.e., the light paths they represent) do not touch or intersect the hubs 19 and 21 of the reels 14 and 15. A light-emitting element described hereinafter is fitted into the interior space of the cylindrical wall 27. The light emitted by this light-emitting element is directed toward the windows 32 and 33 only upon passing through the openings 27a and 27b in the cylindrical wall 27, and emission of light in unnecessary directions is prevented. Therefore, there is no possibility of light scattering and being reflected in unnecessary directions and, without being blocked by the magnetic tape, passing through the windows to cause erroneous detection operation.

In the recording and/or reproducing apparatus 16, a light receiving element, e.g., a lamp 34, fits into the hole 26 when the magnetic tape cassette 10 is inserted into its loading position. In the recording and/or reproducing apparatus 16, a light receiving element, e.g., a photocell 35, is positioned to receive light emitted by the lamp 34 which passes through the openings 27a and 28 and the window 32. In addition, a photocell 36 receives the light emitted by the lamp 34 which passes through the openings 27b, 29, 30, and 31 and the window 33.

The lid 12 comprises a main lid structure

of plate form facing the front face part of the cassette case 11 and side face flanges or side parts 12a and 12b formed integrally with this main lid structure. The lid 12, at its side parts 12a and 12b, is pivotally supported by hinge pins 40 and 41 on the side walls of the cassette case 11 near the front face part. The lid 12 is continually urged to swing toward a closed position by a torsion spring 42 around the pivot pin 41. When the magnetic tape cassette 10 is not loaded in the apparatus 16, the lid 12 is closed as, indicated by broken lines in Fig. 1, to cover the magnetic tape 13 which is exposed at the front face of the cassette case 11. When the lid 12 is closed, the windows 32 and 33 are covered by the side parts 12a and 12b of the lid 12, to prevent infiltration of dust into the cassette case and adherence of dust to the magnetic tape. Furthermore, there is almost no possibility of closure of the windows 32 and 33 by dust or grime or by labels stuck thereover because of a reason such as carelessness on the part of the user.

Here, the windows 32 and 33 are provided in the side walls of the cassette case 11 near the front face part thereof, and since the side parts 12a and 12b of the lid 12 need to be of a size which is sufficient merely to cover the windows 32 and 33 when the lid 12 is closed, the lid 12 can be made small.

Within the case 11, a lock plate 43 is rotatably supported by pivot pins 44a and 44b and urged by a torsion spring 45 to press against the inner surface of the case side wall 11b. The lock plate 43 has an opening 46. Projections 47 and 48 on the side surface of the lock plate 43 project through openings in the side wall 11b of the case. The projection 47 engages a recess 49 in the side part 12b of the lid 12, when it is closed, thereby locking the lid 12 against opening. The projection 48 is disposed within a groove formed between the side part 12b of the lid 12 and the outermost surface of the case 11 when the lid 12 is closed.

The magnetic tape cassette 10, with its lid 12 closed, is inserted horizontally in the arrow direction A onto and along a loading platform 50 of the recording and/or reproducing apparatus 16, as indicated in Fig. 3A. A leaf spring 51 has a projection 52 at its free end and is fixed at its root end to the side of the loading platform 50. As the magnetic tape cassette 10 is inserted, the projection 52 slides along the side part 12b of the lid 12. When the magnetic tape cassette 10 is fully inserted as shown in Fig. 3B, the projection 52 fits into the groove between the side part 12b of the lid 12 and the outermost surface of the case 11 and presses the projection 48 toward the left as viewed in the same figure. As a consequence, the lock plate 43 rotates, overcom-

ing the force of the spring 45. The projection 47 is also displaced leftward and is disengaged from the recess 49 of the side part 12b of the lid 12, thereby unlocking the lid 12.

Then, when the loading platform 50 is thereafter lowered, a lug 53 for opening the lid fixedly provided in the recording/reproducing apparatus fits relatively into a groove part 63 provided vertically from the lower surface at a position near the side wall 11b in the front face part of the cassette case 11 and abuts against the lower edge of the lid 12. Together with the downward movement of the cassette 10, the lid 12 engages the lug 53 and opens against the force of the spring 42, as indicated by full lines in Fig. 1. Consequently, the front of the magnetic tape 13 is revealed, and the windows 32 and 33 opened.

On the downward movement of the cassette 10, the lamp 34 is fitted into the hole 26, and the reel drive shafts (not shown) are fitted into shaft holes 17 and 18. At the same time, a capstan 55 fits into a recess 54 on the front side and lower side of the case 11. Magnetic tape drawing out and loading members 58 and 59 fit into recesses 56 and 57.

When the recording and/or reproducing apparatus 16 is placed in the recording or reproducing mode of operation, the upper drum of a guide drum 60 having rotary video heads begins to rotate. At the same time, the magnetic tape drawing out and loading members 58 and 59 move to the positions indicated by broken lines. The magnetic tape 13 is thus wrapped around part of the guide drum 60. A pinch roller 61 presses the magnetic tape 13 against the capstan 55.

The magnetic tape 13 thus clamped by the capstan 55 and the pinch roller 61 is driven by the rotation thereof. The tape on the supply reel 14 is unwound and paid out to be wound up on the takeup reel 15. At the same time, video signals are recorded on or reproduced from the magnetic tape 13 by the video heads of the guide drum 60. An audio signal is recorded or reproduced by an audio head 62.

During the recording or reproducing operation, the light from the lamp 34 is shut off by the magnetic tape 13 paid out or supplied from the supply reel 14 and wound or taken up by the takeup reel 15. Thus, light does not reach the photo cells 35 and 36.

When the magnetic tape 13 has been completely paid out from the supply reel 14, and the recording or reproducing has been completed, the transparent leader tape 20 is paid out into the tape travel path between the reel hub 19 and the guide pole 24. Consequently, the light from the lamp 34, which

until now has been shut off by the opaque magnetic tape 13, passes through the leader tape 20 and the window 32, reaching the photocell 35. This reception of the light by the photocell 35 means the detection of the end of the tape. The resulting output detection signal of the photocell 35 stops the recording or reproducing operation.

The fast forwarding mode operation is carried out with the tape 13 accommodated within the case 11. Upon completion of this fast forwarding mode operation, as indicated in Fig. 4A, the light from the lamp 34 passes through the leader tape 20 and the window 32 and is received by the photocell 35. The fast forwarding mode of operation is thus stopped. The length of the leader tape 20 is selected at a length, for example, such that the leader tape 20 cuts across the path of the light from the lamp 34 to the photocell 35, but it does not reach a position which cuts across the path of the light from the lamp 34 to the photocell 36 when fully unwound.

The rewinding of the magnetic tape 13 is also carried out with the tape accommodated within the case 11. As shown in Fig. 4B, upon completion of the rewinding operation, the transparent leader tape 22 is paid out into the tape travel path between the reel hub 21 and the guide pole 25. As a consequence, the light from the lamp 34, which until now has been shut off by the opaque magnetic tape 13, passes through the leader tape 22, the openings 30, 31 and 46, and the window 33 and reaches the photocell 36. This reception of the light by the photocell 36 means the detection of the end of the tape which has completed its rewinding. The resulting output detection signal of the photocell 36 stops the rewinding operation. The length of the leader tape 22 is selected at a length, for example, such that the leader tape 22 cuts across the path of the light from the lamp 34 to the photocell 36, but not to cut across the light path of the lamp 34 to the photocell 35 when fully unwound. In Figs. 4A and 4B, parts of the magnetic tape 13 and the leader tapes 20 and 22 are shown twisted, but only for explanation purpose.

For the light-emitting means, an arrangement wherein light-emitting elements such as a pair of photodiodes respectively with their light emitting surfaces facing the photocells 35 and 36 are provided at the position of the lamp 34 may also be used instead of using a single lamp.

In each of the above described embodiments of the invention, the light-emitting elements are not limited to lamps but may take other forms that emit light. Furthermore, the light-receiving elements are not limited to photocells, but may be other

elements which receive light and convert it into electric signals.

The tape-end detection signal can be used not only as a signal for stopping the recording and/or reproducing apparatus but also for changing the operational mode thereof, such as from the recording or reproducing mode to the rewinding mode or from the rewinding mode to the recording or reproducing mode.

Further, this invention is not limited to these embodiments thereof. Variations and modifications may be made without departing from the scope of the invention as defined in the appended claims.

A device e.g. as disclosed above, for detecting the ends of a tape in a cassette as disclosed herein forms the subject matter of the invention of U.K. Patent Application No. 51640/76, from which the present application has been divided.

WHAT WE CLAIM IS:—

1. A magnetic tape cassette adapted to be used in a magnetic recording and/or reproducing apparatus provided with means for detecting the ends of magnetic tape in the cassette, said detector means comprising at most two light-emitting means and first and second light-receiving means disposed for operation in response to the light-emitting means, said magnetic tape cassette comprising:

a cassette case;

a first reel having a first hub and accommodated within said case, and a second reel having a second hub and accommodated within the case in side by side relationship with said first reel; and

an opaque magnetic tape being connected at respective ones of the opposite ends thereof to respective first ends of a first and a second transparent leader tape, the respective second ends of said first and second leader tapes being connected to said first and second hubs, respectively, said cassette case having two side walls spaced apart with said first and second reels interposed therebetween, spaced apart front and rear face parts terminated at opposite ends thereof by said side walls, and upper and bottom parts covering the upper and lower portions of a space enclosed within and by the side walls and the front and rear face parts, said cassette case further having a lid hinged on hinge means disposed on the side walls in the vicinity of the front face part thereby to be swingable between closed and opened positions respectively to cover and expose a part of the magnetic tape exposed on the front face part and to cover and expose parts of the side walls in the vicinity of the hinge means, a hole for accommodating said light-emitting means being provided in said bottom part at a

until now has been shut off by the opaque magnetic tape 13, passes through the leader tape 20 and the window 32, reaching the photocell 35. This reception of the light by the photocell 35 means the detection of the end of the tape. The resulting output detection signal of the photocell 35 stops the recording or reproducing operation.

The fast forwarding mode operation is carried out with the tape 13 accommodated within the case 11. Upon completion of this fast forwarding mode operation, as indicated in Fig. 4A, the light from the lamp 34 passes through the leader tape 20 and the window 32 and is received by the photocell 35. The fast forwarding mode of operation is thus stopped. The length of the leader tape 20 is selected at a length, for example, such that the leader tape 20 cuts across the path of the light from the lamp 34 to the photocell 35, but it does not reach a position which cuts across the path of the light from the lamp 34 to the photocell 36 when fully unwound.

The rewinding of the magnetic tape 13 is also carried out with the tape accommodated within the case 11. As shown in Fig. 4B, upon completion of the rewinding operation, the transparent leader tape 22 is paid out into the tape travel path between the reel hub 21 and the guide pole 25. As a consequence, the light from the lamp 34, which until now has been shut off by the opaque magnetic tape 13, passes through the leader tape 22, the openings 30, 31 and 46, and the window 33 and reaches the photocell 36. This reception of the light by the photocell 36 means the detection of the end of the tape which has completed its rewinding. The resulting output detection signal of the photocell 36 stops the rewinding operation. The length of the leader tape 22 is selected at a length, for example, such that the leader tape 22 cuts across the path of the light from the lamp 34 to the photocell 36, but not to cut across the light path of the lamp 34 to the photocell 35 when fully unwound. In Figs. 4A and 4B, parts of the magnetic tape 13 and the leader tapes 20 and 22 are shown twisted, but only for explanation purpose.

For the light-emitting means, an arrangement wherein light-emitting elements such as a pair of photodiodes respectively with their light emitting surfaces facing the photocells 35 and 36 are provided at the position of the lamp 34 may also be used instead of using a single lamp.

In each of the above described embodiments of the invention, the light-emitting elements are not limited to lamps but may take other forms that emit light. Furthermore, the light-receiving elements are not limited to photocells, but may be other

elements which receive light and convert it into electric signals.

The tape-end detection signal can be used not only as a signal for stopping the recording and/or reproducing apparatus but also for changing the operational mode thereof, such as from the recording or reproducing mode to the rewinding mode or from the rewinding mode to the recording or reproducing mode.

Further, this invention is not limited to these embodiments thereof. Variations and modifications may be made without departing from the scope of the invention as defined in the appended claims.

A device e.g. as disclosed above, for detecting the ends of a tape in a cassette as disclosed herein forms the subject matter of the invention of U.K. Patent Application No. 51640/76, from which the present application has been divided.

WHAT WE CLAIM IS:—

1. A magnetic tape cassette adapted to be used in a magnetic recording and/or reproducing apparatus provided with means for detecting the ends of magnetic tape in the cassette, said detector means comprising at most two light-emitting means and first and second light-receiving means disposed for operation in response to the light-emitting means, said magnetic tape cassette comprising:

a cassette case;

a first reel having a first hub and accommodated within said case, and a second reel having a second hub and accommodated within the case in side by side relationship with said first reel; and

an opaque magnetic tape being connected at respective ones of the opposite ends thereof to respective first ends of a first and a second transparent leader tape, the respective second ends of said first and second leader tapes being connected to said first and second hubs, respectively, said cassette case having two side walls spaced apart with said first and second reels interposed therebetween, spaced apart front and rear face parts terminated at opposite ends thereof by said side walls, and upper and bottom parts covering the upper and lower portions of a space enclosed within and by the side walls and the front and rear face parts, said cassette case further having a lid hinged on hinge means disposed on the side walls in the vicinity of the front face part thereby to be swingable between closed and opened positions respectively to cover and expose a part of the magnetic tape exposed on the front face part and to cover and expose parts of the side walls in the vicinity of the hinge means, a hole for accommodating said light-emitting means being provided in said bottom part at a



position substantially intermediate between the first and second reels and near the front face part, the two side walls having respective ones of a first and a second window formed therein at positions near said hinge means, so that the two light-receiving means can be placed thereadjacent, for passing therethrough light from said light-emitting means when permitted by the first or second transparent leader tape and being opened and closed by said lid respectively in the opened and closed positions thereof.

2. A magnetic tape cassette as claimed in claim 1 in which said hole for accommodating the light-emitting means is so positioned that straight lines passing from said hole through the centres of the first and second windows do not intersect said first and second hubs.

3. A magnetic tape cassette as claimed in claim 1 in which said hole in the bottom part of the cassette case is defined and encompassed by a hollow cylindrical wall extending from the rim of the hole at the bottom part into the interior of the case, the interior space within said cylindrical wall being adapted to accommodate the light-emitting means, and the cylindrical wall has a first and a second opening formed therein at positions respectively to permit light from the light-emitting means to pass along first and second straight lines connecting the interior space and the first and second windows, respectively.

4. A magnetic tape cassette as claimed in claim 3 in which the lengths of the leaders are such that, when the first leader tape is fully unwound from the first reel, said first leader tape reaches a position which cuts across said first straight line but does not reach a position which cuts across said second straight line, and, when the second leader tape is fully unwound from the second reel, the second leader tape reaches a position which cuts across said second straight line but does not reach a position which cuts across said first straight line.

5. A magnetic tape cassette as claimed in claim 1 in which the cassette case has a slot for insertion therethrough of a lid opening lug provided in said apparatus thereby to open said lid, and said slot extends perpendicularly to the front face part in the vicinity of one said side wall of the cassette case.

6. A magnetic tape cassette as claimed in claim 5 in which the cassette case has two recessed parts for insertion therein of two magnetic tape drawing out members which are provided in said apparatus.

7. A magnetic tape cassette adapted to be used in a magnetic recording and/or reproducing apparatus provided with detect-

ing means for detecting the ends of a tape in the tape cassette, said detecting means comprising at most two light-emitting means and first and second light-receiving means respectively disposed opposite said light-emitting means, said magnetic tape cassette comprising:

a first reel having a first hub and a second reel having a second hub;

an opaque magnetic tape being connected at respective ones of the opposite ends thereof to respective first ends of a first and a second transparent leader tape, the respective second ends of said first and second leader tapes being connected to said first and second hubs, respectively;

a cassette case for receiving and accommodating said first and second reels, said cassette case having a first and a second side wall respectively having a first and a second window formed therein, said first and second reels being interposed between said first and second side walls, a part of said magnetic tape and said leader tapes being exposed through said first and second windows, a front face part terminated at opposite ends by said side walls, and a bottom face part having a hole for receiving said light-emitting means; and

a lid hinged on said cassette case to swing between a closed position where said lid covers said front face part and said first and second windows and an opened position where said lid exposes said front face part and said first and second windows, said first window being formed in the first side wall at a position where the first window permits light passed through the first leader tape, when fully unwound from said first reel, from the light-emitting means to reach the first light-receiving means disposed, in use, adjacent the first window when said lid is in the opened position, and said second window being formed in the second side wall at a position where the second window permits light passed through the second leader tape, when fully unwound from the second reel, from the light-emitting means to reach the second light-receiving means disposed, in use, adjacent the second window when said lid is in the opened position.

8. A magnetic tape cassette as claimed in claim 7 in which said lid comprises a main lid part which covers the front face part of the cassette case when lid is in said closed position and opposed side parts formed integrally with the main lid part and covering the front parts of the side walls of the cassette case in the vicinity of the parts thereof adjacent the front face part when the lid is in said closed position, and the first and second windows are so formed in the front parts of the side walls of the cassette case as to be covered by said side



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parts of the lid in the closed position thereof.

9. A magnetic tape cassette substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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