

1 599 190

- (21) Application No. 18717/78 (22) Filed 10 May 1978 (19)
- (31) Convention Application No. 795 867 (32) Filed 11 May 1977 in
- (33) United States of America (US)
- (44) Complete Specification published 30 Sept. 1981
- (51) INT. CL.<sup>3</sup> E05C 1/10
- (52) Index at acceptance  
E2A 160 165 168 170 428 EA



(54) LATCH ASSEMBLY FOR A VIDEO TAPE CASSETTE

(71) We, MINNESOTA MINING AND MANUFACTURING COMPANY, a corporation organised and existing under the laws of the State of Delaware, United States of America, of 3M Center, Saint Paul, Minnesota 55133, United States of America, 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:—

This invention relates to latch assemblies for an access door on a video tape cassette of the type used in a video recording and playback machine, such as the "U-Matic" cassette developed by Sony Corporation and described in U.S. Patent No. 3,809,219.

U.S. Patent No. 3,809,219 describes a tape cassette including a latch assembly for a tape cassette which releasably retains the door in its closed position. The latch assembly comprises a movable member slidably mounted in a housing for the cassette and includes a projection adapted to engage the door. The latch assembly includes a separable metal wire coil spring for biasing the movable member to its engaged position, resulting in a latch assembly which requires assembly time to position the spring between the movable member and the housing, and which is more costly to produce than might otherwise be desired.

It is an aim of the present invention to provide an improved latch assembly for an access door of a video cassette which latch assembly is less costly and easier to assemble into a cassette than the prior art latch assemblies described above.

Accordingly, the invention provides a latch assembly for the access door of a video tape cassette which door is pivotably mounted on a housing of the cassette for movement between a closed position over a tape access area, to which the door is biased, and an open position spaced from said access area, said latch assembly comprising a channel on said door, a movable member including a projection slidably mounted in said housing for movement relative to said door between an

engaged position, with said projection positioned to enter said channel when said door is in said closed position to retain said door in said closed position, and a release position with the projection on the movable member spaced from the door; and means for biasing said movable member to said engaged position, wherein said movable member and said means for biasing said movable member to said engaged position are an integral unit of flexible resilient polymeric material with said movable member being a relatively rigid movable body portion of said unit, and said means for biasing being an elongate spring portion of said unit having one end joining said movable portion, an opposite end engaging said housing, and an arcuate part which is resiliently bent to bias said movable portion toward said engaged position.

The present invention will now be described by way of example and with reference to the accompanying drawing, in which like numbers refer to like parts in the several views, and wherein:

Figure 1 is a fragmentary front view of a tape cassette including a latch assembly according to the present invention and having parts broken away to show details,

Figure 2 is a fragmentary top view of the tape cassette of Figure 1 having a top half of the housing removed to show details of the latch assembly;

Figure 3 is an elevational front view of an integral movable member and biasing means in the latch assembly of Figure 1;

Figures 4, 5 and 6 are respectively a left end view, a right end view and a bottom view of the integral movable member and biasing means illustrated in Figure 3;

Figure 7 is an elevational front view of an alternative embodiment for the integral movable member and biasing means in a latch assembly according to the present invention; and

Figures 8, 9 and 10 are respectively a left end view, a right end view and a top view of the integral movable member and biasing means of Figure 7.

Referring now to Figures 1 and 2 there is

55  
60  
65  
70  
75  
80  
85  
90  
95  
100

illustrated a video tape cassette 50 which includes a latch assembly according to the present invention.

5 The video tape cassette 50 includes a pre-determined length of magnetizable recording tape 11, two reels 12 each supporting a different helically wound end portion of the length of tape, and a generally rectangular housing 54 having separable upper and lower parts 55 and 56 enclosing and supporting the reels 12 for rotation to transfer tape between the reels. The housing 56 includes a front wall having a generally planar end portion 58 and a recessed portion 60 defining a tape access area, and means including some guide pins 61 for guiding the tape 11 between the reels 12 through the outer wall and across the tape access area to afford access thereto by the record/playback mechanism of a machine into which the cassette 50 is inserted. Also the cassette 50 includes a door 20, a hinge pivotably mounting the door 20 on the housing 54 for movement between a closed position over the tape access area and an open position spaced from said access area, and a spring 22 which biases the door 20 to its closed position.

25 The modified latch assembly for releasably retaining the door 20 in its closed position comprises a channel 24 defined by an L-shaped protrusion located on the edge of the door 20 opposite the hinge adjacent the planar end portion 58, and an integral movable member and biasing means 62 according to the present invention. The integral movable member and biasing means 62 includes a stiff generally rectangular body portion 64 slidably mounted in the housing 54 in a slot defined between the planar end portion 58 of the front wall, a post 68, and a part of the recessed portion 60 of the front wall that extends adjacent the end portion 58. The body portion has projecting lugs or rails 67 which limit surface contact between the body portion 60 and housing 54. A stop block 66 projecting from the rear of the planar end portion 58 is positioned in a slot 70 in the body portion 64, the length of which slot 70 permits sliding movement of the body portion 64 between (1) an engaged position at which a projection 72 included in the body portion 64 will enter the channel 24 when the door 20 is in its closed position to retain the door 20 in its closed position; and (2) a release position at which the projection 72 is in a position at which the door 20 may be moved from its closed to its open position. Also, the integral slide member and biasing means 62 includes a flexible resilient spring portion 73 having one end joining its body portion 64, an opposite end 75 engaging the housing 54 and an arcuate part 74 between its ends which may be resiliently bent as the body portion 64 moves toward the end 75 so that the spring

portion 73 provides means for biasing the body portion 64 to its engaged position.

The body portion 64 includes a cam surface 80 adapted for engagement through an opening 82 in the planar end portion 58 of the front wall to move the body portion 64 to its disengaged position and allow the door 20 to be opened by a machine into which the cassette is inserted.

Also provided on the body portion 64 is a first cam surface 78 on the projection 72 adapted to be engaged by an edge of the L-shaped channel 24 so that the body portion 64 will be moved to its disengaged position and into engagement with the channel 24 as the door 20 is moved to its closed position. This feature conveniently allows the door 20 to latch itself under the influence of the spring 22 after the door 20 has been opened outside of a video record/playback machine by a person wishing to inspect the tape access area.

The integral movable member and biasing means 62 is molded of a polymeric material, such as acetal, which will form a flexible resilient spring portion 73 while providing a relatively stiff body portion 64. When made from acetal, the arcuate part 74 of the spring portion 73 is preferably about 0.09 inch wide and 0.036 inch thick to provide the desired force to reliably move the body portion 64 to its engaged position. Arcuate parts 74 much less in cross sectional area have been found to take a set and thus are unreliable, whereas those which are substantially larger (particularly in thickness) become too stiff. Also the spring portion 73 has a plurality of arcuate projections 84 which facilitate molding.

Figures 7, 8, 9 and 10 illustrate an alternative embodiment of an integral movable member and biasing means 90 particularly adapted for use in a video tape cassette which is smaller than the cassette 50.

Like the integral member and biasing means 62 illustrated in Figures 1 through 6, the integral movable member and biasing means 90 also includes a body portion 91 adapted to be slidably mounted in a housing of a cassette which body portion 91 has a projection 92 adapted to engage a door of the cassette and first and second cam surfaces 93 and 94 adapted to perform the function of the cam surfaces 78 and 80 of the body portion 64. Also, the integral movable member and biasing means 90 includes a flexible resilient generally S-shaped spring portion 95 having one end joining its body portion 91, an opposite end 97 adapted to engage the housing, and two arcuate parts 96 between its ends which may be resiliently bent as the body portion 91 moves toward the end 97 so that the spring portion 95 can provide means for biasing the body portion 91 towards an engaged position. The two

arcuate parts 96 allow the spring portion 95 to provide even and adequate spring pressure for biasing the body portion 70 while having a shorter spring portion 95 length in the direction of travel of the body portion 91 than the arched spring portion 73. This shorter length of the spring portion 95 facilitates use of the integral movable member and biasing means in smaller video cassettes.

The integral movable member and biasing means 90 is also integrally molded of a resilient flexible polymeric material such as acetal, with the arcuate parts 96 of the spring portion 95 preferably having a thickness of about 0.1 centimeter and width of about 0.15 centimeter.

WHAT WE CLAIM IS:—

1. A latch assembly for the access door of a video tape cassette which door is pivotably mounted on a housing of the cassette for movement between a closed position over a tape access area, to which the door is biased, and an open position spaced from said access area, said latch assembly comprising a channel on said door, a movable member including a projection slidably mounted in said housing for movement relative to said door between an engaged position, with said projection positioned to enter said channel when said door is in said closed position to retain said door

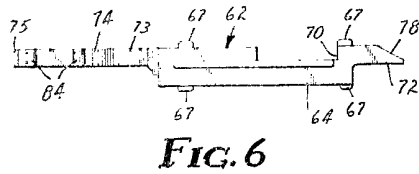
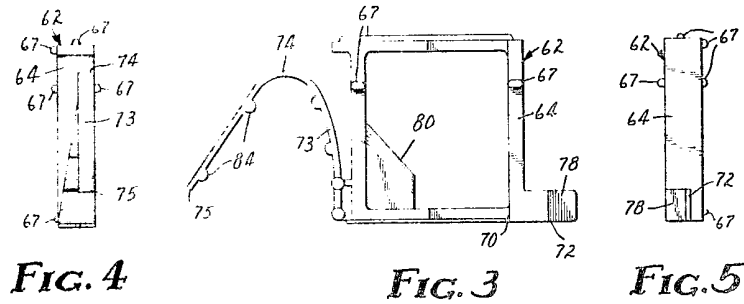
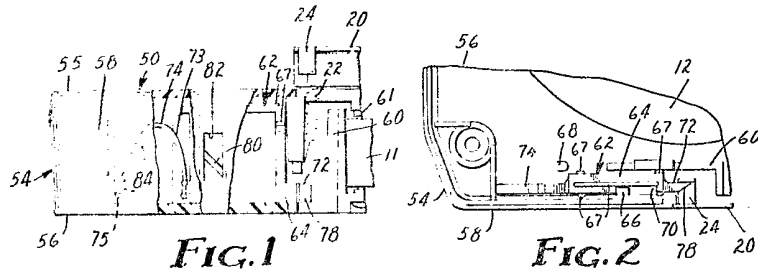
in said closed position, and a release position with the projection on the movable member spaced from the door; and means for biasing said movable member to said engaged position, wherein said movable member and said means for biasing said movable member to said engaged position are an integral unit of flexible resilient polymeric material with said movable member being a relatively rigid movable body portion of said unit, and said means for biasing being an elongate spring portion of said unit having one end joining said movable portion, an opposite end engaging said housing, and an arcuate part which is resiliently bent to bias said movable portion toward said engaged position.

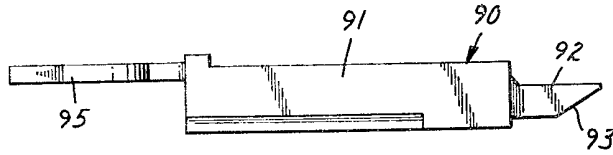
2. A latch assembly for a video tape cassette according to Claim 1 wherein said polymeric material is acetal.

3. A latch assembly for a video tape cassette according to Claim 2 wherein said spring portion has a thickness of about 0.09 centimeter and a width parallel to the axis of bending of about 0.23 centimeter.

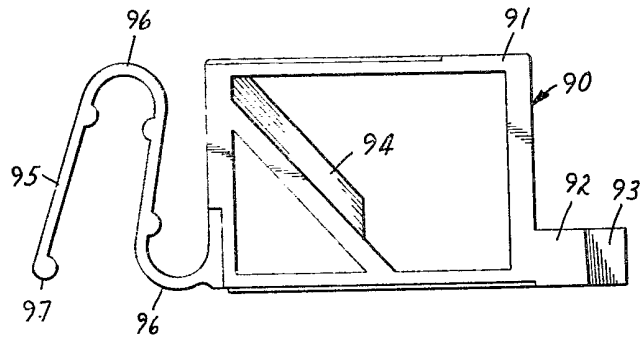
4. A latch assembly substantially as herein described with reference to the accompanying drawings.

For the Applicants,  
LLOYD WISE, TRÉGEAR & CO.,  
Norman House,  
105—109 Strand,  
London, WC2R 0AE.

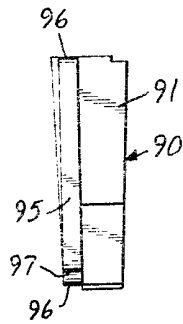




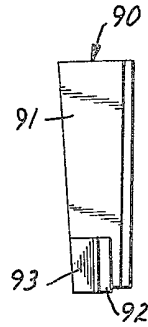
**FIG. 10**



**FIG. 7**



**FIG. 8**



**FIG. 9**