

PATENT SPECIFICATION

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(54) GUIDE ELEMENTS FOR MAGNETIC TAPES TO BE WOUND IN THE FORM OF PACKS OF FLANGELESS HUBS AND TO BE UNWOUND THEREFROM

- (71) We, BADISCHE ANILIN- & SODA-FABRIK AKTIENGESELLSCHAFT, a German Joint Stock Company of 6700 Ludwigshafen, Federal Republic of Germany, 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 This invention relates to guide elements for magnetic tapes to be wound in the form of packs on flangeless hubs and to be unwound therefrom.
- 15 Magnetic tapes wound on flangeless hubs are preferred for studio tape recorders and cassettes for a number of reasons. The total thickness of magnetic tapes has continually decreased in the course of their development, which has inevitably led to a reduction in the lateral rigidity of the tapes. As a result, problems of tape guidance occur to an increasing extent, particularly at high tape transport speeds. Whereas these difficulties have been substantially overcome in the case of studio tape recorders by means of, for example, tape tensioning means and other measures, they have not hitherto been satisfactorily overcome in the case of cassettes. When the recorder is operated, for example in the case of rapid rewind, fast braking of the reels and sudden changes in the direction of tape motion, and during recording and reproduction, jamming of the tape may occur as a result of it slipping from the pack, a saucer-shaped or ridged pack may be produced, loops may form or the tape may even wrap itself round the capstan. These are frequent disturbances which result in damage to the magnetic tape and cassette and may render them useless.

take-up hub and the turn of film approaching said hub a pivotally mounted lever which is provided with two pairs of flanges, the pair of flanges that extend inwardly in a substantially radial direction above and below the reel of film being longer than the pair of flanges extending outwardly across the turn of film approaching said reel. This film cartridge serves as a storage container for a film to be exposed in a cine-camera. The lever is, in view of its shape, only suitable for forming a regular reel of film which is relatively thick (about 100 μ) as compared with a magnetic tape (about 20 μ). Additional guide means located inside the camera are necessary for guiding the film past the lens. Moreover, such a lever cannot be used to guide a magnetic tape because the pair of flanges cooperating with the pack would bend over the windings of magnetic tape and thus damage the tape, and would change the position of the lever if there were discontinuities in the side surfaces of the pack and thus impair its guiding action, which would result in disturbances during winding.

There is also known a cartridge which serves as a storage container for a magnetic tape wound on a flangeless hub. The tape is withdrawn from the cartridge during recording or reproduction using a suitable apparatus, and is then rewound into the cartridge. As tape guide means in the cartridge there is used a member which is slidably mounted in radial grooves between the reel of tape and the turn of tape approaching or leaving said reel. This guide member is cylindrical and is provided with a pair of circular flanges which form two guide channels. The channel on the side of the guide member facing away from the reel serves to guide the tape on and off the reel, whereas the other channel on the side of the guide member facing the reel

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serves to position the guide member relative to the reel, i.e. in contact therewith or in spaced relationship thereto. The tape guide elements proper which guide the tape relative to the magnetic head are provided on the recording-reproducing apparatus and not in the cartridge. As in the case of the above-described film cartridge, the pair of flanges which cooperate with the reel of tape may damage the edges of the tape and they also directly influence the position of the guide member, which is responsible for aligning the turn of tape approaching the reel, if there are discontinuities in the side surfaces defined by the reeled tape. Moreover, the guide member in the cartridge can only provide vertical guidance for the tape because the turn of tape approaching or leaving the reel contacts the guide member over a very small surface only. Another serious disadvantage of this design is that both the guide member and the grooves in the cartridge are very difficult and expensive to manufacture. For the above reasons in particular, the prior art tape guide means cannot be used to form packs which are trouble-free in operation and to guide the tape relative to the magnetic heads on tape recorders using flangeless spools and particularly in cassettes.

The present invention seeks to ensure, with the aid of minor additional means, optimum guidance of the tape on tape recorders using flangeless spools and particularly in cassettes while avoiding the disadvantages of the prior art tape guide elements, and to eliminate disturbances which occur particularly at high tape transport speeds.

According to the present invention a magnetic tape assembly comprises a pair of tape-supporting flangeless hubs rotatable to wind tape off a pack on one hub onto a pack on the other hub, said tape passing between the packs in the form of a loop, and at least one tape guide element mounted for movement towards and away from one of said hubs and in the plane of rotation of said one hub, at least part of said guide element being arranged between the pack on said one hub and the adjacent end of the loop and having a guide surface which is in continuous contact with said end of the loop when the tape is in motion, with guide flanges extending above and below the tape forming said end of the loop.

Embodiments of assembly in accordance with the invention have the following advantages:—

Each winding is freshly oriented on the pack during winding of the tape independently of the shape of the side surfaces of the pack, and optimum guidance of the

tape as it joins or leaves the pack is ensured. The formation of an irregular pack is prevented with the result that each winding is firmly aligned with its neighbour. Consequently, high tape transport speeds are possible even with extremely thin magnetic tapes (9μ or less), and guidance of the tape on its way to and from the magnetic head during recording and reproduction is improved as a result of the tape being effectively guided at one or both extremities of the loop.

In a particularly advantageous embodiment of assembly in accordance with the invention the guide surface of the tape guide element ends at or near the point at which the loop of magnetic tape tangentially joins the pack.

In an advantageous embodiment of the assembly in accordance with the invention the tape guide element is a pivotally mounted, preferably curved, lever.

In a further embodiment the lever may be provided at its free end with guide flanges which extend outwardly away from the pack, the free end extending to a region close to the line passing through the centre of the hubs and being either in continuous contact with the pack or in slight spaced relationship thereto.

Where the guide element defines the free end of a lever, the lever may be advantageously pivotally mounted on a pin located inside the loop of tape and near an idler roll. It is also possible to use the part of the lever adjacent to its pivoted end as a guide for the loop of magnetic tape. In this case a separate idler roll, which is usually required, can be dispensed with.

In an advantageous arrangement and design of assembly where the guide element comprises a lever, the lever may be pivotally mounted outside the loop of tape and cross the loop so that its free end is interposed between an end of the loop and the pack.

In another advantageous embodiment of the assembly in accordance with the invention the free end of a lever defining the guide element is provided with an approximately rectangular slot whose height is approximately the same as the width of the magnetic tape and whose width is less than that of the tape.

The tape guide element in an alternative form of assembly may also be in the form of a guided sliding member having an approximately C profile when viewed from the side.

In a preferred embodiment of assembly in accordance with the invention a tape guide element is provided for each pack.

In another advantageous design of assembly with the guide element comprising a lever, the free end of the lever may be pro-

vided with at least one projection which is slidably located in a groove. As a result, any difficulties which may occur in cartridges for example in connection with the accommodation inside the housing of the tape packs and levers, particularly their free ends, can be overcome.

The tape guide element(s) employed in an assembly in accordance with the invention have the following advantages over conventional tape guide means:—

1. Guidance of the magnetic tape loop in the neighbourhood of the pack(s) and relative to the magnetic heads is improved in particular by the tape guide elements which are capable of movement substantially independently of the pack(s).
2. Troublefree operation, even when extremely thin magnetic tapes and at high tape transport speeds is possible.
3. Static build-up on the tapes can be reduced, as a result of which the quality of the recording may be improved.
4. The tape may be stressed to a lesser degree, thus making high-quality recording and reproduction possible for longer periods.
5. The component parts of the assembly can be mass-produced simply and economically, and they can also be subsequently installed in tape recorders and cassettes without difficulty.

Magnetic tape cartridges, particularly compact cassettes incorporating an assembly in accordance with the invention constitutes a further feature of the invention.

According to a still further feature of the invention a magnetic tape cassette comprises a housing, a pair of tape-supporting flangeless hubs rotatably mounted in spaced-apart relation within the housing, a length of tape forming a pack on each hub with a loop of tape extending between said packs, a pair of tape-guide elements each mounted for movement towards and away from a different one of said hubs and in the plane of rotation of the appropriate hub, a part of each guide element being arranged between the pack on the appropriate hub and the adjacent end of the loop, each guide element having a guide surface which continuously contacts the tape defining said adjacent end of the loop when the tape is in motion, each guide element having guide flanges extending outwardly away from the pack above and below the tape forming said end of the loop.

The invention is described in greater detail below with reference to the accompanying drawings, in which

Fig. 1 is a plan view of the base of a cassette with pivotable levers as tape guide elements,

Fig. 2 is a perspective view of a lever

shown in Fig. 1,

Fig. 2A is a further perspective view of a lever shown in Fig. 1,

Fig. 3 is a plan view of part of the base of a cassette with a lever pivotally mounted on the shaft of an idler roll,

Fig. 4 is a plan view of part of the base of a cassette with a lever pivotally mounted on a guide pin,

Fig. 5a is a plan view of part of the base of a cassette with a lever pivotally mounted on a pin,

Fig. 5b is a perspective sectional view of part of the lever shown in Fig. 5a,

Fig. 6 is a plan view of the base of a cassette having sliding members as tape guide elements,

Figs. 7 and 8 are perspective sectional views of two designs of the sliding member,

Fig. 9 is a plan view of part of the base of a cassette with another lever design, and

Fig. 10 is a perspective view of the lever shown in Fig. 9.

A rectangular base 1 of the housing of a magnetic tape cassette has in the front side wall 2 openings 3 to 5 serving to admit the magnetic heads and pressure rolls (not shown) on the recorder. Openings 6 and 7 are provided in the base 1 near the side wall 2 for admitting the capstan and tape guide pins on the recorder. Pressure pad 8 and magnetic head screening shield 8a are arranged behind opening 3. A magnetic tape 11 is wound on flangeless hubs 9 and 10, which are rotatably mounted on the base 1, to form packs 12 and 13. The tape 11 travels between packs 12 and 13 in a loop formed around idler rolls 14 and 15. In conventional cassettes pins 16 and 17 serve as additional guide means. Pivots 18 and 19 for levers 20 and 21 are let into the base 1 and the top wall (not shown) of the cassette housing, said pivots being arranged inside the loop formed by the tape 11 and near the idler rolls 14 and 15.

In this specification the reference to the "loop" means the length of tape between the outermost turns of tape on the two packs and thus includes that portion of tape M (cf. Fig. 3) which extends from the point at which it joins the outermost turn of the pack to an imaginary line T (of Fig. 3) which is tangential to the pack, at full pack diameter, and parallel to the line 23 passing through the centre of the hubs. The length of tape on the other side of the imaginary line T (which includes the part facing front side wall 2) is also included in the loop S. Friction between the tape and the guide means may be reduced to such an extent by the use of the levers 20 and 21 that the idler rolls 14 and 15 can be replaced by tape

guide pins integral with the housing (and thus non-rotatable). Friction can be further reduced by making the pins of materials over which the tape slides well. Levers 20 and 21 are slightly bowed and are arranged symmetrically with respect to the transverse central axis 22 of the base 1. The free ends of levers 20 and 21 contact the outsides of the packs 12 and 13 at a point near the line 23 so that the end of the loop S adjacent to each outermost turn is in contact with an outwardly facing guide surface 41 on the lever, i.e. the free ends of the levers 20 and 21 are interposed between the loop and the outermost turn of the packs 12 and 13. The free ends of levers 20 and 21 have the guide surfaces 41 facing away from the packs 12 and 13 and are bordered at the top and bottom by approximately wedge-shaped guide flanges 24 and 25, which are shown on a greatly exaggerated scale in Figure 2, the smallest distance between the flanges 24 and 25 corresponding approximately to the width of the tape. The free ends of the levers between the flanges are tapered on the guide-surface sides. The guide surfaces 41 preferably extend to the point at which the tape joins and leaves the packs. As a result of this taper and the elongated guide surface, the magnetic tape in the loop is effectively guided, particularly in the longitudinal direction, directly before it joins the pack. The passage of the tape 11 onto the pack 12 or 13 is facilitated by the taper, damage to the tape thus being prevented in a simple manner. Lever 20a shown in Fig. 2A, which constitutes a preferred embodiment, is similar in design to lever 20, the only differences being that the guide flanges 24a and 25a are much narrower and are approximately rectangular in cross section and extend from the free end of the lever to a point near or beyond the middle thereof. In this embodiment of the invention tape guidance in both the longitudinal and transverse directions is improved because the tape is guided over approximately the entire length of the rectangular area lying between the flanges 24a and 25a. Figs. 3 to 5a show other designs of the levers which are pivotally mounted at other points. In Fig. 3 a lever 26 is pivotally mounted on the shaft used for the idler roll 14 (cf. Fig. 1). In this embodiment the idler rolls are dispensed with, the resulting increase in friction between the tape and a sleeve 27 of the lever 26 being overcome by the provision of a coating of suitable lubricant, e.g. graphite, on the said sleeve. The lever 26 is slightly offset, so that friction between the tape 11 and the lever is reduced, as compared with the lever 20 (cf. Fig. 1). The offset 28 should be so dimensioned that there is a slight gap between it and the pack at maximum pack diameter.

Fig. 4 shows a lever 29 which is provided with an offset 30 and is pivotally mounted on a guide pin 16 on the base 1. In this case the loop of tape is guided past the idler roll 14 around a sleeve 31 of the lever 29 and then via the free end of the lever 29 onto the pack 12, i.e. a tape guide pin which is normally present in a conventional cassette is used as a pivot for the lever 29.

Figs. 5a and 5b show a lever 32 which is pivotally mounted on the pin 16 like the lever 29 in Fig. 4. The free end of this lever 32 comprises an upper flange, a lower flange 33 and an offset plate 34 which is parallel to the tape 11 and at a tangent to the pack 12. There is provided a vertical slit through the lever 32 and the offset plate 34 through which the tape can be easily introduced when the cassette is assembled and through which the tape travels when the cassette is in use, the upper and lower flanges serving as guides for the tape. The plate 34 on the guide surface side, should taper towards the end in contact with the pack. The tape path is the same as in Figs. 1 and 3. The design of the levers and the positioning of the lever pivots, as shown in Figs. 3 to 5a, have the following advantages: additional friction between the lever and the pack is avoided even at maximum pack diameter; friction between the tape and the tape guides is considerably reduced, as compared with conventional cassettes, and consequently less torque is required to drive the reels; and the existing pins 16 and the shaft used for the idler roll 14 can be used as pivots for the levers 26, 29 and 32. In the embodiments shown in Figs. 3 to 5a the levers are the only parts which are additionally required and which ensure optimal tape guidance.

Fig. 6 shows the tape guide elements in the form of sliding members 35 and 36 which are slidably located in grooves 39 and 40 in the base 1 and top wall of the cassette housing situated in the lower corner sectors formed by lines 37 and 38 and the line 23 radially to the packs 12 and 13. Fig. 7 is a perspective sectional view of the sliding member 35 shown in Fig. 6. When viewed from the side, the sliding member 35 has an approximately c profile. Flanges 43 and 44, which are approximately wedge-shaped and face away from the packs, serve as guide means for the tape 11. A central portion 45 which is provided with a guide surface 42 is tapered like the free ends of the levers 20, 21, 20a, 26, 29 and 32 to facilitate the passage of the tape 11 from the loop onto the pack or from the pack into the loop. In the design of sliding member 46 shown in Fig. 8 the purpose of an outer side 47 is to prevent the tape 11, under special circumstances, from jumping out from between the flanges 43 and 44.

However, threading of the tape through the slot in the sliding member 46 during assembly of the cassette does present difficulties. This problem can be solved by providing a slit in the upper flange 43. Straight grooves 39 and 40 which are arranged radially to the packs 12 and 13 may be replaced for example by suitably curved grooves, it being important that the sliding members in their position near the packs should be located in the lower corner sectors formed by lines 37 and 38 and the line 23. Good winding and unwinding of the tape is thereby ensured at all pack diameters.

The free ends of the levers can also be guided in grooves in the base and top wall of the cassette housing in the same manner as the sliding members of Figs. 7 and 8. If desired, recesses may be provided in the base or in the top wall of the cassette housing.

Figs. 9 and 10 show another lever design, a variant of the lever 20a shown in Fig. 2A. Lever 48 is provided at its free end with an integral offset pin 49 so that a rectangular slot 50 which is open at the bottom and through which the tape passes is formed between the guide surface of the lever 48 and the pin 49. The width of slot 50 is preferably less than that of the magnetic tape and its height is approximately the same as the width of the tape. This arrangement ensures that the magnetic tape can only move away from the guide surface of the lever by less than the width of the tape, thus preventing it from losing contact with the guide surface. In compact cassettes, tape tension may be reduced to such an extent during acceleration, fast braking of the spools and sudden changes in the direction of tape motion, that forces come into play which endeavour to pull the tape away from the guide surface 41. This is definitely prevented by the pin 49 of the Figure 10 variant and the side 47 of the Figure 8 variant. The levers may also be provided at their free ends with projections, for example in the shape of runners, which are slidably located in grooves.

A short explanation of how the above-described tape guide elements function is given below:—

By arranging at least part of the tape guide elements 20, 21, 20a, 26, 29, 32, 35, 36, 46 and 48 between the packs and the loop, interaction between the pack, the tape guide elements and the winding up and unwinding of the tape in the loop is utilized to guide the tape. When the tape is in motion in the cassette, or on a studio tape recorder using flangeless hubs, i.e. during recording, reproduction and rewinding, one tape guide element will be drawn towards the growing pack by the tape loop and will be urged outwardly by the growing

pack. The momentary position of the guide elements — whether they are in direct contact with the packs or in spaced relationship thereto — is dependent on the tensile force applied to the tape loop at any one time, the friction existing at any one time between the guide elements and the cassette housing and the force applied at any one time to the guide element by the pack with which it is associated. Since the tape guide element is always located between the outermost winding of the pack and the loop, the position of the tape guide element is determined in each case by the direction of rotation and the size of the pack, the tape in the loop constantly bearing against the guide surface 41 or 42 of the tape guide element. Consequently, whenever, the packs rotate, the tape guide elements ensure optimal guidance of the winding and unwinding loop of tape, i.e. each new turn is freshly oriented on the growing pack during winding of the tape and each new portion of the tape becoming a part of the loop is freshly aligned with respect to the front wall 2 of the cassette during unwinding of the diminishing pack, which results in completely troublefree operation.

In the above arrangements two tape guide elements are employed; this has the advantage that guidance of the tape loop relative to the magnetic head is improved. For some applications, however, one tape guide element may be sufficient. The above-described tape guide elements in magnetic tape cartridges have given excellent service under field operating conditions, despite the fact that the space available for accommodating additional tape guide means in a compact cassette, in particular, is minimal.

WHAT WE CLAIM IS:—

1. A magnetic tape assembly comprising:—
a pair of tape-supporting flangeless hubs rotatable to wind tape off a pack on one hub onto a pack on the other hub, said tape passing between the packs in the form of a loop, and
at least one tape guide element mounted for movement towards and away from one of said hubs and in the plane of rotation of said one hub, at least part of said guide element being arranged between the pack on said one hub and the adjacent end of the loop and having a guide surface which is in continuous contact with said end of the loop when the tape is in motion, with guide flanges extending above and below the tape forming said end of the loop.
2. An assembly as claimed in claim 1 wherein said guide surface ends at or near the point at which the loop of magnetic tape tangentially joins the pack.
3. An assembly as claimed in claim 1

However, threading of the tape through the slot in the sliding member 46 during assembly of the cassette does present difficulties. This problem can be solved by providing a slit in the upper flange 43. Straight grooves 39 and 40 which are arranged radially to the packs 12 and 13 may be replaced for example by suitably curved grooves, it being important that the sliding members in their position near the packs should be located in the lower corner sectors formed by lines 37 and 38 and the line 23. Good winding and unwinding of the tape is thereby ensured at all pack diameters.

The free ends of the levers can also be guided in grooves in the base and top wall of the cassette housing in the same manner as the sliding members of Figs. 7 and 8. If desired, recesses may be provided in the base or in the top wall of the cassette housing.

Figs. 9 and 10 show another lever design, a variant of the lever 20a shown in Fig. 2A. Lever 48 is provided at its free end with an integral offset pin 49 so that a rectangular slot 50 which is open at the bottom and through which the tape passes is formed between the guide surface of the lever 48 and the pin 49. The width of slot 50 is preferably less than that of the magnetic tape and its height is approximately the same as the width of the tape. This arrangement ensures that the magnetic tape can only move away from the guide surface of the lever by less than the width of the tape, thus preventing it from losing contact with the guide surface. In compact cassettes, tape tension may be reduced to such an extent during acceleration, fast braking of the spools and sudden changes in the direction of tape motion, that forces come into play which endeavour to pull the tape away from the guide surface 41. This is definitely prevented by the pin 49 of the Figure 10 variant and the side 47 of the Figure 8 variant. The levers may also be provided at their free ends with projections, for example in the shape of runners, which are slidably located in grooves.

A short explanation of how the above-described tape guide elements function is given below:—

By arranging at least part of the tape guide elements 20, 21, 20a, 26, 29, 32, 35, 36, 46 and 48 between the packs and the loop, interaction between the pack, the tape guide elements and the winding up and unwinding of the tape in the loop is utilized to guide the tape. When the tape is in motion in the cassette, or on a studio tape recorder using flangeless hubs, i.e. during recording, reproduction and rewinding, one tape guide element will be drawn towards the growing pack by the tape loop and will be urged outwardly by the growing

pack. The momentary position of the guide elements — whether they are in direct contact with the packs or in spaced relationship thereto — is dependent on the tensile force applied to the tape loop at any one time, the friction existing at any one time between the guide elements and the cassette housing and the force applied at any one time to the guide element by the pack with which it is associated. Since the tape guide element is always located between the outermost winding of the pack and the loop, the position of the tape guide element is determined in each case by the direction of rotation and the size of the pack, the tape in the loop constantly bearing against the guide surface 41 or 42 of the tape guide element. Consequently, whenever, the packs rotate, the tape guide elements ensure optimal guidance of the winding and unwinding loop of tape, i.e. each new turn is freshly oriented on the growing pack during winding of the tape and each new portion of the tape becoming a part of the loop is freshly aligned with respect to the front wall 2 of the cassette during unwinding of the diminishing pack, which results in completely troublefree operation.

In the above arrangements two tape guide elements are employed; this has the advantage that guidance of the tape loop relative to the magnetic head is improved. For some applications, however, one tape guide element may be sufficient. The above-described tape guide elements in magnetic tape cartridges have given excellent service under field operating conditions, despite the fact that the space available for accommodating additional tape guide means in a compact cassette, in particular, is minimal.

WHAT WE CLAIM IS:—

1. A magnetic tape assembly comprising:—

a pair of tape-supporting flangeless hubs rotatable to wind tape off a pack on one hub onto a pack on the other hub, said tape passing between the packs in the form of a loop, and

at least one tape guide element mounted for movement towards and away from one of said hubs and in the plane of rotation of said one hub, at least part of said guide element being arranged between the pack on said one hub and the adjacent end of the loop and having a guide surface which is in continuous contact with said end of the loop when the tape is in motion, with guide flanges extending above and below the tape forming said end of the loop.

2. An assembly as claimed in claim 1 wherein said guide surface ends at or near the point at which the loop of magnetic tape tangentially joins the pack.

3. An assembly as claimed in claim 1



or 2 wherein said tape guide element is a pivotally mounted lever.

4. An assembly as claimed in claim 3 wherein said lever is provided at its free end with guide flanges which extend outwardly away from the pack, said free end extending to a region close to the line passing through the centre of the hubs.

5. An assembly as claimed in claim 3 or claim 4, wherein said lever is pivotally mounted on a pin located inside said loop of tape and near an idler roll for said tape.

6. An assembly as claimed in claim 3 or claim 4, wherein a part of said lever adjacent to its pivoted end also serves as a guide for the loop of magnetic tape.

7. An assembly as claimed in claim 3 or claim 4, wherein said lever is pivotally mounted outside said loop of tape and crosses the loop so that its free end is interposed between an end of the loop and the pack.

8. An assembly as claimed in claim 3 wherein the free end of said lever is provided with an approximately rectangular slot whose height is approximately the same as the width of the magnetic tape and whose width is less than that of the tape.

9. An assembly as claimed in claim 1 or 2 wherein said tape guide element is a guided slidably mounted member having an approximately C profile when viewed in the direction of tape transport therethrough.

10. An assembly as claimed in any of claims 3 to 8 wherein the free end of said lever is provided with at least one projection which is slidably located in a groove.

11. An assembly as claimed in any pre-

ceding claim wherein a separate tape guide element is provided for each pack.

12. A magnetic tape cartridge or cassette, comprising an assembly as claimed in any preceding claim.

13. A magnetic tape cassette comprising a housing, a pair of tape-supporting flangeless hubs rotatably mounted in spaced-apart relation within the housing, and a length of tape forming a pack on each hub with a loop of tape extending between said packs, a pair of tape-guide elements each mounted for movement towards and away from a different one of said hubs and in the plane of rotation of the appropriate hub, a part of each guide element being arranged between the pack on the appropriate hub and the adjacent end of the loop, each guide element having a guide surface which continuously contacts the tape defining said adjacent end of the loop when the tape is in motion, each guide element having guide flanges extending outwardly away from the pack above and below the tape forming said end of the loop.

14. A cassette substantially as hereinbefore described with reference to and as illustrated in Figures 1 and 2; Figure 1 as modified by Figures 2a, 3, 4, 5a and 5b or 9 and 10; or Figure 6 as modified by Figures 7 or 8 of the accompanying drawings.

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