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Conner et al.

[11] **3,794,399**

[45] **Feb. 26, 1974**

[54] **PHOTOGRAPHIC APPARATUS FOR MOTION PICTURE PROJECTION**

[75] Inventors: **James M. Conner,** Mamaroneck, N.Y.; **Henry J. Salvador,** Whittier, Calif.

[73] Assignee: **Polaroid Corporation,** Cambridge, Mass.

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[21] Appl. No.: **325,857**

Related U.S. Application Data

[62] Division of Ser. No. 174,374, Aug. 24, 1971, Pat. No. 3,736,051.

[52] **U.S. Cl.** ..... **312/244,** 312/7 TV, 352/72

[51] **Int. Cl.. G03b 19/04,** G03b 23/02, A47b 95/02

[58] **Field of Search** 312/7–11, 244; 250/14; 16/115; 352/72, 74

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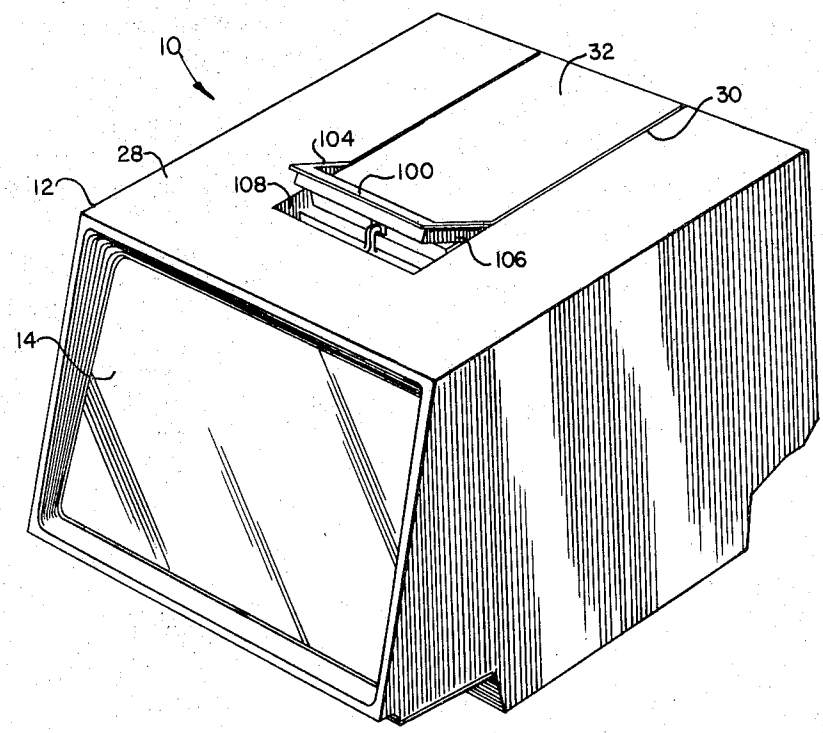
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Primary Examiner—Casmir A. Nunberg

[57] **ABSTRACT**

Projector for use with a motion picture film cassette, employing a housing having a front viewing face and a cassette-receiving cavity in communication with the top surface of the housing. A door member mounted at the rear of the opening and configured to block the opening when pivoted into closing position thereacross, carries a cassette-receiving guide which is adapted to receive the cassette from the front of the projector when the door is in its open position and to carry it to an operative location in the cavity when the door is pivoted to its closed position. The door is adapted to displace a drive mechanism of the apparatus into operative relation with the cassette, and the guide is coupled to the door through a lost motion member such that the cassette remains fixed in its operative location during engagement and disengagement of the drive mechanism. Additionally, a handle member is pivotally attached to the apparatus for selective displacement from a first position flush with a surface of the housing to a depressed position where it effects displacement of the door from its closed position and to an upright position where it is accessible for carrying of the unit.

8 Claims, 8 Drawing Figures



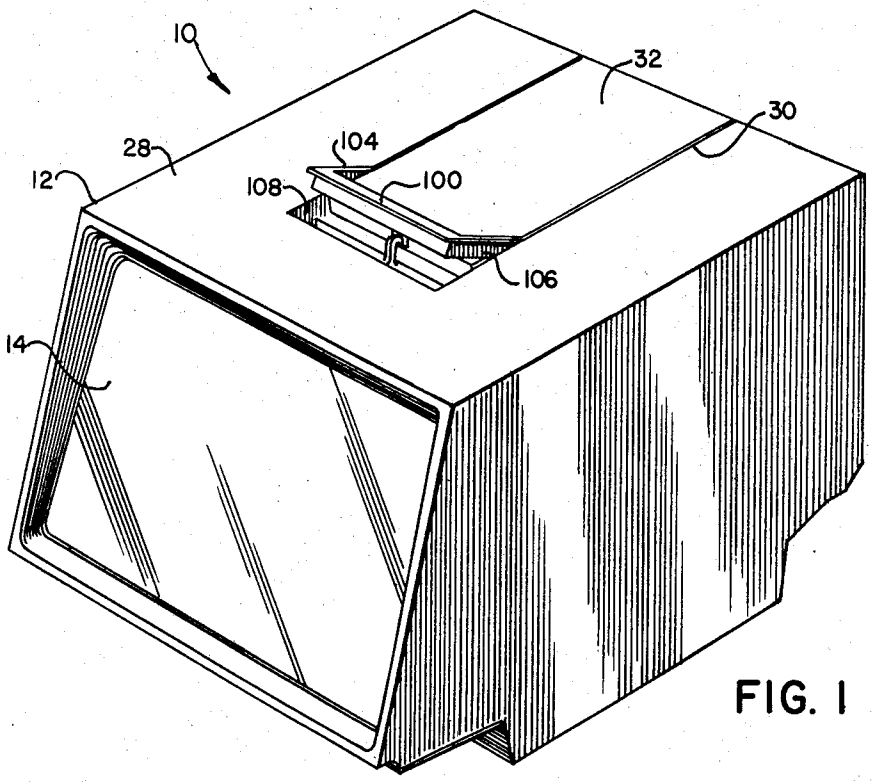

10
32
30
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104
12
108
100
106
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FIG. 1

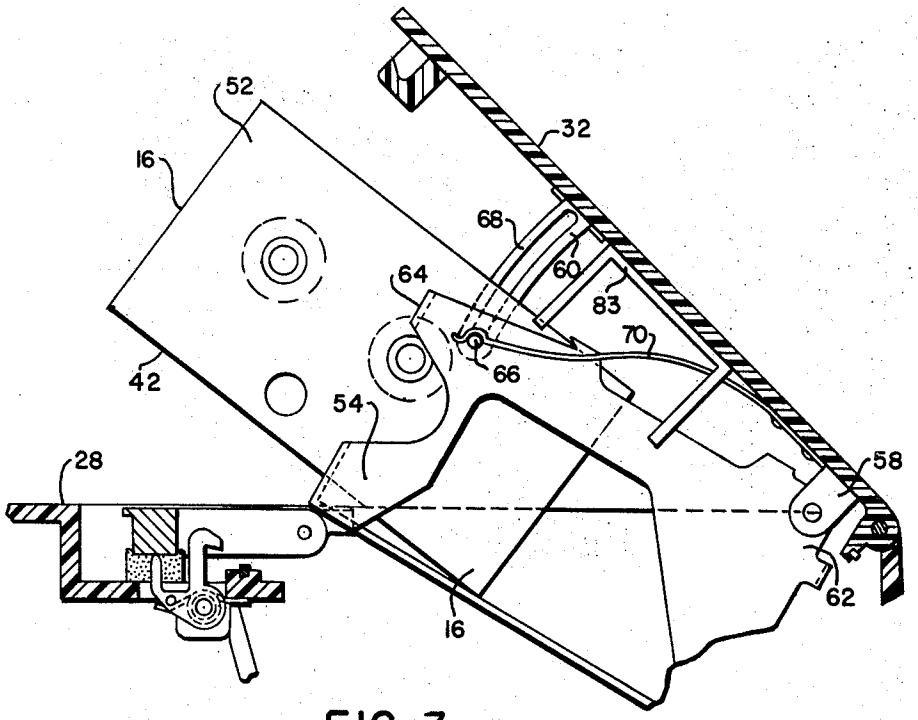

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62
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FIG. 3

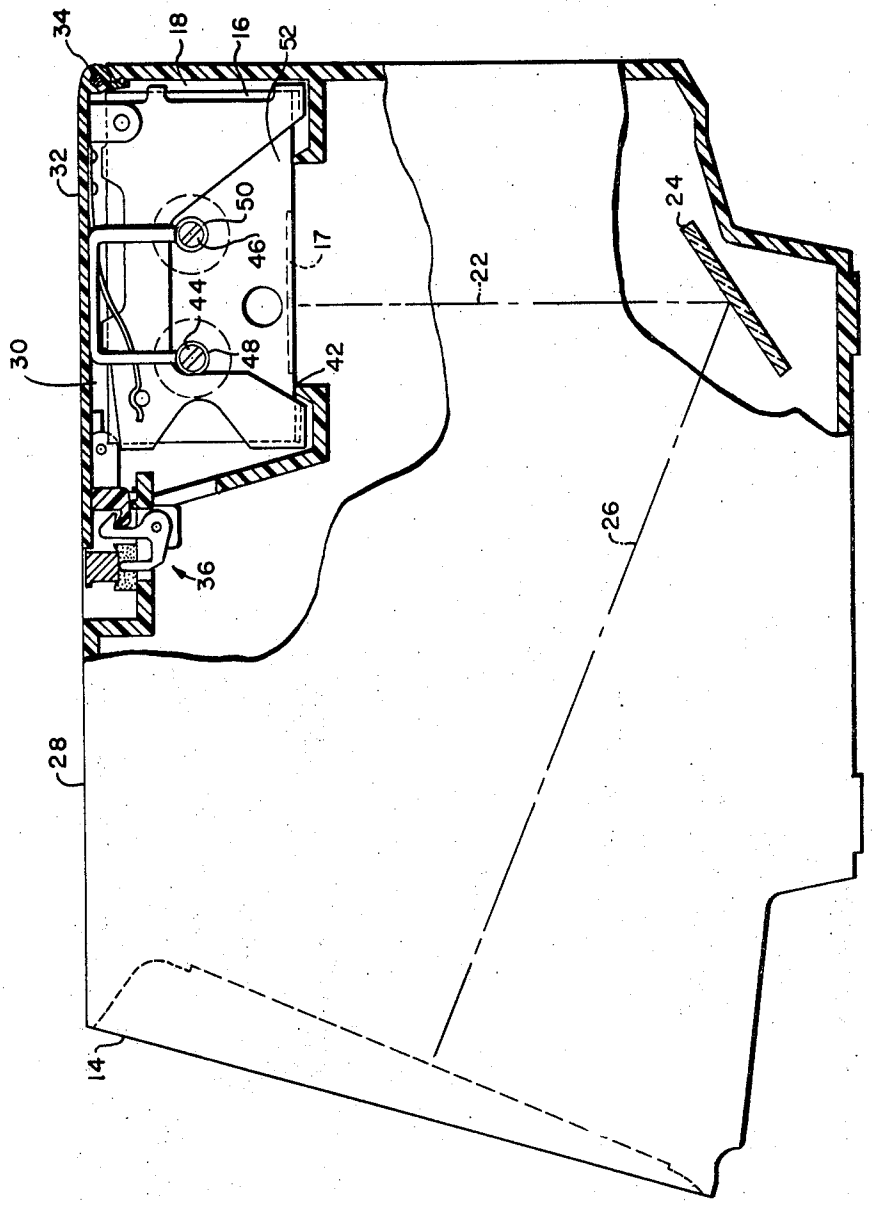


FIG. 2

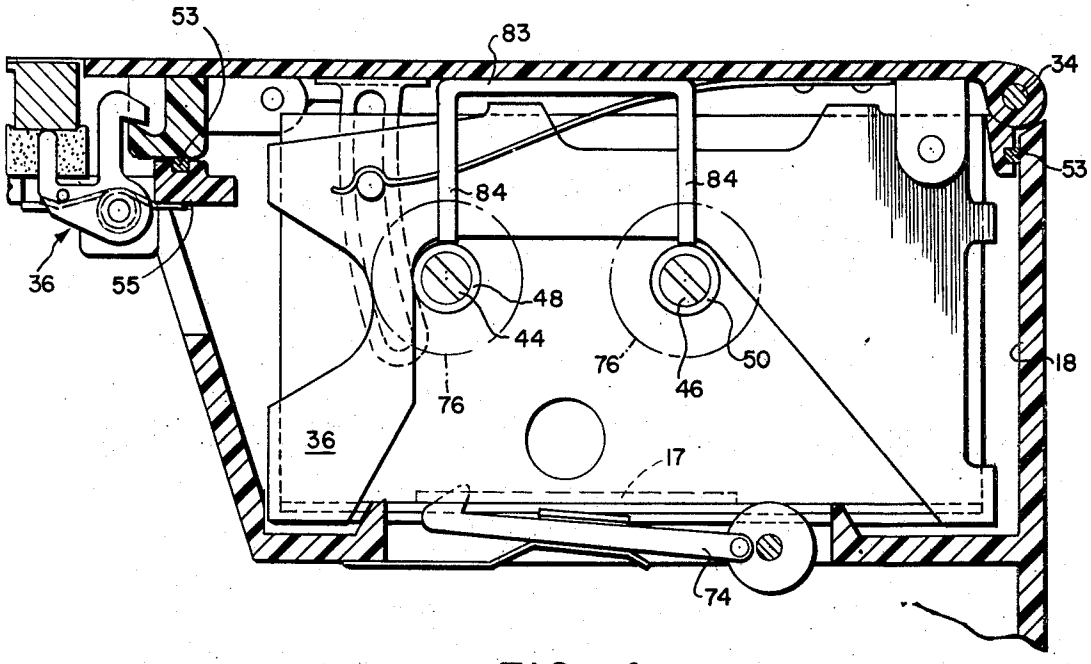

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FIG. 4

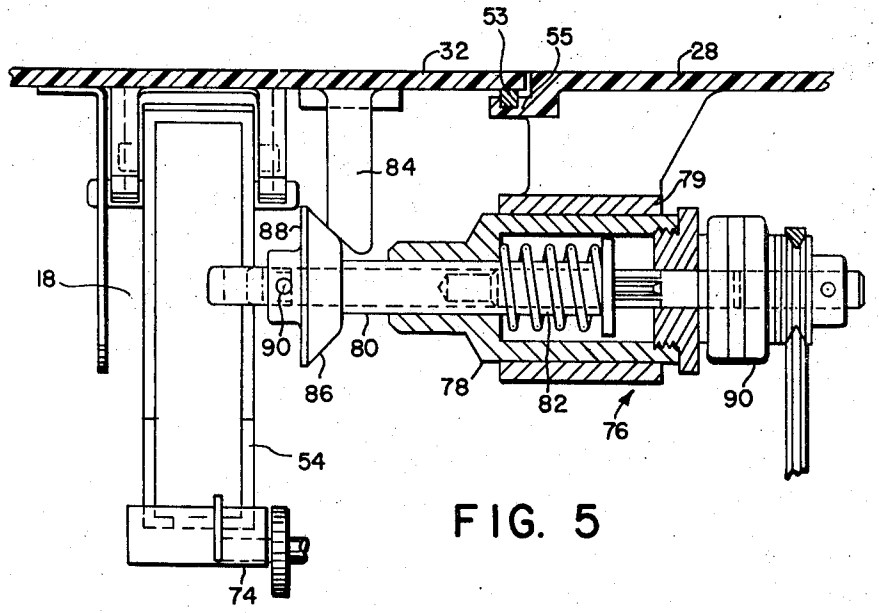

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86
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FIG. 5

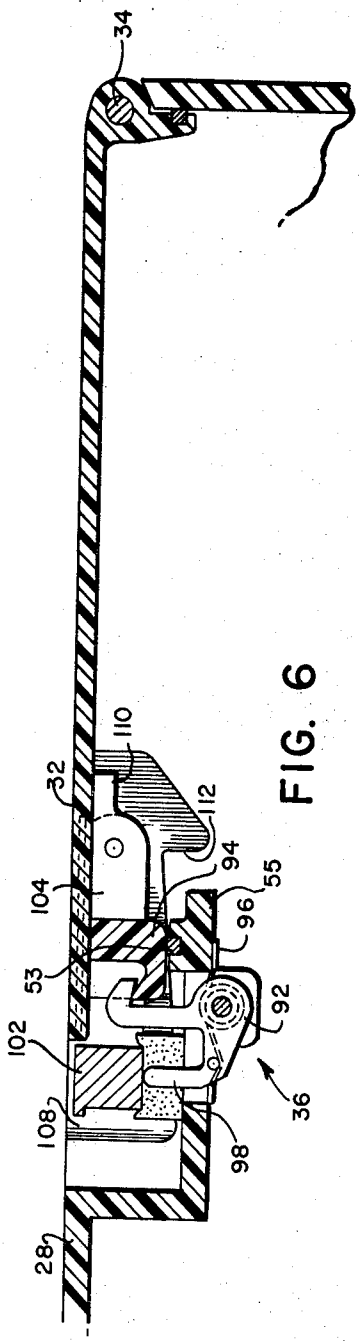


FIG. 6

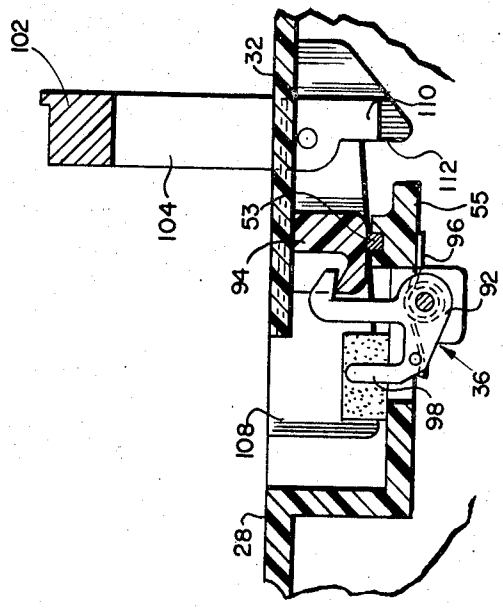


FIG. 8

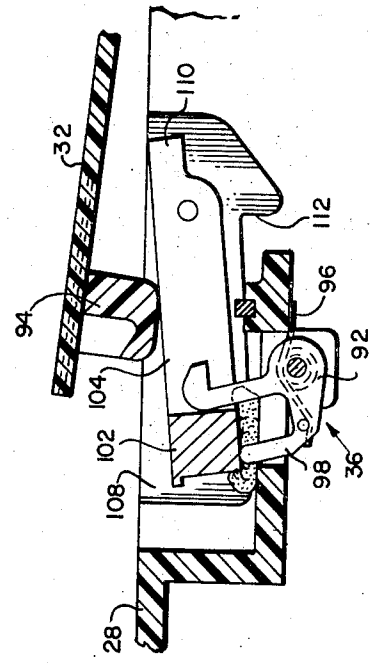


FIG. 7

PHOTOGRAPHIC APPARATUS FOR MOTION PICTURE PROJECTION

This application is a division of application Ser. No. 174,374, filed Aug. 24, 1971, now U.S. Pat. No. 3,736,051.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to photographic apparatus and more particularly to photographic apparatus adapted for operation of a motion picture film cassette.

2. Description of the Prior Art

In motion picture photography with which the present application is particularly concerned, film cassettes have attained wide use inasmuch as they eliminate direct handling of the film by the operator. However, such cassettes place additional burdens on the camera and projector apparatus. For example, the apparatus must provide a suitable arrangement for insertion and removal of the cassette from an operative location within the interior of the unit. Such arrangements should provide positive location of the cassette in its operative position and should be conveniently located with respect to other operational portions of the apparatus so as to be easily accessible to the operator. Moreover, the loading arrangements are further complicated inasmuch as motion picture film cassettes conventionally provide operative elements accessible from adjoining surfaces, for example, a film gate at one edge and film spools at the cassette side such that the apparatus must interact with the cassette in each of these orthogonal planes.

Additionally, the projector apparatus of the present invention is intended for use with multi-purpose cassettes, such as described in copending application Ser. No. 755,901 now abandoned of E. H. Land filed Aug. 28, 1968, which are designed for exposure, processing and projection without removal of the film from the cassette. Consequently, the apparatus is adapted for facilitating development as well as projection of the film strip carried by the cassette, and hence, the loading arrangement should also be effective to exclude light from entering the apparatus in the vicinity of the cassette.

An important object of this invention, therefore, is to provide improved photographic apparatus for operation of a motion picture film cassette.

Another primary object of this invention is to provide improved photographic apparatus for facilitating the insertion of a motion picture film cassette into and its subsequent removal from an operative location within the apparatus.

A further object of this invention is to provide photographic apparatus adapted to facilitate the location of a motion picture film cassette within the interior of the apparatus housing in operative relation with components of the apparatus.

Still another object of this invention is to provide photographic apparatus, for use with a photographic film cassette, employing a handle adapted for carrying of the unit and operation of its cassette loading mechanism.

A still further object of this invention is to provide photographic projector apparatus employing a cassette loading mechanism which additionally provides a light sealing arrangement.

SUMMARY OF THE INVENTION

The apparatus of the invention, which is particularly adapted for use with the motion picture film cassettes for projection of images of the film carried therein, comprises a housing having an opening adapted to receive such cassette and a pivotally mounted closure member configured to block the opening when pivoted into position thereacross. It also includes cassette-receiving means coupled to the closure member and adapted to receive such cassette when the closure member is in an open position and for positioning it within the interior of the housing in an operative location when the closure member is pivoted to its closed position.

In the preferred embodiment, the photographic apparatus is a viewer adapted for projection of images recorded on the film strip carried by a motion picture film cassette to a front viewing-face of the apparatus. A cassette-receiving chamber is disposed within the viewer housing in communication with a top surface thereof, and a door member is pivotally mounted at the rear of the opening. A guide member mounted on the underside of the door, is configured to receive the cassette from the front of the housing when the door is in its open position and to automatically position it within the cassette-receiving chamber when the door member is pivoted to its closed position. Additionally, a gasket-like member configured for peripheral engagement with the door member excludes light from entering the chamber in the vicinity of its cassette-receiving opening.

During its closing, the door member is adapted to couple a drive mechanism of the viewer to the film spools of the cassette. Further, the guide member is attached to the door through a lost motion member such that, during closing, the cassette is positioned in its operative location prior to engagement of the drive mechanism and remains fixed in this position subsequent to disengagement of the drive mechanism.

Additionally a handle, is displaceably mounted on the viewer for displacement between an upright position wherein it provides means for carrying of the viewer and a depressed position wherein it effects displacement of the cassette-loading door from its closed position. Preferably, the handle is a U-shaped structure havng a pair of spaced parallel arm members depending from a centrally located hand engageable portion. At their distal ends, the arm members are pivotally attached to the top surface of the viewer and coupled to a door-latch thereof such that the hand engageable portion is pivotable from a storage position flush with the top surface to a position above this surface, where it is available for carrying of the unit, and to position slightly below this surface, where it effects release of the door-latch.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features that are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation together with additional objects and advantages thereof will best be understood in the following description of the preferred embodiment when read in connection with the accompanying drawings wherein like numbers have

been employed in the different figures to denote the same parts and wherein:

FIG. 1 is a diagrammatic view in perspective of a motion picture viewer embodying the features of this invention;

FIG. 2 is a diagrammatic cut-away side elevation of the viewer of FIG. 1, partially illustrating its internal construction;

FIG. 3 is a fragmentary view illustrating the operation of the cassette-loading mechanism employed in the viewer of FIG. 1;

FIG. 4 is a fragmentary view illustrating the operative relation of the cassette with other elements of the viewer;

FIG. 5 is a fragmentary sectional view illustrating the spool drive mechanism employed in the viewer of FIG. 1;

FIG. 6 is a fragmentary view illustrating the door-latch arrangement;

FIG. 7 is a fragmentary view depicting operation of the latch arrangement shown in FIG. 6; and

FIG. 8 is a fragmentary view illustrating the position of the apparatus handle when it is located in position for carrying of the apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIGS. 1 and 2, the photographic apparatus preferably takes the form of a rear projection viewer including a box shaped housing 12 having a front viewing-face or screen 14. Positioned within housing 12, in a cassette-receiving chamber or well 18, is a motion picture film cassette or magazine 16 having its film gate 17 in optical alignment with the optical axis of the viewer for projection of film images by conventional means (not shown) downwardly along optical path 22 to mirror 24 and therefrom, along path 26 to the rear of screen 14.

Cassette 16 is a motion picture film cassette comprising a generally parallelepiped casing, enclosing a motion picture film (not shown) mounted on a pair of film spools (not shown) for transport across a cassette opening or film gate 17 which is disposed in the lower edge 42 of the casing. Access to the spool shafts 44 and 46 is provided through openings 48 and 50 of the casing side 52.

The cassette-receiving well 18 extends to and is in communication with opening 30 of the top surface 28 of the viewer, and a closure member or door 32 is pivotally mounted at the rear edge of opening 30 for controlling access to well 18. Hence, the door 32 is mounted on shaft 34 for pivotal motion from a closed position, blocking the opening 30, to an open position permitting insertion and removal of cassette 16. Latching means 36, later described in detail, secures door 32 in its closed position.

Inasmuch as the apparatus is intended for use with multi-purpose cassettes such as those described in the aforementioned copending application, the viewer is adapted for development of the film carried within the cassette. Hence, it includes means (not shown) for selectively excluding light from entering the cassette well 18 from the interior of the apparatus so as to effectively provide a light-tight well (as for example, by means of a displaceably mounted shutter, not shown, for selectively sealing the aperture plate 72 of the well 18) and includes means for excluding light from entering the cassette well 18 in the proximity of the door 32. Hence, a sealing gasket 53 of elastomeric material or the like is disposed on the door member or adjoining areas of the housing 12, as shown in FIGS. 4 and 5. Other sealing arrangements for the exterior of chamber 18 are also possible, for example, the overlap between the door 32 and shelf-like portions of surface 28 such as shown at 55 may be suitable.

A guide member or cassette-receiving sleeve 54 is coupled to the underside of the door 32 and is adapted to receive cassette 16 when the door is in its open position, as shown in FIG. 3, and to carry it into pocket 18 and locate it therein in operative relation to other components of the apparatus when the door is pivoted to its closed position as shown in FIG. 4.

In its operative position the lower edge 42 of the cassette 16 is located at the bottom surface 57 of the well 18 with its film gate 17 in alignment with an aperture plate 72 and its film strip (not shown) in engagement with a conventional claw 74. Additionally, the cassette 16 is in operative relation to a projection lamp (not shown) which is adapted to project film images along optical path 22 and to screen 14. Further, as later explained in detail in regard to FIG. 5, the spool shafts 44 and 46 are disposed in engagement with appropriate drive mechanisms 76.

The sleeve 54, which comprises an open ended container adapted to substantially conform to the dimensions of the cassette 16, is coupled to the underside of the door 32 by a pair of spaced mounting members 58 and 60 which permit limited pivotal motion between the sleeve and the door. At its interior end 62, the sleeve 54 is coupled to the member 58 for pivotal motion thereto whereas at its forward end 64, it is coupled to member 60 in an arrangement providing lost motion coupling between the sleeve and the door. In this regard, a shaft or lug 66 of sleeve 54 extends within an elongated slot 68 of member 60 and thereby permits limited translational movement between the sleeve and the member. Additionally, the sleeve 54 is biased downwardly from the door 32 by means of a leaf spring 70 such that the sleeve leads the door during closing of the latter and lags the door during the opening thereof.

When the door 32 is open as shown in FIG. 3, the sleeve 54 is drawn partially out of pocket 18 and positioned for insertion or removal of the cassette 16 from the front of the viewer. With the door in this position, the cassette 16 may be slid rearwardly into sleeve 54 for loading purposes and slid in a forwardly direction for unloading. Consequently, the loading arrangement most advantageously facilitates loading of the projector from the operative or viewing end of the apparatus.

Upon closing the door 32, the cassette 16 is automatically carried into the pocket 18 and seated therein in operative relation with the aperture plate 72 and the claw mechanism 74 at the bottom of the pocket as shown in FIG. 4. Additionally, closing of the door 32 displaces a pair of spool drive mechanisms 76, one of which is shown in detail in FIG. 5, into engagement with the spool shafts 44 and 46. Hence, the structure provides means responsive to movement of the loading mechanism for displacing the spool driving means of the projector into or out of pocket 18 for engagement with or disengagement from the cassette 16 when the latter is positioned therein.

As shown in FIG. 5, the drive mechanism 76 is mounted for rotation within a bearing sleeve 79 which

is fixedly attached to the underside of the top viewer surface **28**. Each drive mechanism **76** includes a sleeve **78** journaled in bearing sleeve **79** for rotational motion with respect thereto. A drive shaft, **80**, which carries a collar-like cam **88** is slideably mounted within sleeve **78** and is keyed thereto by conventional means (not shown) so as to rotate therewith. Hence, the shaft **80** is adapted for translational motion with respect to sleeve **78** so as to permit lateral displacement of the shaft with respect to cassette pocket **18**. In this regard, the shaft **80** is biased by a spring **82** in a direction away from pocket **18**. Attached to the door member **32**, is a U-shaped member **83** (shown more clearly in FIG. **4**) which carries a pair of depending arms **84** adapted to operatively engage the inclined surface **86** of each collar member **88** to cam each shaft **80** towards pocket **18** for coupling engagement with the cassette spools when the door is closed. As shown, collar **88** may be fixedly mounted on shaft **80** for rotational motion therewith by a pin **90** or the like. Alternatively, retaining rings (not shown) may be employed to limit the translational motion of collar **88** with respect to shaft **80** while prmitting rotational motion thereto. Finally, a conventional clutch arrangement **90** is employed to drive the unit from any conventional power means (not shown). The latter may also be utilized to drive the claw **74**.

Displacing of the drive means in accordance with door movement in conjunction with the lost motion means and downward bias of guide member **54** seats the cassette in its operative position prior to the lateral engagement of the drive and retains it in such position for a time subsequent to disengagement. Hence, drive engaging arms **84** position the drive mechanism **76** in engagement with the cassette **16** during the interval when the door moves relative to guide **54**, or that is only when the door **32** is close to its closed position. Stated otherwise, the drive is engaged during the final stages of movement of the door to its closed position and is disengaged or released during the initial stages of movement of the door to its open position. However, since the sleeve **54** leads the door during its closing and lags the door during its opening in accordance with its lost motion and spring bias arrangement, the cassette is retained in a fixed position during this engagement and disengagement.

As previously indicated, door **32** is retained in its closed position by a latch mechanism **36** which as shown in FIGS. **6**, **7** and **8**, includes a latch member **92** pivotally mounted to housing **12** and adapted for automatically engaging a depending, hook-like arm **94** of the door **32** when the latter is closed. This engagement is effected by a spring **96** which biases latch member **92** toward arm **94**. Additionally, latch member **92** includes an extended arm **98** configured for effecting pivotal motion of the latch member out of locking engagement and release of the door **32** in accordance with downward movement of the arm member **98** as shown in FIG. **7**.

The latch release is accomplished in this embodiment by a U-shaped handle member **100** (see FIG. **1**) which includes a hand engageable portion or bar **102** having a pair of depending arms **104** and **106**, which are pivotally mounted to the top surface **28** of housing **12** to permit pivotal motion of the handle thereto. Preferably, the surface **28** includes a recess **108** within which handle **100** is stored, flush with the top surface, and within which the bar **102** may be depressed below the top surface for effecting release of the door member **32**. For carrying of the unit, the bar **102** is pivoted to a location above the surface **28** as shown in FIG. **8** wherein arm members **104** and **106** are in a substantial upright position and the bar **102** is properly located to permit grasping of it by an operator. One or both arms **104** and **106** carry a finger or lug member **110** which functions to raise the door during its release and in cooperation with a vertical surface **112** of the housing **12** provide a handle-stop in the carrying position. Advantageously, door member **32** may also be lightly upwardly biased by any conventional means such as a leaf spring (not shown) so as to urge the door to a slightly raised position once its arm **94** is released.

Preferably, handle member **100** is located on the viewer such that its pivot point or its operation fulcrum is close to the vertical plane of the housing **12** which also passes through its center of gravity of the apparatus. Of course, while location away from this plane wll effect the attitude of the housing **12** during carrying of the viewer, it will not defeat the carrying function of the handle.

Those familiar with the motion picture arts will readily appreciate the novel and highly unique advantages of this invention which provides an inexpensive and efficient loading arrangement for facilitating insertion and removal of a film cassette in a direction which is related to the overall operation of the apparatus and the position of the operator during such operation. Hence, the loading mechanism is particularly adapted for incorporation into a compact rear projection viewer to permit the operator to rapidly operate motion picture film cassettes with a minimum of effort. Further, an exterior light seal is provided in the vicinity of the cassette-receiving chamber, and the loading mechanism also efficiently locates the cassette within the apparatus in a positive operative engagement with interfacing components of the latter.

It should be understood that this invention may be practiced or embodied in still other ways without departing from the spirit or essential character thereof. Hence, the preferred embodiment herein is illustrative and not restrictive, the scope of the invention being indicated by the appended claims and all variations which come with the meaning of the claims are intended to be embraced therein.

What is claimed is:

1. Photographic apparatus for use with a motion picture cassette, said apparatus comprising:

a housing having an opening configured to facilitate the insertion of such cassette into and subsequent removal of such cassette from said apparatus;

a closure member displaceably mounted on said housing for movement between a first position wherein it blocks said opening and a second position wherein it does not block said opening; and

means including a hand engageable member for effecting displacement of said closure member from its said first position and for facilitating carrying of said apparatus, said means displaceably mounted on said housing for movement at least between a first position wherein it effects displacement of said closure member from its said first position and a second position wherein said hand engageable member is accessible for grasping thereof by an operator for carrying of said apparatus.

2. The apparatus of claim 1 including means for latching said closure member in its blocking position across said opening and said means for displacing said closure member being configured for effecting the release of said latching means responsive to location of said displacing means in its said first position.

3. The apparatus of claim 2 wherein said hand engageable member is coupled to the top surface of said housing for providing a fulcrum positioned close to a vertical plane of said housing which passes near the center of gravity of said apparatus.

4. The apparatus of claim 1 wherein said displacing means is a U-shaped member comprising a centrally located hand grip portion and a pair of lever members depending in spaced parallel relation therefrom, and said lever members are pivotally coupled at their distal ends to the top surface of said housing for displacement of said hand grip portion between a first position wherein it is spaced from said top surface and a second position wherein it is disposed in close proximity to said top surface.

5. The apparatus of claim 1 including means for latching said closure member in its said first position, said latching means displaceably mounted on said housing for movement between a first position wherein it latches closure member door when it is in its said first position and a second position wherein it releases closure member door from its said first position, and said displacing means configured for engaging said latching means and displacing it to its said second position when said displacing means is moved to its said first position.

6. Photographic apparatus for use with a motion picture cassette, said apparatus comprising:

a housing having an opening configured to facilitate the insertion of such cassette into and subsequent removal of such cassette from said apparatus;

first means, displaceably mounted on said housing for movement between a first and a second position, for receiving such cassette when said means is in its said first position and for positioning such cassette within said apparatus when said first means is displaced to its said second position; and

second means including a hand engageable member for effecting displacement of said first means from its said second position and for facilitating carrying of the apparatus, said second means displaceably mounted on said housing for movement at least between a first position wherein it effects displacement of said first means from its said first position and a second position wherein said hand engageable portion is accessible for grasping thereof by an operator for carrying of said apparatus.

7. The apparatus of claim 6 wherein said first means comprises a guide member displaceably mounted on said housing for movement between a first and second position, and said guide member configured to slideably receive such cassette when said member is in its said first position and to carry it within said opening and position it at a predetermined location within said apparatus when said member is displaced to its said second position.

8. The apparatus of claim 7 additionally including means for releasably latching said guide member in its said second position, and said second means being configured to release said latching means when said second means is disposed in its said first position.

* * * * *