

[54] CARTRIDGE TAPE PLAYER DOOR
MOUNTING ASSEMBLY

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312/10

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312/10; 206/DIG. 36, DIG. 25

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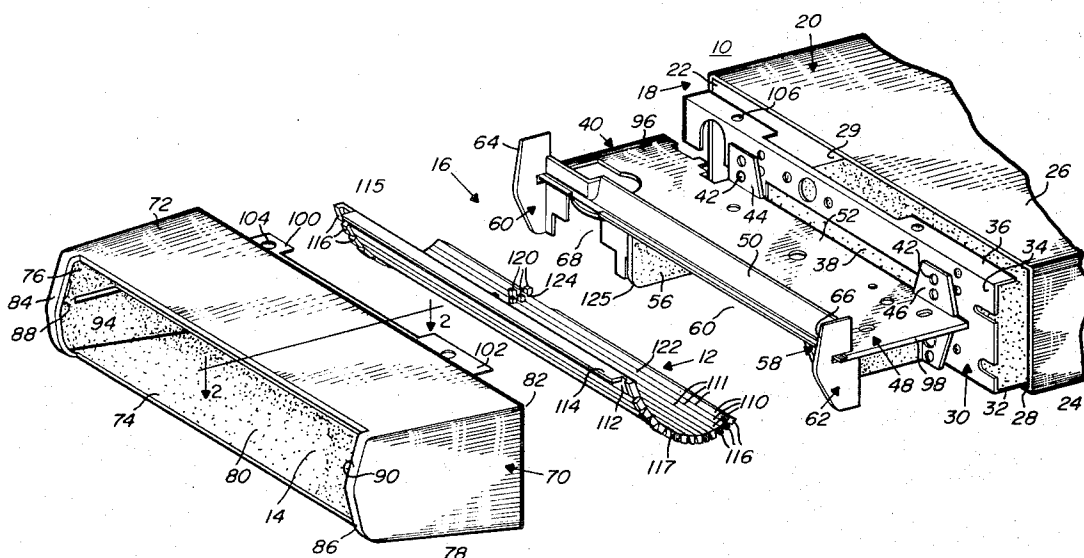
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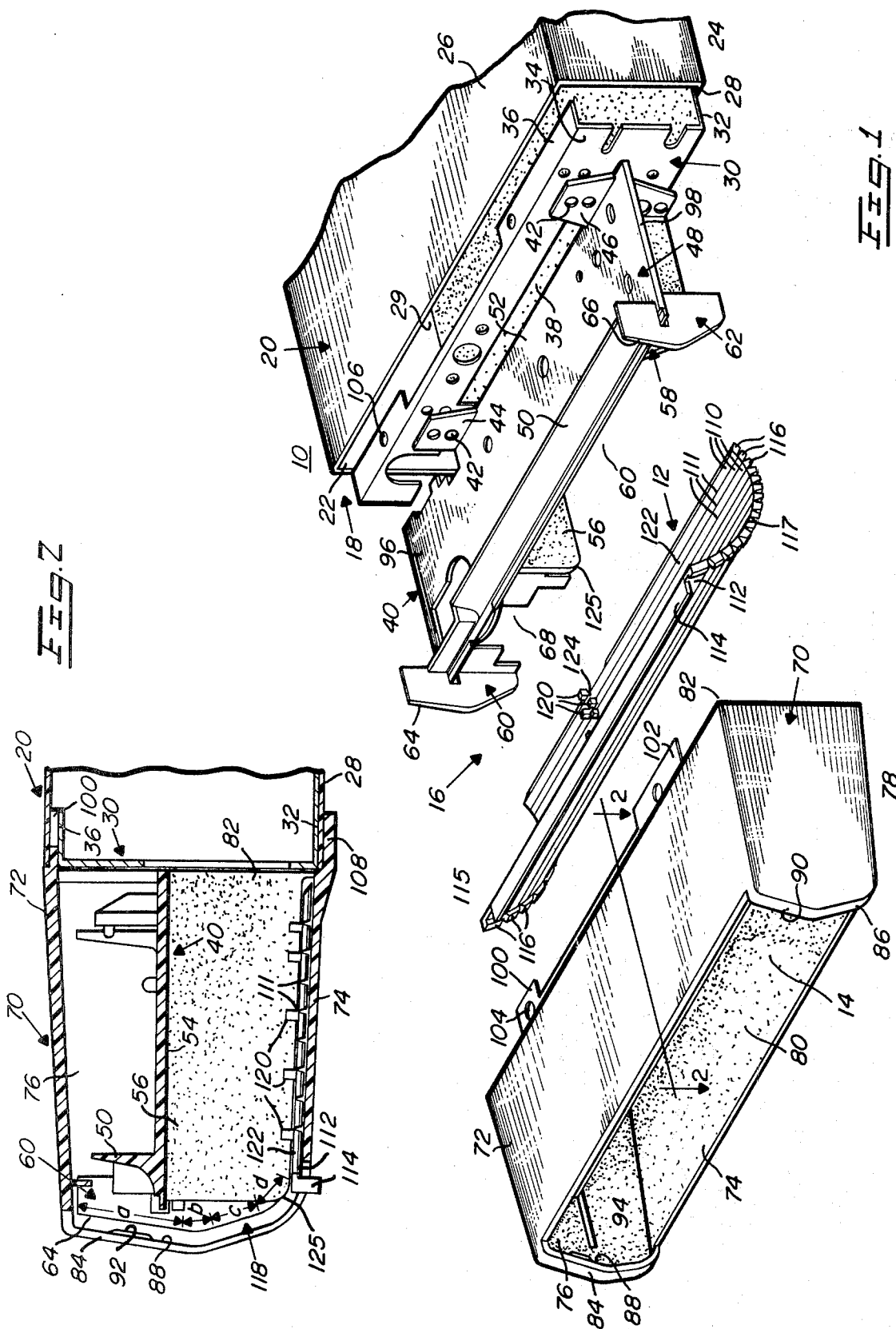
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ABSTRACT

A mounting arrangement for a flexible, "roll top" door member covering the cartridge receiving opening in a tape player housing includes a first, outer housing member having bottom, top and side walls with front and rear openings. Lip portions formed with the side walls at the front thereof extend in opposing relation to block off portions of the front opening. A second, inner housing member is received in the first housing member through the rear opening thereof. The second housing member includes a pair of spaced guide rail members shaped complementarily to the lip portions to form channels therebetween. The edges of the door member are captured between corresponding lip portions and guide rail members at the sides of the housing members for movement in the channels defined thereby between open and closed positions with respect to the front opening of the first housing member. A pair of descending walls on the second housing member define a cartridge passageway. One of the descending walls coacts with spaced tabs provided on the inner surface of the door member to form a track, to guide the latter when the door member is in an open position.

12 Claims, 4 Drawing Figures





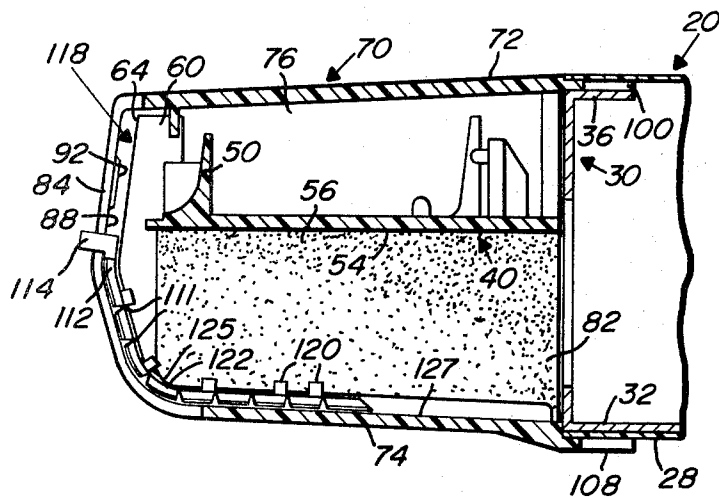


Fig. 3

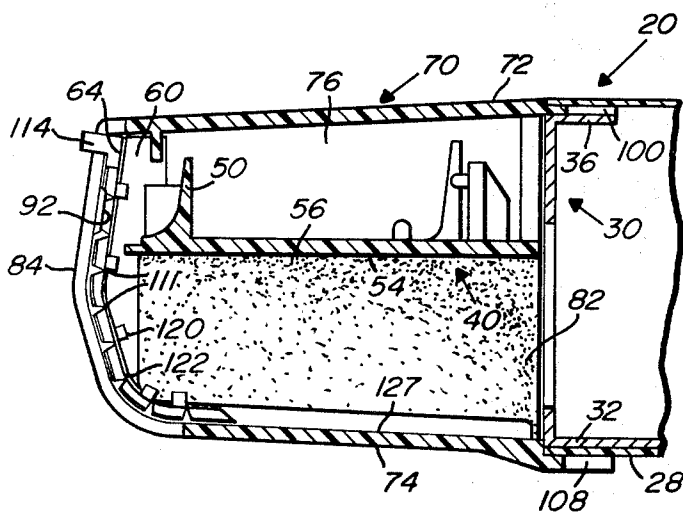


Fig. 4

CARTRIDGE TAPE PLAYER DOOR MOUNTING ASSEMBLY

BACKGROUND

This invention relates generally to cartridge tape players having a manually operable door member covering the cartridge receiving opening thereof and more particularly to the mounting of such a door member in the player housing.

In co-pending U.S. Pat. application, Ser. No. 255,499, filed May 22, 1972, in the name of Marcus M. Artner et al. and assigned to the same assignee as the instant application, there is shown a cartridge type tape player having a manually operated door member, preferably of the "roll top" variety, which can be slideably closed or opened with respect to the cartridge receiving opening of the player. When in the closed condition, the door covers completely, a cartridge inserted into the player.

The mounting of a door of the type described above in a tape player or in other environments, would normally be accomplished by providing a pair of opposing side plates, each having a guide or slot formed therein into which opposite side edges of the door would be received. Thereafter, the end plates would be attached to additional chassis structure to retain the plates in positions whereby the door member is captured in the guides, therebetween.

While the above method of mounting a door member in a tape player housing is acceptable, the number of components and fasteners required to mount the door properly is excessive and the assembly time required is prohibitively long. Furthermore, if and when repairs are needed, dismantling the door member assembly requires considerable time, which would tend to increase the cost of repair.

SUMMARY

Accordingly, it is a primary object of the present invention to provide in a cartridge type tape player including a manually operated door member covering the cartridge receiving opening, a new and improved assembly for mounting the door member on the player housing.

It is another object of the present invention to provide a new and improved mounting assembly in a tape player of the above described type wherein the door member is of the "roll top" type.

It is still another object of the present invention to provide a door mounting assembly for a cartridge tape player of the above described type which uses a minimum of parts, is simple to assemble and requires a minimum of time for assembling.

Briefly, a preferred embodiment of the door mounting assembly for a cartridge tape player including a flexible door member mounted for manual movement to open and closed positions with respect to the cartridge receiving opening of the player, includes a first housing member or escutcheon forming the front portion of the tape player housing, having bottom, top and interconnecting side walls, respectively, with an open front and rear. Protruding from and formed integrally with each of the side walls is a lip portion. The lip portions extend in opposing relation, covering slightly a portion of the front opening of the escutcheon.

The door member, preferably of the "roll top" or longitudinally segmented type, having a width substantially equal to the inner width of the escutcheon between the side walls, is received through the rear opening of the escutcheon and is positioned so that opposite front surface ends of the door engage the inner surfaces of the lip portions of the side walls; the lip portions preventing removal of the door member through the front opening.

A sub-escutcheon or housing member is thereafter received through the rear opening of the escutcheon; the width of the sub-escutcheon also being substantially equal to the inner width dimension of the escutcheon. Near each of the ends of the sub-escutcheon, there is provided a forwardly facing guide rail member having a front edge, the curvature of which is complementary to that of the lip portions provided on the escutcheon. Upon movement of the sub-escutcheon into the escutcheon to a predetermined position with respect thereto, there is formed between the guide rail members and lip portions, respectively, a pair of guide channels in which the ends of the door member are retained. Both the escutcheon and sub-escutcheon are fastened to the remaining portion of the tape player housing to provide proper alignment thereof and thus the proper width to the guide channels, so that the door member moves freely therein between closed and open positions with respect to the cartridge receiving opening.

A pair of downwardly extending plates or walls formed with the sub-escutcheon define the cartridge receiving cavity or passageway. One of the plates is designed to serve as a guide to coact with spaced tabs on the inner surface of the door member forming a track or channel to ensure proper alignment of the door member when the latter is in an open or partially open position with respect to the cartridge receiving opening.

DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is an exploded perspective view of a cartridge tape player including a door mounting assembly according to the invention; and

FIG. 2-4 are side sectional views of the cartridge tape player of FIG. 1 taken along the line 2-2, and shown in an assembled condition, with the door member being moved to various positions in the different views.

DETAILED DESCRIPTION

Referring now to the drawings in greater detail wherein like numerals have been employed throughout the various views to designate similar components, there is illustrated in FIG. 1 a cartridge tape player housing assembly designated generally by the numeral 10, including a slideable, flexible door member 12 for opening and closing off the cartridge receiving opening 14 of the player and door mounting arrangement 16 according to the invention.

A main portion 18 of the cartridge tape player housing assembly comprises a first outer housing portion 20 having side walls 22, 24 joined by a top wall 26, a rear wall (not shown) and a pair of opposing, inwardly facing extensions, such as 28, of side walls 22, 24, and a second inner housing portion 30 received in the outer housing portion 20 through the front opening 29 thereof. The inner housing portion 30 includes a base wall 32 and front plate member 34 formed therewith.

Suitable fasteners (not shown) extending through side wall extensions 28 of the outer housing portion and lower wall 32 of the inner housing portion 30, join the housing portions together. A top lip or extension portion 36 of front plate member 34 is provided also on inner housing portion 30; the function thereof to be described hereinafter. A central opening 38 is formed in the front plate member 34 to permit passage of a tape cartridge into the joined first and second housing portions. Tape playing and driving instrumentalities (not shown) are mounted on the bottom wall 32 of the inner housing portion 30, within the confines of outer housing portion 20 for playing back information recorded on a tape cartridge received in the player.

A sub-escutcheon housing member 40 making up a part of the door mounting arrangement 16 of the invention, is attached to the front plate member 34 of inner housing portion 30 by screws or suitable fasteners (not shown) which extend through apertures, such as 42, in brackets 44, 46 formed on the sub-escutcheon.

The sub-escutcheon is preferably fabricated in one piece of molded plastic, and, as shown in the drawing (FIG. 1), includes a horizontal plate portion 48 which extends the width thereof and to which the aforementioned brackets 44, 46 are joined. An upstanding, curved wall portion 50 extends from the upper surface 52 of the plate portion 48 and is employed to block the sight of internal components of the player from persons viewing the player from the front thereof with the door member 12 in an open position.

Extending downwardly beneath the plate portion 48 and attached to the lower surface 54 thereof, are a pair of spaced guide walls or members 56, 58. The guide members define a passageway 60 therebetween through which a tape cartridge inserted into the player, passes. One of the guide walls 56, as will be described in greater detail hereinafter, serves also as a guide for the manually operated door member 12 when the latter is moved to an open position.

At each side of the sub-escutcheon 40, there is formed a forward extending guide rail member, 60, 62, respectively. The front surfaces, 64, 66, respectively, of the guide rail members are predeterminedly curved or contoured and are smooth to permit ease of movement of door member 12 thereover, as will be described. Between guide member 56 and guide rail member 60 there is provided a specially shaped opening 68 which accommodates a thumb wheel control member for a radio receiver (not shown) which can be included in the tape player housing if desired; see copending U.S. Pat. application, Ser. No. 255,499, filed May 22, 1972, for additional information.

The sub-escutcheon 40 described heretofore is received in a front escutcheon or housing member 70 of the player, which also makes up a part of the door mounting arrangement 16. The escutcheon 70 has top and bottom walls 72, 74, respectively, and side walls 76, 78. Both a front and rear opening 80, 82, respectively, are provided in the escutcheon 70 for receiving a tape cartridge therein and to permit passage thereof through the housing portion 70 into the main housing portion 18 of the player.

A pair of lip portions 84, 86, are formed with and extend from side walls 76, 78 respectively, of escutcheon 70. The lip portions are turned inwardly in opposing relation to block off small areas of the front opening 80 of the escutcheon on both sides thereof. The lip por-

tions and the guide rail members 60, 62 of sub-escutcheon 40, as will be explained hereinafter in greater detail, form a track or guide channel for door member 12 upon receipt of sub-escutcheon 40 in escutcheon 70. On the inner surfaces 88, 90 of lip portions 84, 86, respectively, there is provided a boss or raised portion, such as 92, which frictionally engages the door member 12 upon moving the latter to a closed position (FIG. 4) to retain the door closed.

In the inwardly facing surface of each of the side walls 76, 78, there is provided a horizontal slot, such as 94, (FIG. 1) for receiving the edges 96, 98, respectively, of the horizontal plate 48 of sub-escutcheon 40 which extend outwardly beyond guide rail members 60, 62 to align the latter properly with respect to the escutcheon 70 upon insertion of the sub-escutcheon thereinto.

Mounting tabs 100, 102 are formed at the rear of top wall 72 of escutcheon 70 for securing the escutcheon to the inner housing portion 30. Suitable fasteners, such as screws, pass through apertures such as, 104 in tabs 100, 102, and apertures such as 106 and lip portion 36 of the inner housing portion 30 to join the two together. A lower tab 108 extends from the lower wall 74 of the escutcheon 70 as well. Fasteners (not shown) extend through the lower tab 108 into lower wall 32 of the inner housing portion to aid in securing the housing portions in an assembled condition.

The preferred embodiment of door member 12 provided in the tape player according to the invention is of the "roll top" type, but one formed of a flexible material likewise could be employed and still fall within the scope of the invention. The door member includes a plurality of longitudinal segments, such as 110, which are joined hingedly together by integrally formed hinges to provide the door with flexibility and for ease of movement thereof between open and closed positions with respect to the front opening 80 of escutcheon 70. At the upper end 112 of the door member, there is provided a bar or handle portion which is easily gripped to manually slide the door to any position. At the side edges 115, 117 of the door there are provided enlarged portions such as 116 (FIG. 1). Each segment of the door includes such an enlarged portion; the total number of enlarged portions on each side of the door acting as a runner or the like on which door member 12 travels as it moves in a respective track 118 provided therefor, the last-mentioned tracks 118 being formed upon insertion of the sub-escutcheon into the escutcheon 70 when assembling the tape player housing.

Sub-escutcheon 40 and escutcheon 70 are dimensioned such that upon proper assembly; i.e. fastening sub-escutcheon to front plate member 34 of the inner housing portion and escutcheon 70 to the lower wall 32 and upper lip portion 36 of the inner housing portion, the front surfaces 64, 66 of guide rail members 60, 62, respectively, are positioned in a predetermined, spaced relation with the inwardly facing, opposing lip portions 84, 86 of escutcheon 70 to form the tracks 118 into which the side edges 115, 117, of door member 12 are received. The contour or curvature of the lip portions 84, 86 is complementary to that of the front edges of the guide rail members 60, 62 so that a similarly contoured track 118 is provided therebetween. In the example shown in the drawings (FIG. 2) the track extends along a substantially straight path over the distance a ,

then is curved along a predetermined arc *b*, extends straight thereafter for a distance *c* and is once again curved along an arc *d*. The construction of tracks 118, however, need not be exactly as described for proper operation of the door member therein. Other suitably contoured tracks may be provided as well and still fall within the scope of the instant invention.

As mentioned heretofore, the guide member 56 of sub-escutcheon 40 which defines one side of the cartridge passageway in the housing, also serves as a guide for door member 12 when the latter is in the fully or partially opened position (See FIGS. 2 and 3). A series of raised tabs, such as 120, are provided on the segments 110 of door member 12 along the inner surface 122 thereof. The tabs are so arranged as to form a track 124 (FIG. 1) therebetween which is aligned with and into which guide member 56 is received upon assembling the housing members 40, 70 of the player.

When assembling the tape player housing members, after the tape driving and playing instrumentalities, etc., have been provided on the base wall 32 of inner housing portion 30, sub-escutcheon 40 is fastened to the front plate member 34 of the last-mentioned housing portion. Door member 12 is then inserted as shown in FIG. 1, into the escutcheon or front housing portion 70 so that the enlarged portions 116 forming the runners on the opposite sides of the door engage the inner surfaces 88, 90 of the lip portions 84, 86, respectively. Thereafter, the escutcheon 70 is fitted over the sub-escutcheon so that edges 96, 98 of the plate portion 48 thereof are received in slots 94 of the side walls 76, 78 of escutcheon 70. The escutcheon is then pushed over the sub-escutcheon until tabs 100, 102 are in a position to receive a fastener which passes therethrough and through apertures 106 in the inner housing portion 30 as well. At this time, the guide rail members 60, 62 are positioned in proper alignment with and spaced properly from the lip portions 84, 86, respectively, to form tracks 118 therebetween into which door member 12 is automatically mounted. The mounting of the door member 12 is a relatively simple task with the door mounting arrangement according to the invention since there is no need to insert each edge of the door member into a preformed track, etc., provided in end caps or plates as would be expected. Instead, the mere insertion of the sub-escutcheon into escutcheon 70 with the door member already provided therein, automatically forms the tracks for the door member and mounts the door member therein simultaneously.

In operation, when the door member is in a fully opened position (FIG. 2) guide member 56 is received in the track 124 provided between predeterminedly positioned tabs 120. The guide member and tabs prevent the door member from vibrating or wobbling in the housing while the ends 115, 117 thereof are temporarily removed from tracks 118 when the door member is moved to the fully open position.

Once the door member is moved toward a closed position, the leading portions of the side edges thereof enter tracks 118 and the door member is guided thereby. The trailing portion of the door member, however, still is guided by the tabs 120 and guide member 56. It should be noted that the corner 125 of guide member 56 is arcuate and similarly shaped to arc *d* to permit the door member to pass easily thereover as it is moved.

When the door member is in a fully closed position (FIG. 4), at least a pair of tabs 120 at the trailing end of the door member nevertheless remain in contact with guide member 56 to avoid the possibility of the guide member being removed from track 124 entirely. Both guide members 56, 58 extend downwardly toward the inner surface 127 of bottom wall 74 of escutcheon 70 and are separated therefrom sufficiently to permit door member 12 to pass thereunder. Thus, when the door member is in the fully open position (FIG. 1) a cartridge inserted into the player passes over the inner surface of the door member between guide members 56, 58, into the main housing portion 18 of the housing assembly. Thereafter, the door member may be raised to a closed position without affecting the positioning of the tape cartridge.

It should be noted that upon moving the door member 12 to a fully closed position as shown in FIG. 4 of the drawings, boss members 92 provided on the inner surfaces 88 and 90 of the lip portions 84, 86, respectively, frictionally engage the door member to maintain the latter in a closed position. Thus, in the case wherein the tape cartridge is mounted in an automobile or the like vehicle, the chance of the door member being jarred to an open position from a fully closed position is minimized. In the case wherein the door is placed at a partially open position, as shown in FIG. 3 of the drawings, movement of the leading end of the door member slightly beyond arc *b* (FIG. 2) causes the enlarged portions 116 at the edges 115, 117 of the door to also frictionally engage guide rail members 60, 62 and lip portions 84, 86 to maintain the door in this position so that access can be had to the controls normally provided along the surface of upstanding portion 50 without permitting access to the tape cartridge passageway.

While a particular embodiment of the invention has been shown and described, it should be understood that the invention is not limited thereto since many modifications may be made. It is therefore contemplated to cover by the present application any and all such modifications as fall within the true spirit and scope of the appended claims.

We claim:

1. A mounting arrangement for a manually operable door member covering the cartridge receiving opening in a tape player housing, including in combination: a first housing member having a pair of side walls spaced from each other by a predetermined distance and connected to top and bottom walls extending between said side walls, and having a front open end through which a cartridge is received in said tape player, each of said side walls including a lip portion formed at an end thereof at the front of said housing member, said lip portions extending in opposing relation a predetermined distance into said front opening, a second housing member dimensioned for and received in said first housing, said second housing member including a pair of spaced guide rail members, each said guide rail member being aligned with one of said lip portions to form a guide channel therebetween and a flexible door member having a width equal substantially to the distance between said side walls of said first housing member, opposite side edges of said door member being received in said guide channels, respectively, said door member being captured therein between said lip portions and guide rail members, respectively, and being

movable to open and closed positions with respect to the front tape cartridge receiving opening of said first housing member.

2. A door mounting arrangement as claimed in claim 1 wherein said flexible door member is of the roll top type including a plurality of hingedly joined longitudinal segments providing flexibility thereto.

3. A door mounting arrangement as claimed in claim 2 wherein each of the longitudinal segments of said door member includes an enlarged portion at each end thereof, said enlarged portions at common ends of said door member forming runners received in corresponding guide channels, on which said door is carried upon movement thereof between open and closed positions.

4. A door mounting arrangement as claimed in claim 1 wherein each of said lip portions includes, at a predetermined location along the surface thereof facing a corresponding guide rail member, a raised portion for frictionally engaging said door member when the latter is moved to a closed position for maintaining said door member in said closed position.

5. A door mounting arrangement as claimed in claim 4 wherein said lip portions and guide rail members are complementarily shaped to provide predeterminedly contoured guide channels therebetween.

6. A door mounting arrangement as claimed in claim 5 wherein each said guide channel is contoured to include a first substantially straight section extending from the top wall of said first housing member toward the bottom wall thereof, a second curved section defined by a predetermined arc, adjacent said first straight section, a second substantially straight section adjacent said first curved section and a second curved section defined by a predetermined arc, between said second substantially straight section and the lower wall of said first housing member.

7. A door mounting arrangement as claimed in claim 1 wherein the inner surface of each side wall of said first housing member includes a horizontal slot formed therein and wherein said second housing member includes a substantially horizontal plate member formed therewith, the side edges of said plate member extending outwardly beyond said guide rail members on opposite sides of said second housing members and being received in said slots for aligning said guide rail members with corresponding lip portions.

8. A door mounting arrangement as claimed in claim 1 wherein said second housing member includes a pair of substantially vertical wall members defining a passageway therebetween through which a cartridge received in said tape player passes, the free ends of said guide members extending downwardly toward the bottom wall of said first housing member and spaced a predetermined distance therefrom, wherein said door member includes, along an inwardly facing surface thereof, means defining a guide track, and wherein one of said vertical wall members is received in said guide track means upon movement of said door member to a fully opened position between the free ends of said

guide members and the bottom wall of said first housing member.

9. A door mounting arrangement as claimed in claim 8 wherein said guide track means is defined by a plurality of predeterminedly spaced tabs formed along the inner surface of said door member.

10. A mounting arrangement for a manually movable flexible door member covering the cartridge receiving opening in a tape player housing, including in combination: an escutcheon having a pair of side walls spaced from each other by a predetermined distance and connected to top and bottom walls extending between said side walls, and having a front, cartridge receiving opening and a rear opening, each of the side walls of said escutcheon including a lip portion provided at an end thereof at the front of said escutcheon, said lip portions extending in opposing relation a predetermined distance into said front opening to block off a portion thereof at each side, a sub-escutcheon dimensioned for receipt in said escutcheon through said rear opening, including a pair of guide rail members each extending in a substantially vertical plane, said guide rail members being spaced a predetermined distance from each other so that upon receipt of said sub-escutcheon in said escutcheon, corresponding guide rail members and lip portions are aligned to form guide tracks therebetween and a flexible door member including a plurality of longitudinal hingedly joined segments each having a width substantially equal to the distance between said side walls of said escutcheon, and being receivable therein between said lip portions and guide rail members of said escutcheon and sub-escutcheon, respectively, for mounting in said guide tracks, said door member being movable in said guide tracks between open and closed positions with respect to said front cartridge receiving opening of said escutcheon.

11. A mounting arrangement as claimed in claim 10 wherein said flexible door member includes on an inwardly facing surface thereof a plurality of spaced tabs, said tabs forming a guide channel along said segments, and wherein said sub-escutcheon includes a pair of descending substantially vertical walls defining a cartridge passageway, one of said walls being receivable in said guide channel on the inner surface of said door member for guiding the latter upon movement of said door member toward an open position.

12. A mounting arrangement as claimed in claim 11 wherein each of the side walls of said escutcheon includes on the inner surface thereof, a horizontal slot and wherein said sub-escutcheon includes a substantially horizontal plate member to which said guide rail members and said vertically descending walls are attached, the side edges of said horizontal plate member extending outwardly beyond said guide rail members for receipt in corresponding slots in the side walls of said escutcheon upon receipt of said sub-escutcheon therein, thereby to align said guide rail members with said lip portions to form said guide tracks.

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