United States Patent

Camras

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[54] TAPE CARTRIDGE WITH AUXILIARY SPRING BIASING ELEMENTS

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[51] **Int. Cl.**.....**G11b 23/06**

[58] **Field of Search**.....179/100.2 Z; 242/55.19 A; 274/4 B, 4 C, 11 B, 11 C

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[57] **ABSTRACT**

An endless loop magnetic tape cartridge compatible with existing players which have a single laterally acting retention roller, the cartridge containing an independent longitudinal bias element acting on the retention roller and forwardly biasing the cartridge by reaction. Controlled lateral bias may also be provided. Preferably the cartridge is formed in two halves of configuration to receive and retain the bias element therebetween.

14 Claims, 4 Drawing Figures

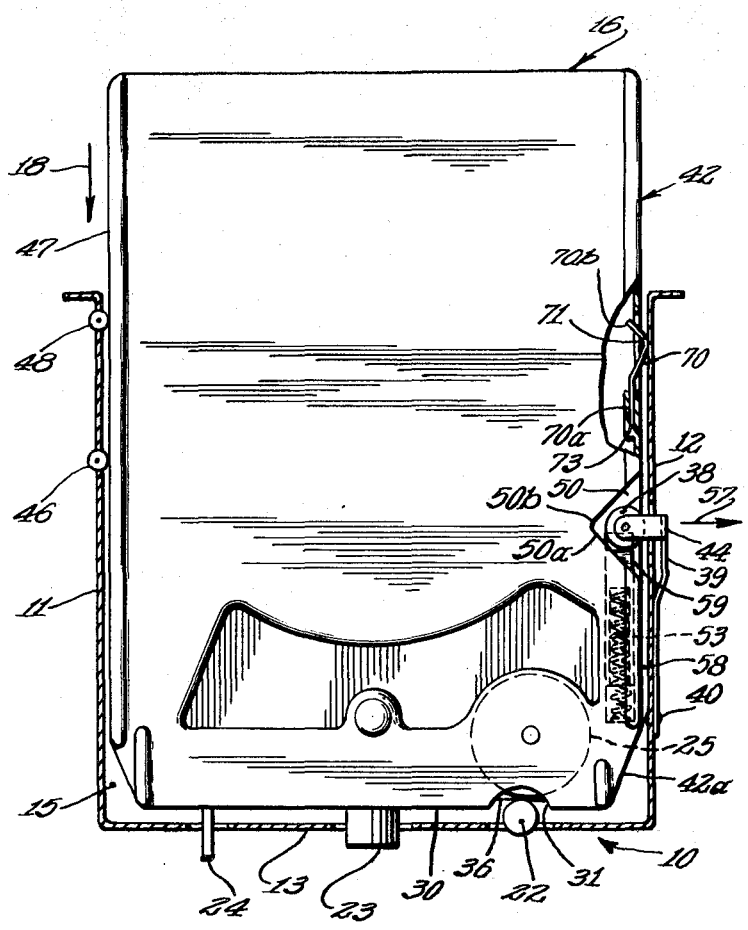

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Fig. 1

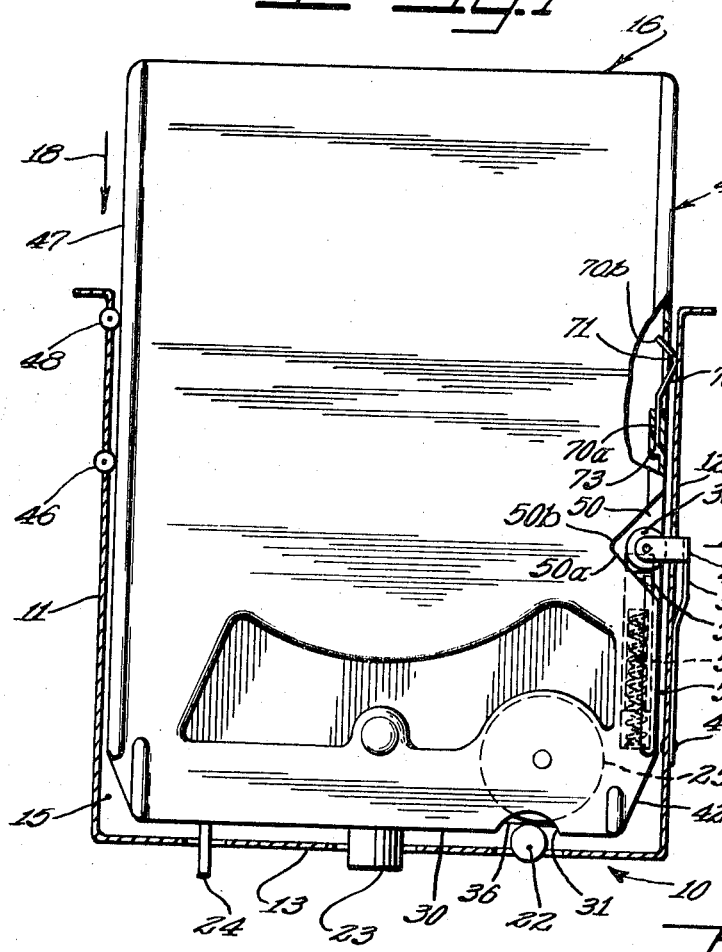


Fig. 2

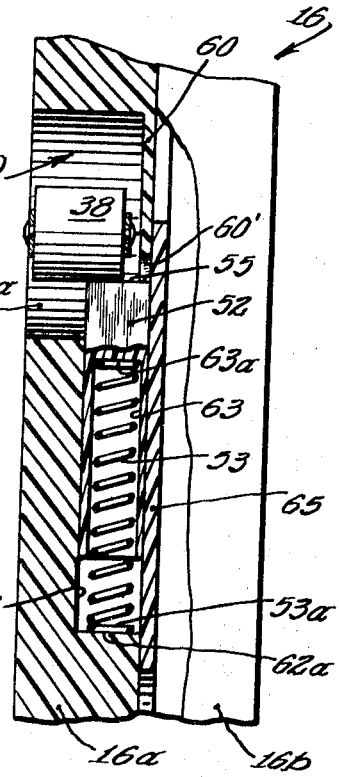


Fig. 3

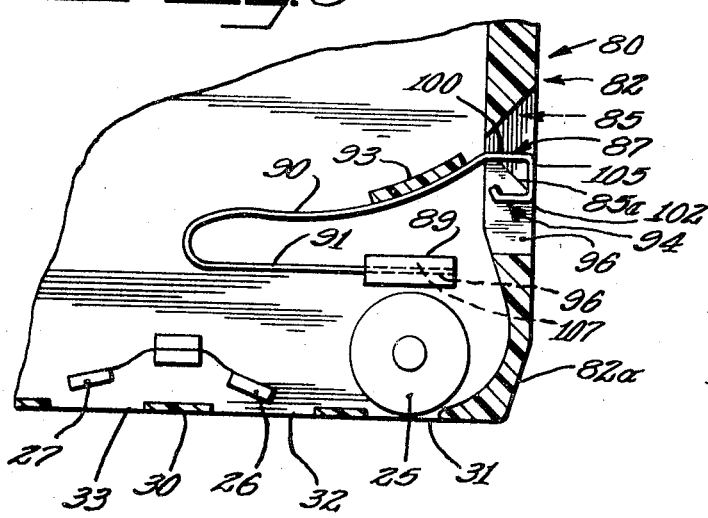
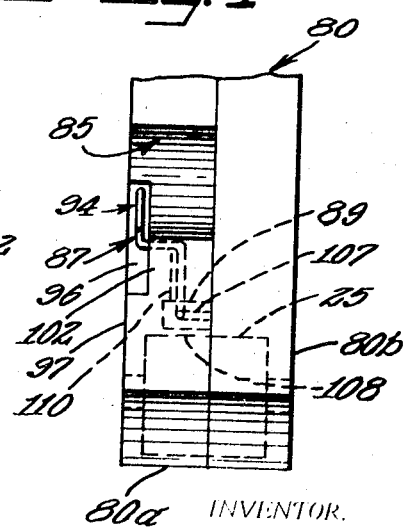


Fig. 4



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TAPE CARTRIDGE WITH AUXILIARY SPRING BIASING ELEMENTS

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an endless loop magnetic tape cartridge compatible with existing player machines but wherein a definite accurate forward bias of the cartridge toward the capstan is provided independently of the conventional single laterally acting retention roller.

A further object of the invention is to provide a cartridge which is adapted to be loaded longitudinally into a receiving space which has a laterally acting retention roller but wherein the cartridge is configured such that the laterally acting retention roller cannot laterally bias the cartridge, so that strong side forces between the cartridge and its receiving unit are avoided.

Another object of the invention is to provide a compatible endless loop magnetic tape cartridge enabling reduced or negligible side forces so as to ensure an accurate pressure engagement between the capstan and the pressure roll during transducing operation.

Still another object of the invention is to provide a compatible endless loop magnetic tape cartridge which provides essentially free adjustability of the cartridge within its receiving space to accommodate to slight irregularities such as in the capstan roll, for improved transducing operation in comparison with the prior art wedged-in-place cartridge configuration.

Yet another object of the invention is to provide a cartridge configuration which can be simply and economically molded and wherein the novel elements are extremely easily assembled with the remaining parts of the cartridge.

Other objects, features and advantages of the present invention will be apparent from the following detailed description taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a somewhat diagrammatic horizontal sectional view with certain portions of the cartridge broken away and in section;

FIG. 2 is an enlarged fragmentary longitudinal sectional view of the cartridge illustrating preferred details of construction;

FIG. 3 is a somewhat diagrammatic fragmentary horizontal sectional view illustrating a modified cartridge in accordance with the present invention; and

FIG. 4 is a somewhat diagrammatic fragmentary side elevational view of the cartridge of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, portions of a conventional endless loop tape cartridge player unit **10** are illustrated including sidewalls **11** and **12** and front wall **13** defining a cartridge receiving space **15**. A cartridge such as indicated at **16** is moved in a longitudinally forward direction such as indicated by arrow **18** until the cartridge reaches an operative position within the player unit. The player unit **10** further includes certain elements such as a capstan driver roller **22**, a magnetic transducer head **23** and a tape engaging element **24** which are to be cooperatively associated with conventional elements within the cartridge such as pressure roller **25**, and pressure pads **26** and **27**, FIG. 3. As seen in FIGS. 1 and 3, the cartridge conventionally includes a front wall **30** with open regions such as indicated at **31**, **32** and **33**, FIG. 3, for exposing the magnetic tape **36**, FIG. 1, to contact with the elements **22–24**. The element **24** may include electrical contact elements which are bridged by a conductive strip on the magnetic tape **36** so as to control indexing movement of the transducer head **23** for scanning of the successive channels recorded on the tape **36**.

In the conventional player mechanism, the sidewall **12** is provided with a laterally acting retention roller **38** which is carried on a relatively strong spring arm **39** secured to the side **12** by fastening means such as indicated at **40**. In the conventional system, a sloping forward wall portion **42***a* of longitudinal sidewall **42** of cartridge **16** engages roller **38** as the cartridge is loaded into the receiving space **15**, camming the roller from a retention position within the receiving space in a laterally outward direction. Then, with a conventional cartridge configuration, the lateral biasing spring **39** forces the roller **38** laterally inwardly along a sloping intermediate wall portion of the longitudinal sidewall corresponding to sidewall **42** so as to wedge the conventional cartridge forwardly and laterally and in effect lock the cartridge within the receiving space. In order to provide the necessary amount of forward bias with this conventional arrangement, the spring force of the arm **39** is necessarily relatively great with the result that there is a strong lateral force exerted on the cartridge giving rise to friction which prevents the reliable maintenance of an accurate pressure between the capstan **22** and pressure roller such as indicated at **25**.

In the conventional player, means such as an extension on bracket portion **44** of spring arm **39** limits the lateral inward movement of the retention roller **38** in the absence of the cartridge so as to define what is herein termed a retention position, but which position would not actually be attained with conventional wedge-type retention action. In the conventional cartridge player, a guide roller such as indicated at **46** is provided for cooperation with the opposite sidewall **47** of cartridge **16**. Some commercial machines also include additional rollers as indicated at **48** for use in conjunction with the cartridge so as to provide even more accurate and reliable positioning of such cartridge.

The cartridge **16** in accordance with the present invention is provided with a recess **50** extending into the longitudinal sidewall **42**, but the recess **50** is of such a configuration that the sloping wall portion **50***a* thereof is clear of any substantial contact with the retention roller **38** in the retention position of the roller shown in FIG. 1 so that the retention roller produces no substantial lateral force on the cartridge **16** and no substantial forward force on the cartridge such as is present in the conventional arrangement.

In place of the conventional wedge-type arrangement, the cartridge **16** is provided with a longitudinal biasing element **52** which is provided with a predetermined longitudinal biasing force by means of a compression spring **53** acting to urge the element **52** longitudinally rearwardly against retention roller **38** in operative position of the cartridge. As shown in FIG. 2 the retention element **52** is provided with a rear retention roller engaging face **55** which has essentially a planar rectangular configuration with the plane of the end face **55** lying at right angles to the direction of movement of the element **52**, and parallel to the lateral direction of movement of retention roller **38** indicated by arrow **57** in FIG. 1. Thus, the roller **38** does not exert a lateral biasing force on the cartridge even by virtue of its contact with the end face **55** of the longitudinal biasing element. On the other hand, when the biasing element **52** has its rear face **55** in engagement with the retention roller **38** as shown in FIGS. 1 and 2, the forward end **53***a* of compression spring **53** will transmit a reaction forward biasing force on the cartridge **16**.

As the cartridge **16** is inserted into the receiving space **15**, the retention roller **38** will ride along the longitudinal sidewall section **58** and along the side edge face **59** of retention element **52** until such time as the central axis of the roller **38** is beyond the edge face **55** of biasing element **52**. At this time, the force exerted by spring **53** is sufficiently less than the force exerted by spring arm **39** that the spring arm **39** will force the roller **38** to its retention position shown in FIG. 1 with the spring **53** under substantial compression so as to exert a substantial longitudinal biasing force on the cartridge **16**, maintaining stable pressure engagement of the pressure roll **25** in relation to tape **36** and capstan **22**. As the cartridge is being loaded, the longitudinal biasing element **52** will be maintained in its extreme rearward position by virtue of the force of compression spring **53**, with the rear face **55** engaging the stop provided by edge face **60'** of the wall **60** of the cartridge. It

will be noted that the stop **60** is located substantially forwardly of the central axis of retention roller **38** so as to facilitate the lateral inward movement of the retention roller to its retention position, forcing the biasing element **52** to the active position illustrated in FIGS. **1** and **2**.

As best seen in FIG. **2**, the cartridge **16** is preferably made in two parts **16***a* and **16***b* which are secured in mating relationship to form a housing for the conventional elements of the cartridge. The part **16***a* includes a longitudinally extending notch **62** for slidably receiving the biasing element **52**, the forward end **53***a* of compression spring **53** being bottomed against forward wall **62***a* of the notch **62**. It will be observed that the biasing element **52** and the notch **62** are of substantially rectangular cross sections, the biasing element **52** having a longitudinal cylindrical bore **63** with a rear end face **63***a* seating the forward end of compression spring **53**. The other half **16***b* of cartridge **16** is preferably provided with a wall portion **65** overlying the entire extent of notch **62** so as to confine the biasing element **52** for longitudinal reciprocal movement only when the halves **16***a* and **16***b* are assembled.

It will further be observed from FIG. **2** that when the cartridge **16** is to be shifted rearwardly to a standby position or removed entirely from the receiving space **15**, the rearward movement of the cartridge **16** will cause the retention roller **38** to press the biasing element **52** into its receiving notch **62** until the retention roller **38** engages the sloping sidewall portion **50***a* of recess **50**. Further rearward movement of the cartridge **16** will then wedge the retention roller **38** laterally outwardly in the direction of arrow **57**, FIG. **1**, the roller **38** rolling on the rear edge face **55** of biasing element **52** and pressing the biasing element further in the retracting direction into the notch **62** until such time as the retention element **38** is in rolling engagement with the portion **58** of the longitudinal sidewall **42** of cartridge **16**. The cartridge may be retained in a standby position partially retracted from the receiving space **15**, or removal of the cartridge **16** may be continued, the retention roller **38** riding on wall portion **58** and then on sloping front wall portion **42***a* as the cartridge is removed from the player unit.

As illustrated in FIG. **1**, if desired, cartridge **16** may be provided with a controlled amount of lateral bias by means of a spring finger **70** acting through an aperture **71** in sidewall **42** to engage the side **12** of the transducer or player unit **10**. The rollers **46** and **48** coact with the lateral bias spring **71** so as to provide a controlled amount of friction which is sufficiently small to ensure reliable maintenance of accurate pressure between the capstan **22** and pressure roll **25** under impetus of longitudinal biasing spring **53**. With or without the provision of the lateral bias spring **71**, the cartridge **16** is so constructed as to be essentially freely movable within the receiving space **15** so as to adjust to or follow slight irregularities in the orientation or position of the capstan **22**.

The forward leg **70***a* of spring finger **70** may fit in a notch **73** which is closed by material of the upper half **16***b* of the cartridge **16** in a manner entirely similar to the closure of notch **62**. The forward free edge **70***b* of lateral bias finger **70** may be arranged so as to limit the lateral outward movement of the biasing finger **70** when the cartridge is removed from the player unit. The spring finger **70** thus provides a substantially negligible protrusion from the normal contour of the cartridge. In other respects, the overall dimensions of the cartridge **16** may be essentially identical to the corresponding dimensions of a conventional eight-track endless loop magnetic tape cartridge.

By way of summary of operation for the embodiment of FIGS. **1** and **2**, as the cartridge **16** is inserted into the receiving space **15**, forward wall portion **42***a* cams the retention roller **38** laterally outwardly, after which the retention roller rides along the wall portion **58** and the edge face **59** of longitudinal bias element **52**. When the centerline of roller **38** is behind the end face **55** of bias element **52** with the end face **55** against stop edge **60'**, FIG. **2**, the spring arm **39** exerts sufficient force to drive retention roller **38** into recess **50** and to drive bias element **52** forwardly against the action of compression spring **53**. The retention roller **38** assumes a retention position as indicated in FIGS. **1** and **2** where the retention roller **38** is free of any substantial contact with the sloping wall portion **50***a* of recess **50**, the forward bias on the cartridge being determined exclusively by the action of compression spring **53**.

In retracting the cartridge from the operative position shown in FIGS. **1** and **2**, the bias element **52** is driven into its receiving notch **62**, FIG. **2**, and the roller **58** wedged out of recess **50** by virtue of its rolling contact with sloping wall **50***a*, FIG. **1**.

FIGS. **3** and **4** illustrate a modified embodiment which is of even greater simplicity than the embodiment of FIGS. **1** and **2**. In this embodiment, a cartridge **80** is similar to cartridge **16** except in the particulars indicated and includes a longitudinal sidewall **82** corresponding to longitudinal sidewall **42** and a sloping forward wall portion **82***a* having the function of wall portion **42***a*, FIG. **1**. Recess **85** corresponds in its relationship to retention roller **38** to the particulars given with respect to recess **50** of the previous embodiment so that the retention roller **38** is free of any substantial contact with the walls of recess **85** and particularly with the sloping forward wall **85***a* thereof.

In this embodiment, a longitudinal bias element **87** is in the form of an elongated wire spring, for example of circular cross section, extending in a generally hairpin configuration from a mounting block **89**. The rear leg **90** of the bias element **87** is urged rearwardly relative to the forward leg **91** by virtue of the resilience of the material, the rear leg **90** being confined against rearward movement by means of stop wall portion **93** when the cartridge is removed from the machine. The free end **94** of the bias element is longitudinally movable within a notch **96** at the bottom face **97** of the lower section **80***a* of cartridge **80**.

It will be noted that the centerline of retention roller **38** is generally in alignment with the bottom portion **50***b* of notch **50** in FIG. **1**, and similarly the notch **85** is arranged so that the center of the retention roller **38** will be in alignment with point **85***b* at the bottom of notch **85**, FIG. **3**. Thus, the center axis of rotation of the retention roller **38** will be displaced rearwardly relative to the roller engaging face **100** of bias element **87**. Further notch **96** is relatively shallow in comparison with the axial extent of the retention roller **38** so that the retention roller will ride on face **102** of sidewall **82** of cartridge **80** as the cartridge is inserted into the receiving space. As the roller **38** comes into lateral alignment with sloping face **85***a*, it will engage longitudinal length portion **105** of the bias element **87** and will be prevented from moving into the recess **85** until the central axis of the retention roller **38** has moved beyond the laterally extending portion **100** of the bias element **87**. Thereupon, as in the previous embodiment, the force of the spring arm **39** will be sufficient to force the retention roller **38** into the notch **85** forcing the free end portion **94** of bias element **87** forwardly. The resultant compression of the bias element **87** will produce a reaction force at the mounting block **89** which is in substantially direct alignment behind the axis of pressure roller **25** so that the pressure roller **25** is biased in the longitudinal forward direction from a point on the cartridge directly in alignment with the capstan **22**.

As in the previous embodiment, when it is desired to remove the cartridge **80**, the cartridge is removed rearwardly causing the retention roller **38** to move the free end **94** further forwardly into the notch **96**, the retention roller **38** being cammed laterally outwardly by virtue of the sloping wall portion **85***a*. Thereafter, the portion **102** of the longitudinal sidewall **82** of the cartridge **80** will maintain the retention roller **38** in its laterally outward position as the cartridge is removed from the machine.

The mounting block **89** is provided with a longitudinally extending notch **107** for receiving a portion **91***a* of forward leg **91** of the bias element **87**. The notch **107** may receive a retaining finger **108** of corresponding configuration which is integral with the upper part **80***b* of the cartridge. Thus as the halves

80*a* and 80*b* are mated, the projecting retaining finger 108 is progressively moved into the notch 107 of block 89 to firmly retain the end portion 91*a* of bias element 87 at the bottom of the notch. As indicated in FIG. 4, the part 80*a* may be provided with a ledge partially indicated at 110 which overlies a portion of the rear leg 90 of the bias element so that the bias element is firmly retained at the desired level within the notch 96 as indicated in FIG. 4. The configuration of ledge 110 is such, of course that the free end 94 of the bias element is movable in the forward direction as described and such that the bias element 87 is conveniently assembled and retained with the lower half 80*a* prior to its assembly with the upper half 80*b* and the consequent complete retention of the bias element at its desired location within the housing defined by the parts 80*a* and 80*b*.

Summarizing the operation for the embodiment of FIGS. 3 and 4, as the cartridge 80 is inserted into the receiving space such as indicated at 15 in FIG. 1, the sloping forward wall portion 82*a* wedges the retention roller 38 laterally outwardly in the direction of arrow 57, FIG. 1. The roller 38 then rides on surface portion 102 of sidewall 82 and along the longitudinally extending portion 105 of the bias element spring wire 87. When the center axis of retention roller 38 is beyond the laterally extending portion 100 of bias element 87, spring arm 39, FIG. 1, of the retention roller 38 forces the retention roller into the recess 85 and forces the free end 94 of bias element 87 in the forward direction along notch 96, FIGS. 3 and 4. The compression of legs 90 and 91 of bias element 87 results in a reaction being exerted against the mounting block 89, FIG. 3, so as to bias the pressure roller 25 in the forward longitudinal direction and maintain the desired stable pressure engagement of the pressure roller 25 with the tape and capstan element 22 in the same way as shown in FIG. 1.

In removing the cartridge 80, the retention roller 38 further compresses the free end 94 of the bias element 87 in the forward direction along notch 96, the retention roller 38 riding along the sloping wall 85*a* and along the wall portion 102 as the cartridge is completely removed from the player or transducer unit generally designated by the reference numeral 10 in FIG. 1.

The description of FIGS. 1 and 2 and the other descriptive matter herein is specifically applicable to the embodiment of FIGS. 3 and 4 except as inconsistent therewith, and the longitudinal bias element 87 provides the desired definite accurate forward spring bias toward the capstan and avoids the strong side forces between the cartridge and the transducer unit and provides the desired essentially free adjustability of the cartridge within the receiving space as in the preceding embodiment. A lateral bias element such as spring finger 70, FIG. 1, may be provided for the embodiment of FIGS. 3 and 4 as well. It will be understood that in the embodiment of FIGS. 3 and 4, the notch 96 is sufficiently deep, and the free end 94 of the bias element 87 is located at a level such as to reliably insure its full contact with the retention roller 38 regardless of any manufacturing tolerances. As generally indicated in FIG. 2, the sloping wall portion such as 50*a* in FIG. 2 will generally overlap the retention roller 38 for a substantial proportion of the axial extent thereof so that there will be reliable firm contact between the retention roller 38 and the sloping wall portion 50*a* or 85*a* as the cartridge is retracted from the receiving space. As indicated in FIG. 2, the longitudinal bias element 52 may be arranged to engage a substantial portion of the longitudinal extent of the retention roller 38, or with respect to the embodiment of FIGS. 3 and 4, the longitudinal bias element may be arranged to engage the retention roller at a region spaced inwardly from the margins of the roller by a substantial distance. Thus firm engagement is insured in spite of any manufacturing tolerances or any slight deflection of the engaging parts from their respective normal operating planes.

One cartridge in accordance with the present invention which was actually constructed and successfully operated for the reproduction of musical selections was entirely comparable to the embodiment of FIGS. 1 and 2 except that the longitudinal bias element 52 was located within an internal longitudinal recess formed in the wall of a conventional eight-track cartridge. For the purposes of actual commercial production, it is considered that the embodiment of FIGS. 1 and 2 is preferable over the recessed wall embodiments. The location of the longitudinal bias element in the prototype corresponded more nearly to the location of the free end 94 of longitudinal bias element 87 in FIGS. 3 and 4. A second prototype which was formed from a conventional cartridge conformed essentially to that illustrated in FIGS. 3 and 4 and was successively operated for the reproduction of music. Both prototypes were found to be entirely reliable and consistent in their operation when repeatedly inserted into a conventional player machine, and the prototypes were considered to avoid the disadvantages noted herein for the conventional cartridge when associated with the conventional player.

In each of the embodiments the changes in deflection of the spring (53 or 87) due to minor variations in dimensions of the cartridge and receiving space (as a result of manufacturing tolerances and the like) is substantially negligible in its effect on the biasing force, so that the force of the biasing member (52 or 94) is substantially constant regardless of such minor variations.

In FIG. 1, the laterally acting spring element 70 may be replaced by a fixed button of the same external configuration as presented by spring 70 in FIG. 1 or the width dimension can be increased to give the same effect as such a fixed button. As a further alternative such a button may be mounted on a spring arm such as 70*a*.

The configuration of FIGS. 1 and 2 exactly as illustrated has been constructed and operated for the reproduction of music. This embodiment was found to be entirely reliable and consistent in its operation when repeatedly inserted into a conventional player.

The plunger, cavity, and spring are shown in simple form for easy molding and assembly, but may be modified as for example with protrusions or depressions for guiding, stopping, or coupling with the external abutment. Other materials may be substituted. A portion of the plunger may even extend rearward of the side notch to give it additional support.

In place of hairpin spring 87, FIG. 3, a cantilever spring could be provided anchored at the side of cartridge 80 opposite the side with recess 85 and extending across the width dimension of the cartridge and into recess 85 at the position of free end 94. The spring would then have an end configuration as shown at 94, but would extend from portion 100 directly across the width of the cartridge. Each of the bias elements described herein would present the substantially constant biasing force in spite of minor dimensional variations as previously mentioned, and would accommodate adjustment of the cartridge in contrast to the wedged in place retention of the prior art.

It will be apparent that many modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A tape cartridge for use in a transducer unit of the type having a tape driving member, a longitudinally extended cartridge receiving space defined between a pair of spaced-apart sidewalls for accommodating longitudinal movement of said cartridge into operative relationship to the tape driving member and a laterally biased retention element disposed on one side of the cartridge receiving space for retaining the cartridge longitudinally in operative relation with the transducer unit, said cartridge comprising a tape record medium within said cartridge, a pressure roll within said cartridge for cooperating with the tape driving member to drive said tape record medium, and a spring at one side thereof for engagement with one of the sidewalls forming the cartridge receiving space to urge said cartridge in a lateral direction against the opposite one of the sidewalls when the cartridge is retained in the receiving space.

2. A tape cartridge for use in a transducer unit of the type having a tape driving member, a longitudinally extended cartridge receiving space formed between spaced-apart sidewalls for accommodating longitudinal movement of said cartridge into operative relationship to the tape driving member, and a laterally biased retention element disposed on one side of the cartridge receiving space for retaining the cartridge longitudinally in operative relation with the transducer unit, said cartridge comprising a tape record medium within said cartridge, a pressure roll within said cartridge for cooperating with the tape driving member to drive said tape record medium and a button protruding at one side thereof for engagement with one of the sidewalls forming the cartridge receiving space to laterally position the cartridge in the receiving space.

3. A cartridge adapted for cooperation with a transducer unit having a cartridge receiving space and having an abutment that holds the cartridge in said space, said cartridge having a biasing member carried therewith for urging the cartridge in a given direction when the cartridge is retained in said receiving space by said abutment, said cartridge also having a recess arranged to receive said abutment to retain said cartridge in said receiving space and means for automatically forcing the abutment out of said recess when the cartridge is removed from the receiving space.

4. The cartridge of claim 3 with said forcing means comprising a sloping wall portion of the cartridge.

5. A tape cartridge adapted for cooperation with a transducer unit that has a tape driving capstan, a longitudinally extended cartridge receiving space for accommodating longitudinal movement of a cartridge into operative relationship to the capstan, and a single laterally biased retention element disposed at one side of said cartridge receiving space and biased toward a cartridge retaining position within said cartridge receiving space, said cartridge comprising

a housing having a front wall with an open region therein to expose a portion of a tape path therein which is in alignment with said capstan to accommodate driving engagement of the capstan with a tape record medium extending along said path,

said housing having a longitudinal sidewall for extension along one side of the cartridge receiving space when the cartridge is inserted therein, said housing having a recess extending from its longitudinal sidewall at a position which is in lateral alignment with the retention element when the cartridge is in operative relationship to the capstan, said recess providing clearance accommodating lateral movement of the retention element into its retaining position under the impetus of its lateral bias, and

a longitudinal bias element in said housing for coaction with said retention element and having a longitudinally rearwardly acting biasing means for urging the bias element rearwardly against said retention element, said biasing means exerting a substantial biasing force which by reaction acts in a forward longitudinal direction on the cartridge to maintain said cartridge in stable pressure engagement with said capstan during transducing operation.

6. The cartridge of claim 5 with said longitudinal bias element being movable into said recess in the absence of said retention element, and said bias and retention elements having cooperating configurations such that the retention element will move the bias element in the forward longitudinal direction as the retention element moves laterally into said recess.

7. The cartridge of claim 6 with said biasing means urging the bias element rearwardly with a force less than that exerted by the lateral bias of said retention element, to accommodate automatic forward longitudinal movement of the bias element by the retention element, when the cartridge is inserted in the receiving space.

8. A tape cartridge for use in a transducer unit of the type having a tape driving member, a longitudinally extended cartridge receiving space for accommodating longitudinal movement of said cartridge into operative relationship to the tape driving member, and a laterally biased retention element disposed on one side of the cartridge receiving space, said tape cartridge comprising a tape record medium within said cartridge, a pressure roll within said cartridge for cooperating with the tape driving member to drive said tape record medium, and a biasing member carried with said cartridge and cooperating with the retension element for urging said cartridge into drive relation with the tape driving member whenever said cartridge is retained in the cartridge receiving space by the retention element.

9. The cartridge of claim 8 with said biasing member urging said cartridge into a given position with a force determined by said biasing member.

10. The cartridge of claim 8 with said biasing member urging said cartridge into a given position with a force determined by said biasing member, the force of said biasing member being substantially constant regardless of minor variations in dimensions of the cartridge and receiving space.

11. The cartridge of claim 8 with said biasing member being within the confines of the overall cartridge configuration exclusive of said biasing member.

12. The cartridge of claim 8 with said cartridge having a recess arranged to receive the retention member to retain said cartridge in said receiving space.

13. The cartridge of claim 8 with said biasing member comprising a spring urged plunger.

14. The cartridge of claim 8 with said biasing member comprising a bendable spring element.

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